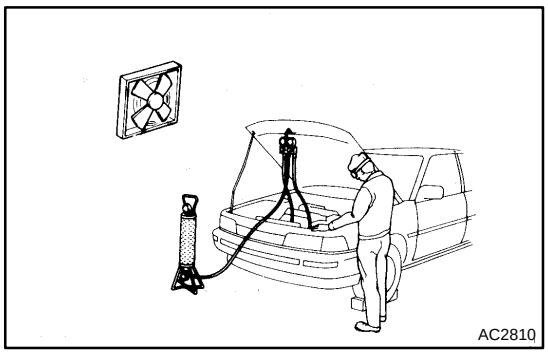

AC2810

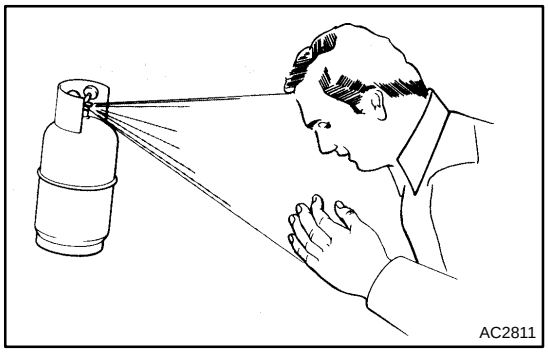
AIR CONDITIONING SYSTEM

AC09C–01

PRECAUTION

1. DO NOT HANDLE REFRIGERANT IN AN ENCLOSED AREA OR NEAR AN OPEN FLAME

2. ALWAYS WEAR EYE PROTECTION


AC2811

3. BE CAREFUL NOT TO GET LIQUID REFRIGERANT IN YOUR EYES OR ON YOUR SKIN

If liquid refrigerant gets in your eyes or on your skin.

(a) Wash the area with lots of cool water.

CAUTION:

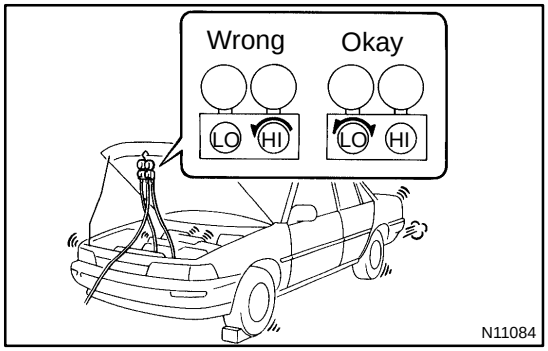
Do not rub your eyes or skin.

(b) Apply clean petroleum jelly to the skin.

(c) Go immediately to a physician or hospital for professional treatment.

4. NEVER HEAT CONTAINER OR EXPOSE IT TO NAKED FLAME

5. BE CAREFUL NOT TO DROP CONTAINER AND NOT TO APPL PHYSICAL SHOCKS TO IT



N11084

6. DO NOT OPERATE COMPRESSOR WITHOUT ENOUGH REFRIGERANT IN REFRIGERANT SYSTEM

If there is not enough refrigerant in the refrigerant system oil lubrication will be insufficient and compressor burnout may occur, so that take care to avoid this, necessary care should be taken.

7. DO NOT OPEN HIGH PRESSURE MANIFOLD VALVE WHILE COMPRESSOR IS OPERATING

If the high pressure valve is opened, refrigerant flows in the reverse direction and could cause the charging cylinder to rupture, so open and close the only low pressure valve.

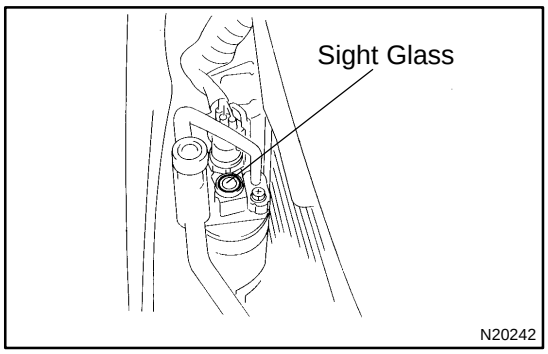
8. BE CAREFUL NOT TO OVERCHARGE SYSTEM WITH REFRIGERANT

If refrigerant is overcharged, it causes problems such as insufficient cooling, poor fuel economy, engine overheating etc.

9. SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The Lexus ES300 is equipped an SRS (Supplemental Restraint System) such as the driver and passenger air bag. Failure to carry out service operations the correct sequence could cause the SRS to unexpectedly deployed during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the SRS, it is possible the SRS may fail to operate when required. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following item carefully, then follow the correct procedure described in the repair manual.

AC2SY–01



ON–VEHICLE INSPECTION

1. INSPECT REFRIGERANT VOLUME

Observe the sight glass on the liquid tube.

Test conditions:

- Running engine at 1,500 rpm
- Blower speed control switch set at ”HI”
- A/C switch ON
- Temperature control set at ”MAX. COOL”
- Fully open doors

Item	Symptom	Amount of refrigerant	Remedy
1	Bubbles present in sight glass	*Insufficient	(1) Check for gas leakage with gas leak detector and repair if necessary (2) Add refrigerant until bubbles disappear
2	No bubbles present i sight glass	None, sufficient or too much	Refer to item 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	(1) Check for gas leakage with gas leak detector and repair if necessary (2) Add refrigerant until bubbles disappear
4	Temperature between compressor inlet and outlet is noticeably different	Correct or too much	Refer to items 5 and 6
5	Immediately after air conditioning is turned off, refrigerant in sight glass stays clear	Too much	(1) Discharge refrigerant (2) Evacuate air and charge proper amount of new refrigerant
6	When air conditioning is turned off, refrigerant foams and then stays clear	Correct	–

HINT:

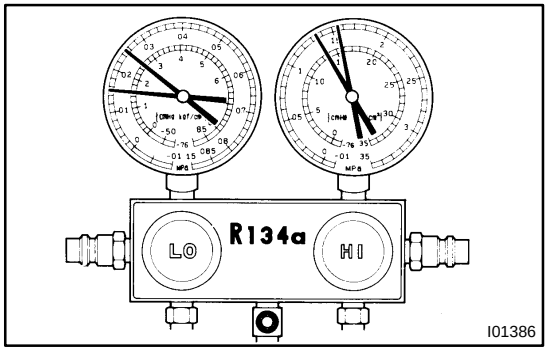
*: Bubbles in the sight glass with ambient temperatures higher than usual can be considered normal if cooling is sufficient.

2. INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET

This is a method in witch the trouble is located by using a manifold gauge set. Read the manifold gauge pressure when the these conditions are established.

Test conditions:

- Temperature at the air inlet with the switch set at RECIRC is 30 – 35 ˚C (86 – 95 ˚F)
- Engine running at 1,500 rpm
- Blower speed control set at ”HI”
- Temperature control set at ”MAX COOL”



(1) Normally functioning refrigeration system

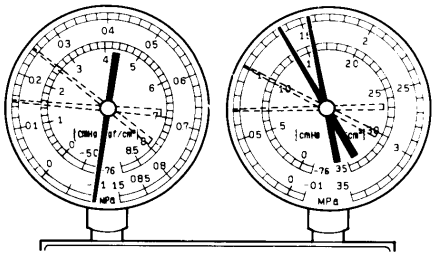
Gauge reading:

Low pressure side: 0.15 – 0.25 MPa (1.5 – 2.5 kgf/cm^2)

High pressure side: 0.15 – 0.25 MPa (1.5 – 2.5 kgf/cm^2)

(2) Moisture present in refrigeration system.

Condition: Periodically cools and then fails to cool

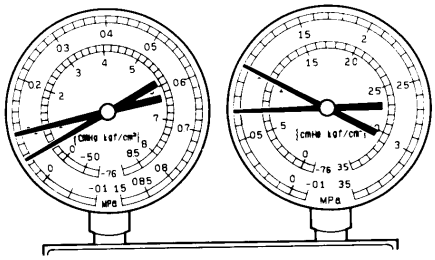


I01387

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
During operation, pressure on low pressure side sometimes become a vacuum and sometime normal	Moisture entered in refrigeration system freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts	• Drier in oversaturated state • Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant	(1) Replace receiver (2) Remove moisture in cycle through repeatedly evacuating air (3) Charge proper amount of new refrigerant

(3) Insufficient cooling

Condition: Insufficient cooling

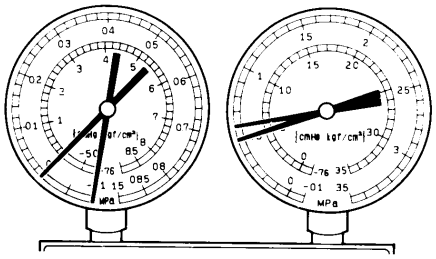


I01388

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure low on both low and high pressure sides • Bubbles seen in sight glass continuously • Insufficient cooling performance	Gas leakage at some place in refrigeration system	• Insufficient refrigerant in system • Refrigerant leaking	(1) Check for gas leakage with gas leak detector and repair if necessary (2) Charge proper amount of refrigerant (3) If indicated pressure value is near 0 when connected to gauge, create the vacuum after inspecting and repairing the location of the leak

(4) Poor circulation of refrigerant

Condition: Insufficient cooling

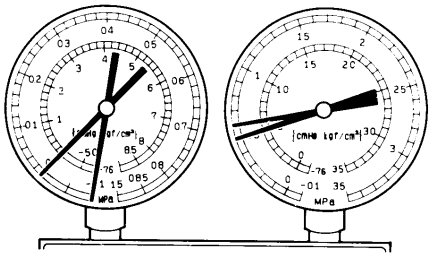


I01389

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure low in both low and high pressure sides • Frost on tube from receiver to unit	Refrigerant flow obstructed by dirt in receiver	Receiver clogged	Replace receiver

(5) Refrigerant does not circulate

Condition: Does not cool (Cools from time to time in some cases)

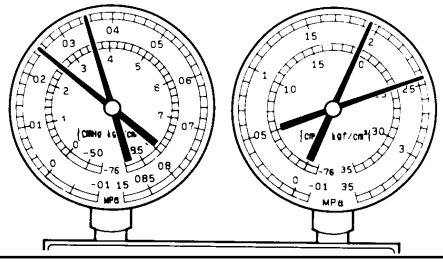


I01449

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Vacuum indicated on low pressure side, very low pressure indicated on high pressure side • Frost or dew seen on piping before and after receiver/ drier or expansion valve	• Refrigerant flow obstructed by moisture or dirt in refrigeration system • Refrigerant flow obstructed by gas leakage from expansion valve	Refrigerant does not circulate	(1) Check expansion valve (2) Clean out dirt in expansion valve by blowing with air (3) Replace receiver (4) Evacuate air and charge new refrigerant to proper amount (5) For gas leakage from expansion valve, replace expansion valve

(6) Refrigerant overcharged or insufficient cooling of condenser

Condition: Insufficient cooling

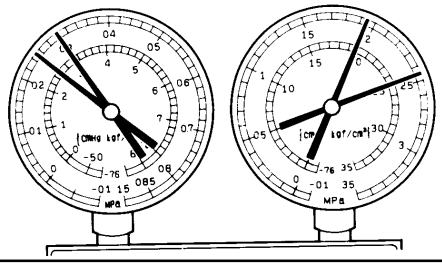


I01390

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure too high on both low and high pressure sides • No air bubbles seen through the sight glass even when the engine rpm is lowered	• Unable to develop sufficient performance due to excessive refrigeration system • Insufficient cooling of condenser	• Excessive refrigerant in cycle → refrigerant over charged • Condenser cooling → condenser fins clogged of condenser fan faulty	(1) Clean condenser (2) Check condenser fan motor operation (3) If (1) and (2) are in normal state, check amount of refrigerant Charge proper amount of refrigerant

(7) Air present in refrigeration system

Condition: Insufficient cooling



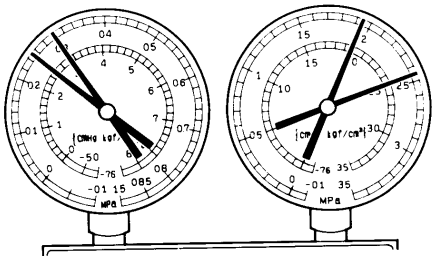
NOTE : These gauge indications are shown when the refrigeration system has been opened and the refrigerant charged without vacuum purging.

I01392

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure too high on both low and high pressure sides • The low pressure piping hot to touch • Bubbles seen in sight glass	Air entered in refrigeration system	• Air present in refrigeration system • Insufficient vacuum purging	(1) Check compressor oil to see if it is dirty or insufficient (2) Evacuate air and charge new refrigerant

(8) Expansion valve improperly

Condition: Insufficient cooling

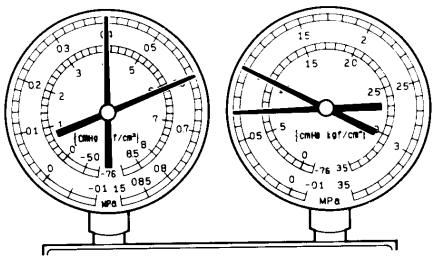


I01450

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure too high on both low and high pressure sides • Frost or large amount of dew on piping on low pressure side	Trouble in expansion valve	• Excessive refrigerant in low pressure piping • Expansion valve opened too wide	Check expansion valve Replace if defective

(9) Defective compression compressor

Condition : Does not cool



I01393

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure too high on low and high pressure sides • Pressure too low on high pressure side	Internal leak in compressor	• Compression defective • Valve leaking or broken sliding parts	Repair or replace compressor

3. INSPECT IDLE–UP SPEED

(a) Warm up engine

(b) Inspect idle–up speed when the these conditions are established.

Test conditions:

- Blower speed control set at ”HI”
- Temperature control set at ”MAX COOL”
- A/C switch ON
- Put gear shift in neutral

Magnetic clutch condition	Idle speed
Magnetic clutch not engaged	700 ± 50 rpm
Magnetic clutch engaged	700 ± 50 rpm

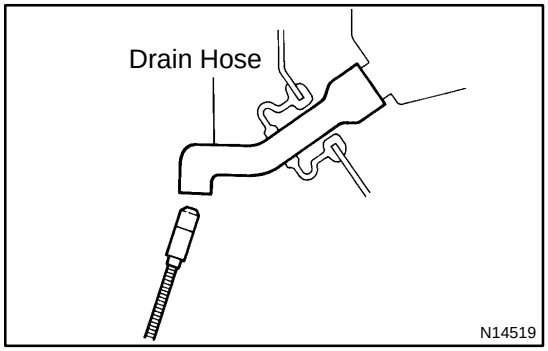
If idle speed is not as specified, check IAC valve and air intake system.

4. INSPECT FOR LEAKAGE OF REFRIGERANT

(a) Perform under these conditions:

- Stop engine
- Secure good ventilation (If not, the gas leak detector may react to volatile gases which are not refrigerant, such as evaporated gasoline or exhaust gas.)
- Repeat the test 2 or 3 times
- Make sure that there is some refrigerant remaining in the refrigeration system.

  When compressor is OFF: Approx. 392 – 588 kPa (4 – 6 kgf/cm^2, 57 – 85 psi)



(b) Bring the gas leak detector close to the drain hose before performing the test.

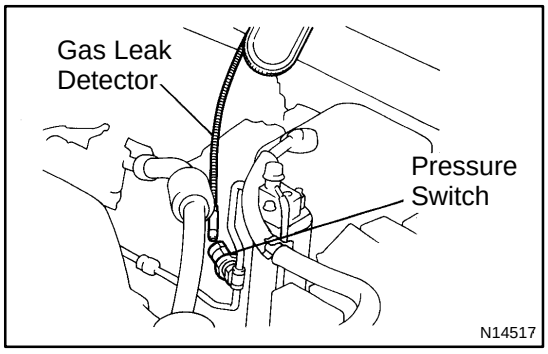
HINT:

- After the blower motor is stopped, leave the A/C unit for more than 15 minutes.
- Expose the gas leak detector sensor the under the drain hose.
- When bring the gas leak detector close to the drain hose, make sure that the gas leak detector does not reach to the volatile gases.

If such reaction is unavoidable, the vehicle must be lifted up.

(c) If gas leak is not detected through the drain hose, remove the blower linear controller from the A/C unit. Then insert the gas leak detector sensor into the unit and perform the test.

(d) Disconnect the connector and leave the pressure switch for approx. 20 minutes. Then bring the gas leak detector close to the pressure switch and perform the test.



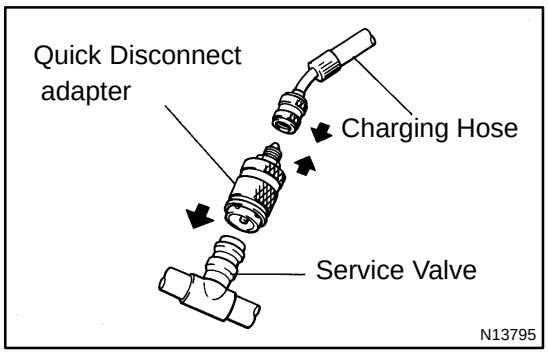
(e) Bring the gas leak detector close to the refrigerant lines and perform the test.

HINT:

Make sure that there is no dirt on joints.

AC09E–01

EVACUATING



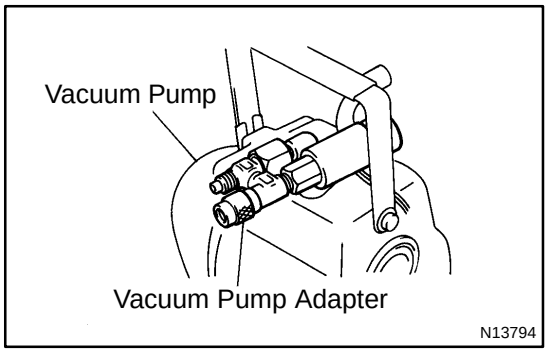
1. CONNECT QUICK DISCONNECT ADAPTER TO CHARGING HOSES

2. REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINES

3. SET ON MANIFOLD GAUGE SET

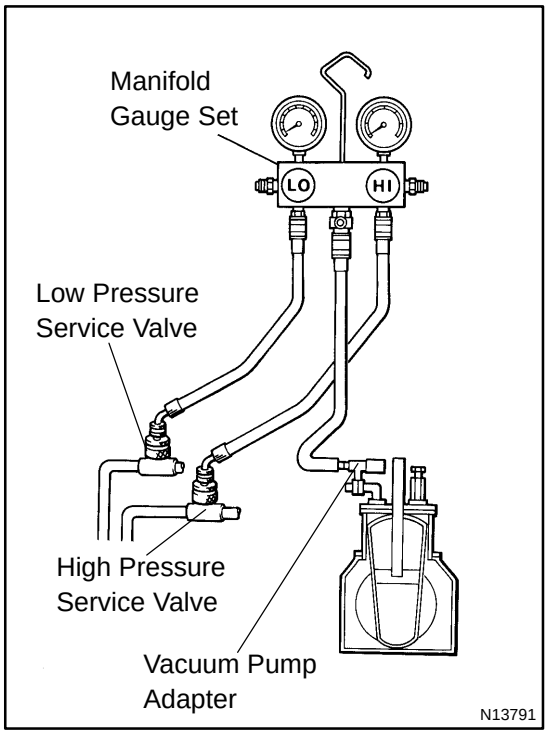
(a) Close both hand valves of manifold gauge set.

(b) Connect the quick disconnect adapter to the service valves.



4. EVACUATE AIR FROM REFRIGERATION SYSTEM

(a) Connect the vacuum pump adapter to the vacuum pump.



(b) Connect the center hose of the manifold gauge set to the vacuum pump adapter.

(c) Open both the high and low hand valves and run the vacuum pump.

(d) After 10 minutes or more, check that the low pressure gauge indicates 750 mmHg (30 in.Hg) or more.

HINT:

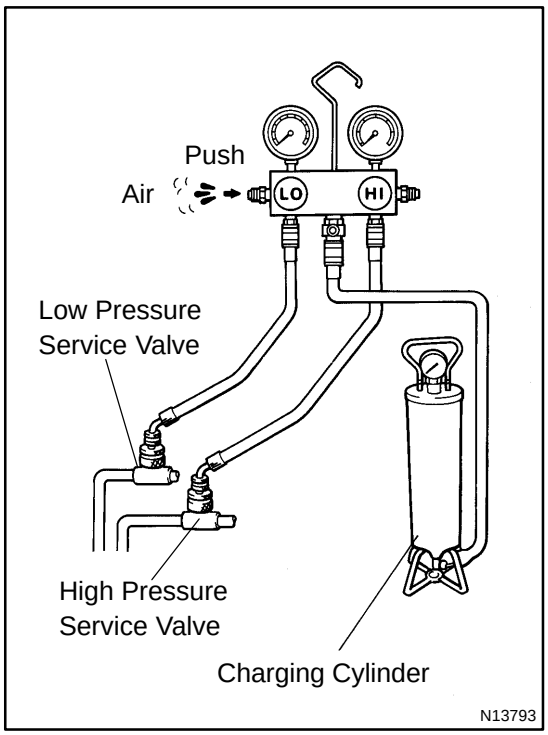
If the reading is not 750 mmHg (30 in.Hg) or more, close both hand valves of manifold gauge set and stop the vacuum pump. Check the system for leaks and repair as necessary.

(e) Close both the high and low hand valves and stop the vacuum pump.

(f) Leave the system in this condition for 5 minutes or more and check that there is no gauge indicator.

AC09F–01

CHARGING



1. INSTALL CHARGING CYLINDER

HINT:

When handling the charging cylinder, always follow the directions given in the instruction manual.

(a) Charge proper amount of refrigerant into the charging cylinder.

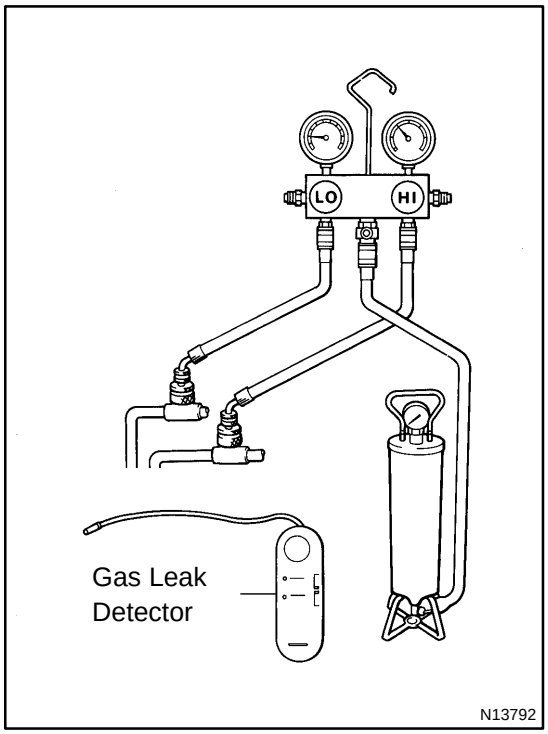
(b) Connect the center hose to the charging cylinder.

CAUTION:

Do not open both high and low pressure hand valves of manifold gauge set.

(c) Open the valve of charging cylinder.

(d) Press the valve core on the side of manifold gauge and expel the air inside of the center hose.



2. INSPECT REFRIGERATION SYSTEM FOR LEAKS

(a) Open the high pressure hand valve and charge refrigerant.

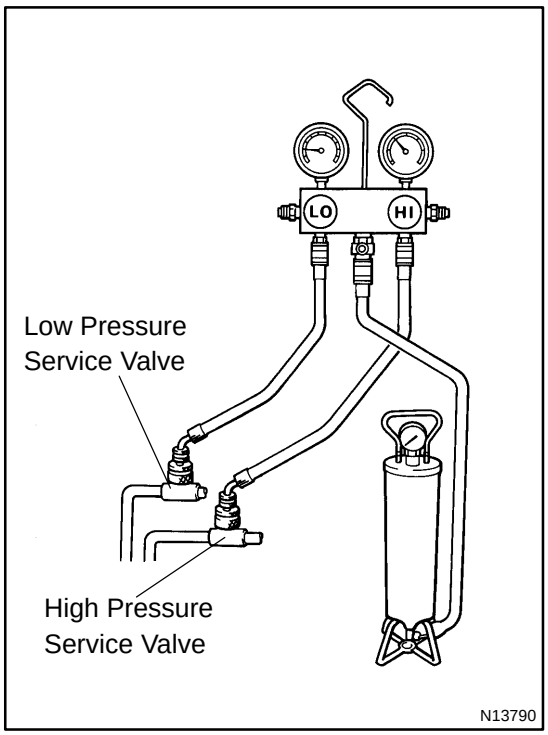
(b) When the low pressure gauge indicates 98 kPa (1 kgf/cm^2, 14 psi), close the high pressure hand valve.

(c) Using a gas leak detector, check the system for leakage.

(d) If leak is found, repair the faulty component or connection.

CAUTION:

Use the refrigerant recovery/ recycling machine to recover the refrigerant whenever replacing parts.



3. CHARGE REFRIGERANT INTO REFRIGERANT SYSTEM

If there is no leak after refrigerant leak check, charge the proper amount of refrigerant into refrigeration system.

CAUTION:

- **Never run the engine when charging system through the high pressure side.**
- **Do not open the low pressure hand valve when the system is being charged with liquid refrigerant.**

(a) Open the high pressure and valve fully.

(b) Charge specified amount of refrigerant, then close the high pressure hand valve.

HINT:

A fully charged system is indicated by the sight glass being free of any bubbles.

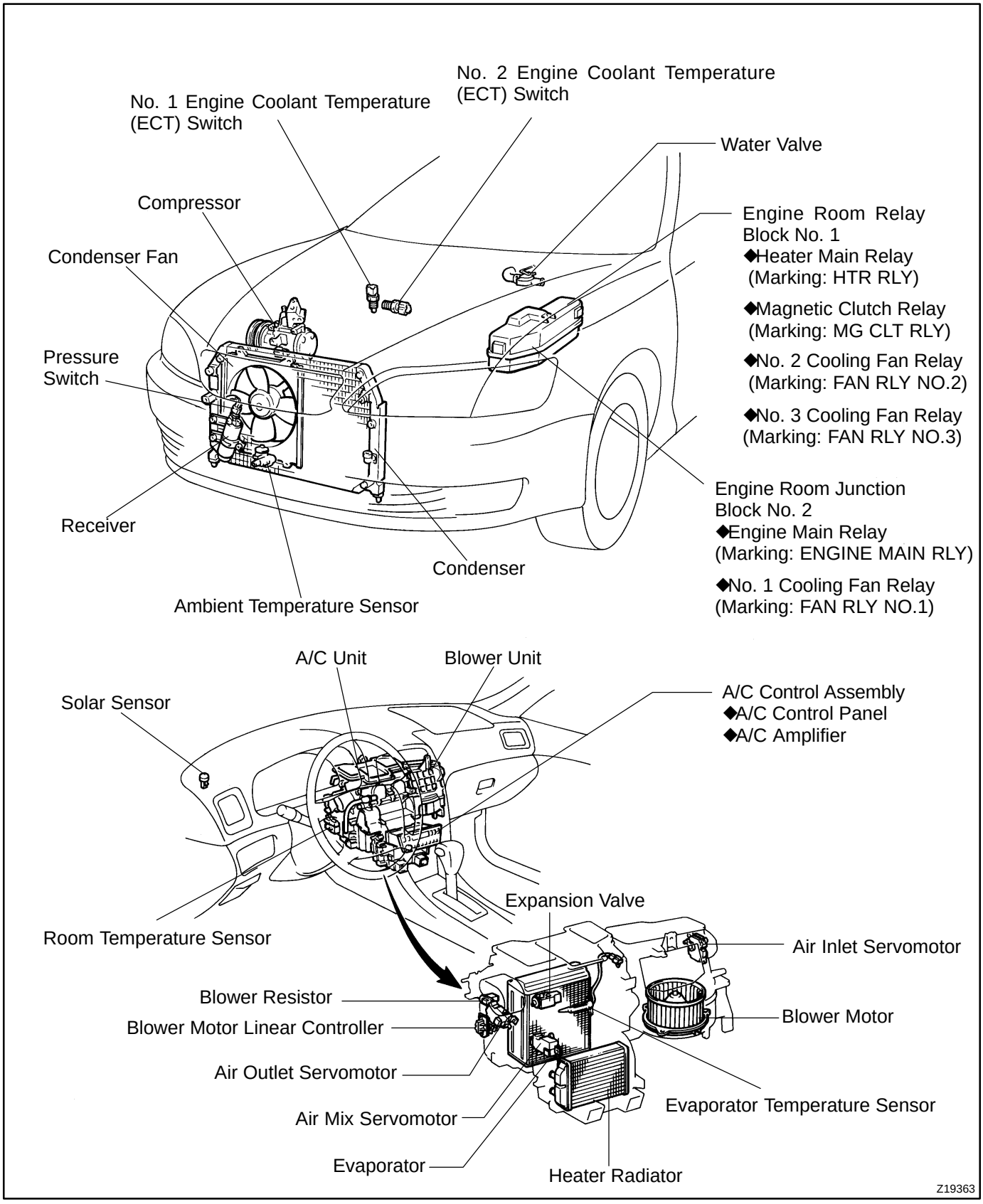
4. SET OFF MANIFOLD GAUGE SET

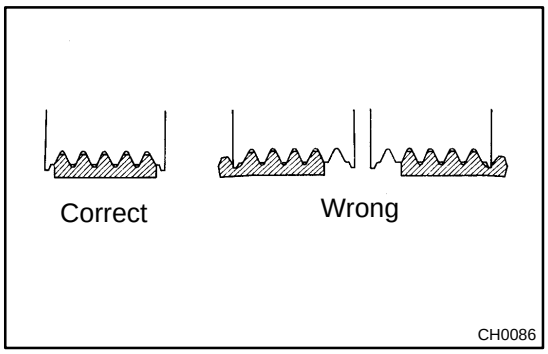
(a) Close both hand valves of manifold gauge set.

(b) Disconnect the quick disconnect adapters from the service valve.

5. INSTALL CAPS TO SERVICE VALVES ON REFRIGERANT LINES

LOCATION


No. 2 Engine Coolant Temperature (ECT) Switch
No. 1 Engine Coolant Temperature (ECT) Switch
Water Valve
Compressor
Engine Room Relay Block No. 1
◆Heater Main Relay (Marking: HTR RLY)
◆Magnetic Clutch Relay (Marking: MG CLT RLY)
◆No. 2 Cooling Fan Relay (Marking: FAN RLY NO.2)
◆No. 3 Cooling Fan Relay (Marking: FAN RLY NO.3)
Condenser Fan
Pressure Switch
Engine Room Junction Block No. 2
◆Engine Main Relay (Marking: ENGINE MAIN RLY)
◆No. 1 Cooling Fan Relay (Marking: FAN RLY NO.1)
Receiver
Condenser
Ambient Temperature Sensor
A/C Unit
Blower Unit
Solar Sensor
A/C Control Assembly
◆A/C Control Panel
◆A/C Amplifier
Expansion Valve
Room Temperature Sensor
Air Inlet Servomotor
Blower Resistor
Blower Motor
Blower Motor Linear Controller
Air Outlet Servomotor
Evaporator Temperature Sensor
Air Mix Servomotor
Evaporator
Heater Radiator
Z19363



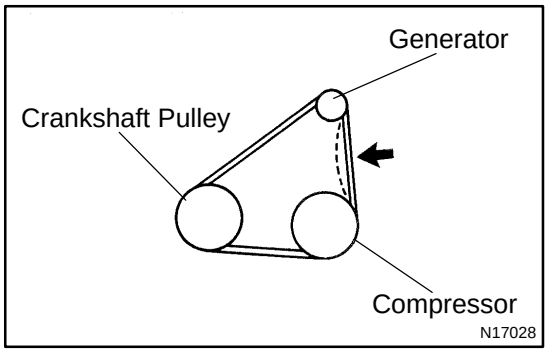
DRIVE BELT

AC09H–01

ON–VEHICLE INSPECTION

1. INSPECT DRIVE BELT'S INSTALLATION CONDITION

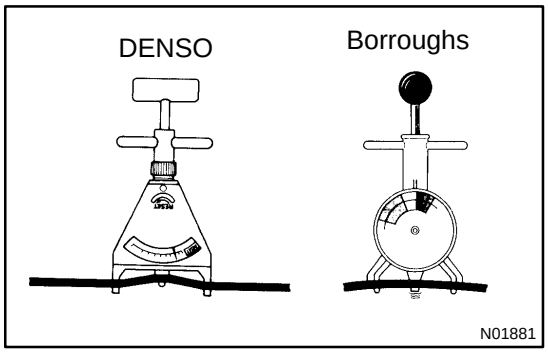
Check that the drive belt fits properly in the ribbed grooves.



2. INSPECT DRIVE BELT TENSION

Using a belt tension gauge, check the drive belt tension.

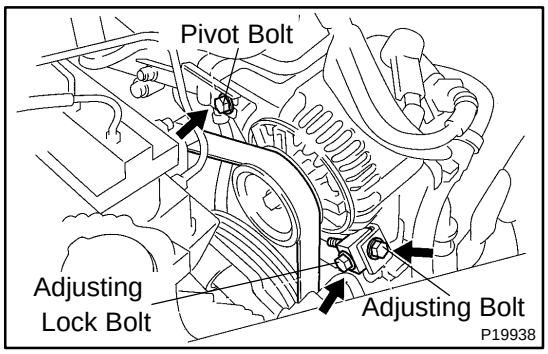
Drive belt tension:
New belt: 165 ± 26 lbf
Used belt: 110 ± 11 lbf



HINT:

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing the drive belt, check that it fits properly in the ribbed grooves.

AC09I–01



REMOVAL

REMOVE DRIVE BELT

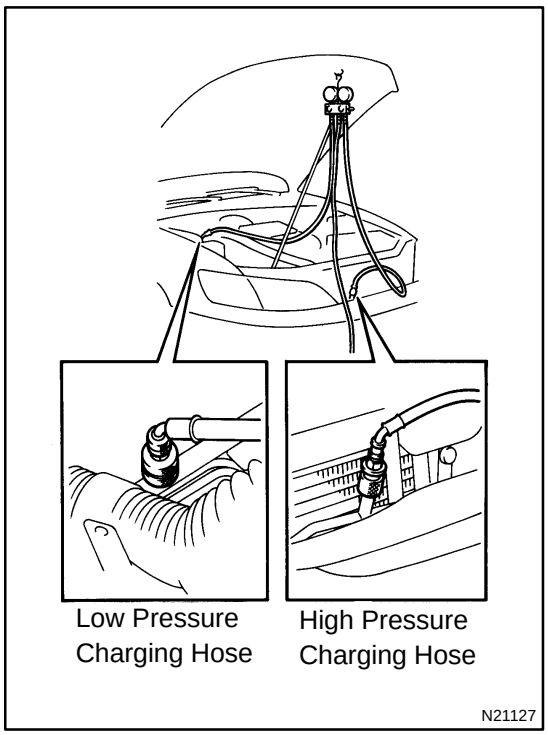
(a) Loosen the pivot bolt and adjusting lock bolt.
Torque:
Pivot bolt: 56 N·m (570 kgf·cm, 41 ft·lbf)
Adjusting lock bolt: 18 N·m (185 kgf·cm, 13 ft·lbf)

(b) Loosen the belt tension by adjusting bolt and remove the drive belt.

AC09J–02

INSTALLATION

Installation is in the reverse order of removal (See page AC–14).



MANIFOLD GAUGE SET

AC09K–01

SET ON

1. CONNECT CHARGING HOSES TO MANIFOLD GAUGE SET

Tighten the nuts by hand.

CAUTION:

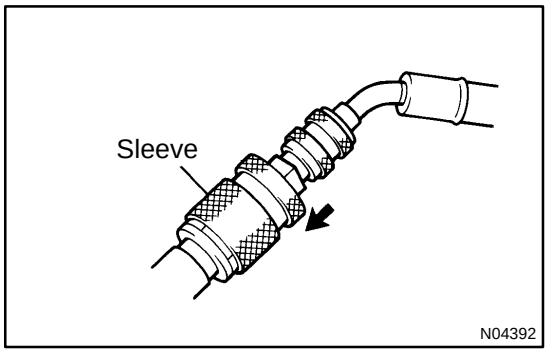
Do not connect the wrong hoses.

2. CONNECT QUICK DISCONNECT ADAPTERS TO CHARGING HOSES

Tighten the nuts by hand.

3. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET

4. REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINE

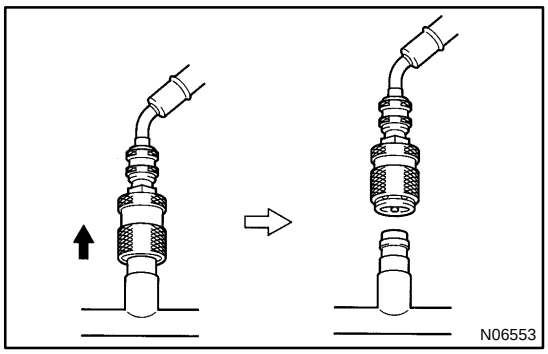


5. CONNECT QUICK DISCONNECT ADAPTERS TO SERVICE VALVES

HINT:

Push the quick disconnect adapter onto the service valve, then slide the sleeve of the quick disconnect adapter downward to lock it.

AC09L–01



SET OFF

1. **CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET**
2. **DISCONNECT QUICK DISCONNECT ADAPTERS FROM SERVICE VALVES ON REFRIGERANT LINE**

HINT:

Slide the sleeve of the quick disconnect adapter upward to unlock the adapter and remove it from the service valve.

3. **INSTALL CAPS TO SERVICE VALVES ON REFRIGERANT LINE**

REFRIGERANT LINE

AC09M–01

ON–VEHICLE INSPECTION

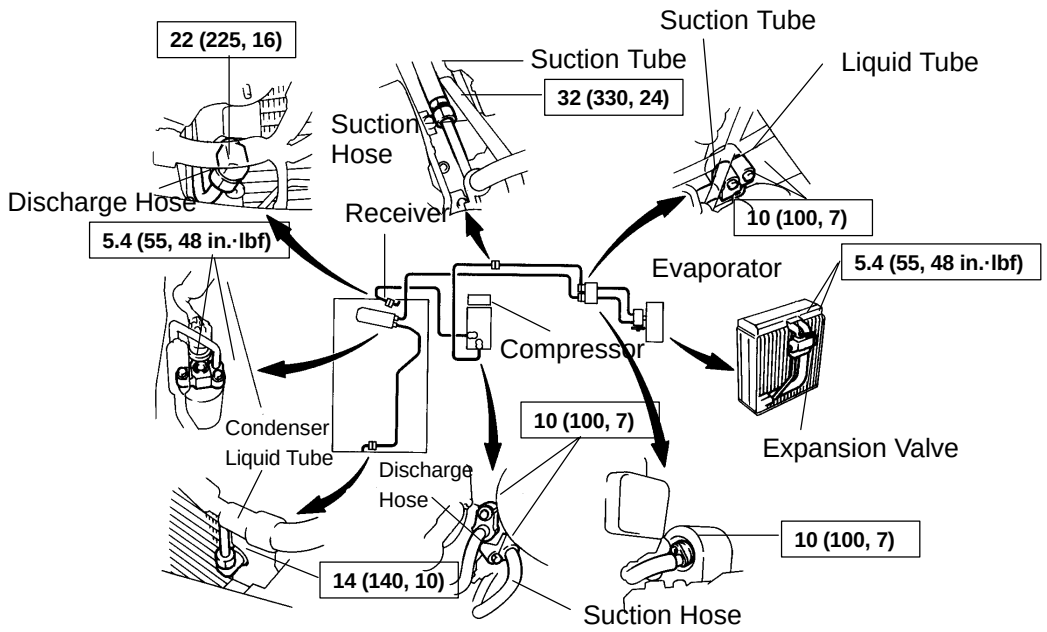
1. INSPECTION HOSE AND TUBE CONNECTIONS FOR LOOSENESS

2. INSPECT HOSES AND TUBES FOR LEAKAGE

Using a gas leak detector, check for leakage of refrigerant.

AC09N–02

LOCATION



AC09O–02

REPLACEMENT

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

2. REPLACE FAULTY TUBE OR HOSE

NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

3. TIGHTEN JOINT OF BOLT OR NUT TO SPECIFIED TORQUE

NOTICE:

Connections should not be torqued tighter than the specified torqued.

Part tightened	N·m	kgf·cm	ft·lbf
Receiver x Liquid tube	5.4	55	48 in.·lbf
Condenser x Discharge hose	22	225	16
Condenser x Liquid tube	14	140	10
Compressor x Discharge hose	10	100	7
Compressor x Suction hose	10	100	7
A/C unit x Liquid and Suction tube	10	100	7
Evaporator x Expansion valve	5.4	55	48 in.·lbf
Liquid line (Block joint)	10	100	7
Suction line (Block joint)	10	100	7
Suction line (Piping joint)	32	330	24

4. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount: 800 ± 50 g (28.22 ± 1.76 oz.)

5. INSPECT FOR LEAKAGE OF REFRIGERANT

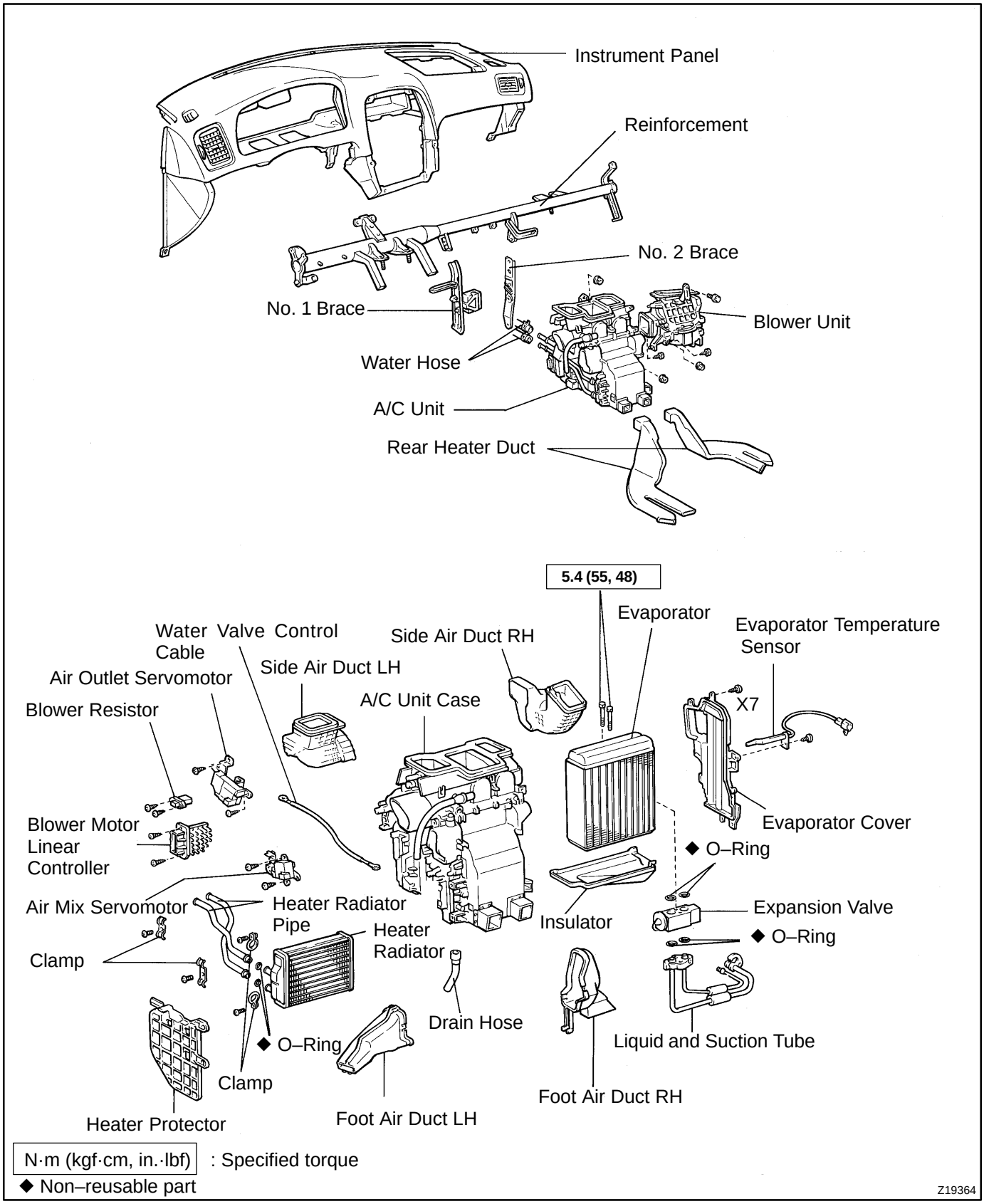
Using a gas leak detector, check for leakage of refrigerant.

6. INSPECT AIR CONDITIONING OPERATION

AIR CONDITIONING UNIT

AC09P–03

COMPONENTS



AC09Q–01

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:

At the time of the installation, please refer to the following item.

Evacuate air from refrigeration system.

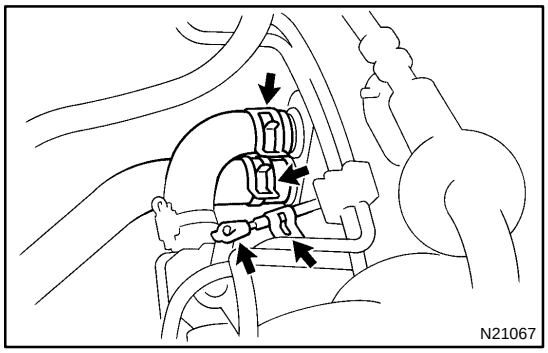
Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 800 ± 50 g (28.22 ± 1.76 oz.)

2. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all the coolant.



3. DISCONNECT WATER VALVE CONTROL CABLE FROM WATER VALVE

HINT:

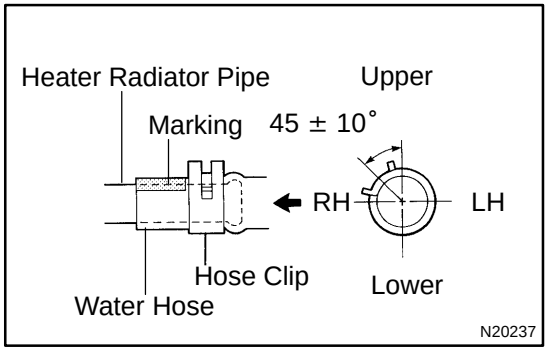
At the in time of the installation, please refer to the following item.

For installing the control cable, refer to ”INSTALLATION” of ”WATER VALVE” on page AC–60.

4. DISCONNECT WATER HOSES FROM HEATER RADIATOR PIPES

(a) Using pliers, grip the claw of the hose clip and slide the hose clip along the hose.

(b) Disconnect the water hoses.



HINT:

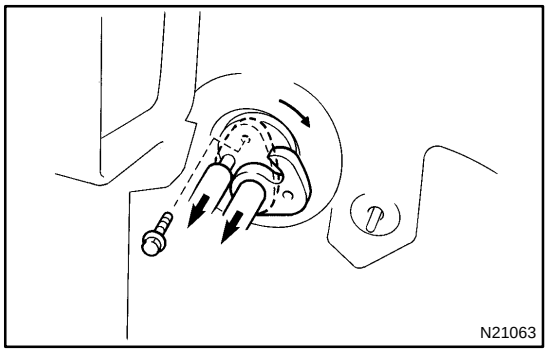
At the time of the installation, please refer to the following items.

- Push the water hose onto the heater radiator pipe as far as the pipe grommet and install the hose clip.
- Install the hose clip in a position, as shown in the illustration.

5. REMOVE THESE PARTS:

(a) Blower unit (See page AC–29)

(b) Instrument panel and reinforcement (See page BO–82)



6. DISCONNECT LIQUID AND SUCTION TUBES

Remove the bolt and slide the plate, then disconnect both tubes.

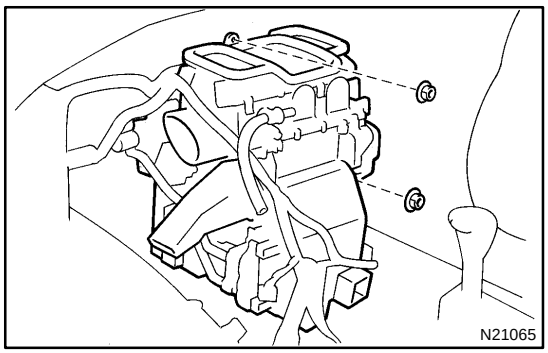
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

HINT:

At the time of the installation, please refer to the following item. Lubricate 2 new O–rings with compressor oil and install the tubes.



7. REMOVE A/C UNIT

(a) Slide the floor carpet backward.

(b) Remove the rear heater ducts.

(c) Disconnect the connectors.

(d) Remove the 2 nuts and A/C unit.

AC09R–01

DISASSEMBLY

1. REMOVE THESE PARTS:

(a) Side air ducts LH, RH

(b) Foot air ducts LH, RH

2. REMOVE EVAPORATOR TEMP. SENSOR

Remove the screw and pull out the sensor.

3. REMOVE EVAPORATOR

(a) Remove the 6 screws and evaporator cover.

HINT:

At the time of reassembly, please refer to the following item.

Do not reuse the evaporator cover.

(b) Pull out the evaporator.

HINT:

At the time of reassembly, please refer to the following item.

If evaporator is replaced, add compressor oil to evaporator.

Add 40 cc (1.4 fl.oz.)

Compressor oil: ND–OIL 8 or equivalent

4. REMOVE EXPANSION VALVE

Using a hexagon wrench, remove the 2 bolts and separate the evaporator and expansion valve.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

HINT:

At the time of reassembly, please refer to the following item.

Lubricate 4 new O–rings with compressor oil and install the valve.

5. REMOVE AIR MIX SERVOMOTOR

(a) Remove the 3 screws and servomotor.

(b) Remove the water valve control cable from the servomotor.

6. REMOVE AIR OUTLET SERVOMOTOR

Remove the 2 screws and servomotor.

7. REMOVE HEATER RADIATOR

(a) Release the 3 claws and remove the heater protector.

(b) Remove the 2 screws and 2 clamps, then pull out the heater radiator.

(c) Remove the 2 screws, 2 clamps and heater radiator pipes from the heater radiator.

8. REMOVE BLOWER RESISTOR

(a) Disconnect the connector.

(b) Remove the 2 screws and blower resistor.

9. REMOVE BLOWER MOTOR LINEAR CONTROLLER

(a) Disconnect the connector.

(b) Remove the 2 screws and blower motor linear controller.

10. REMOVE WIRE HARNESS

Release the claw and remove the wire harness.

AC09T–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC–25).

AC09S–01

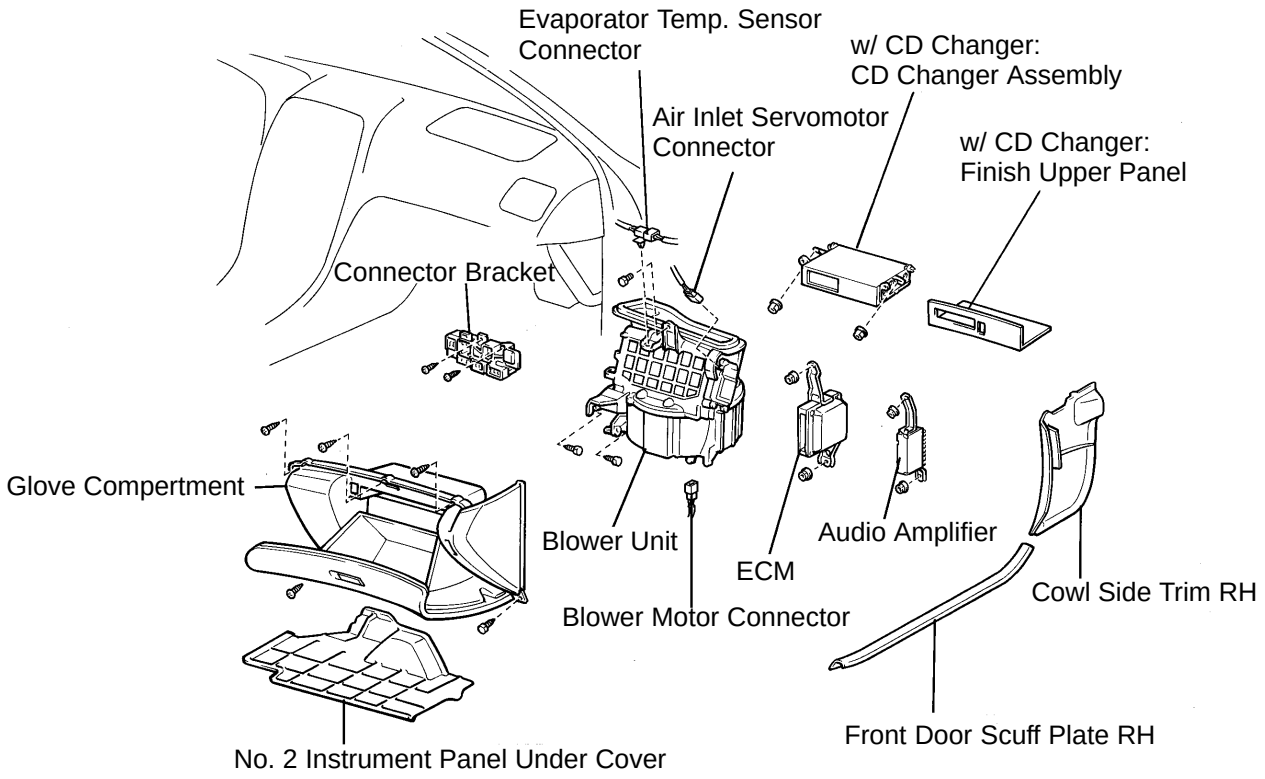
INSTALLATION

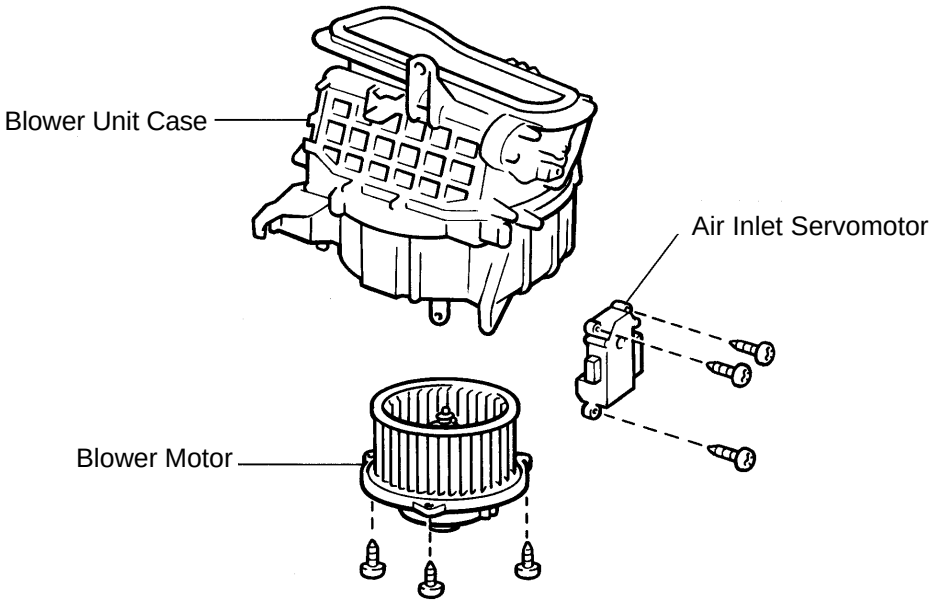
Installation is in the reverse order of removal (See page AC–23).

BLOWER UNIT

AC09U–02

COMPONENTS





Z19365

AC09V–02

REMOVAL

1. REMOVE THESE PARTS:

(a) Cowl side trim RH
(b) Front door scuff plate RH
(c) No.2 instrument panel under cover
(d) Glove Compartment
(e) w/ CD Changer:
Finish upper panel
(f) w/ CD Changer:
CD change assembly
(g) Audio amplifier
(h) ECM

2. REMOVE CONNECTOR BRACKET SET SCREWS

3. REMOVE BLOWER UNIT

(a) Disconnect the connectors from blower unit.
(b) Disconnect the wire harness clamps.
(c) Disconnect the evaporator temp. sensor connector clamp.
(d) Remove the 2 screws, bolt and nut, then remove the blower unit.

AC09W–01

DISASSEMBLY

1. REMOVE BLOWER MOTOR

Remove the 3 screws and blower motor.

2. REMOVE AIR INLET SERVOMOTOR

Remove the 3 screws and servomotor.

AC09X–02

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC–30).

AC09Y–02

INSTALLATION

Installation is in the reverse order of removal (See page AC–29).

COMPRESSOR AND MAGNETIC CLUTCH

AC09Z–01

ON–VEHICLE INSPECTION

1. INSPECT COMPRESSOR FOR METALLIC SOUND

(a) Start the engine.

(b) Check if there is metallic sound from the compressor when the A/C switch is on.

If metallic sound is heard, replace the compressor assembly.

2. INSPECT REFRIGERANT PRESSURE

(See page AC–3)

3. INSPECT VISUALLY FOR LEAKAGE OF REFRIGERANT FROM SAFETY SEAL

Using a gas leak detector, check for leakage of refrigerant.

If there is any leakage, replace the compressor assembly.

4. INSPECT COMPRESSOR LOCK SENSOR

(See page DI–552)

5. MAKE THESE VISUAL CHECKS:

(a) Leakage of grease from the clutch bearing.

(b) Signs of oil on the pressure plate or rotor.

If necessary, repair or replace.

6. INSPECT MAGNETIC CLUTCH BEARING FOR NOISE

(a) Start the engine.

(b) Check for abnormal noise from near the compressor when the A/C switch is OFF.

If abnormal noise is being emitted, replace the magnetic clutch.

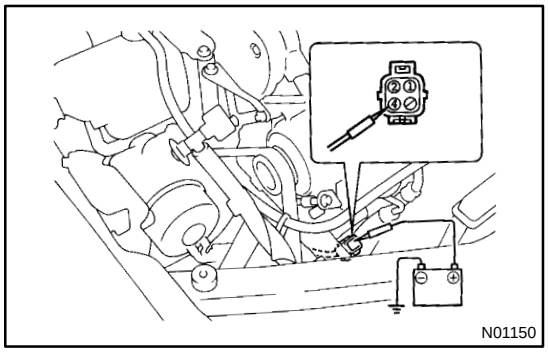
7. INSPECT MAGNETIC CLUTCH

(a) Disconnect the connector from the magnetic clutch.

(b) Connect the positive (+) lead from the battery to the terminal 4 and the negative (–) lead to the body ground.

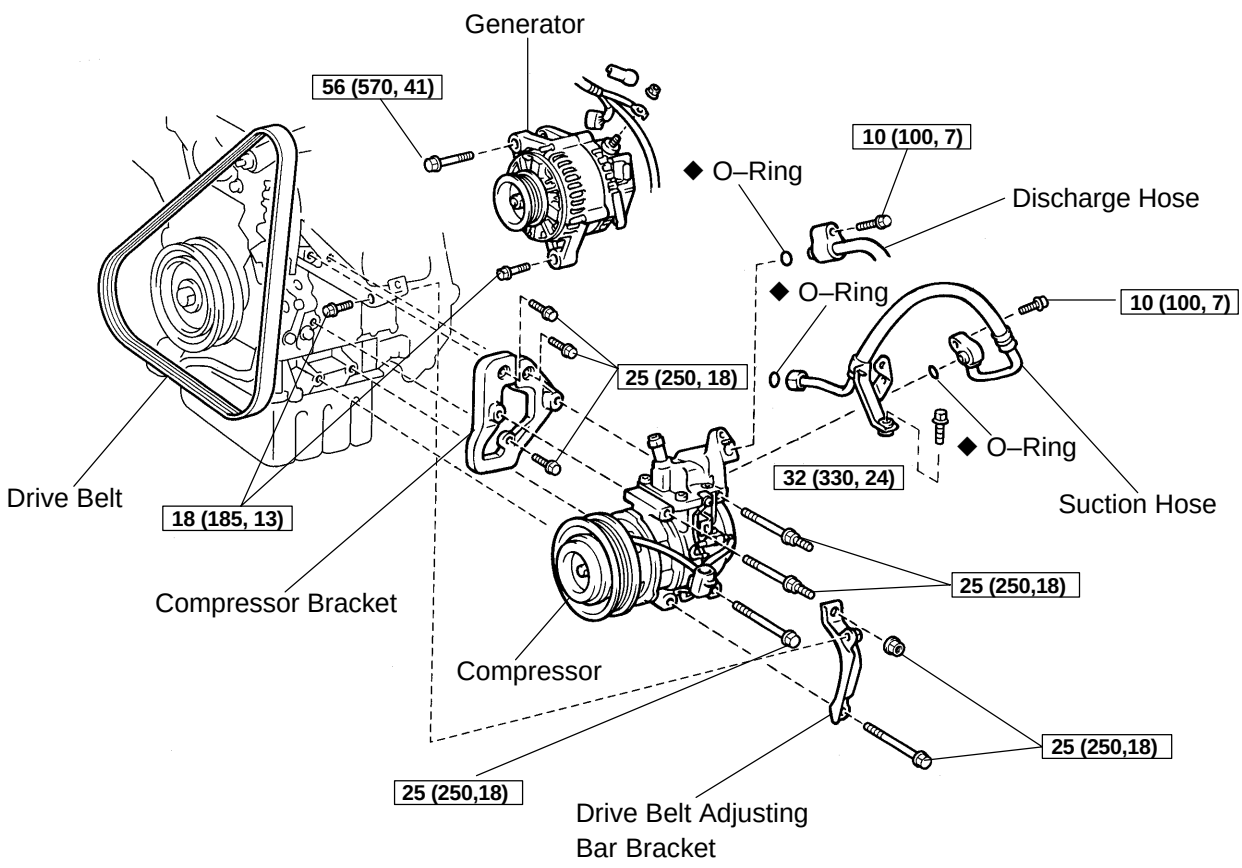
(c) Check that the magnetic clutch is energized.

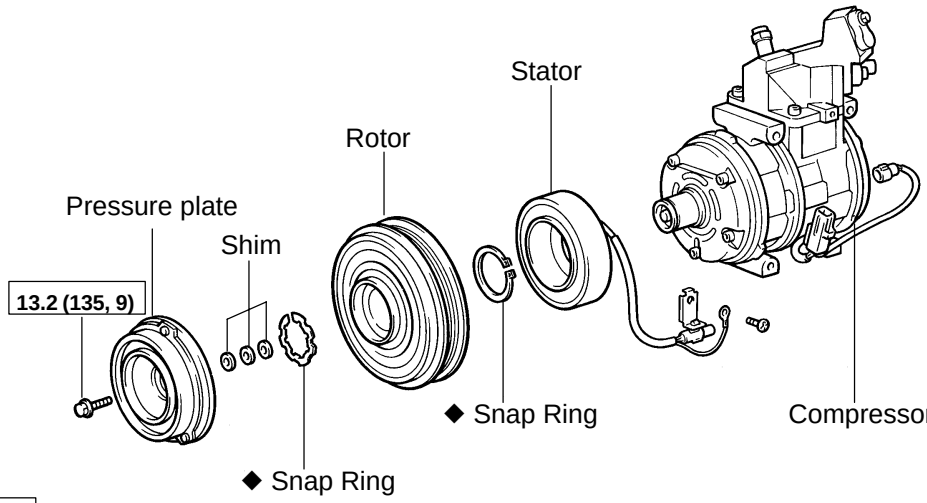
If operation is not as specified, replace the magnetic clutch.



AC0A0–01

COMPONENTS





N·m (kgf·cm, ft·lbf) : Specified torque

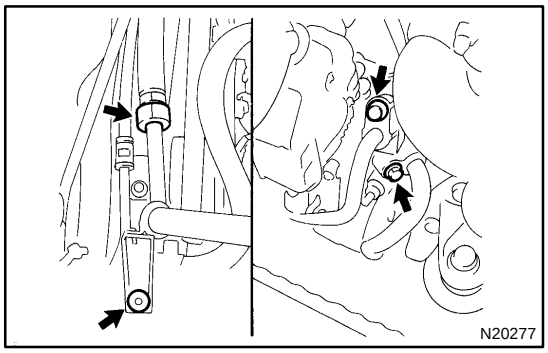
◆ Non–reusable part

I01448

AC0A1–01

REMOVAL

1. **RUN ENGINE AT IDLE SPEED WITH A/C ON FOR APPROX.10 MINUTES**
2. **STOP ENGINE**
3. **DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM BATTERY**
4. **DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM**
5. **REMOVE DRIVE BELT**
   (See page AC–15)


N20277

6. REMOVE SUCTION HOSE

(a) Remove the suction hose clamping bolt.

(b) Disconnect the wire harness clamp.

(c) Loosen the nut and bolts and remove the suction hose.

NOTICE:

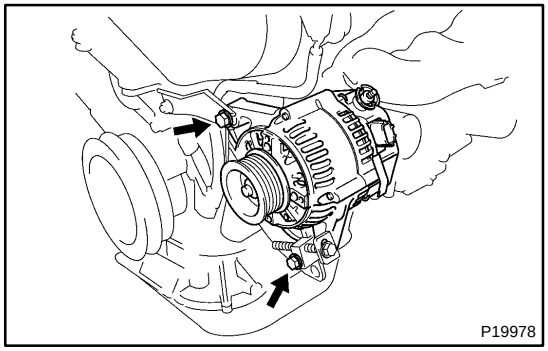
Cap the open fittings immediately to keep moisture or dirt out of the system.

7. DISCONNECT DISCHARGE HOSE

Remove the bolt and disconnect the hose.

NOTICE:

Cap the open fitting immediately to keep moisture or dirt out of the system.


P19978

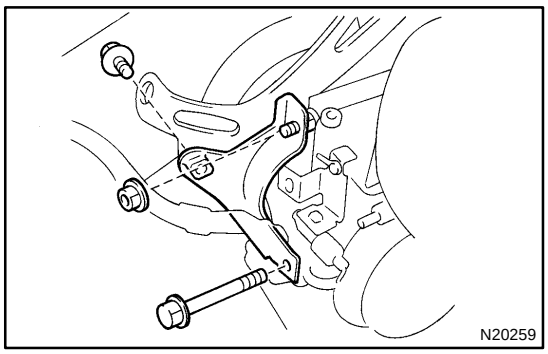
8. REMOVE GENERATOR

(a) Disconnect the generator connector.

(b) Remove the nut, and disconnect the generator wire.

(c) Disconnect the wire harness from the clip.

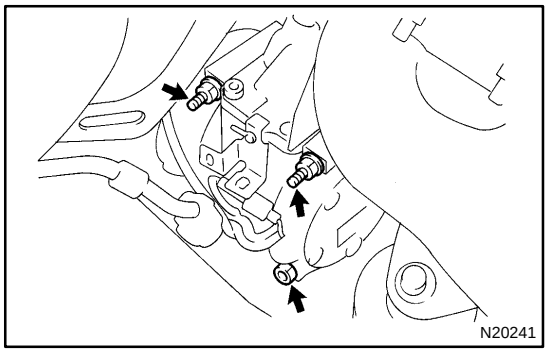
(d) Remove the pivot bolt, plate washer, adjusting lock bolt and generator.



9. REMOVE COMPRESSOR

(a) Disconnect the connector.

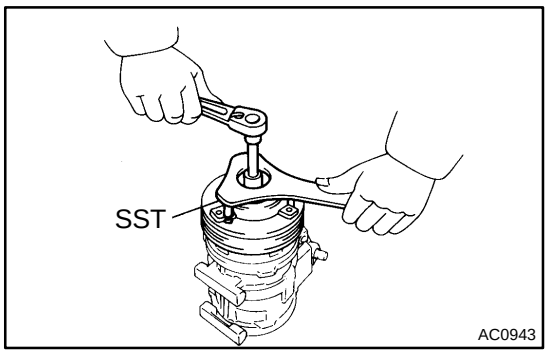
(b) Remove the 2 bolts, nut and generator drive belt adjusting bar bracket.



(c) Remove the 3 bolts and compressor.

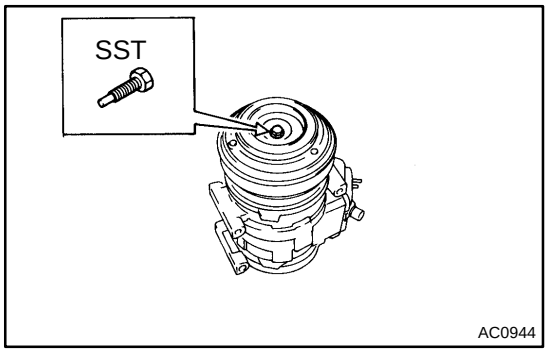
AC0A2–03

DISASSEMBLY

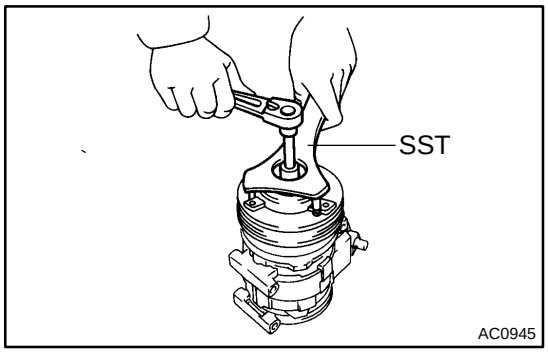


1. REMOVE PRESSURE PLATE

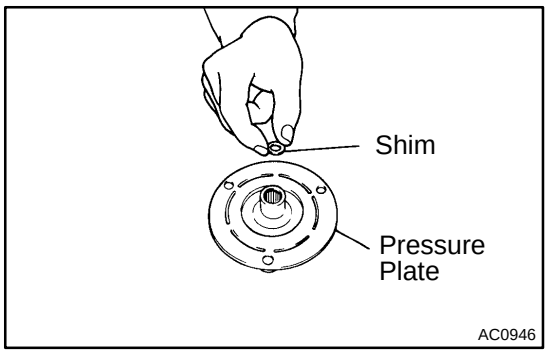
(a) Using SST and a socket wrench, remove the shaft bolt.
Torque: 13.2 N·m (135 kgf·cm, 9 ft·lbf)
SST 07112–76060



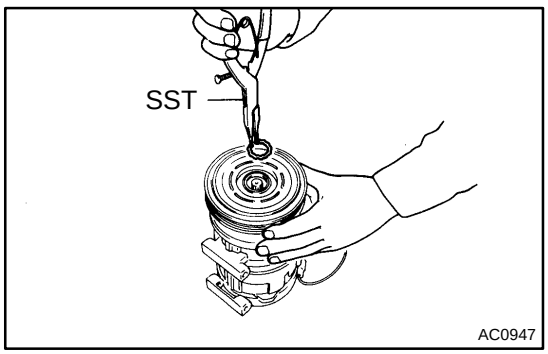
(b) Install SST on the pressure palate.
SST 07112–66040



(c) Using SST and socket wrench, remove the pressure plate.
SST 07112–76060

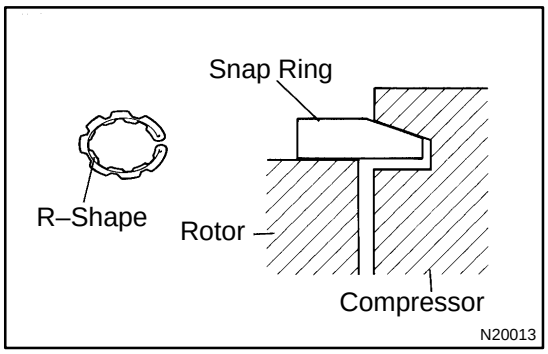


(d) Remove the shims from the pressure palate.

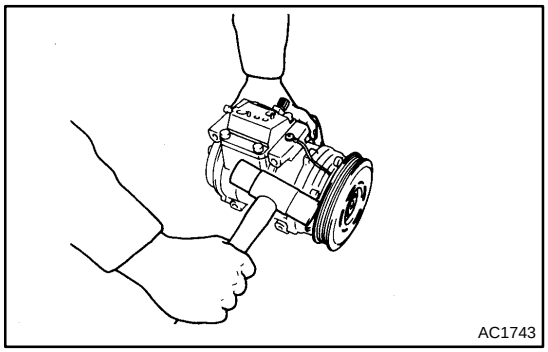


2. REMOVE ROTOR

(a) Using SST, remove the snap ring.
SST 07114–84020

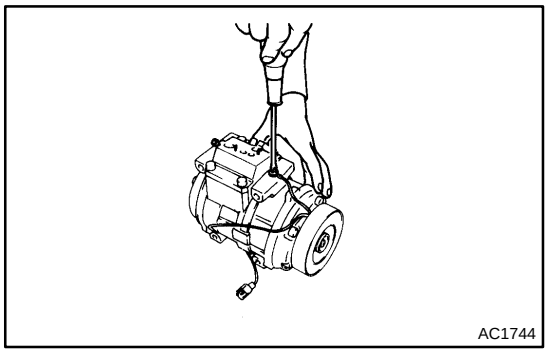


NOTICE:
At the time of reassembly, please refer to the following item.
The snap ring should be installed so that beveled side faces up.



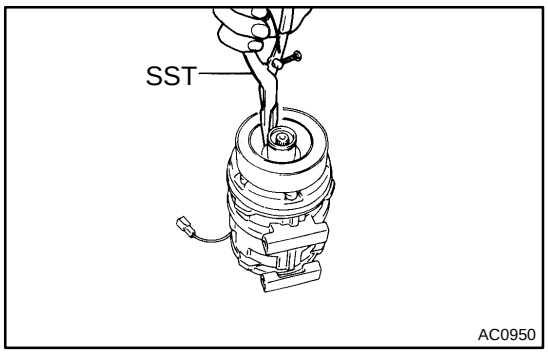
(b) Using a plastic hammer, tap the rotor off the shaft.

NOTICE:
Be careful not to damage the pulley when tapping on the rotor.

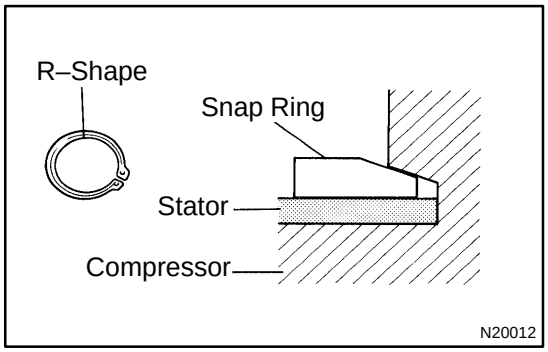


3. REMOVE STATOR

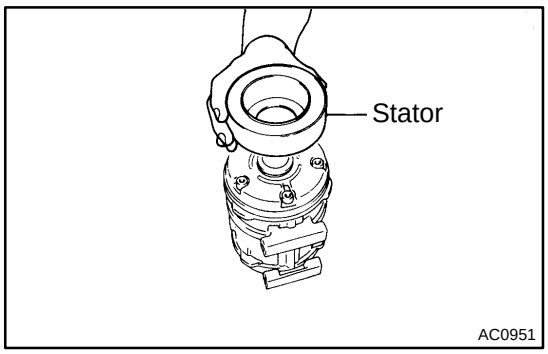
(a) Disconnect the stator lead wire from the compressor housing.



(b) Using SST, remove the snap ring.
SST 07114–84020

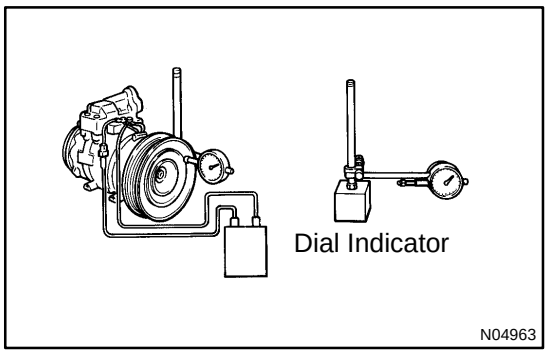


NOTICE:
At the time of reassembly, please refer to the following item.
The snap ring should be installed so that its beveled side faces up.



(c) Remove the stator.

AC0A3–03



REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC–37).

CHECK CLEARANCE OF MAGNETIC CLUTCH

HINT:

After reassembly, check the magnetic clutch clearance.

(a) Set the dial indicator to the pressure plate of the magnetic clutch.

(b) Connect the magnetic clutch lead wire to the positive (+) terminal of the battery.

(c) Check the clearance between the pressure plate and rotor when connecting the negative (–) terminal battery.

Standard clearance:

0.5 ± 0.15 mm (0.020 ± 0.0059 in.)

If the clearance is not within the standard clearance, adjust the clearance using shims to obtain the standard clearance.

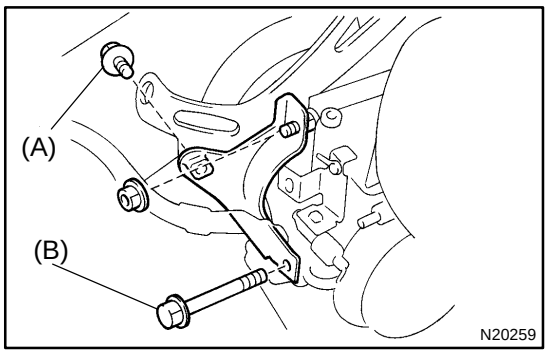
Shim thickness:

0.1 mm (0.004 in.)

0.3 mm (0.012 in.)

0.5 mm (0.020in.)

AC0A4–03



INSTALLATION

1. INSTALL COMPRESSOR

(a) Install the compressor with 3 bolts.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

(b) Install the generator drive belt adjusting bar bracket with 2 bolts and a nut.
Torque:
Bolt (A): 18 N·m (185 kgf·cm, 13 ft·lbf)
Bolt (B): 25 N·m (250 kgf·cm, 18 ft·lbf)
Nut: 25 N·m (250 kgf·cm, 18 ft·lbf)

2. INSTALL GENERATOR

(a) Mount generator on the generator bracket with the pivot bolt and adjusting lock bolt. Do not tighten the bolts yet.

(b) Connect the generator connector.

(c) Connect the generator wire with the nut.

3. CONNECT DISCHARGE HOSE
Torque:10 N·m (100 kgf·cm, 7 ft·lbf)

NOTICE:
Hoses should be connected immediately after the caps have been removed.

HINT:
Lubricate a new O–ring with compressor oil and install the tube.

4. INSTALL SUCTION HOSE

(a) Install the suction hose and tighten the bolt and nut.
Torque:
Piping joint: 32 N·m (330 kgf·cm, 24 ft·lbf)
Block joint: 10 N·m (100 kgf·cm, 7 ft·lbf)

HINT:
Lubricate 2 new O–rings with the compressor oil and install the hose.

(b) Install the suction hose clamping bolt.

(c) Connect the wire harness clamp.

5. INSTALL DRIVE BELT
(See page AC–16)

6. INSPECT DRIVE BELT
(See page AC–14)

7. CONNECT NEGATIVE (–) TERMINAL CABLE TO BATTERY

8. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT
Specified amount: 800 ± 50 g (28.22 ± 1.76 oz.)

9. INSPECT FOR LEAKAGE OF REFRIGERANT
Using a gas leak detector, check for leakage of refrigerant.
If there is leakage, check the tightening torque at the joints.

10. INSPECT A/C OPERATION

RECEIVER

AC0A7–01

ON–VEHICLE INSPECTION

INSPECT FITTINGS FOR LEAKAGE

Using a gas leak detector, check for leakage.
If there is leakage, check the tightening torque at the joints.

AC0A6–01

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:

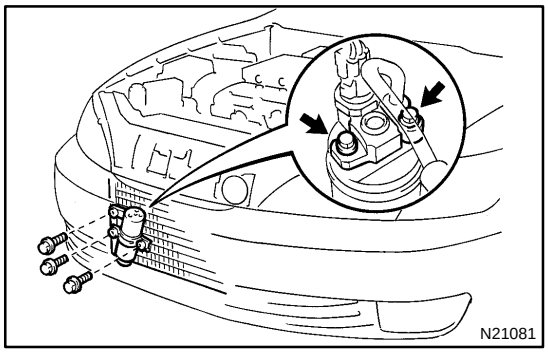
At the time of installation, please refer to the following item.

Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 800 ± 50 g (28.22 ± 1.76 oz.)

2. REMOVE RADIATOR UPPER SUPPORT SEAL



3. DISCONNECT 2 LIQUID TUBES FROM RECEIVER

Remove the 2 bolts and both tubes.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

HINT:

At the time of installation, please refer to the following item.

Lubricate 2 new O–rings with compressor oil and install the tubes.

4. REMOVE RECEIVER

(a) Remove the holder bolt and pull out receiver downward.

HINT:

At the time of installation, please refer to the following item.

If receiver is replaced, add compressor oil to receiver.

Add 20 cc (0.71 fl.oz.)

Compressor oil: ND–OIL 8 or equivalent

(b) Remove the 2 bolts and holder.

AC0A5–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–43).

CONDENSER

AC0A8–01

ON–VEHICLE INSPECTION

1. INSPECT CONDENSER FINS FOR BLOCKAGE OR DAMAGE

If the fins are clogged, wash them with water and dry with compressed air.

NOTICE:

Be careful not to damage the fins.

If the fins are bent, straighten them with a screwdriver or pliers.

2. INSPECT CONDENSER AND FITTINGS FOR LEAKAGE

Using a gas leak detector, check for leakage of refrigerant.

If there is leakage, check the tightening torque at the joints.

AC0A9–02

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

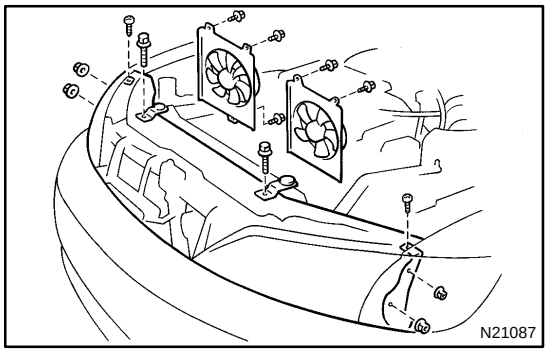
HINT:

At the time of installation, please refer to the following item.

Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 800 ± 50 g (28.22 ± 1.76 oz.)



2. REMOVE THESE PARTS:

(a) Radiator upper support seal

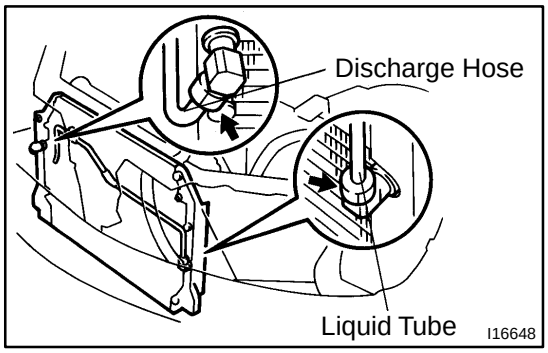
(b) Receiver and holder
(See page AC–43)

(c) Radiator upper support

(d) Clearance lights

(e) Headlights

(f) Radiator fan and condenser fan



3. DISCONNECT DISCHARGE HOSE

Loosen the nut and disconnect the discharge hose.

Torque: 22 N·m (225 kgf·cm, 16 ft·lbf)

NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

HINT:

At the time of installation, please refer to the following item

Lubricate a new O–ring with compressor oil and install the tube.

4. REMOVE LIQUID TUBE

Loosen the nut and remove the liquid tube.

Torque: 14 N·m (140 kgf·cm, 10 ft·lbf)

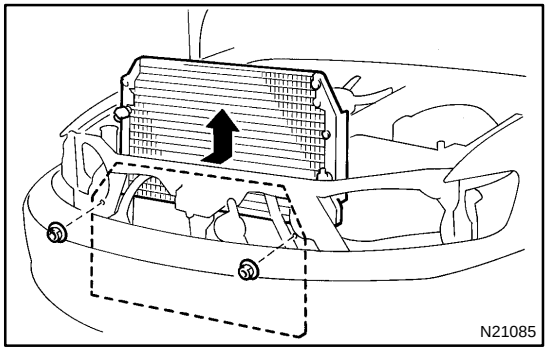
NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

HINT:

At the time of installation, please refer to the following item

Lubricate a new O–ring with compressor oil and install the tube.



5. REMOVE CONDENSER

(a) Remove the 2 nuts from condenser upper mountings.

(b) Push the radiator toward the engine.

(c) Push the condenser toward the radiator and pull it upward.

HINT:

At the time of installation, please refer to the following item.

If condenser is replaced, add compressor oil to the compressor.

Add 40–50 cc (1.4–1.7 fl.oz.)

Compressor oil: ND–OIL 8 or equivalent

AC0AA–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–46).

EVAPORATOR

AC0AB–02

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:

At the time of installation, please refer to the following item.

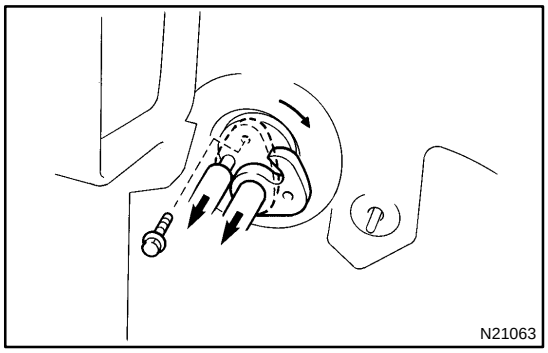
Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 800 ± 50 g (28.22 ± 1.76 oz.)

2. REMOVE BLOWER UNIT

(See page AC–29)



3. DISCONNECT LIQUID AND SUCTION TUBE

Remove the bolt and slide the plate, then disconnect both tubes.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

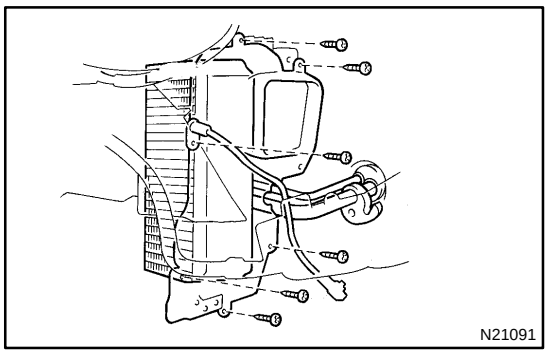
NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

HINT:

At the time of installation, please refer to the following item.

Lubricate 2 new O–rings with compressor oil and install the tubes.



4. REMOVE EVAPORATOR

(a) Disconnect the connector.

(b) Remove the screw and pull out the evaporator temp. sensor.

(c) Remove the 5 screws and evaporator cover.

HINT:

At the time of installation, please refer to the following item.

Do not reuse the evaporator cover.

(d) Pull out the evaporator.

HINT:

At the time of installation, please refer to the following item.

If evaporator is replaced, add compressor oil to evaporator.

Add 40 cc (1.4 fl.oz.)

Compressor oil: ND–OIL 8 or equivalent

AC0AD–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–48).

HEATER RADIATOR

AC0AE–01

REMOVAL

1. DRAIN ENGINE COOLANT FROM RADIATOR

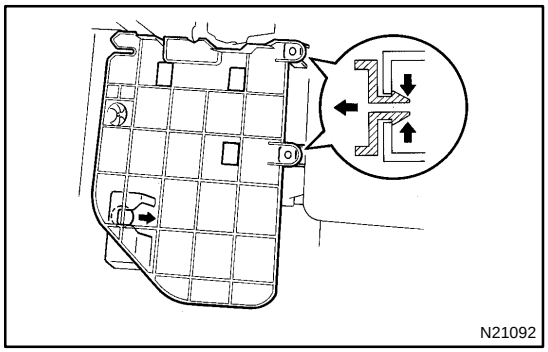
HINT:

It is not necessary to drain out all coolant.

2. REMOVE THESE PARTS:

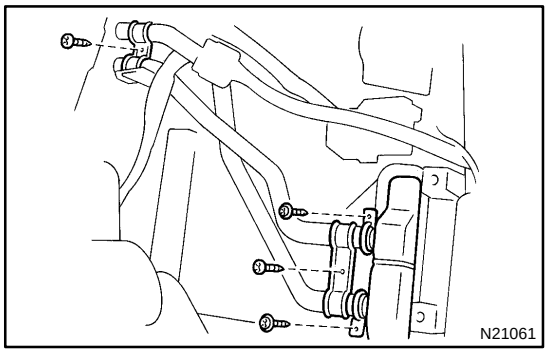
(a) No.1 lower panel

(b) Lower panel LH



3. REMOVE HEATER RADIATOR

(a) Release the 3 claws and remove the heater protector.



(b) Remove 2 screws and 2 clamps.

(c) Remove the 2 screws and 2 clips, then disconnect the heater radiator pipes from heater radiator.

(d) Remove 2 O–rings from heater radiator pipes.

HINT:

At the time of installation, please refer to the following item.

Do not reuse 2 O–rings.

(e) Pull out the heater radiator.

AC0AF–01

INSPECTION

INSPECT FINS FOR BLOCKAGE

If the fins are clogged, clean them with compressed air.

AC0AG–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–52).

EXPANSION VALVE

AC0AH–01

ON–VEHICLE INSPECTION

1. CHECK QUANTITY OF GAS IN REFRIGERATION CYCLE

2. SET ON MANIFOLD GAUGE SET

(See page AC–17)

3. RUN ENGINE

Run the engine at 1,500 rpm for at least 5 minutes.

Then check that the high pressure reading is 1.37 – 1.57 MPa (14 – 16 kgf/cm^2, 199 –228 psi).

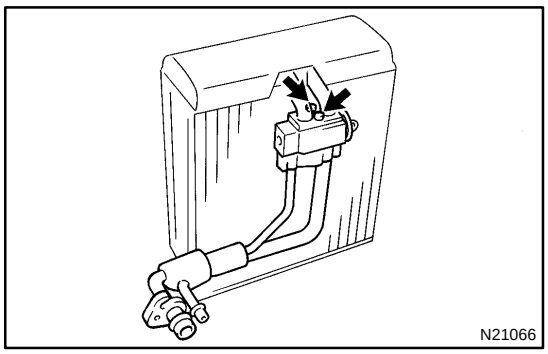
4. CHECK EXPANSION VALVE

If the expansion valve is faulty, the low pressure reading will drop to 0 kPa (0 kgf/cm^2, 0 psi).

HINT:

When the low pressure drops to 0 kPa (0 kgf/cm^2, 0 pis), check the receiver's IN and OUT sides for no temperature difference.

AC0AI–02



REMOVAL

1. REMOVE EVAPORATOR
(See page AC–48)

2. REMOVE EXPANSION VALVE

Using a hexagon wrench, remove the 2 bolts and separate the expansion valve, evaporator and tube.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

HINT:

At the time of installation, please refer to the following item.

Lubricate 4 new O–rings with compressor oil and install the tube and valve.

AC0AJ–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–56).

WATER VALVE

AC0AK–01

ON–VEHICLE INSPECTION

1. WARM UP ENGINE

2. DISCONNECT WATER VALVE CONTROL CABLE

3. INSPECT WATER VALVE OPERATION

(a) Check that warm air blown out when the water valve lever is moved to ”WARM” position.

(b) Check that cool air blown out when the water valve is moved to the ”COOL” position.

If operation is not as specified, replace the water valve.

4. CONNECT WATER VALVE CONTROL CABLE

HINT:

After connection, adjust the control cable.

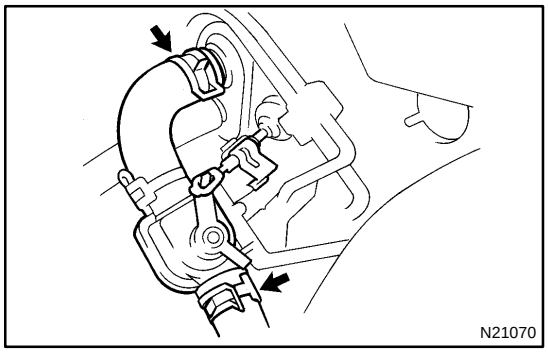
AC0AL–02

REMOVAL

1. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

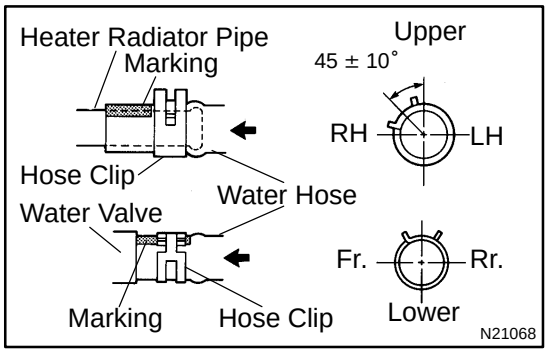
It is not necessary to drain out all the coolant.



2. DISCONNECT WATER HOSES FROM WATER VALVE AND HEATER RADIATOR PIPE

(a) Using pliers, grip the claws of the hose clip and slide the hose clip along the hose.

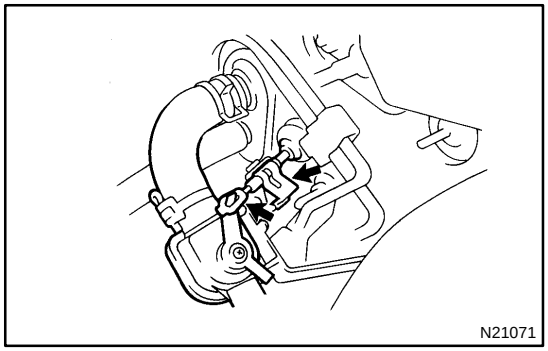
(b) Disconnect the water hose.



HINT:

At the time of installation, please refer to the following items.

- Push the water hose onto the heater radiator pipe as far as the pipe grommet.
- Install the hose clip in a position, as shown in the illustration.

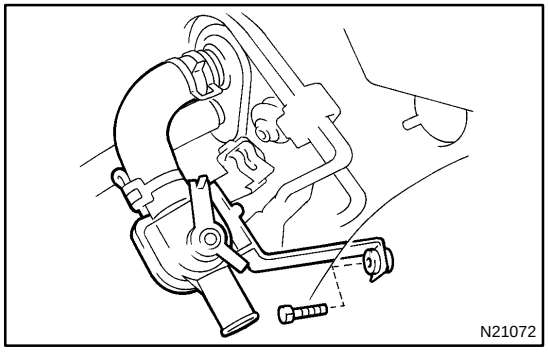


3. DISCONNECT WATER VALVE CONTROL CABLE FROM WATER VALVE

HINT:

At the time of installation, please refer to the following item.

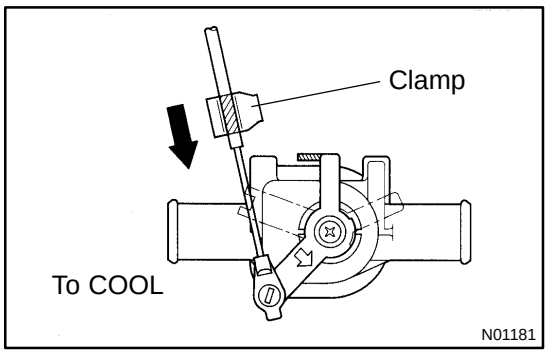
For installing the control cable, refer to ”INSTALLATION”.



4. REMOVE WATER VALVE

Remove the bolt and water valve.

AC0AM–02



INSTALLATION

Installation is in the reverse order of removal (See page AC–59).

HINT:

After installation, adjust water valve control cable.

ADJUST WATER VALVE CONTROL CABLE

(a) Turn ignition switch to ON.

(b) Set temperature control switch at ”COOL”.

(c) Set the water valve control lever on the ”COOL” position and install the control cable and lock the clamp.

HINT:

Lock the clamp while lightly pushing the outer cable in the direction shown by arrow.

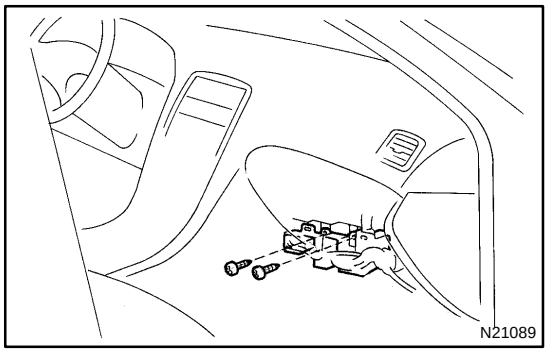
BLOWER MOTOR

AC0AN–02

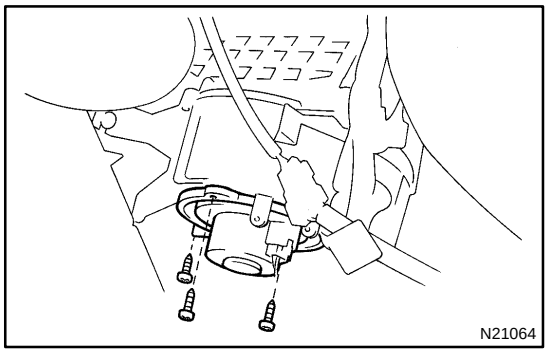
REMOVAL

1. REMOVE THESE PARTS:

(a) Cowl side trim RH
(b) Front door scuff plate RH
(c) No. 2 instrument panel under cover



2. REMOVE 2 CONNECTOR BRACKET SET SCREWS



3. REMOVE BLOWER MOTOR

(a) Disconnect the connector.
(b) Remove the 3 screws and blower motor.

AC0AO–02

INSPECTION

INSPECT BLOWER MOTOR CIRCUIT

(See page DI–583)

AC0AP–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–61).

BLOWER RESISTOR

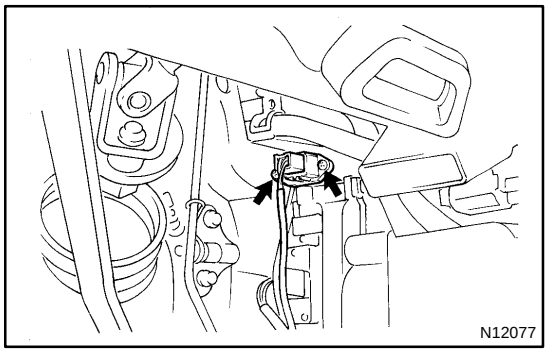
AC0AQ–02

REMOVAL

1. REMOVE THESE PARTS:

(a) No. 1 instrument lower panel

(b) Instrument lower panel LH

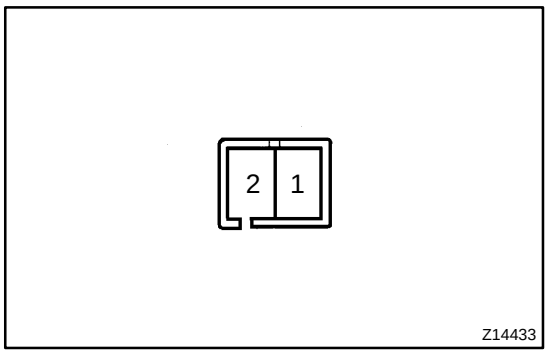


2. REMOVE BLOWER RESISTOR

(a) Disconnect the connector.

(b) Remove the 2 screws and blower resistor.

AC2SZ–01



INSPECTION

INSPECT BLOWER RESISTOR RESISTANCE

Measure resistance between terminals.

Standard resistance:

1.8 – 2.2 Ω

If resistance is not as specified, replace the blower resistor.

AC0AS–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–64).

BLOWER MOTOR LINEAR CONTROLLER

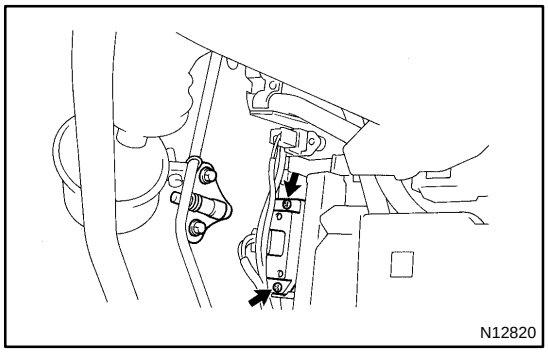
AC0AT–02

REMOVAL

1. REMOVE THESE PARTS:

(a) No. 1 instrument lower panel

(b) Instrument lower panel LH



2. REMOVE BLOWER MOTOR LINEAR CONTROLLER

(a) Disconnect the connector.

(b) Remove the 2 screws and controller.

AC0AU–02

INSPECTION

INSPECT BLOWER MOTOR LINEAR CONTROLLER CIRCUIT

(See page DI–583)

AC0AV–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–67).

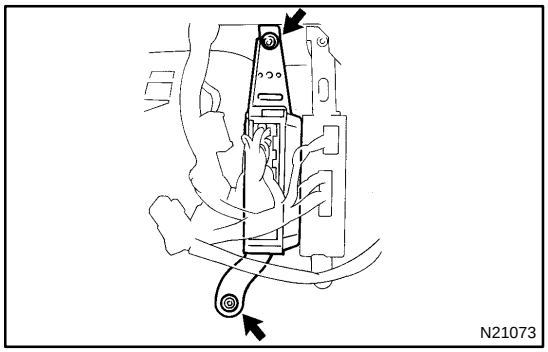
AIR INLET SERVOMOTOR

AC0AW–02

REMOVAL

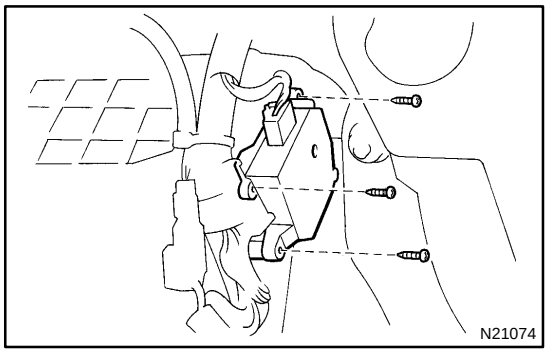
1. REMOVE THESE PARTS:

(a) Cowl side trim RH
(b) Front door scuff plate RH
(c) No. 2 instrument panel under cover
(d) Glove compartment



2. REMOVE ECM

(a) Disconnect the connectors.
(b) Remove the 2 nuts and ECM.



3. REMOVE AIR INLET SERVOMOTOR

(a) Disconnect the connector.
(b) Remove the 3 screws and servomotor.

AC0AX–01

INSPECTION

1. **INSPECT AIR INLET SERVOMOTOR CIRCUIT**
   (See page DI–566)
2. **INSPECT AIR INLET DAMPER POSITION SENSOR CIRCUIT**
   (See page DI–560)

AC0AY–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–70).

AIR MIX SERVOMOTOR

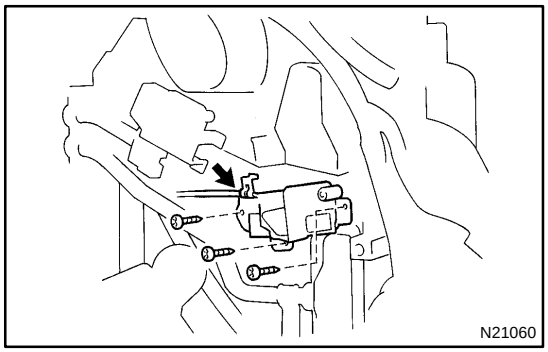
AC0AZ–02

REMOVAL

1. REMOVE THESE PARTS:

(a) No. 1 instrument lower panel

(b) Instrument lower panel LH



2. REMOVE AIR MIX SERVOMOTOR

(a) Disconnect the connector.

(b) Remove the 3 screws and servomotor, then disconnect the control cable.

AC0B0–01

INSPECTION

1. **INSPECT AIR MIX SERVOMOTOR CIRCUIT**
   (See page DI–563)
2. **INSPECT AIR MIX DAMPER POSITION SENSOR CIRCUIT**
   (See page DI–557)

AC0B1–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–73).

AIR OUTLET SERVOMOTOR

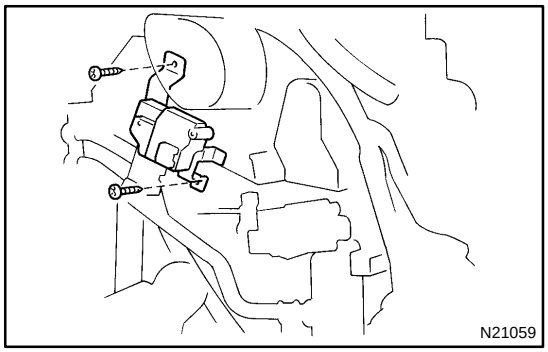
AC0B2–02

REMOVAL

1. REMOVE THESE PARTS:

(a) No. 1 instrument lower panel

(b) Instrument lower panel LH



2. REMOVE AIR OUTLET SERVOMOTOR

(a) Disconnect the connector.

(b) Remove the 2 screws and servomotor.

AC0B3–02

INSPECTION

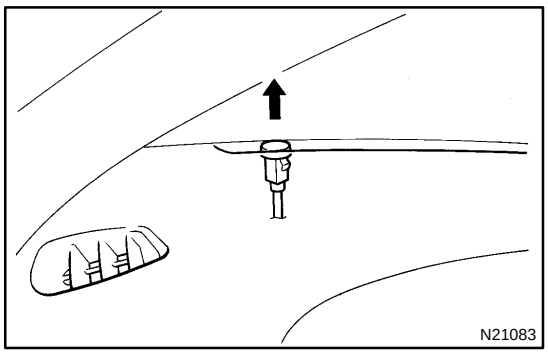
INSPECT AIR OUTLET SERVOMOTOR CIRCUIT

(See page DI–574)

AC0B4–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–76).



SOLAR SENSOR

AC0B5–01

REMOVAL

REMOVE SOLAR SENSOR

Using a screwdriver, pull out the sensor, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.

AC0B6–01

INSPECTION

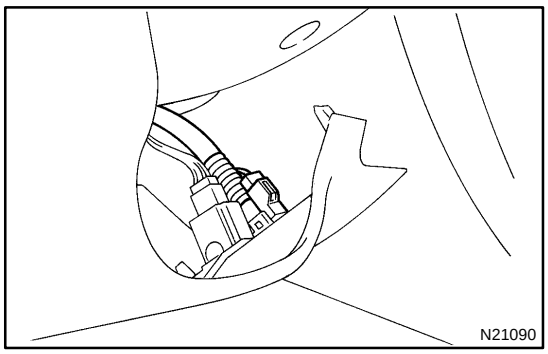
INSPECT SOLAR SENSOR CIRCUIT

(See page DI–549)

AC0B7–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–79).



ROOM TEMPERATURE SENSOR

AC0B8–02

REMOVAL

REMOVE ROOM TEMP. SENSOR

(a) Remove the No. 1 instrument lower panel set screws.
(b) Disconnect the aspirator hose.
(c) Disconnect the connector.
(d) Release the 2 claws and pull out the sensor from No. 1 instrument lower panel.

AC0B9–01

INSPECTION

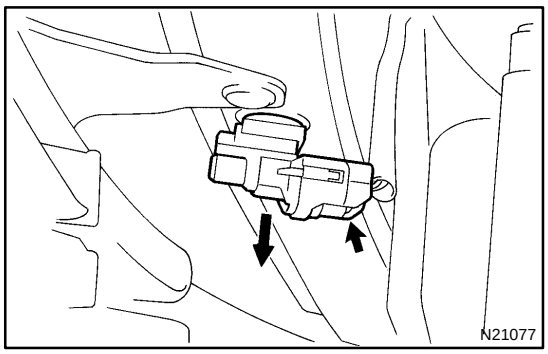
INSPECT ROOM TEMP. SENSOR CIRCUIT

(See page DI–537)

AC0BA–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–82).



AMBIENT TEMPERATURE SENSOR

AC0BE–01

REMOVAL

REMOVE AMBIENT TEMPERATURE SENSOR

(a) Disconnect the connector.
(b) Pull out the sensor from bumper reinforcement.

AC0BF–01

INSPECTION

INSPECT AMBIENT TEMPERATURE SENSOR CIRCUIT

(See page DI–540)

AC0BG–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–85).

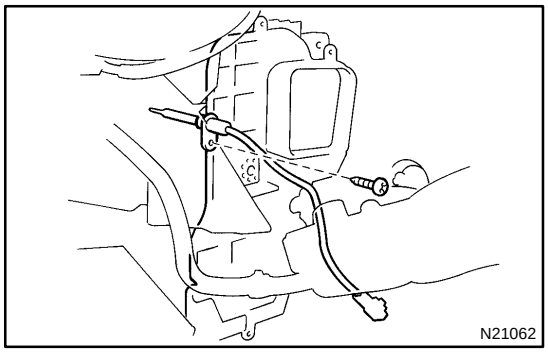
EVAPORATOR TEMPERATURE SENSOR

AC0BB–02

REMOVAL

1. REMOVE THESE PARTS:

(a) Cowl side trim RH
(b) Front door scuff plate RH
(c) No. 2 instrument panel under cover
(d) Glove compartment
(e) w/ CD Changer:
Finish upper panel
(f) w/ CD Changer:
CD changer assembly
(g) Audio amplifier
(h) ECM
(i) Blower unit (See page AC–29)



2. REMOVE EVAPORATOR TEMP. SENSOR

(a) Disconnect the connector.
(b) Remove the screw and pull out the sensor.

AC0BC–01

INSPECTION

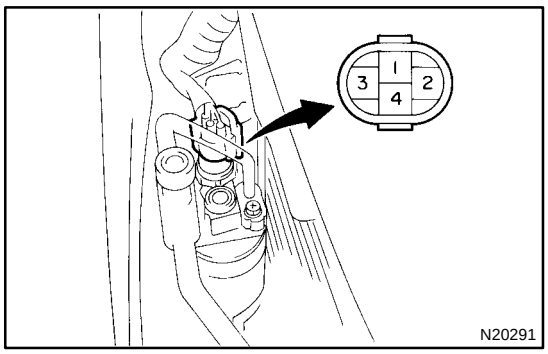
INSPECT EVAPORATOR TEMP. SENSOR CIRCUIT

(See page DI–543)

AC0BD–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–88).

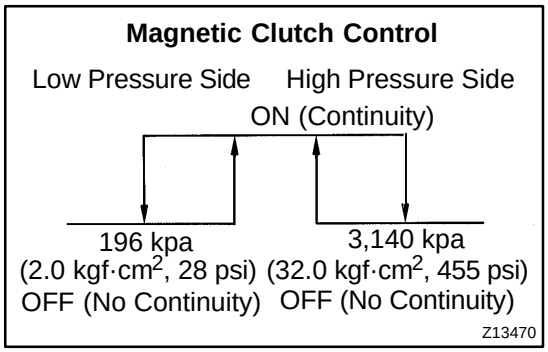


PRESSURE SWITCH

AC0BH–01

ON–VEHICLE INSPECTION

1. **SET ON MANIFOLD GAUGE SET**
   (See page AC–17)
2. **DISCONNECT CONNECTOR FROM PRESSURE SWITCH**
3. **RUN ENGINE AT APPROX. 1,500 RPM**

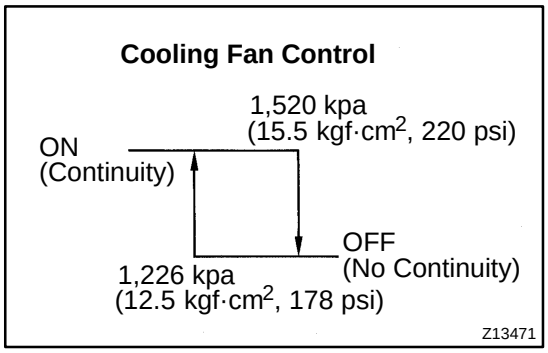


4. **Magnetic Clutch Control:**
   INSPECT PRESSURE SWITCH OPERATION

(a) Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (–) lead to terminal 1.

(b) Check continuity between terminals when refrigerant pressure is changed, as shown in the illustration.

If operation is not as specified, replace the pressure switch.



5. **Cooling Fan Control:**
   INSPECT PRESSURE SWITCH OPERATION

(a) Connect the positive (+) lead from the ohmmeter to terminal 2 and the negative (–) lead to terminal 3.

(b) Check continuity between terminals when refrigerant pressure is changed, as shown in the illustration.

If operation is not as specified, replace the pressure switch.

6. **STOP ENGINE AND SET OFF MANIFOLD GAUGE SET**
7. **CONNECT CONNECTOR TO PRESSURE SWITCH**

AC0BI–01

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

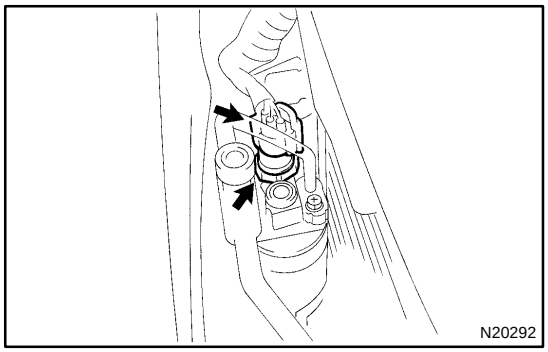
HINT:

At the time of installation, please refer to the following item.

Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 800 ± 50 g (28.22 ± 1.76 oz.)



2. REMOVE PRESSURE SWITCH FROM LIQUID TUBE

Disconnect the connector and remove the pressure switch.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

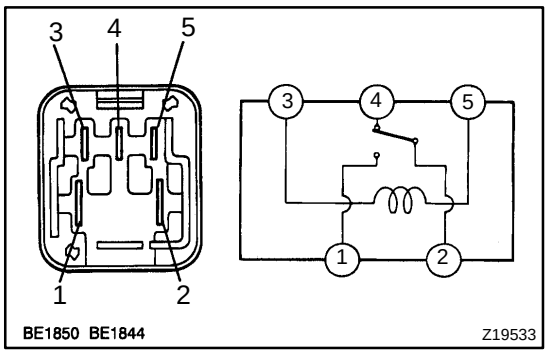
HINT:

- Lock the switch mount on the tube with an open end wrench, being careful not to deform the tube, and remove the switch.
- At the time of installation, please refer to the following item.
  Lubricate a new O–ring with compressor oil and install the switch.

AC0BJ–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–92).



RELAY

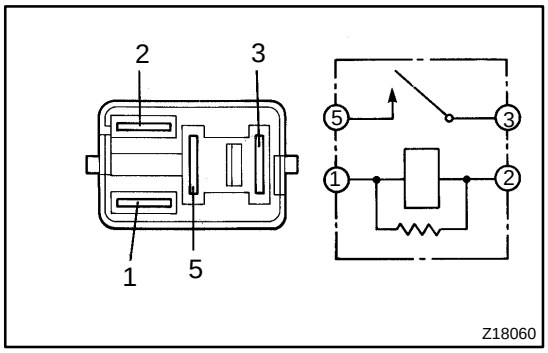
INSPECTION

AC2T0–01

1. INSPECT HEATER MAIN RELAY (Marking: HTR RLY) CONTINUITY

Condition	Tester connection	Specified condition
Constant	2 – 4 1 – 3	Continuity
Apply B+ between terminals 3 and 5.	1 – 2	Continuity

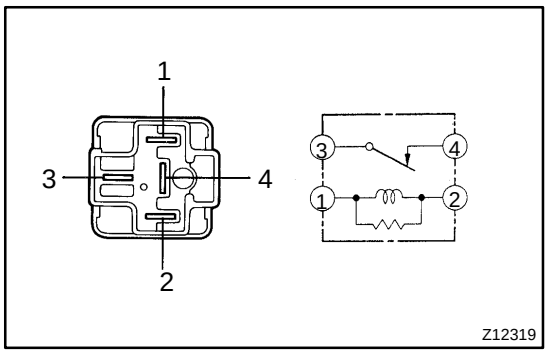
If continuity is not as specified, replace the relay.



2. INSPECT MAGNETIC CLUTCH RELAY (Marking: MG CLT RLY) CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

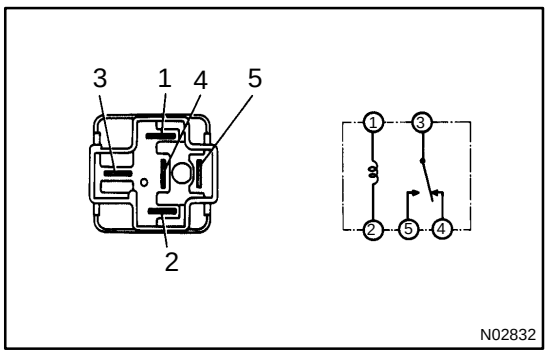
If continuity is not as specified, replace the relay.



3. INSPECT No.1 COOLING FAN RELAY (Marking: FAN RLY NO.1) CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2 3 – 4	Continuity
Apply B+ between terminals 1 and 2.	3 – 4	No continuity

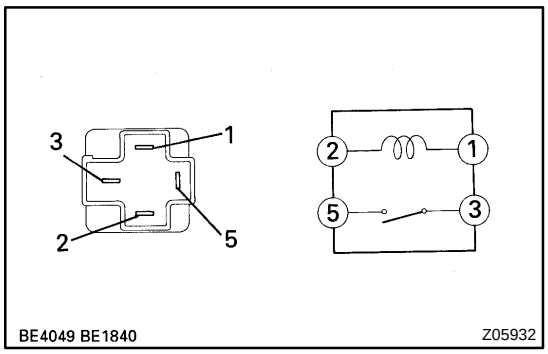
If continuity is not as specified, replace the relay.



4. INSPECT No. 2 COOLING FAN RELAY (Marking: FAN RLY NO.2) CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2 3 – 4	Continuity
Apply B+ between terminals 1 and 2	3 – 5	Continuity

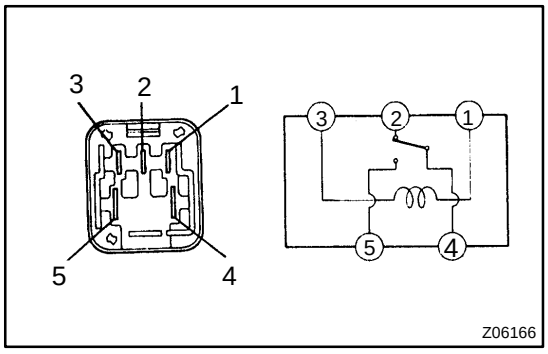
If continuity is not as specified, replace the relay



5. INSPECT No.3 COOLING FAN RELAY (Marking: FAN RLY NO.3) CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.



6. INSPECT ENGINE MAIN RELAY (Marking: ENGINE MAIN RLY) CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 3 2 – 4	Continuity
Apply B+ between terminals 1 and 3.	4 – 5	Continuity

If continuity is not as specified, replace the relay.

CONDENSER FAN

AC0BL–01

ON–VEHICLE INSPECTION

1. INSPECT CONDENSER FAN OPERATION

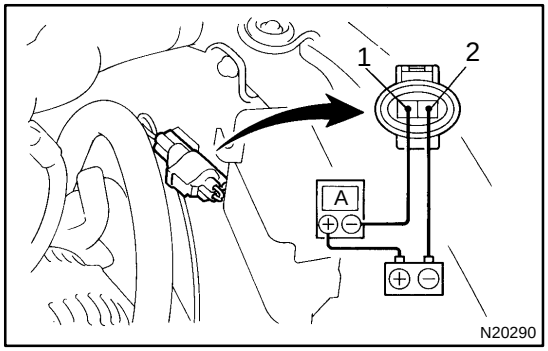
Inspect the fan operation, as shown in the chart below.

Test conditions:

- Ignition switch ON
- Blower speed control switch position ”HI”
- Temperature control dial at ”MAX. COOL”
- Install on manifold gauge set”
- A/C switch ON

Condition	Fan operation
Engine coolant temperature 83 ˚C (181 ˚F) or below	Not rotate
Engine coolant temperature 98 ˚C (208 ˚F) or above	Rotate
Refrigerant pressure is less than 1,520 kPa (15.5 kgf/cm^2, 220 psi)	Not rotate
Refrigerant pressure is 1,520 kPa (15.5 kgf/cm^2, 220 psi) or above	Rotate

If operation is not as specified, proceed to the next inspection.



2. INSPECT CONDENSER FAN MOTOR OPERATION

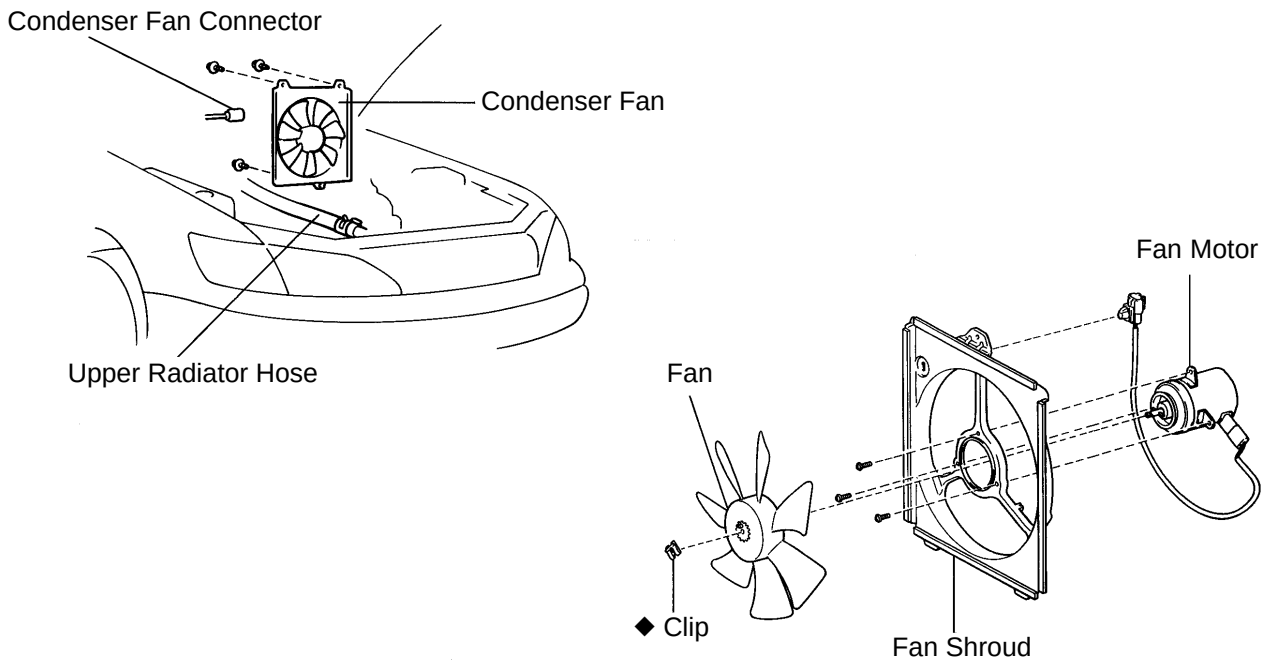
(a) Disconnect the fan connector.
(b) Connect battery and ammeter.
(c) Check that the fan rotates smoothly, and then check that the reading on the ammeter.

Specified amperage: 10.1 ± 1.8 A at 20 ˚C (68 ˚F)

If operation is not as specified, replace the fan motor.
If operation is as specified, check the pressure switch, cooling fan relays and engine coolant temp. switch.

AC0BM–01

COMPONENTS



◆ Non–reusable part

Z19368

AC0BN–01

REMOVAL

1. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all the coolant.

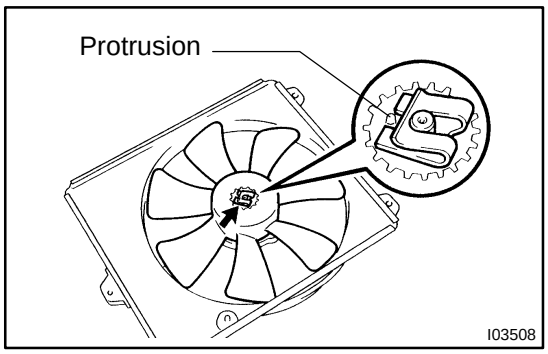
2. DISCONNECT UPPER RADIATOR HOSE FROM RADIATOR

3. REMOVE CONDENSER FAN

(a) Disconnect the connector.

(b) Remove the 3 bolts and fan.

AC0BO–01



DISASSEMBLY

1. REMOVE FAN

Remove the clip and fan.

NOTICE:

When removing the clip and fan, do not apply too much force to the motor shaft. And do not scratch the motor shaft.

HINT:

At the time of installation, please refer to the following item.

Install a new clip from the side opposite the protrusion on the fan.

2. REMOVE FAN MOTOR

(a) Disconnect the lead wire from the fan shroud.

(b) Remove the 3 screws and fan motor.

AC0BP–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC–99).

AC0BQ–01

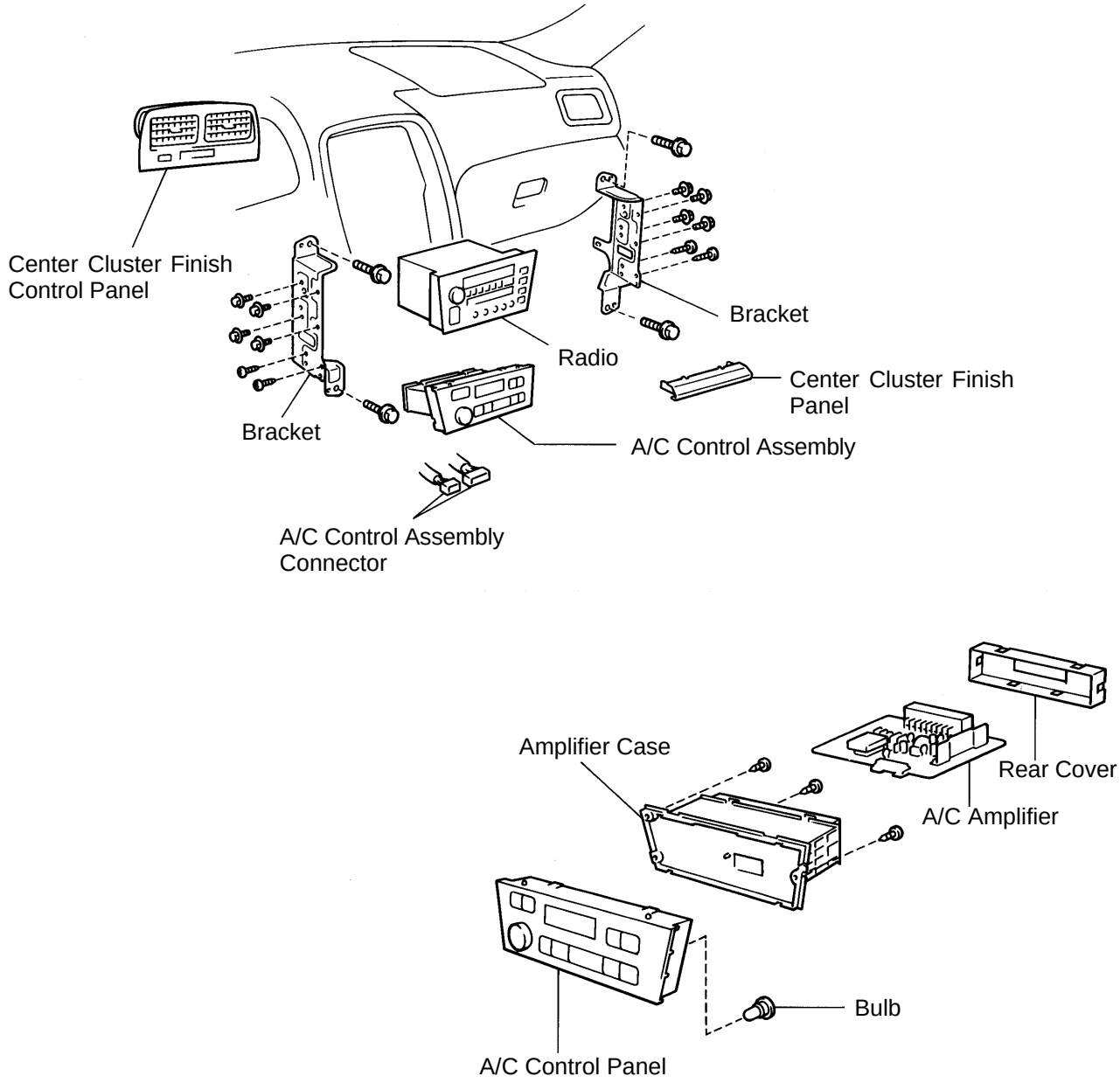
INSTALLATION

Installation is in the reverse order of removal (See page AC–98).

AIR CONDITIONING CONTROL ASSEMBLY

AC0BR–02

COMPONENTS



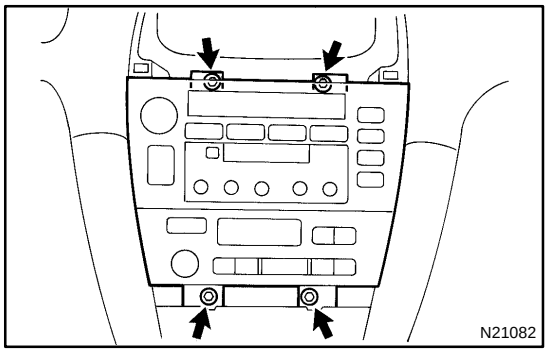
AC0BS–01

REMOVAL

1. REMOVE THESE PARTS:

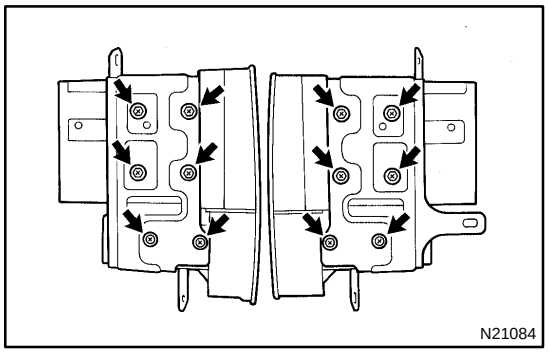
(a) End cluster finish panel

(b) Center cluster finish panel



2. REMOVE A/C CONTROL ASSEMBLY

(a) Remove the 4 bolts and pull out the A/C control assembly with radio, then disconnect the connectors.

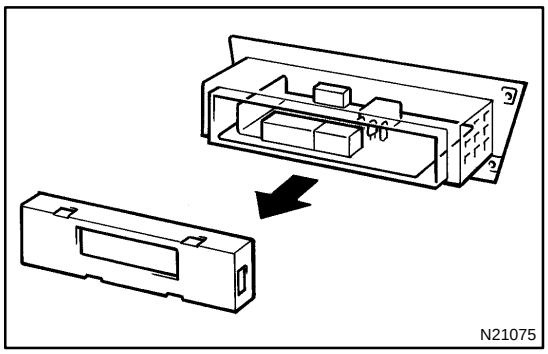


(b) Remove the 8 bolts, 4 screws and bracket.

(c) Remove the A/C control assembly from the radio.

AC0BT–01

DISASSEMBLY



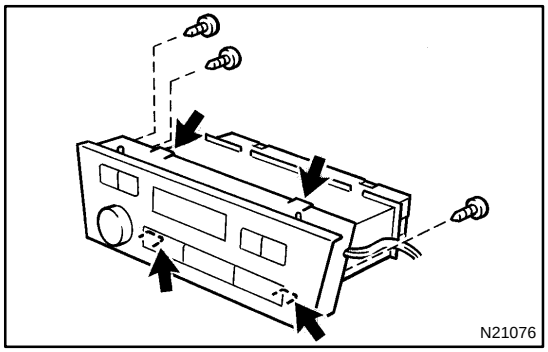
1. REMOVE A/C AMPLIFIER

(a) Release the 4 claws and remove the rear cover.

(b) Pull out the A/C amplifier backward.

HINT:

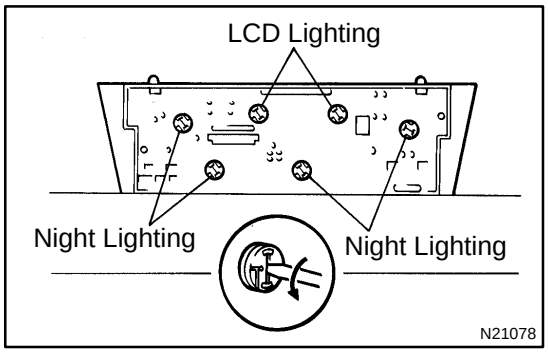
Hold the supply parts A/C amplifier using the electrostatic prevention bag it comes packed in.



2. SEPARATE A/C CONTROL PANEL AND A/C AMPLIFIER CASE

(a) Remove the 3 screws.

(b) Release the 4 claws, then separate the A/C control panel and A/C amplifier case.



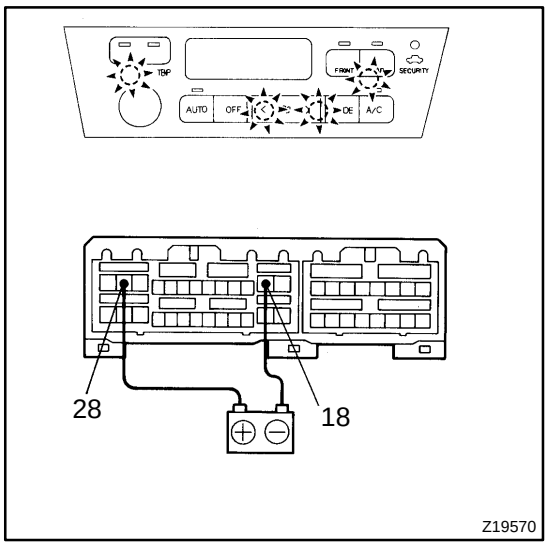
3. REMOVE BULB

Using a screwdriver, turn the bulb to left and pull out the bulb.

AC0BU–02

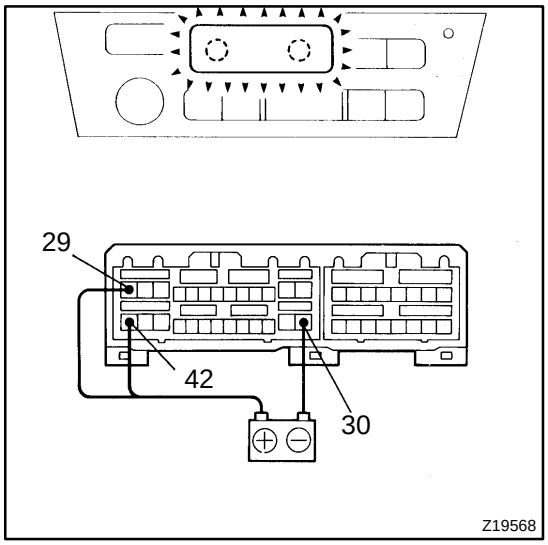
INSPECTION

1. INSPECT NIGHT LIGHTING

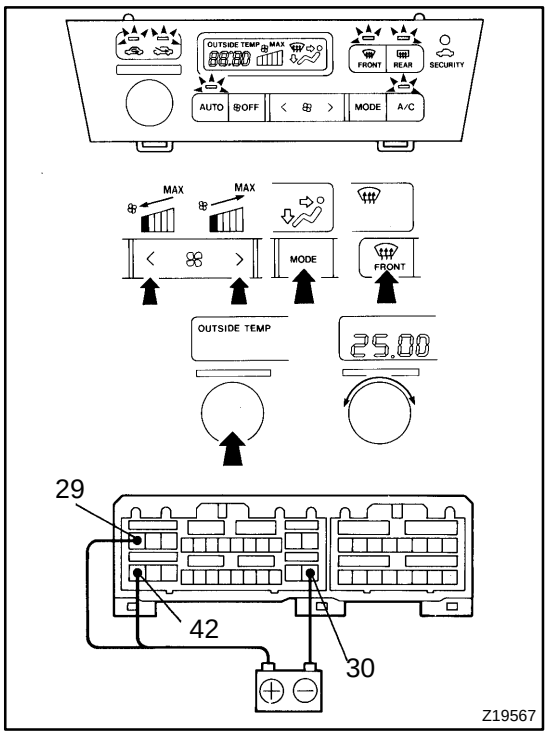


Connect the positive (+) lead from the battery to terminal 28 and the negative (–) lead to terminal 18, then check that the illumination lights up.
If there is bulb not light up, replace the bulb only.
If all bulb does not light up, replace the A/C control panel.

2. INSPECT LCD LIGHTING



Connect the positive (+) lead from the battery to terminal 29, 42 and the negative (–) lead to terminal 30, then check that the illumination lights up.
If there is bulb not light up, replace the replace the bulb only.
If the 2 bulbs do not light up, try replace the bulb with a new one
If the bulbs do not light up, replace the A/C control panel.

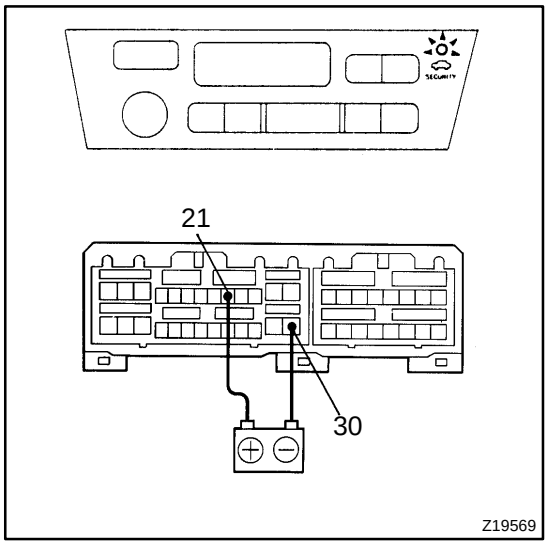


3. INSPECT SWITCH OPERATION

(a) Connect the positive (+) lead from the battery to terminal 29, 42 and the negative (–) lead to terminal 30.

(b) Operate the switches and check that the indicator and LCD indication change, as shown in the illustration.

If operation is not as specified, replace the A/C control panel.



4. INSPECT SECURITY INDICATOR

Connect the positive (+) lead from the battery to terminal 21 and negative (–) lead to terminal 30, then check that the indicator light up.

If operation is not as specified, replace the A/C control panel.

5. INSPECT A/C CONTROL ASSEMBLY CIRCUIT (See page DI–526)

AC0BV–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC–104).

AC0BW–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–103).

ENGINE COOLANT TEMPERATURE (ECT) SWITCH

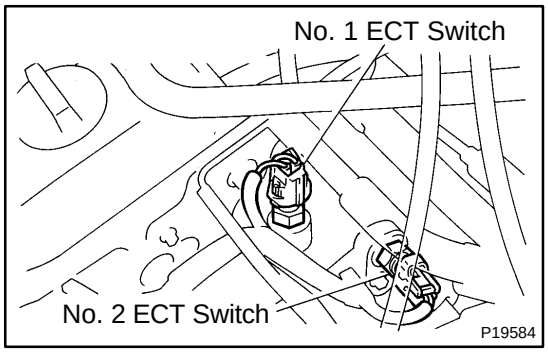
AC0BX–02

REMOVAL

1. DRAIN ENGINE COOLANT FROM RADIATOR

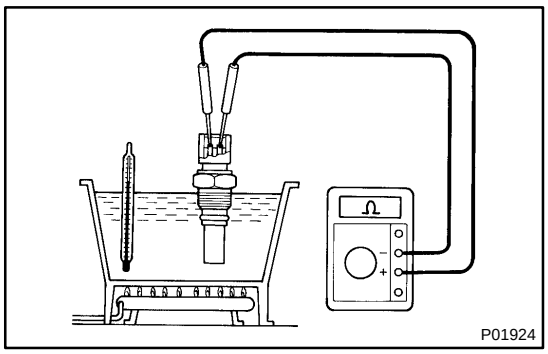
HINT:

It is not necessary to drain out all the coolant.



2. REMOVE ECT SWITCHES

AC0BY–01



INSPECTION

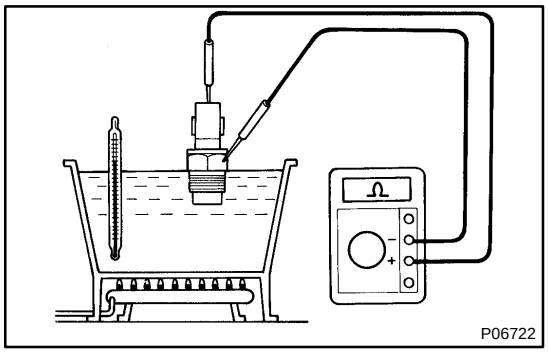
1. INSPECT No. 1 SWITCH CONTINUITY

(a) Using an ohmmeter, check that no continuity exists between the terminals when the coolant temperature is above 98˚C (208˚F).

If continuity exists, replace the switch.

(b) Using an ohmmeter, check that continuity exists between the terminals when the coolant temperature is below 88˚C (190˚F).

If no continuity exists, replace the switch.



2. INSPECT No. 2 SWITCH CONTINUITY

(a) Using an ohmmeter, check that no continuity exists between the terminal and switch body when the coolant temperature is above 93˚C (199˚F).

If continuity exists, replace the switch.

(b) Using an ohmmeter, check that continuity exists between the terminals when the coolant temperature is below 83˚C (181˚F).

If no continuity exists, replace the switch.

AC0BZ–01

INSTALLATION

Installation is in the reverse order of removal (See page AC–109).

AUTOMATIC TRANSAXLE SYSTEM

AX01L–01

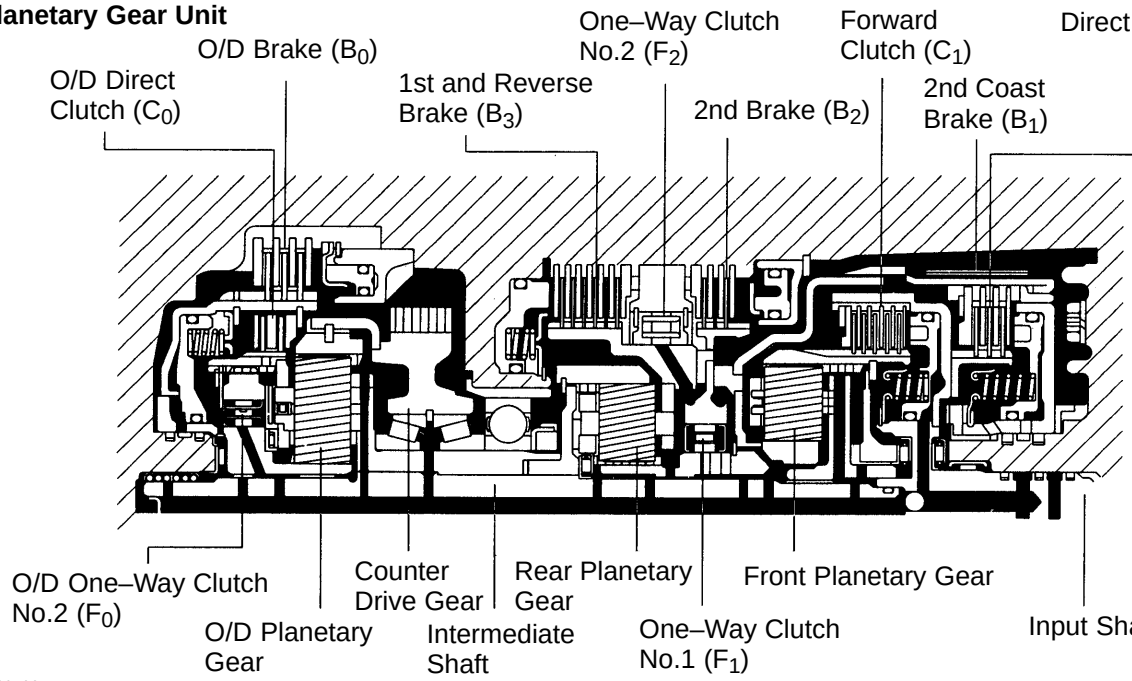
PRECAUTION

If the vehicle is equipped with a mobile communication system, refer to the precautions in the IN section.

AX0WG–01

OPERATION

Planetary Gear Unit



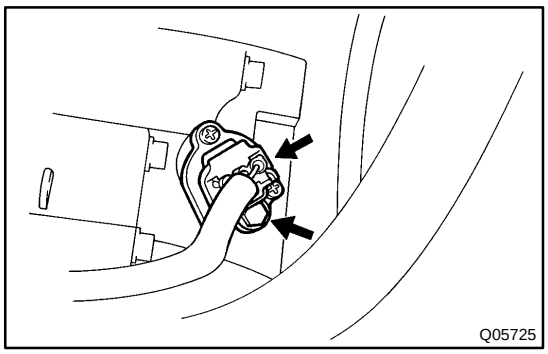
V08426 D09109

Shift Lever Position	Gear Position	C_0	C_1	C_2	B_0	B_1	B_2	B_3	F_0	F_1	F_2
P	Parking	◆									
R	Reverse	◆		◆				◆			
N	Neutral	◆									
D	1st	◆	◆						◆		◆
	2nd	◆	◆				◆		◆	◆	
	3rd	◆	◆	◆			◆		◆		
	O/D		◆	◆	◆		◆				
2	1st	◆	◆						◆		◆
	2nd	◆	◆			◆	◆		◆	◆	
	*3rd	◆	◆	◆			◆		◆		
L	1st	◆	◆					◆	◆		◆
	*2nd	◆	◆			◆	◆		◆	◆	

*Down–shift only–no up–shift

◆ : Operating

D01018 D09110


Q05725

VEHICLE SPEED SENSOR

AX01N–02

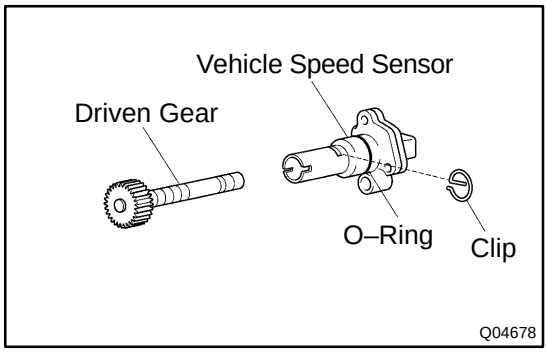
ON–VEHICLE REPAIR

1. REMOVE AIR CLEANER ASSEMBLY

2. DISCONNECT VEHICLE SPEED SENSOR CONNECTOR

3. REMOVE VEHICLE SPEED SENSOR ASSEMBLY

(a) Remove the bolt and vehicle speed sensor assembly.



Q04678

(b) Remove the clip and driven gear from the vehicle speed sensor.

(c) Remove the O–ring from the vehicle speed sensor.

4. INSTALL VEHICLE SPEED SENSOR ASSEMBLY

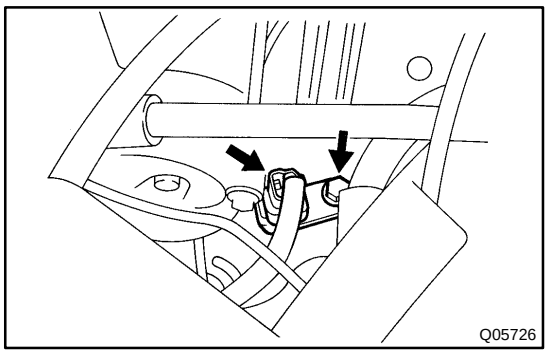
(a) Coat a new O–ring with ATF and install it to the vehicle speed sensor.

(b) Install the driven gear to the vehicle speed sensor and clip.

(c) Install the vehicle speed sensor assembly with the bolt.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

5. CONNECT VEHICLE SPEED SENSOR CONNECTOR

6. INSTALL AIR CLEANER ASSEMBLY



DIRECT CLUTCH SPEED SENSOR

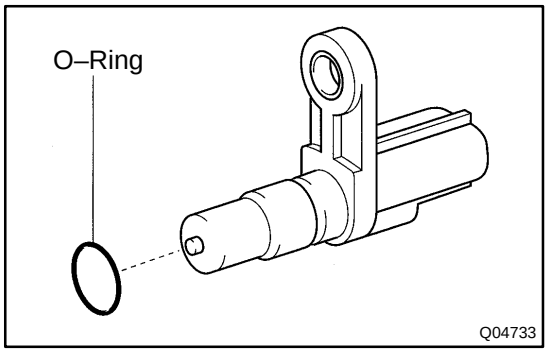
AX01O–02

ON–VEHICLE REPAIR

1. DISCONNECT DIRECT CLUTCH SPEED SENSOR CONNECTOR

2. REMOVE DIRECT CLUTCH SPEED SENSOR

(a) Remove the bolt and direct clutch speed sensor.

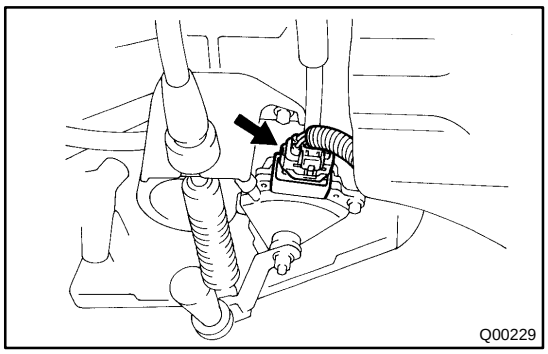


(b) Remove the O–ring from direct clutch speed sensor.

3. INSTALL DIRECT CLUTCH SPEED SENSOR

(a) Coat a new O–ring with ATF and install it to the direct clutch speed sensor.

(b) Install the direct clutch speed sensor with the bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

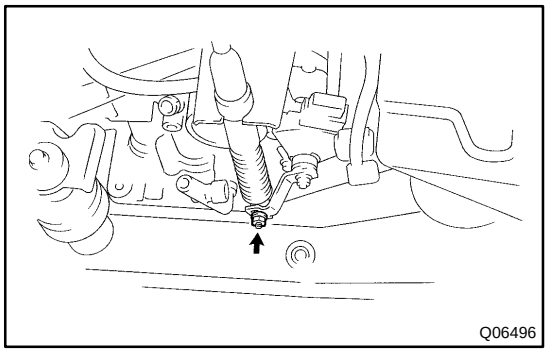

Q00229

PARK/NEUTRAL POSITION (PNP) SWITCH

AX01P–02

ON–VEHICLE REPAIR

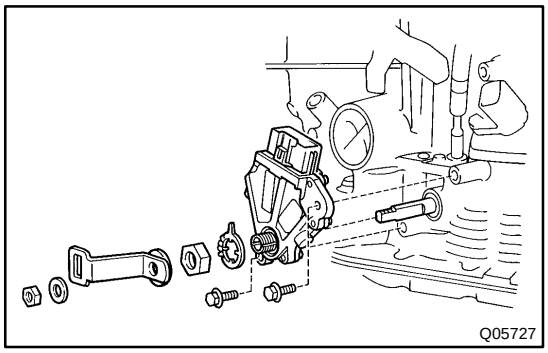
1. DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR


Q06496

2. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Remove the clip from the shift control cable.

(b) Remove the nut and control cable.

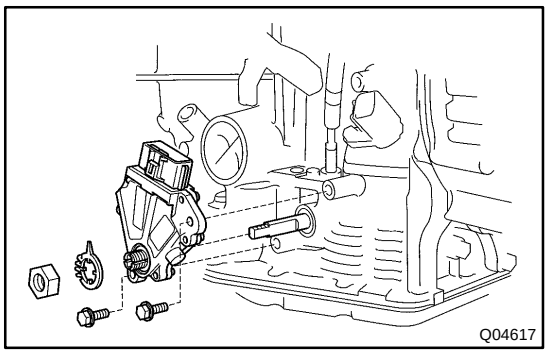

Q05727

(c) Remove the nut, washer and transaxle control shaft lever.

(d) Using a screwdriver, pry off the lock plate.

(e) Remove the nut and lock plate.

(f) Remove the 2 bolts and pull out the park/neutral position switch.


Q04617

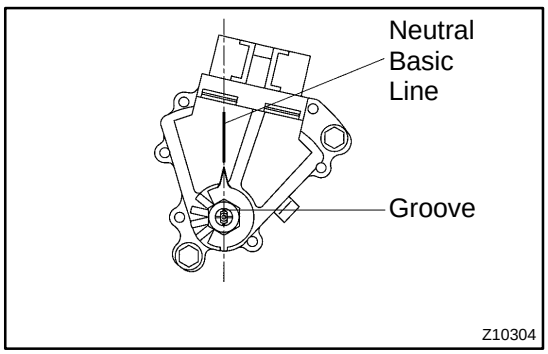
3. INSTALL AND ADJUST PARK/NEUTRAL POSITION SWITCH

(a) Temporarily install the park/neutral position switch with the 2 bolts.

(b) Install a new lock plate and nut.

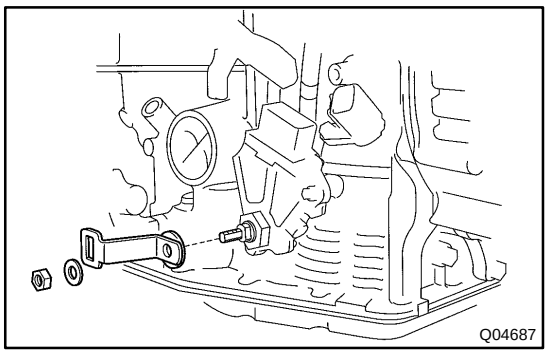
Torque: 6.9 N·m (70 kgf·cm, 61 in.·lbf)

(c) Stake the nut with the lock plate.

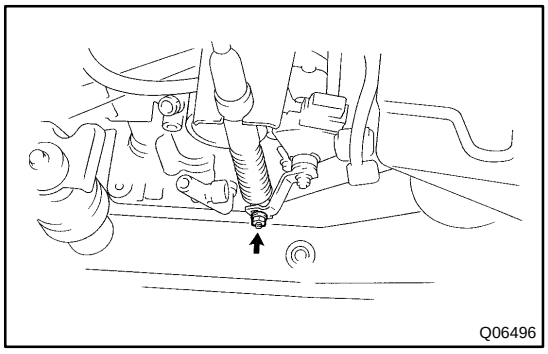


Z10304

(d) Adjust the park/neutral position switch.
(See page DI–150)



(e) Install the transaxle control shaft lever and washer.



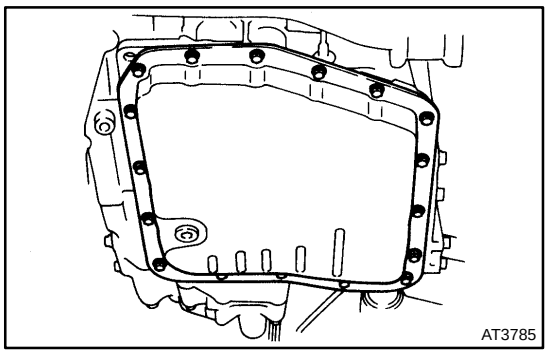
(f) Install and torque the nut.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

(g) Install the control cable and nut.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

(h) Install the clip to the shift control cable.

4. CONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR

5. TEST DRIVE VEHICLE



VALVE BODY ASSEMBLY

AX0WH–01

ON–VEHICLE REPAIR

1. CLEAN TRANSAXLE EXTERIOR

To help prevent contamination, clean the exterior of the transaxle.

2. DRAIN ATF

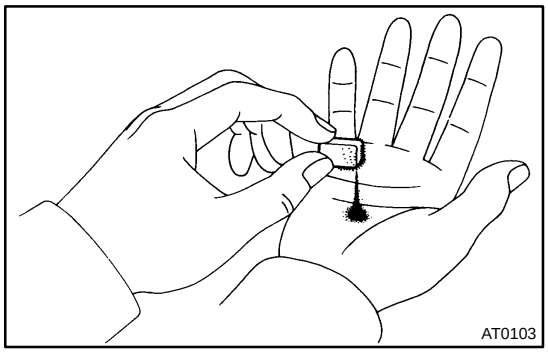
Using a hexagon wrench, remove the drain plug and fluid into the suitable container.

3. REMOVE OIL PAN AND GASKET

NOTICE:

Some fluid will remain in the oil pan.

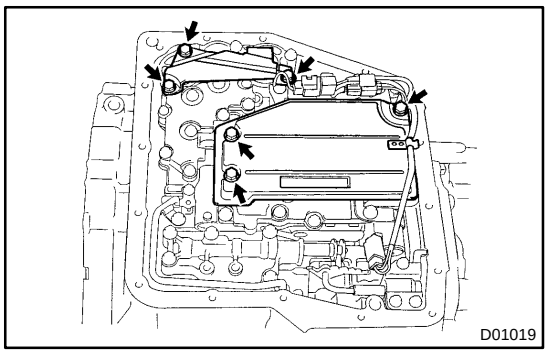
Remove oil pan bolts, and carefully remove the pan assembly. Discard the gasket.



4. EXAMINE PARTICLES IN PAN

Remove the magnets and use them to collect any steel chips. Look at the chips and particles in the pan and magnet carefully to anticipate what type of wear you will find in the transaxle.

- Steel (magnetic): bearing, gear and plate wear
- Brass (non–magnetic): bushing wear



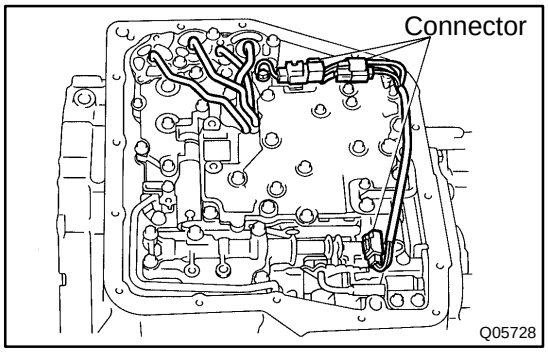
5. REMOVE OIL STRAINER AND APPLY PIPE BRACKET

(a) Remove the 3 bolts and oil strainer.

NOTICE:

Be careful as oil will come out of the strainer when it is removed.

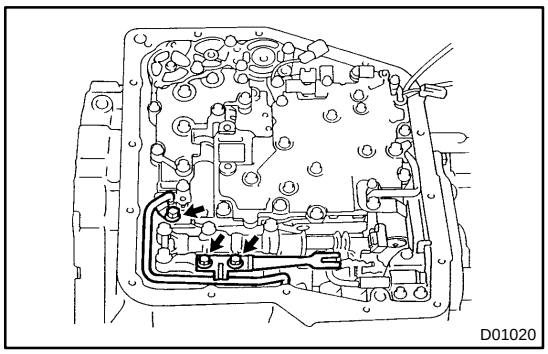
(b) Remove the 3 bolts and apply pipe bracket.



6. REMOVE OIL PIPES

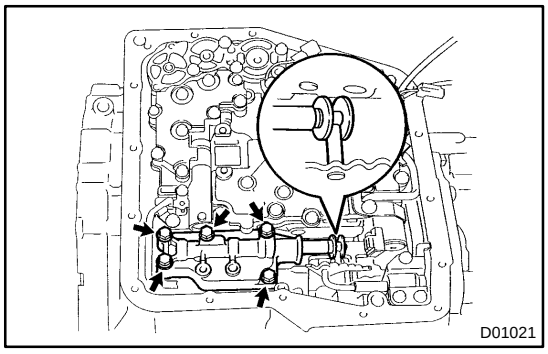
Pry up both pipe ends with a large screwdriver and remove the 5 pipes.

7. DISCONNECT SOLENOID CONNECTORS



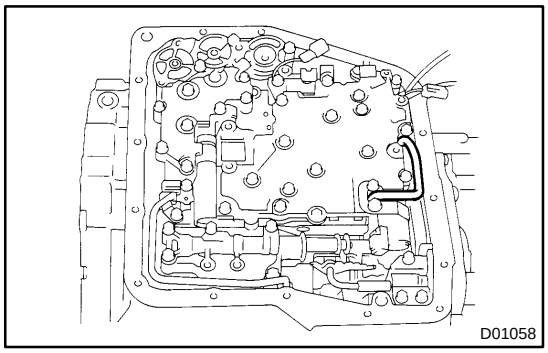
8. REMOVE TRANSFER LUBRICATION APPLY PIPE

(a) Remove the 2 bolts and detent spring.
(b) Remove the pipe set bolts.
(c) Pry up the pipe with a screwdriver and remove the pipe.



9. REMOVE MANUAL VALVE BODY

Remove the 5 bolts and manual valve body.

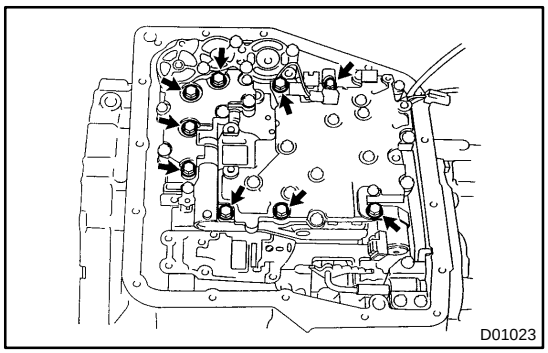


10. REMOVE B_3 APPLY PIPE

(a) Remove the pipe retainer.
(b) Pry up the pipe with a screwdriver and remove the pipe.

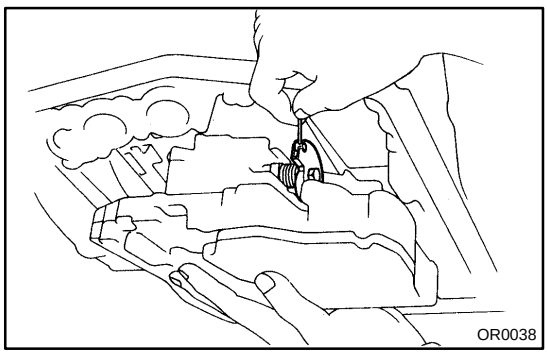
NOTICE:

Be careful not to bend or damage the pipe.



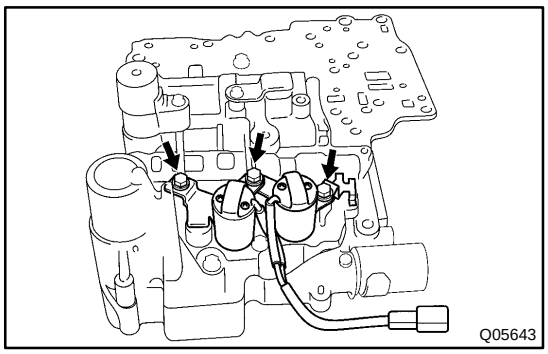
11. REMOVE VALVE BODY

(a) Remove the 9 bolts.



(b) Disconnect the throttle cable from the cam and remove the valve body.

12. REMOVE 2ND BRAKE APPLY GASKET



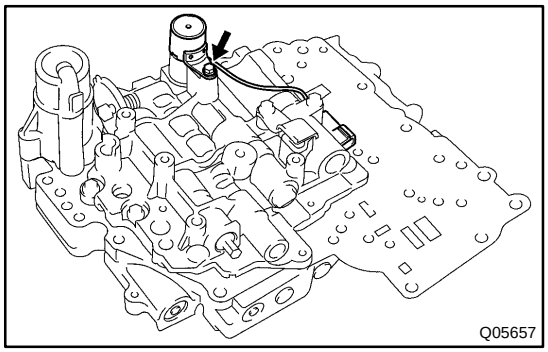
13. REMOVE SOLENOID VALVES

(a) Remove the 3 bolts, shift solenoid valve No.1 and No.2 with the retainer.

NOTICE:

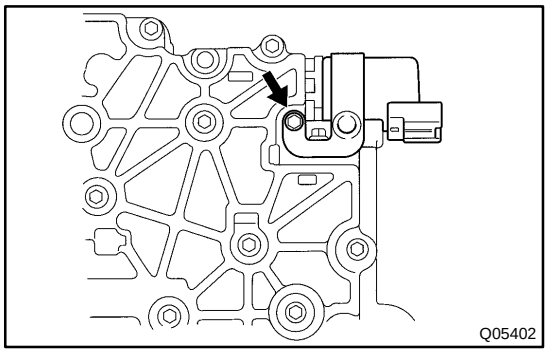
When removing solenoid, do not use a screwdriver, etc. to pry up the solenoid.

(b) Remove the O–rings from the shift solenoid valve No.1 and No.2.



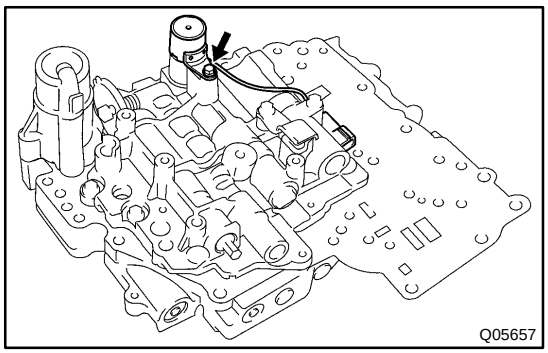
(c) Remove the bolt and shift solenoid valve SL.

(d) Remove the O–ring from the shift solenoid valve SL.



(e) Remove the bolt and shift solenoid valve SLN.

(f) Remove the O–ring from the shift solenoid valve SLN.



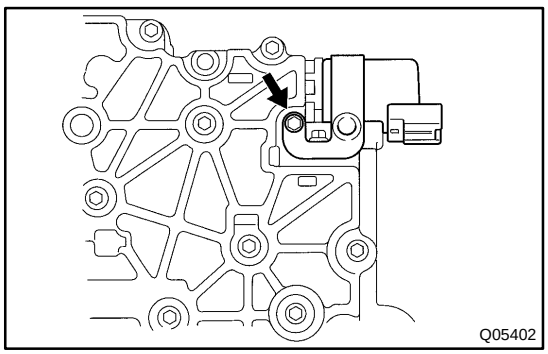
14. INSTALL SOLENOID VALVES

(a) Coat the 2 new O–rings with ATF and install it to the shift solenoid valve SL.

(b) Install the shift solenoid valve SL.

(c) Install and torque the bolt.

Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)

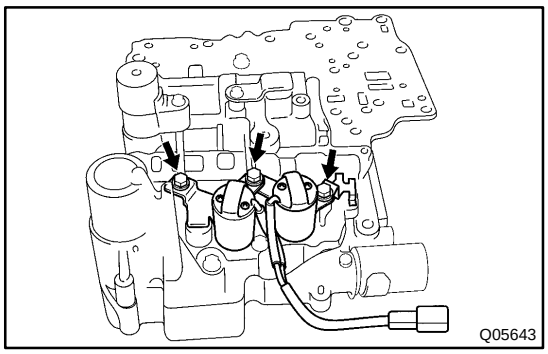


(d) Coat the 2 new O–rings with ATF and install it to the shift solenoid valve SLN.

(e) Install the shift solenoid valve SLN.

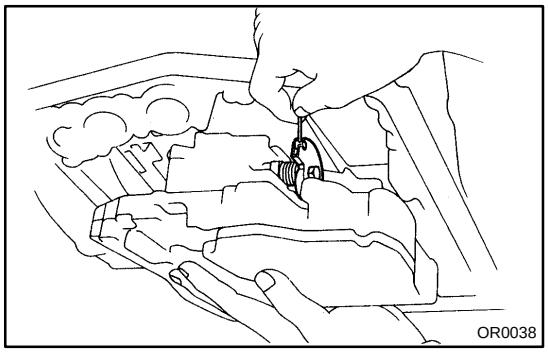
(f) Install and torque the bolt.

Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)



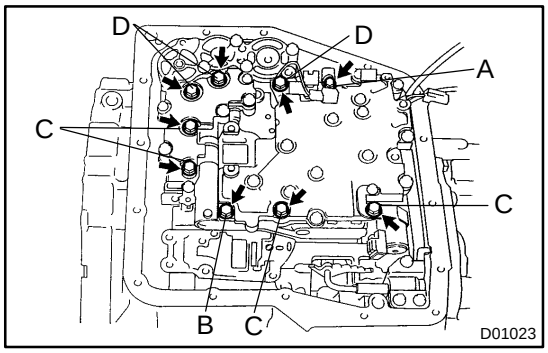
(g) Coat the 2 new O–rings with ATF and install it to the shift solenoid valve No.1 and No.2.
(h) Install the No.1 and No.2 solenoids.
(i) Install and torque the 3 bolts.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)

15. PLACE NEW 2ND BRAKE APPLY GASKET



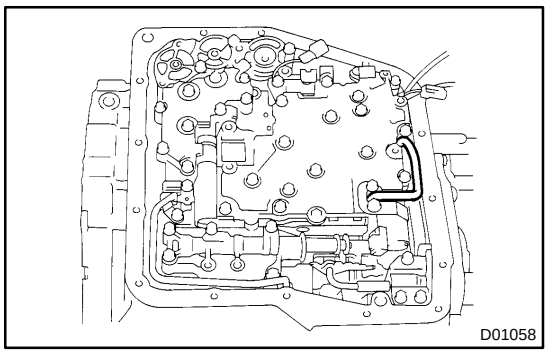
16. INSTALL VALVE BODY TO TRANSAXLE CASE
(a) While holding the cam down with your hand, slip the cable end into the slot.
(b) Lower the valve body into place.

NOTICE:
Be careful not to entangle the solenoid wire.



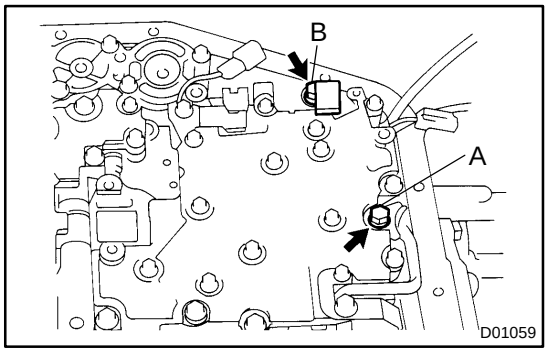
(c) Install and tighten the 9 bolts.

HINT:
Hand tighten the 9 bolts first, then torque with a torque wrench.
Bolt length:
Bolt A: 30 mm (1.181 in.)
Bolt B: 43 mm (1.693 in.)
Bolt C: 48 mm (1.890 in.)
Bolt D: 52 mm (2.047 in.)
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

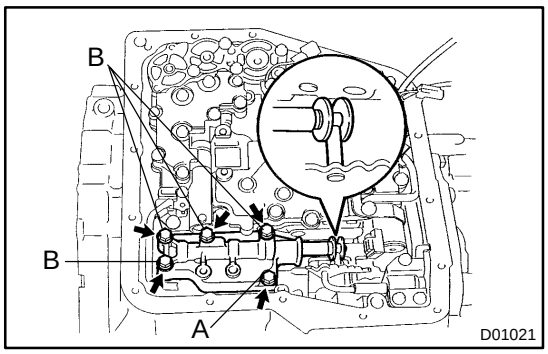


17. INSTALL B_3 APPLY PIPE

NOTICE:
Be careful not to bend or damage the pipe.



18. INSTALL CONNECTOR CLAMP AND PIPE RETAINER
(a) Install the connector clamp and pipe retainer.
(b) Install and torque the 2 bolts.
Bolt length:
Bolt A: 48 mm (1.890 in.)
Bolt B: 39 mm (1.535 in.)
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



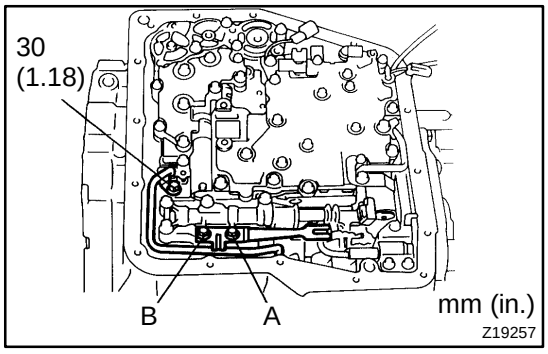
19. INSTALL MANUAL VALVE BODY

(a) Align the manual valve with the pin on the manual shaft lever.

(b) Lower the manual valve body into place.

(c) Hand tighten the 5 bolts first. Then, tighten them with a torque wrench.

Bolt length:
Bolt A: 22 mm (0.866 in.)
Bolt B: 36 mm (1.417 in.)
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



20. INSTALL TRANSFER LUBRICATION APPLY PIPE

(a) Place the detent springs on the manual valve body and hand tighten the 2 bolts first. Then, tighten them with a torque wrench.

Bolt length:
Bolt A: 14 mm (0.551 in.)
Bolt B: 36 mm (1.417 in.)
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

(b) Check that the manual valve lever is touching the center of the detent spring tip roller.

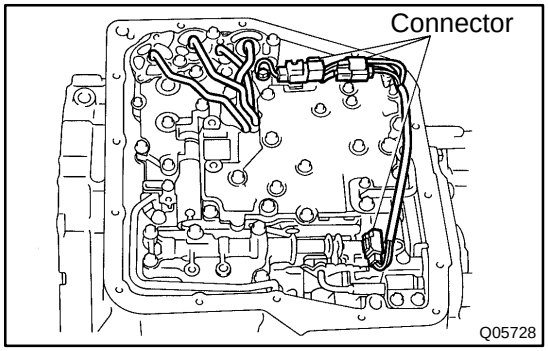
(c) Using a plastic hammer, install the pipe into the position.

NOTICE:

Be careful not to bend or damage the pipe.

(d) Install and torque the bolt.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



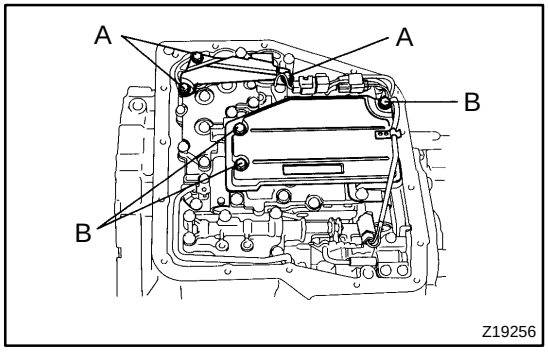
21. CONNECT SOLENOID CONNECTORS

22. INSTALL OIL PIPES

Using a plastic hammer, install the pipes into the positions.

NOTICE:

Be careful not to bend or damage the pipes.

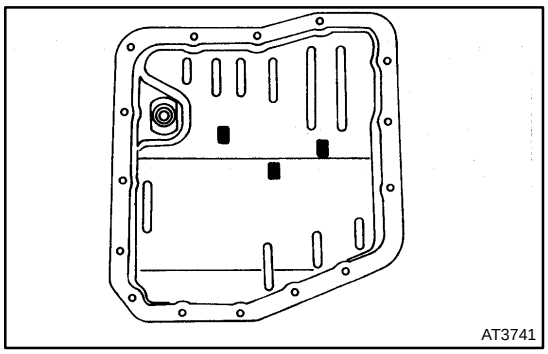


23. INSTALL OIL STRAINER AND APPLY PIPE BRACKET

(a) Install the oil strainer and apply pipe bracket.

(b) Install and torque the 6 bolts.

Bolt length:
Bolt A: 22 mm (0.866 in.)
Bolt B: 52 mm (2.047 in.)
Torque:
Bolt A: 10 N·m (100 kgf·cm, 7 ft·lbf)
Bolt B: 11 N·m (110 kgf·cm, 8 ft·lbf)

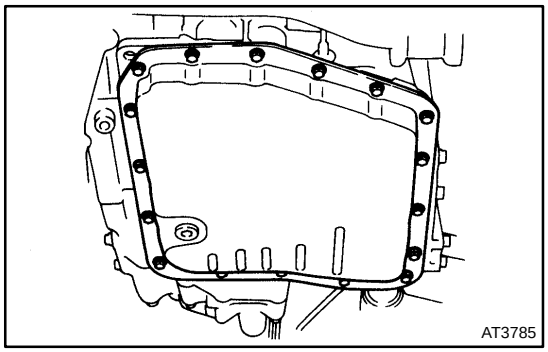


24. INSTALL MAGNETS IN PLACE

Install the 3 magnets in the indentations of the oil pan, as shown in the illustration.

NOTICE:

Make sure that the magnet does not interfere with the oil pipes.



25. INSTALL OIL PAN AND GASKET

(a) Install the oil pan and a new gasket.

(b) Install and torque the 17 new bolts.

Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)

26. INSTALL AND TORQUE DRAIN PLUG

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

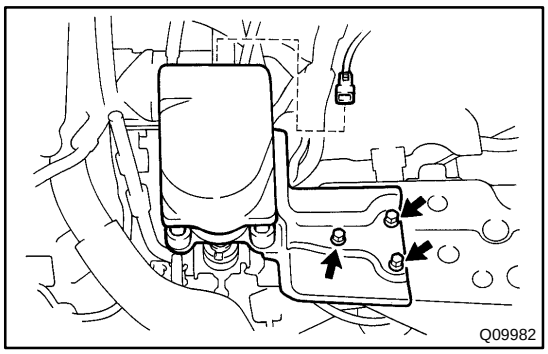
27. FILL ATF AND CHECK FLUID LEVEL

(See page DI–150)

THROTTLE CABLE

AX01R–02

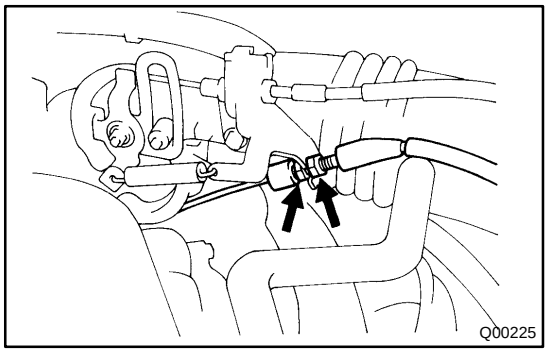
ON–VEHICLE REPAIR



1. REMOVE BATTERY

2. REMOVE CRUISE CONTROL ACTUATOR

Remove the 3 bolts and cruise control actuator.

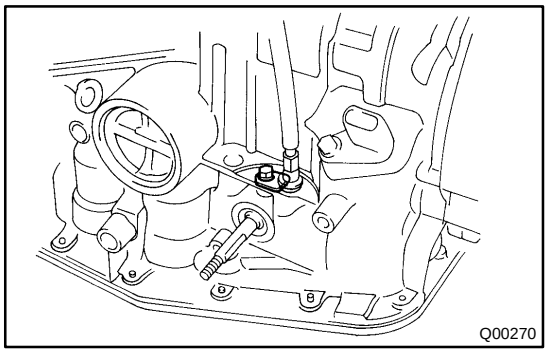


3. DISCONNECT THROTTLE CABLE FROM ENGINE

Disconnect the cable from the throttle linkage.

4. REMOVE PARK/NEUTRAL POSITION SWITCH
(See page AX–5)

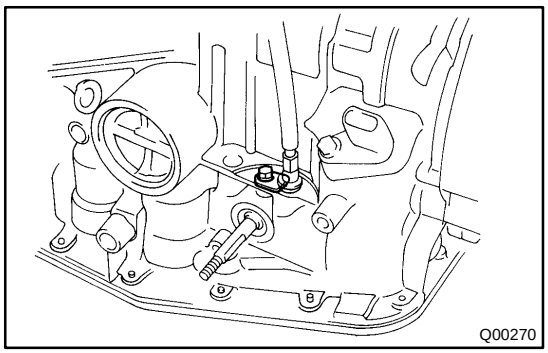
5. REMOVE VALVE BODY
(See page AX–7)



6. REMOVE THROTTLE CABLE

(a) Remove the bolt and retaining plate.

(b) Pull out the cable from the transaxle case.



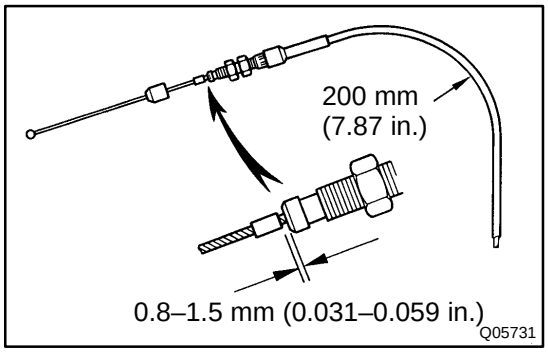
7. INSTALL CABLE INTO TRANSAXLE CASE

(a) Make sure to push it in all the way.

(b) Install the retaining plate.

(c) Install and torque the bolt.

8. INSTALL VALVE BODY
(See page AX–7)



9. IF THROTTLE CABLE IS NEW, STAKE STOPPER OR PAINT MARK ON INNER CABLE

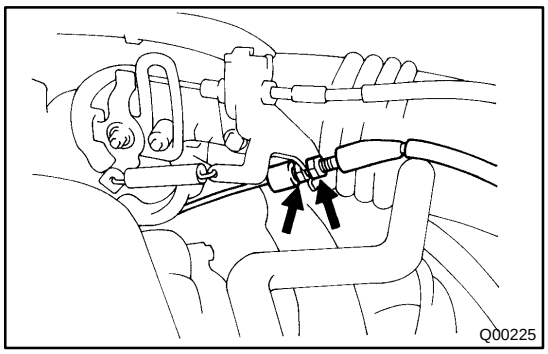
HINT:

New cables do not have a staked cable stopper.

(a) Bend the cable so there is a radius of about 200 mm (7.87 in.).

(b) Pull the inner cable lightly until slight resistance is felt, and hold it there.

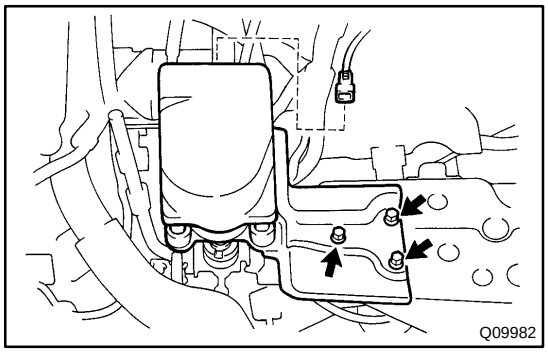
(c) Stake the stopper, 0.8–1.5 mm (0.031–0.059 in.) from the end of outer cable.



10. CONNECT THROTTLE CABLE TO ENGINE
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

11. ADJUST THROTTLE CABLE
(See page DI–150)

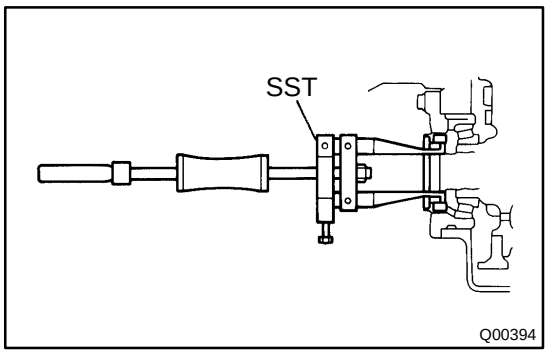
12. INSTALL PARK/NEUTRAL POSITION SWITCH
(See page AX–5)



13. INSTALL CRUISE CONTROL ACTUATOR
Install the cruise control actuator with the 3 bolts.

14. INSTALL BATTERY

15. TEST DRIVE VEHICLE



DIFFERENTIAL OIL SEAL

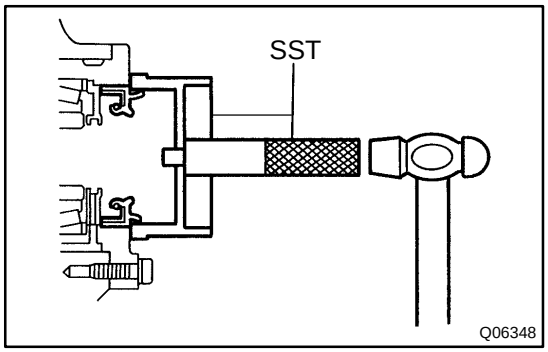
AX01S–02

ON–VEHICLE REPAIR

1. REMOVE FRONT DRIVE SHAFT
(See page SA–15)

2. REMOVE SIDE GEAR SHAFT OIL SEAL

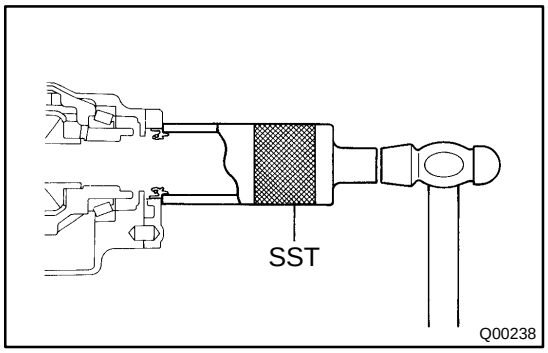
Using SST, pull out the oil seal.
SST 09308–00010



3. INSTALL LEFT SIDE GEAR SHAFT OIL SEAL

(a) Using SST and a hammer, drive in a new oil seal.
SST 09223–15020, 09351–32014 (09351–32130)
Oil seal depth: 0 ± 0.5 mm (0 ± 0.02 in.)

(b) Coat the lip of the oil seal with MP grease.



4. INSTALL RIGHT SIDE GEAR SHAFT OIL SEAL

(a) Using SST, drive in a new oil seal.
SST 09316–60010 (09316–00010)
Oil seal depth: 0 ± 0.5 mm (0 ± 0.02 in.)

(b) Coat the lip of the oil seal with MP grease.

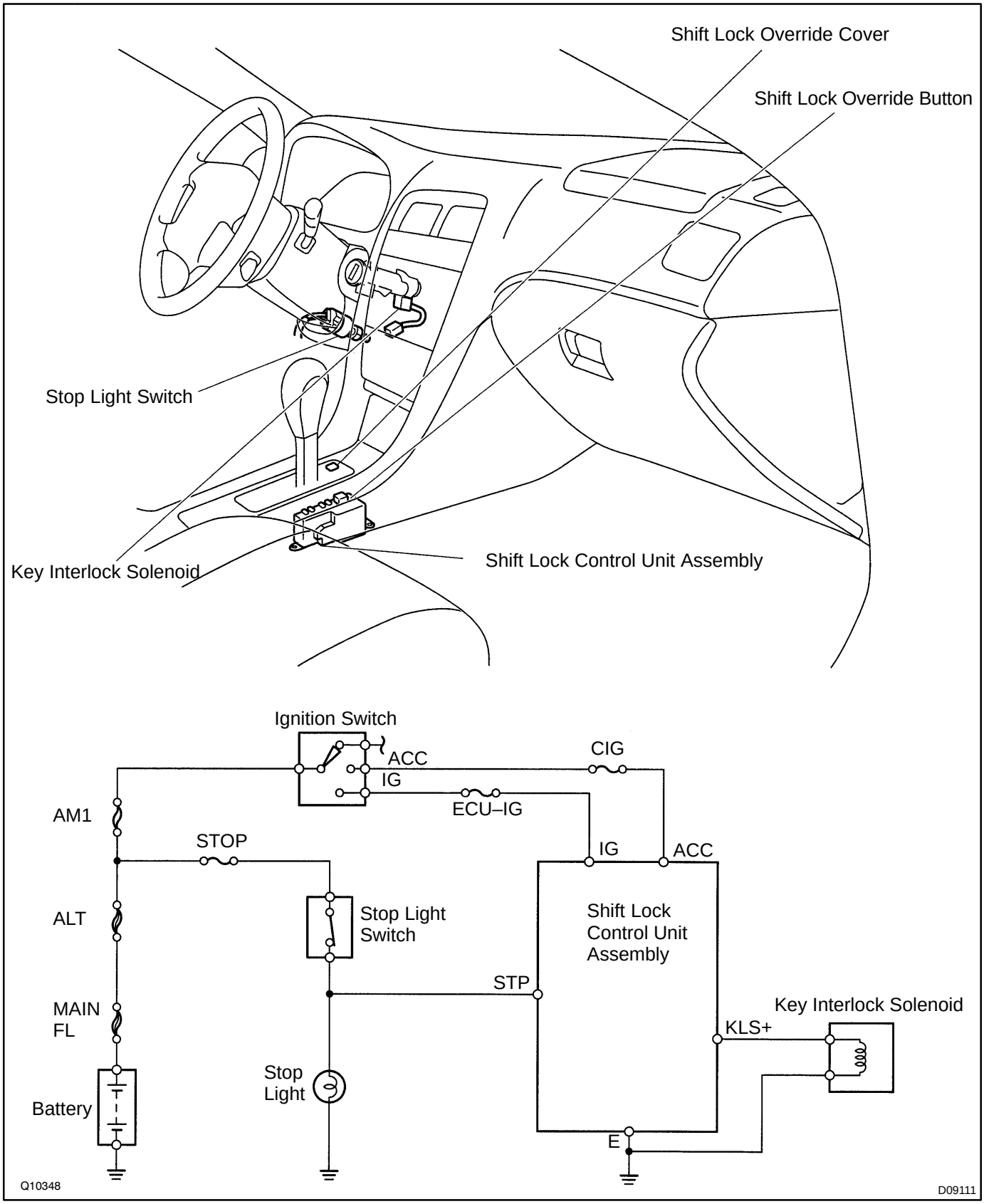
5. INSTALL FRONT DRIVE SHAFT
(See page SA–15)

6. CHECK TRANSAXLE FLUID LEVEL
(See page DI–150)

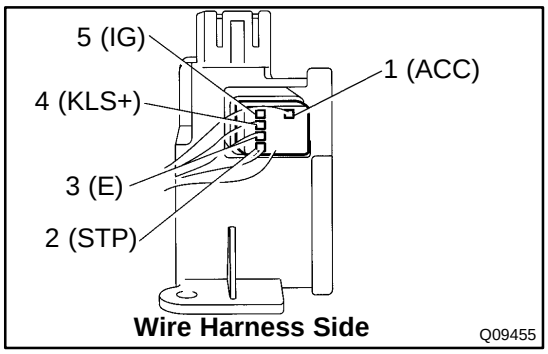
SHIFT LOCK SYSTEM

LOCATION

AX01T–02



AX01U–01



INSPECTION

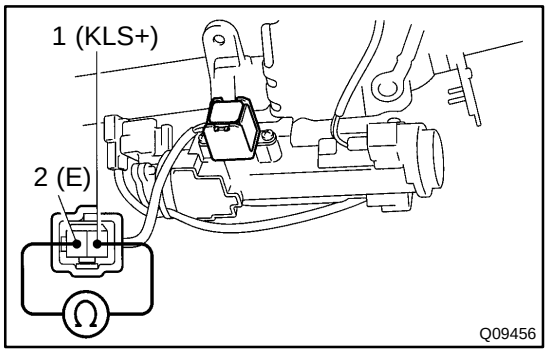
1. INSPECT SHIFT LOCK CONTROL UNIT ASSEMBLY

Using a voltmeter, measure the voltage at each terminal.

HINT:

Do not disconnect the shift lock control unit assembly connector.

Terminal	Measuring Condition	Voltage (V)
1 – 3 (ACC – E)	Ignition switch ACC	10 – 14
5 – 3 (IG – E)	Ignition switch ON	10 – 14
2 – 3 (STP – E)	Depressing brake pedal	10 – 14
4 – 3 (KLS^+ – E)	(1) Ignition switch ACC and P position (2) Ignition switch ACC and except P position (3) Ignition switch ACC and except P position (After approx. 1 second)	0 7.5 – 11 6 – 9.5



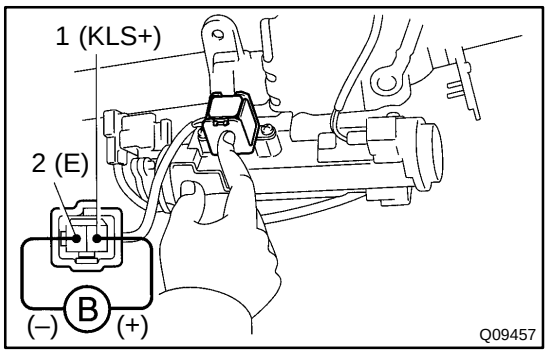
2. INSPECT KEY INTERLOCK SOLENOID

(a) Disconnect the solenoid connector.

(b) Using an ohmmeter, measure resistance between terminals.

Standard resistance: 12.5–16.5 Ω

If resistance value is not as specified, replace the solenoid.



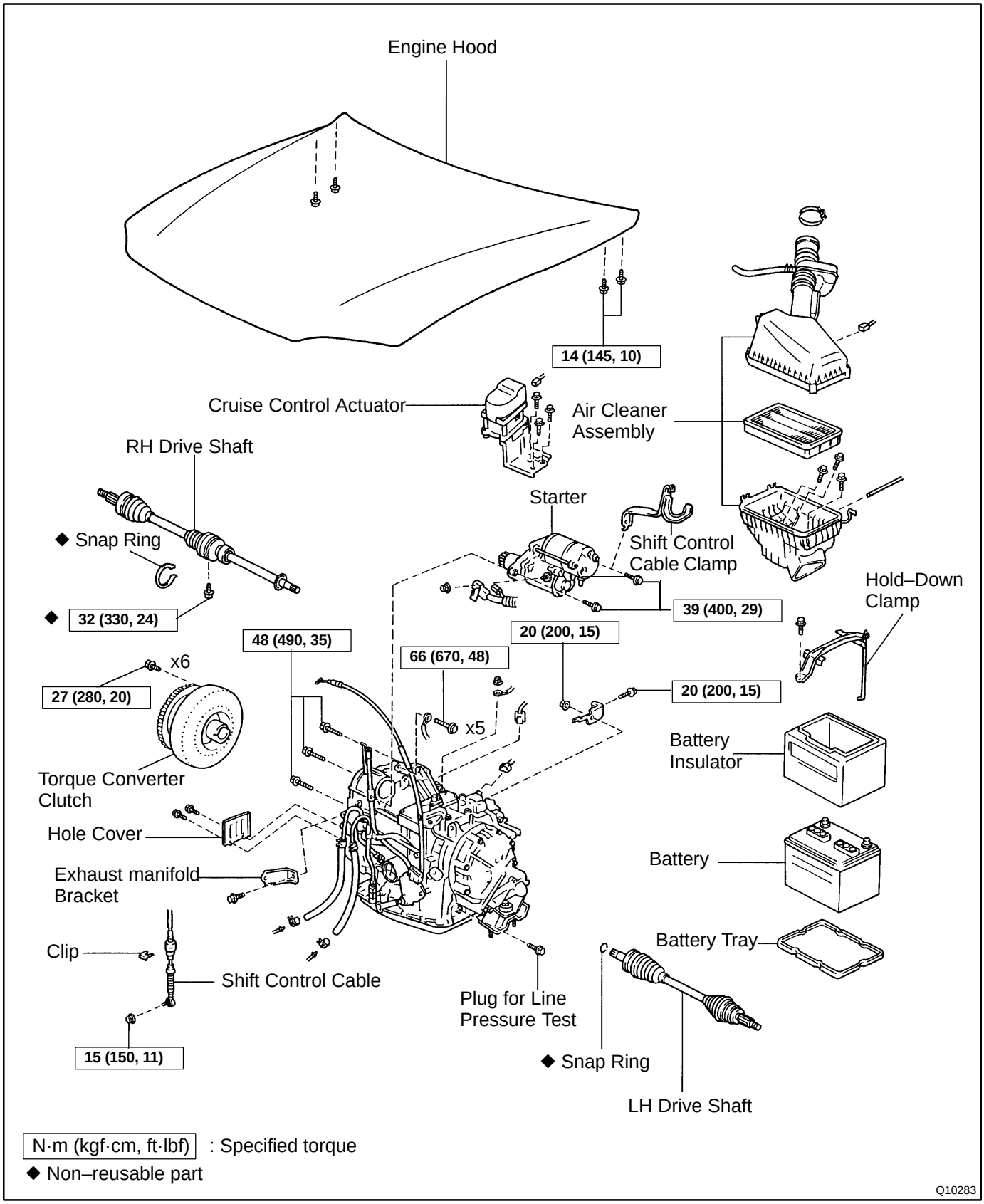
(c) Apply battery positive voltage between terminals. Check that an operation noise can be heard from the solenoid.

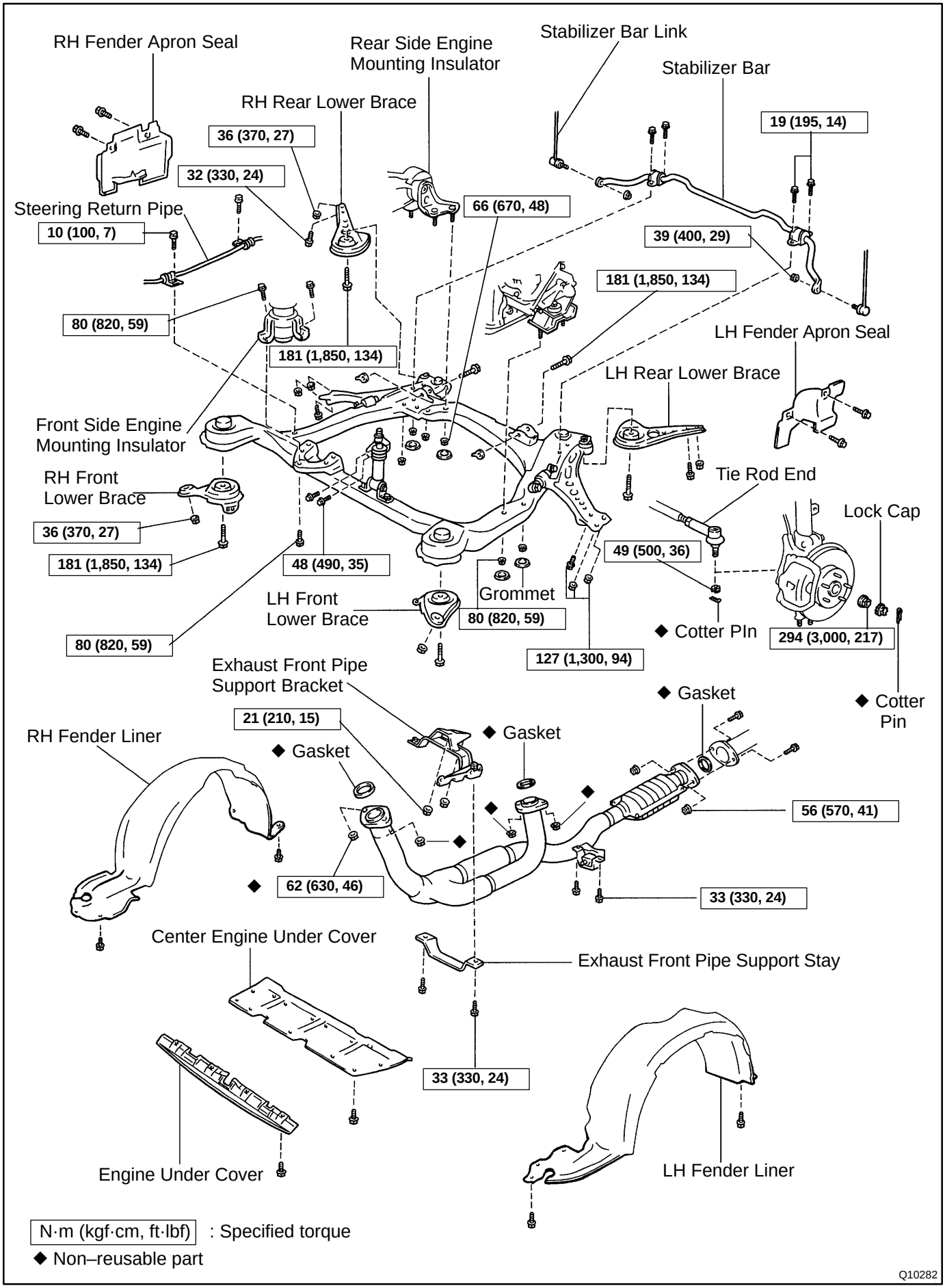
If the solenoid does not operated, replace the solenoid.

AUTOMATIC TRANSAXLE UNIT

AX01V–02

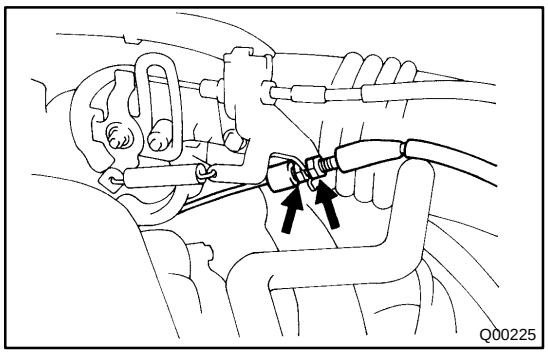
COMPONENTS




RH Fender Apron Seal
Rear Side Engine Mounting Insulator
Stabilizer Bar Link
Stabilizer Bar
RH Rear Lower Brace
36 (370, 27)
32 (330, 24)
19 (195, 14)
Steering Return Pipe
10 (100, 7)
66 (670, 48)
39 (400, 29)
181 (1,850, 134)
80 (820, 59)
LH Fender Apron Seal
181 (1,850, 134)
LH Rear Lower Brace
Front Side Engine Mounting Insulator
RH Front Lower Brace
Tie Rod End
Lock Cap
36 (370, 27)
181 (1,850, 134)
48 (490, 35)
49 (500, 36)
Grommet
LH Front Lower Brace
80 (820, 59)
◆ Cotter PIn
294 (3,000, 217)
80 (820, 59)
127 (1,300, 94)
Exhaust Front Pipe Support Bracket
◆ Gasket
◆ Cotter Pin
21 (210, 15)
◆ Gasket
◆ Gasket
RH Fender Liner
56 (570, 41)
◆ 62 (630, 46)
33 (330, 24)
Center Engine Under Cover
Exhaust Front Pipe Support Stay
33 (330, 24)
Engine Under Cover
LH Fender Liner
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Q10282

AX01W–02

REMOVAL

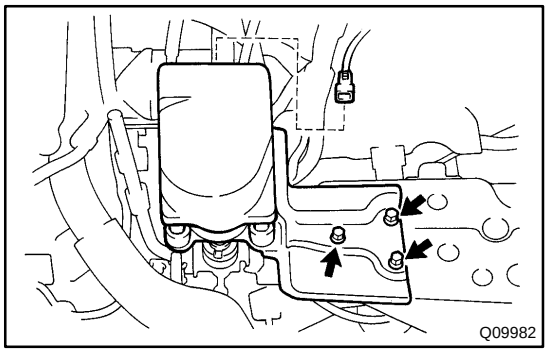


1. REMOVE BATTERY

2. REMOVE AIR CLEANER ASSEMBLY

3. REMOVE THROTTLE CABLE FROM THROTTLE BODY

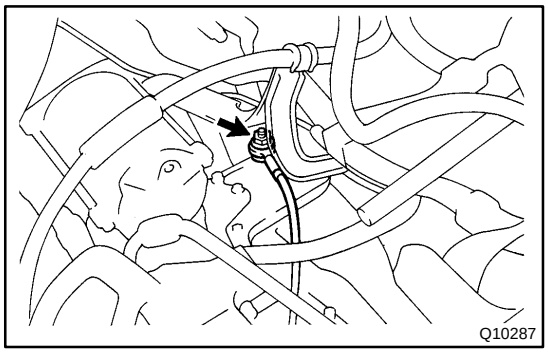
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)



4. w/ Cruise Control:
REMOVE CRUISE CONTROL ACTUATOR

(a) Disconnect the connector.

(b) Remove the 3 bolts and disconnect cruise control actuator with the bracket.



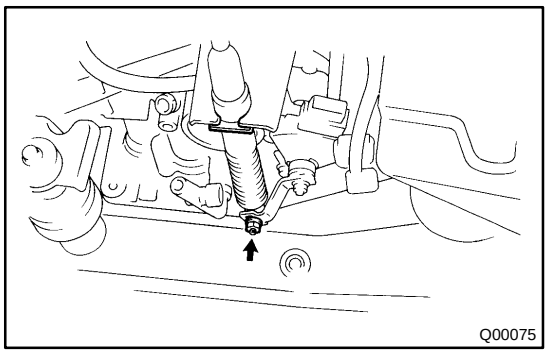
5. DISCONNECT GROUND CABLE

6. DISCONNECT VEHICLE SPEED SENSOR CONNECTOR

7. DISCONNECT DIRECT CLUTCH SPEED SENSOR CONNECTOR

8. DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR

9. DISCONNECT SOLENOID CONNECTOR

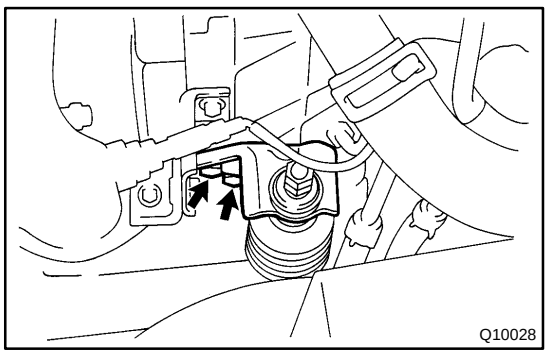


10. DISCONNECT SHIFT CONTROL CABLE

(a) Remove the nut and disconnect the shift control cable from the park/neutral position switch.

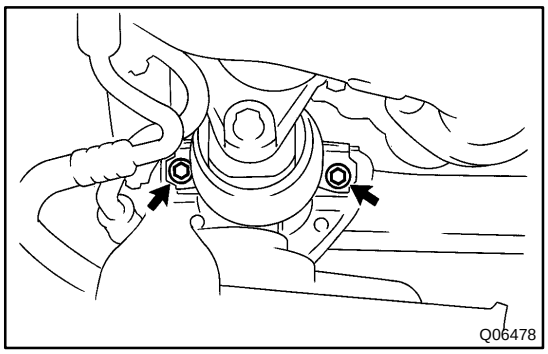
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

(b) Remove the clip and disconnect the shift control cable.

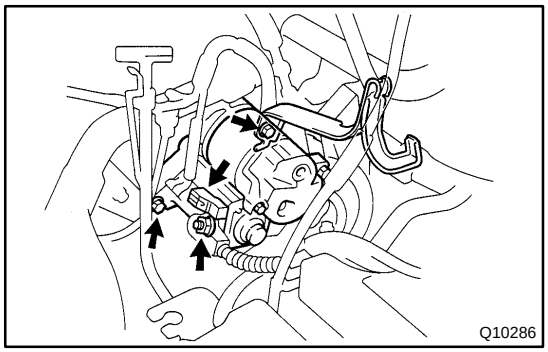


11. REMOVE 2 ENGINE MOUNTING ABSORBER BOLTS

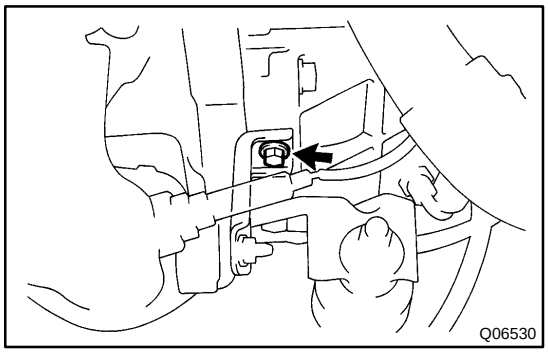
Torque: 48 N·m (490 kgf·cm, 35 ft·lbf)



12. REMOVE 2 FRONT SIDE ENGINE MOUNTING BOLTS
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)



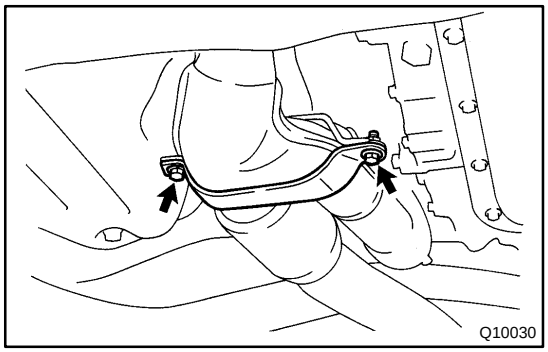
13. REMOVE STARTER AND SHIFT CONTROL CABLE CLAMP
(a) Disconnect the connector and remove the nut.
(b) Remove the 2 bolts, starter and shift control cable clamp.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)



14. REMOVE EXHAUST MANIFOLD BRACKET MOUNTING BOLT
Torque: 20 N·m (200 kgf·cm, 15 ft·lbf)

15. REMOVE 5 TRANSAXLE–TO–ENGINE BOLTS AND DISCONNECT GROUND TERMINAL
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)
16. REMOVE ENGINE HOOD
(a) Disconnect the washer pipe.
(b) Remove the 4 bolts and engine hood.
Torque: 14 N·m (145 kgf·cm, 10 ft·lbf)
17. RAISE AND SUPPORT VEHICLE SECURELY
18. REMOVE FRONT WHEELS
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
19. REMOVE DIFFERENTIAL FLUID DRAIN PLUG AND GASKET
HINT:
At the time of installation, please refer to the following item.
Replace the used gasket with a new gasket.
20. DRAIN DIFFERENTIAL FLUID
21. REMOVE LH AND RH ENGINE SIDE COVERS
22. REMOVE LH AND RH FRONT DRIVE SHAFTS
(See page SA–15)

23. REMOVE ENGINE UNDER FRONT COVER AND CENTER ENGINE UNDER COVER


Q10030

24. REMOVE EXHAUST FRONT PIPE

(a) Remove the 2 bolts and exhaust front pipe support stay.
Torque: 33 N·m (330 kgf·cm, 24 ft·lbf)

(b) Remove the 4 nuts.
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)

HINT:
At the time of installation, please refer to the following item.
Replace the used nuts with new once.

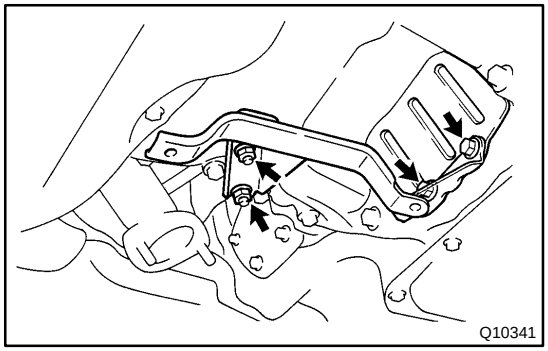
(c) Remove the 2 bolts and nuts.
Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

HINT:
At the time of installation, please refer to the following item.
Replace the used nuts with new once.

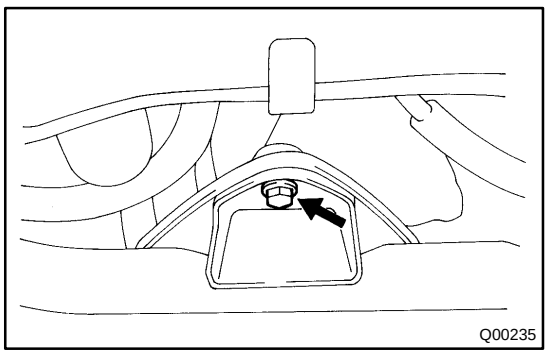
(d) Remove the 2 exhaust front pipe clamp bolts and exhaust front pipe.
Torque: 33 N·m (330 kgf·cm, 24 ft·lbf)

(e) Remove the 3 gaskets.

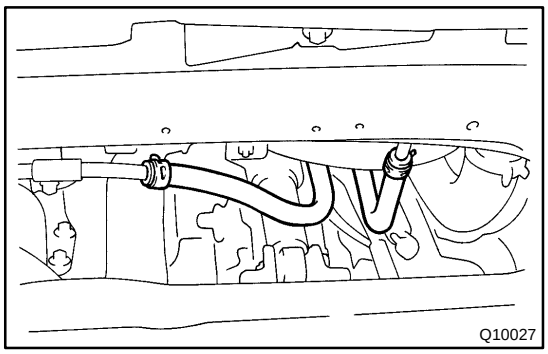
HINT:
At the time of installation, please refer to the following item.
Replace the used gaskets with new once.


Q10341

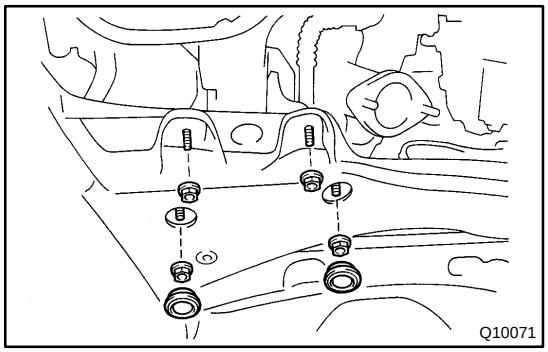
(f) Remove the 2 nuts, 2 bolts, exhaust front pipe support bracket and hole cover.
Torque:
Exhaust front pipe support bracket mounting nut:
21 N·m (210 kgf·cm, 15 ft·lbf)
Hole plug mounting bolt:
20 N·m (200 kgf·cm, 15ft·lbf)


Q00235

25. REMOVE FRONT SIDE ENGINE MOUNTING INSULATOR BOLT
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)



26. DISCONNECT 2 OIL COOLER HOSES

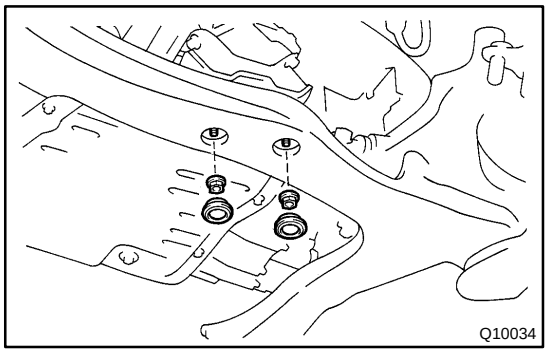


27. REMOVE REAR SIDE ENGINE MOUNTING NUT

(a) Remove the 2 grommets.

(b) Remove the 4 nuts.

Torque: 66 N·m (670 kgf·cm, 48 ft·lbf)

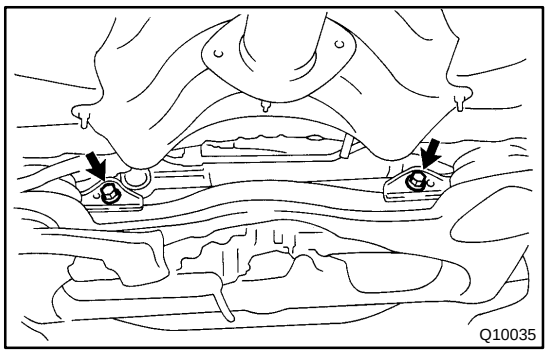


28. REMOVE LEFT SIDE TRANSAXLE MOUNTING NUT

(a) Remove the 2 grommets.

(b) Remove the 2 nuts.

Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)



29. REMOVE STEERING GEAR HOUSING

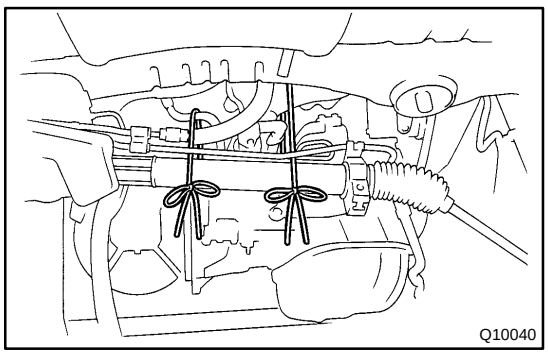
(a) Remove the 4 bolts, LH and RH stabilizer bar brackets and bushings.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

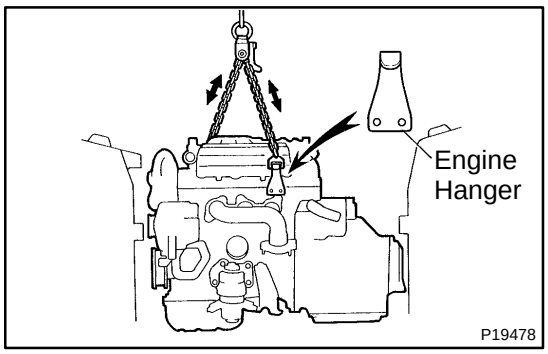
(b) Remove the front stabilizer bar.
(See page SA–41)

(c) Remove the 2 steering gear housing mounting bolts and nuts.

Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)



30. SUPPORT STEERING GEAR HOUSING, AS SHOWN

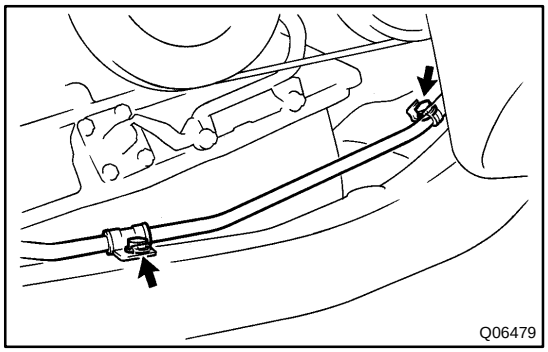


31. ATTACH ENGINE SLING DEVICE TO ENGINE HANGERS

(a) Install the No.2 engine hanger in the correct direction.
Part No.: No.2 engine hanger: 12282–20020
Bolt: 91642–80825
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

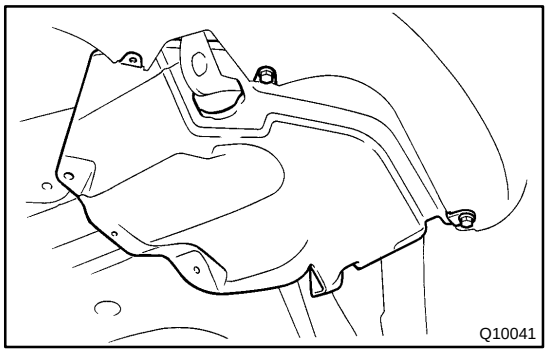
(b) Attach the engine chain hoist to the engine hangers.

CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.

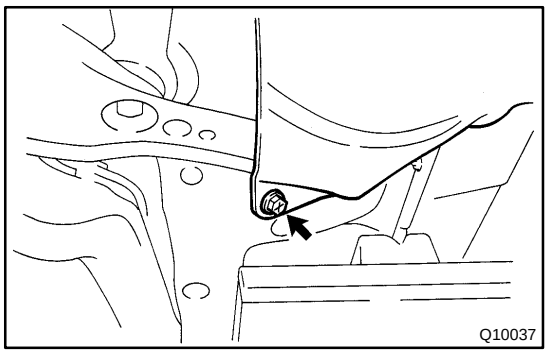


32. REMOVE FRONT FRAME ASSEMBLY

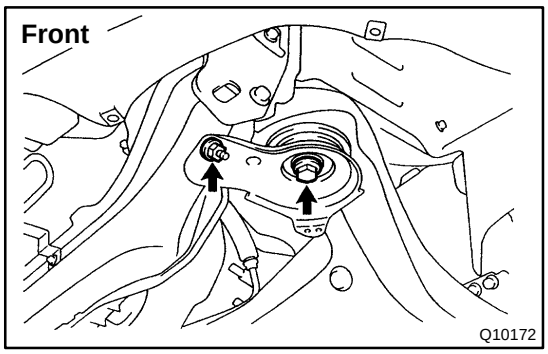
(a) Remove the 2 bolts and steering return pipe mounting brackets.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



(b) Remove the screws and turn over the front side of the LH and RH fender liners.

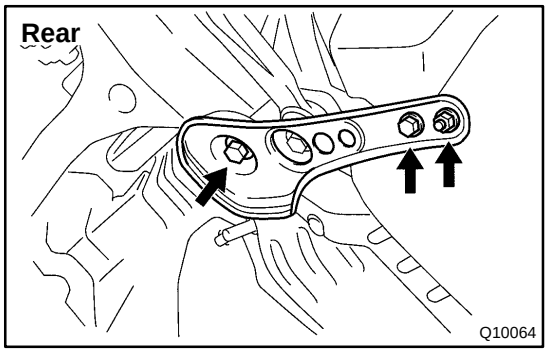


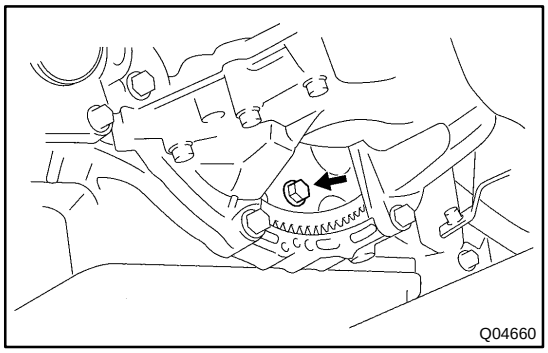
(c) Remove the screws and turn over the rear side of LH and RH fender liners.



(d) Remove the 6 bolts and 4 nuts.
Torque:
19 mm head bolt: 181 N·m (1,850 kgf·cm, 134 ft·lbf)
14 mm head bolt: 32 N·m (330 kgf·cm, 24 ft·lbf)
Nut: 36 N·m (370 kgf·cm, 27 ft·lbf)

(e) Remove the front frame assembly.





33. SUPPORT TRANSAXLE WITH A TRANSMISSION JACK

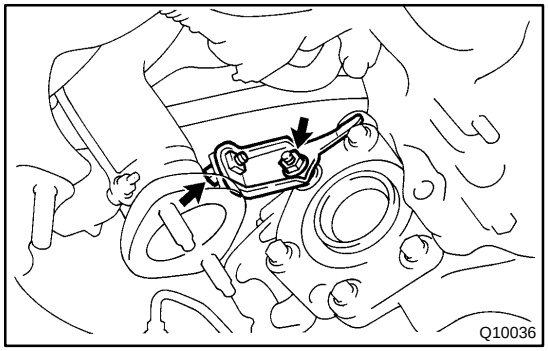
34. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLTS

Turn the crankshaft to gain access to each bolt, remove the 6 bolts with holding the crankshaft pulley bolt by a wrench.

Torque: 27 N·m (280 kgf·cm, 20 ft·lbf)

HINT:

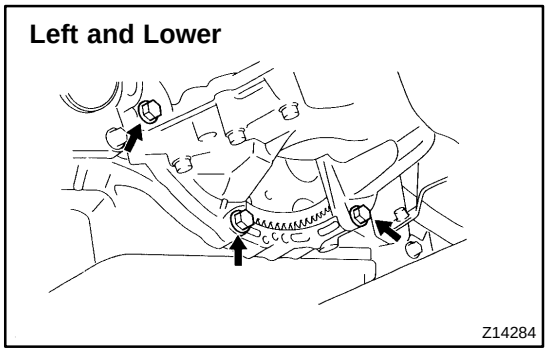
At the time of installation, please refer to the following item.
First install black colored bolt and then the 5 other bolts.



35. REMOVE EXHAUST MANIFOLD PLATE

Remove the bolt, nut and exhaust manifold plate.

Torque: 20 N·m (200 kgf·cm, 15 ft·lbf)



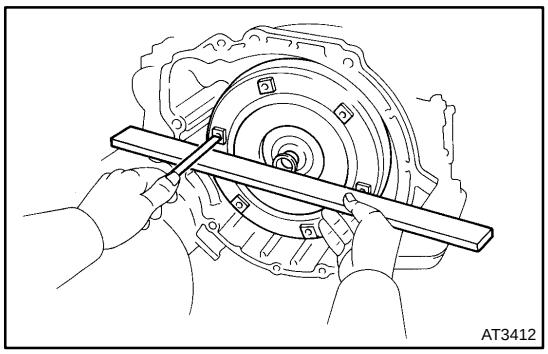
36. REMOVE 3 LOWER TRANSAXLE–TO–ENGINE BOLTS

Torque: 46 N·m (470 kgf·cm, 34 ft·lbf)

37. REMOVE TRANSAXLE ASSEMBLY

Separate the transaxle and engine, and lower the transaxle.

AX01X–02



INSTALLATION

1. CHECK TORQUE CONVERTER CLUTCH INSTALLATION

Using a scale and straight edge, measure from the installed surface to the transaxle housing.

Correct distance: 13.7 mm (0.539 in.) or more

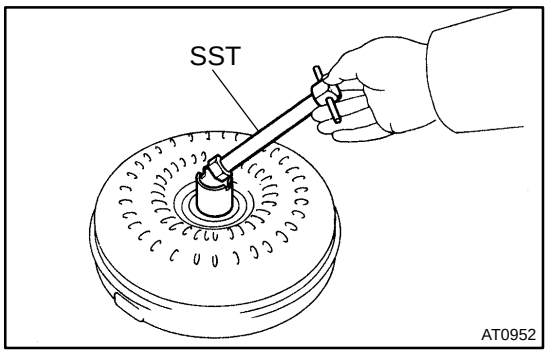
2. TRANSAXLE INSTALLATION

Installation is in the reverse order of removal.
(See page AX–20)

HINT:

After installation, check and inspect items as follows.

- Fluid level. (See page DI–150)
- Front wheel alignment. (See page SA–4)
- Do the road test.
- Hood. (See page BO–7)



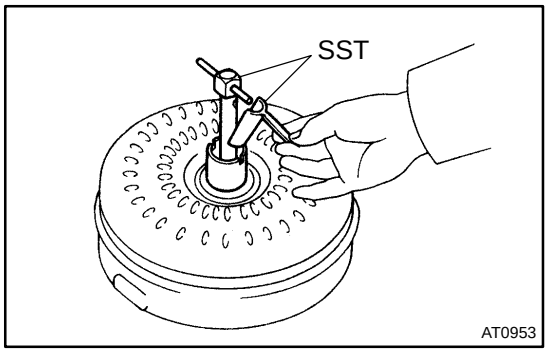
TORQUE CONVERTER CLUTCH AND DRIVE PLATE

AX01Y–02

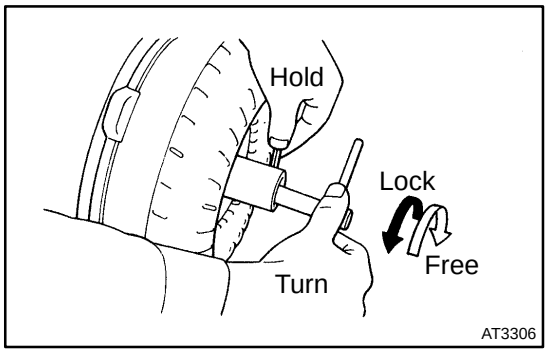
INSPECTION

1. INSPECT ONE–WAY CLUTCH

(a) Install SST into the inner race of the one–way clutch.
SST 09350–32014 (09351–32020)

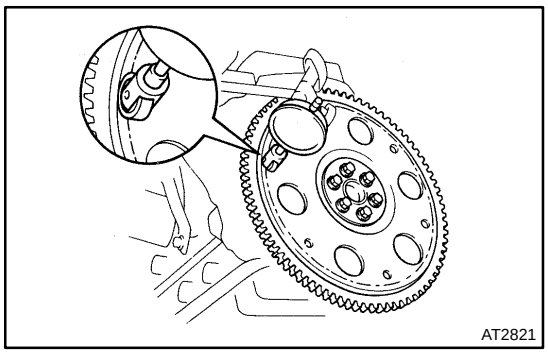


(b) Install SST so that it fits in the notch of the converter hub and outer race of the one–way clutch.
SST 09350–32014 (09351–32010)



(c) With the torque converter clutch standing on its side,the clutch locks when turned counterclockwise, and rotates freely and smoothly clockwise.

If necessary, clean the converter and retest the clutch.
Replace the converter if the clutch still fails the test.



2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

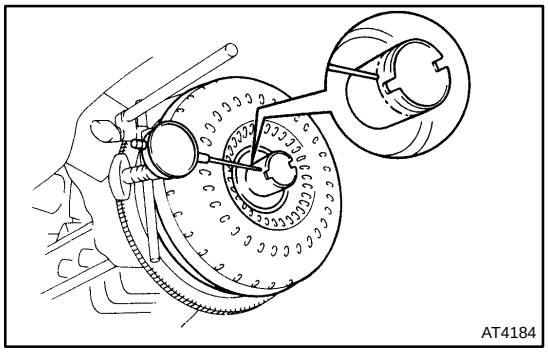
(a) Set up a dial indicator, and measure the drive plate runout.

(b) Check the damage of the ring gear.

Maximum runout: 0.20 mm (0.0079 in.)

If the runout is not within specification or ring gear is damaged, replace the drive plate.

Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)



3. MEASURE TORQUE CONVERTER CLUTCH SLEEVE RUNOUT

(a) Temporarily mount the torque converter clutch to the drive plate. Set up a dial indicator and measure the torque converter clutch sleeve runout.

Maximum runout: 0.30 mm (0.0118 in.)

If the runout is not within the specification, try to correct by reorienting the installation of the converter.

HINT:
Mark the position of the converter to ensure the correct installation.

(b) Remove the torque converter clutch.

HOW TO USE THIS MANUAL

IN002-0W

To assist you in finding your way through the manual, the Section Title and major heading are given at the top of every page.

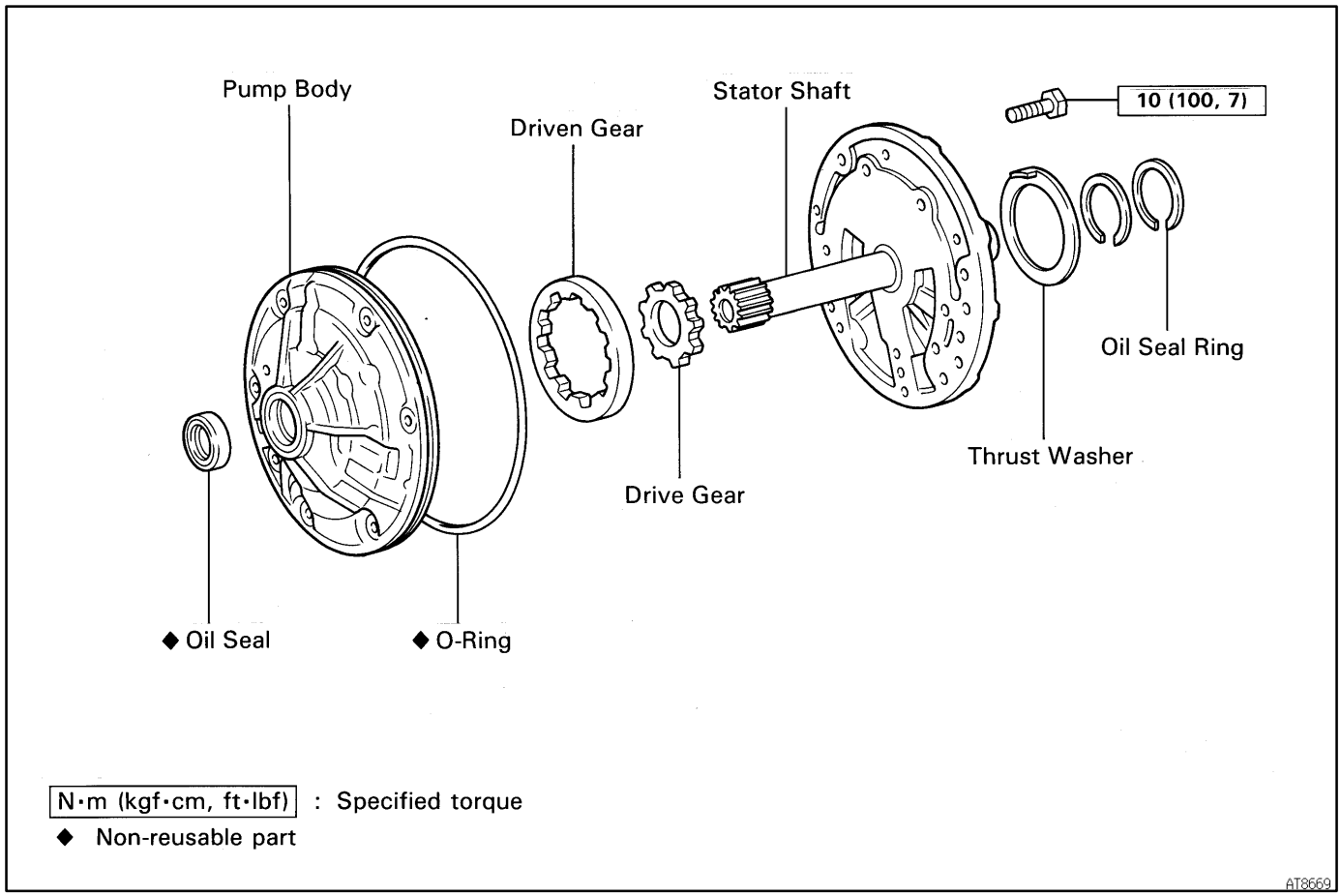
PREPARATION

Preparation lists the SST (Special Service Tools), recommended tools, equipment, lubricant and SSM (Special Service Materials) which should be prepared before beginning the operation and explains the purpose of each one.

REPAIR PROCEDURES

Most repair operations begin with an overview illustration. It identifies the components and shows how the parts fit together.

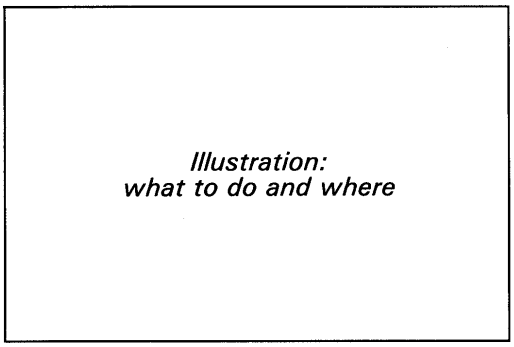
Example:



The procedures are presented in a step-by-step format:

★ The illustration shows what to do and where to do it.
★ The task heading tells what to do.
★ The detailed text tells how to perform the task and gives other information such as specifications and warnings.

Example:



Task heading : what to do

21. CHECK PISTON STROKE OF OVERDRIVE BRAKE

(a) Place SST and a dial indicator onto the overdrive brake piston as shown in the illustration.

SST 09350-30020 (09350-06120)

Set part No. *Component part No.*

Detailed text: how to do task

(b) Measure the stroke applying and releasing the compressed air (392 — 785 kPa, 4 — 8 kgf/cm² or 57 — 114 psi) as shown in the illustration.

Piston stroke: 1.40 — 1.70 mm (0.0551 — 0.0669 in.)

Specification

V00081

This format provides the experienced technician with a FAST TRACK to the information needed. The upper case task heading can be read at a glance when necessary, and the text below it provides detailed information. Important specifications and warnings always stand out in bold type.

REFERENCES

References have been kept to a minimum. However, when they are required you are given the page to refer to.

SPECIFICATIONS

Specifications are presented in bold type throughout the text where needed. You never have to leave the procedure to look up your specifications. They are also found at the back of AX section, for quick reference.

CAUTIONS, NOTICES, HINTS:

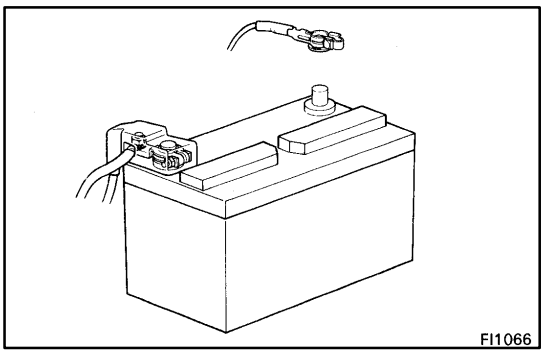
- ★ CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- ★ NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- ★ HINTS are separated from the text but do not appear in bold. They provide additional information to help you perform the repair efficiently.

SI UNIT

The UNITS given in this manual are primarily expressed according to the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the English system.

Example:

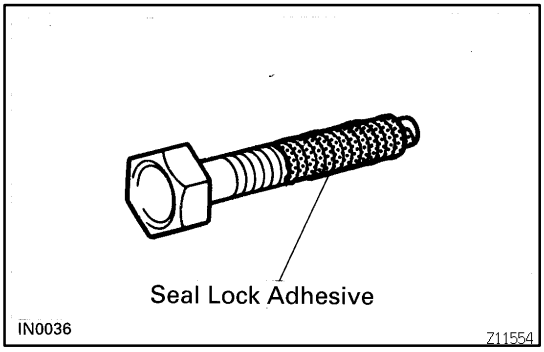
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)


FI1066

GENERAL REPAIR INSTRUCTIONS

IN022-07

1. Use fender, seat and floor covers to keep the vehicle clean and prevent damage.
2. During disassembly, keep parts in the appropriate order to facilitate reassembly.
3. Observe the following:
   (a) Before performing electrical work, disconnect the negative (-) terminal cable from the battery.
   (b) If it is necessary to disconnect the battery for inspection or repair, always disconnect the cable from the negative (-) terminal which is grounded to the vehicle body.
   (c) To prevent damage to the battery terminal post, loosen the terminal nut and raise the cable straight up without twisting or prying it.
   (d) Clean the battery terminal posts and cable terminals with a clean shop rag. Do not scrape them with a file or other abrasive objects.
   (e) Install the cable terminal to the battery post with the nut loose, and tighten the nut after installation. Do not use a hammer to tap the terminal onto the post.
   (f) Be sure the cover for the positive (+) terminal is properly in place.
4. Check hose and wiring connectors to make sure that they are secure and correct.
5. Non-reusable parts
   (a) Always replace cotter pins, gaskets, O-rings and oil seals etc. with new ones.
   (b) Non-reusable parts are indicated in the component illustrations by the "◆" symbol.



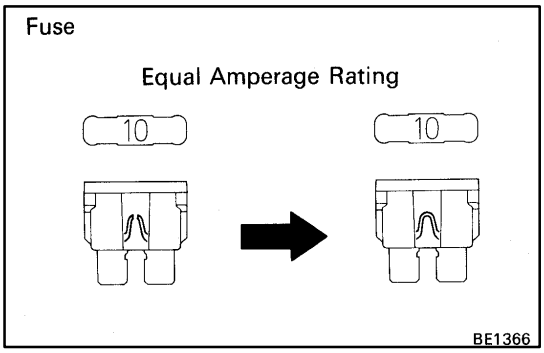
IN0036
Z11554

6. Precoated parts
   Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.
   (a) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.
   (b) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply

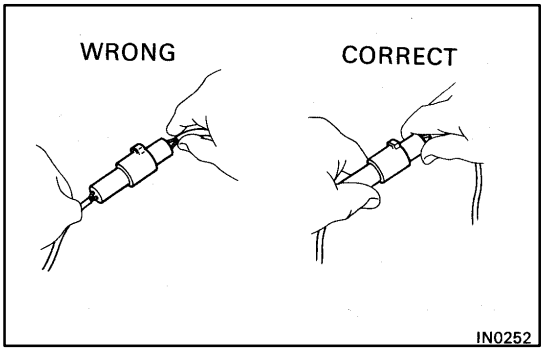
the specified seal lock adhesive to the bolt, nut or threads.

(c) Precoated parts are indicated in the component illustrations by the "★" symbol.

7. When necessary, use a sealer on gaskets to prevent leaks.
8. Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.
9. Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found at the preparation of AX section.



10. When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.



11. To pull apart electrical connectors, pull on the connector itself, not the wires.
12. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations.
    (a) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels at the opposite end in order to ensure safety.
    (b) After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.

ABBREVIATIONS USED IN THIS MANUAL

IN01H-0R

ATF	Automatic Transaxle Fluid
B_0	Overdrive Brake
B_1	Second coast Brake
B_2	Second Brake
B_3	First and Reverse Brake
C_0	Overdrive Direct Clutch
C_1	Forward Clutch
C_2	Direct Clutch
D	Disc
F	Flange
F_0	O/D One-way Clutch
F_1	No.1 One-way Clutch
F_2	No.2 One-way Clutch
MP	Multipurpose
O/D	Overdirve
P	Plate
SSM	Special Service Materials
SST	Special Service Tools

GLOSSARY OF SAE AND TOYOTA TERMS

IN016-02

This glossary lists all SAE-J1930 terms and abbreviations used in this manual in compliance with SAE recommendations, as well as their Toyota equivalents.

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )--ABBREVIATIONS
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	-
B+	Battery Positive Voltage	+B, Battery Voltage
BARO	Barometric Pressure	-
CAC	Charge Air Cooler	Intercooler
CARB	Carburetor	Carburetor
CFI	Continuous Fuel Injection	-
CKP	Crankshaft Position	Crank Angle
CL	Closed Loop	Closed Loop
CMP	Camshaft Position	Cam Angle
CPP	Clutch Pedal Position	-
CTOX	Continuous Trap Oxidizer	-
CTP	Closed Throttle Position	-
DFI	Direct Fuel Injection (Diesel)	Direct Injection (DI)
DI	Distributor Ignition	-
DLC1 DLC2 DLC3	Data Link Connector 1 Data Link Connector 2 Data Link Connector 3	1: Check Connector 2: Toyota Diagnosis Communication Link (TDCL) 3: OBD II Diagnostic Connector
DTC	Diagnostic Trouble Code	Diagnostic Code
DTM	Diagnostic Test Mode	-
ECL	Engine Control Level	-
ECM	Engine Control Module	Engine ECU (Electronic Control Unit)
ECT	Engine Coolant Temperature	Coolant Temperature, Water Temperature (THW)
EEPROM	Electrically Erasable Programmable Read Only Memory	Electrically Erasable Programmable Read Only Memory (EEPROM), Erasable Programmable Read Only Memory (EPROM)
EFE	Early Fuel Evaporation	Cold Mixture Heater (CMH), Heat Control Valve (HCV)
EGR	Exhaust Gas Recirculation	Exhaust Gas Recirculation (EGR)
EI	Electronic Ignition	Toyota Distributorless Ignition (TDI)
EM	Engine Modification	Engine Modification (EM)
EPROM	Erasable Programmable Read Only Memory	Programmable Read Only Memory (PROM)
EVAP	Evaporative Emission	Evaporative Emission Control (EVAP)
FC	Fan Control	-
FEEPROM	Flash Electrically Erasable Programmable Read Only Memory	-
FEPROM	Flash Erasable Programmable Read Only Memory	-
FF	Flexible Fuel	-
FP	Fuel Pump	Fuel Pump
GEN	Generator	Alternator
GND	Ground	Ground (GND)
HO2S	Heated Oxygen Sensor	Heated Oxygen Sensor (HO2S)

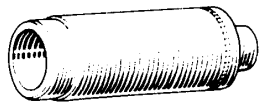
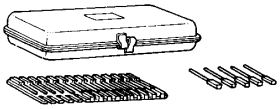
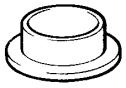
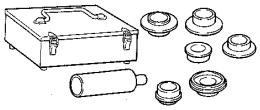
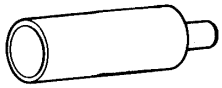
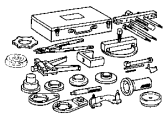
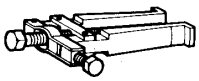
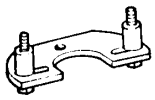
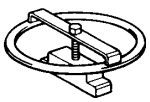
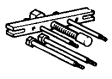
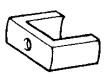
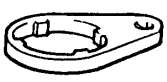
IAC	Idle Air Control	Idle Speed Control (ISC)
IAT	Intake Air Temperature	Intake or Inlet Air Temperature
ICM	Ignition Control Module	-
IFI	Indirect Fuel Injection	Indirect Injection
IFS	Inertia Fuel-Shutoff	-
ISC	Idle Speed Control	-
KS	Knock Sensor	Knock Sensor
MAF	Mass Air Flow	Air Flow Meter
MAP	Manifold Absolute Pressure	Manifold Pressure Intake Vacuum
MC	Mixture Control	Electric Bleed Air Control Valve (EBCV) Mixture Control Valve (MCV) Electric Air Control Valve (EACV)
MDP	Manifold Differential Pressure	-
MFI	Multiport Fuel Injection	Electronic Fuel Injection (EFI)
MIL	Malfunction Indicator Lamp	Check Engine Light
MST	Manifold Surface Temperature	-
MVZ	Manifold Vacuum Zone	-
NVRAM	Non-Volatile Random Access Memory	-
O2S	Oxygen Sensor	Oxygen Sensor, O_2 Sensor (O_2S)
OBD	On-Board Diagnostic	On-Board Diagnostic (OBD)
OC	Oxidation Catalytic Converter	Oxidation Catalyst Converter (OC), CCo
OP	Open Loop	Open Loop
PAIR	Pulsed Secondary Air Injection	Air Suction (AS)
PCM	Powertrain Control Module	-
PNP	Park/Neutral Position	-
PROM	Programmable Read Only Memory	-
PSP	Power Steering Pressure	-
PTOX	Periodic Trap Oxidizer	Diesel Particulate Filter (DPF) Diesel Particulate Trap (DPT)
RAM	Random Access Memory	Random Access Memory (RAM)
RM	Relay Module	-
ROM	Read Only Memory	Read Only Memory (ROM)
RPM	Engine Speed	Engine Speed
SC	Supercharger	Supercharger
SCB	Supercharger Bypass	-
SFI	Sequential Multiport Fuel Injection	Electronic Fuel Injection (EFI), Sequential Injection
SPL	Smoke Puff Limiter	-
SRI	Service Reminder Indicator	-
SRT	System Readiness Test	-
ST	Scan Tool	-
TB	Throttle Body	Throttle Body
TBI	Throttle Body Fuel Injection	Single Point Injection Central Fuel Injection (Ci)
TC	Turbocharger	Turbocharger
TCC	Torque Converter Clutch	Torque Converter
TCM	Transmission Control Module	Transmission ECU (Electronic Control Unit)
TP	Throttle Position	Throttle Position
TR	Transmission Range	-

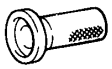
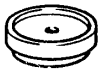
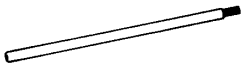
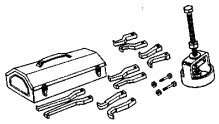
TVV	Thermal Vacuum Valve	Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three-Way Catalytic Converter	Three-Way Catalyst (TWC) CC_{RO}
TWC+OC	Three-Way + Oxidation Catalytic Converter	CC_R + CCo
VAF	Volume Air Flow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor (Read Switch Type)
WOT	Wide Open Throttle	Full Throttle
WU-OC	Warm Up Oxidation Catalytic Converter	-
WU-TWC	Warm Up Three-Way Catalytic Converter	Manifold Converter
3GR	Third Gear	-
4GR	Fourth Gear	-

PREPARATION

SST (SPECIAL SERVICE TOOLS)

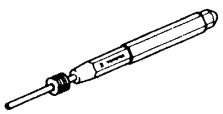
AX02L-06

	09226-10010	Crankshaft Front & Rear Bearing Replacer	Install RH retainer oil seal
	09240-00020	Wire Gauge Set	
	09316-2001 1	Transfer Bearing Replacer	
	09316-6001 1	Transmission & Transfer Bearing Replacer	
	(09316-0001 1)	Replacer Pipe	
	09350-32014	TOYOTA Automatic Transmission Tool Set	
	09308-10010	Oil Seal Puller	
	(09351-32032)	Counter Driven Gear Holding Tool	
	(09351-32040)	No.1 Piston Spring Compressor	
	(09351-32050)	Snap Ring Expander	
	(09351-32061)	Oil Pump Puller	
	(09351-32070)	No.2 Piston Spring Compressor	
	(09351-32080)	Lock Nut Wrench	

	(09351-32100)	Drive Pinion Bearing Replacer	
	(09351-32120)	Overdrive Bearing Replacer	
	(09351-32140)	Oil Seal Replacer	
	(09351-32150)	Oil Seal Replacer	
	(09351-32190)	Measure Terminal	
	(09351-32200)	No.3 Piston Spring Compressor	
	09608-1601 1	Rear Hub Bearing Tool-	Remove differential side bearing
	09612-65014	Steering Worm Bearing Puller	Remove pinion shaft bearing outer race
	09950-40010	Puller B Set	

AX02M-02

RECOMMENDED COOL

	09031-00030	Pin Punch .	

AX02N-02

EQUIPMENT

Feeler gauge	Check major clearance.
Vernier calipers	Check length of second coast brake piston rod.
Dial indicator with magnetic base	Check piston stroke and end play of the output shaft.
Dial indicator	Check inside diameter of major bushing.
Straight edge	Check side clearance of oil pump.
Torque wrench	

AX01V-08

LUBRICANT

Item	Capacity	Classification
Automatic transaxle fluid:		
Dry fill	6.75 liters (7.10 US qts, 5.94 Imp.qts)	ATF D-II or DEXRON® III (DEXRON® II)
Drain and refill	2.5 liters (2.6 US qts, 2.2 Imp.qts)	
Differential oil	0.85 liters (0.89 US qts, 0.75 Imp.qts)	ATF D-II or DEXRON® III (DEXRON® II)

AX02P-02

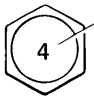
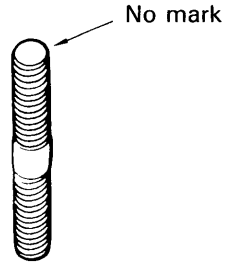
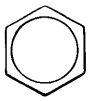
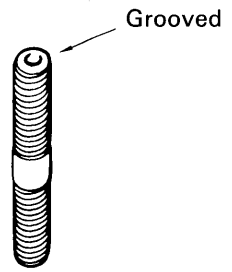
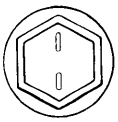
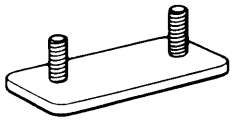
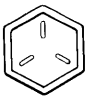
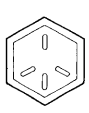
SSM (SPECIAL SERVICE MATERIALS)

08826-00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	Differential LH bearing retainer Differential RH retainer
08833-00070	Adhesive 1324, THREE BOND 1324 or equivalent	Differential RH retainer set bolt

STANDARD BOLT TORQUE SPECIFICATIONS

IN008-02

HOW TO DETERMINE BOLT STRENGTH

	Mark	Class		Mark	Class
Hexagon head bolt	 Bolt head No. 4— 5— 6— 7— 8— 9— 10— 11—	4T 5T 6T 7T 8T 9T 10T 11T	Stud bolt	 No mark	4T
	 No mark	4T		 Grooved	6T
Hexagon flange bolt w/ washer hexagon bolt	No mark	4T			
Hexagon head bolt	2 protruding lines	5T			
Hexagon flange bolt w/ washer hexagon bolt	 2 protruding lines	6T	Welded bolt		4T
Hexagon head bolt	 3 protruding lines	7T			
Hexagon head bolt	 4 protruding lines	8T			

V00078

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N·m	kgf·cm	ft·lbf	N·m	kgf·cm	ft·lbf
4T	6	1	5	55	48 in.·lbf	6	60	52 in.·lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	—	—	—
5T	6	1	6.5	65	56 in.·lbf	7.5	75	65 in.·lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	—	—	—
6T	6	1	8	80	69 in.·lbf	9	90	78 in.·lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	—	—	—
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	—	—	—
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

SERVICE SPECIFICATIONS

SERVICE DATE

AX0H1-06

Second Coast Brake

Piston stroke	2.0 - 3.5 mm	0.079 - 0.138 in.
Piston rod length	95.2 mm	3.748 in.
	96.3 mm	3.791 in.

Oil Pump

Body clearance	STD	0.07 - 0.15 mm	0.0028 - 0.0059 in.
	Maximum	0.30 mm	0.0118 in.
Tip clearance	STD	0.11 - 0.14 mm	0.0043 - 0.0055 in.
	Maximum	0.30 mm	0.0118 in.
Side clearance	STD	0.02 - 0.05 mm	0.0008 - 0.0020 in.
	Maximum	0.10 mm	0.0039 in.
Pump body bushing inside diameter	Maximum	38.18 mm	1.5031 in.
Stator shaft bushing inside diameter			
Front side	Maximum	21.57 mm	0.8492 in.
Rear side	Maximum	27.07 mm	1.0657 in.

Direct Clutch

Piston stroke	0.91 - 1.35 mm	0.0358 - 0.0531 in.
Drum bushing inside diameter	48.27 mm	1.9004 in.
Flange thickness	2.70 mm	0.1063 in.
	3.00 mm	0.1181 in.

Forward Clutch

Piston stroke	1.79 - 2.21 mm	0.0704 - 0.0870 in.
Flange thickness	2.30 mm	0.0906 in.
	2.70 mm	0.1063 in.

Front Planetary Gear

Sun gear bushing inside diameter	Maximum	22.59 mm	0.8894 in.
Ring gear flange bushing inside diameter	Maximum	30.08 mm	1.1842 in.
Planetary pinion gear thrust clearance	Maximum	0.61 mm	0.024 in.

Rear Planetary Gear

Planetary pinion gear thrust clearance	Maximum	0.61 mm	0.024 in.

First and Reverse Brake

Pack clearance	1.92 - 2.68 mm	0.0756 - 0.1055 in.

Overdrive Unit

Piston stroke		1.75 - 2.49 mm	0.0689 - 0.0980 in.
Direct clutch bushing inside diameter	Maximum	22.13 mm	0.8713 in.
Planetary pinion gear thrust clearance	STD	0.16 - 0.56 mm	0.0063 - 0.0220 in.
	Maximum	0.61 mm	0.024 in.

Valve Body Spring

Spring	Free length / Coil outer diameter mm (in.)	Total No. of coils / Color
Upper valve body		
Low coast modulator valve	20.2 (0.795) / 7.9 (0.311)	11.9 / Purple
B_1 orifice control valve	24.8 (0.976) / 6.4 (0.252)	12.0 / White
Down-shift plug	15.0 (0.591) / 11.0 (0.433)	7.0 / None
Throttle valve	31.5 (1.240) / 7.0 (0.276)	11.4 / Green
Lock-up relay valve	26.8 (1.055) / 10.2 (0.402)	10.8 / Yellow
Lower valve body		
2-3 shift valve	28.0 (1.102) / 9.4 (0.370)	10.3 / None
Second coast modulator valve	20.2 (0.795) / 7.9 (0.311)	11.9 / Purple
Accumulator control vavle	25.1 (0.988) / 8.6 (0.339)	8.0 / Red
Secondary regulator valve	46.9 (1.846) / 5.9 (0.232)	21.8 / None
Second lock valve	20.7 (0.815) / 7.4 (0.291)	9.5 / None
Reverse control valve	38.1 (1.500) / 6.5 (0.256)	19.0 / White/Purple
1-2 shift valve	29.2 (1.150) / 8.9 (0.350)	12.0 / Light Green
3-4 shift valve	28.0 (1.102) / 7.6 (0.299)	10.3 / None
Primary regulator valve	36.6 (1.441) / 16.1 (0.634)	6.3 / None
Cut-back valve	21.8 (0.858) / 6.0 (0.236)	13.5 / None
Solenoid modulator valve	30.2 (1.189) / 5.6 (0.220)	15.3 / Purple/Pink

Valve Body Key

Key	Height mm (in.)	Width mm (in.)	Thickness mm (in.)
Upper valve body			
B_1 orifice control valve	8.9 (0.350)	5.0 (0.197)	3.2 (0.126)
Low coast modulator valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
Lower valve body			
Accumulator control valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
Secondary regulator valve	11.0 (0.433)	5.0 (0.197)	3.2 (0.126)
1-2 shift valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
2-3 shift valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
3-4 shift valve	6.5 (0.256)	5.0 (0.197)	3.2 (0.126)
Second lock valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
Second coast modulator valve	8.0 (0.315)	5.0 (0.197)	3.2 (0.126)
Reverse control valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
Cut-back valve	9.2 (0.362)	5.0 (0.197)	3.2 (0.126)
Solenoid modulator valve	8.5 (0.335)	5.0 (0.197)	3.2 (0.126)
Lock-up control valve	9.2 (0.315)	5.0 (0.197)	3.2 (0.126)

Accumulator Spring

Spring		Free length mm (in.)	Color
C_0	Inner	47.5 (1.870)	White
	Outer	16.3 (0.642)	None
C_1		73.6 (2.898)	None
C_2		51.8 (2.039)	Yellow / Purple
B_0		66.8 (2.630)	Red / Yellow
B_2	Inner	70.3 (2.767)	None
	Outer	88.2 (3.473)	None

Differential Assembly

Drive pinion preload (at Starting)			
New bearing	1.0 - 1.6 N·m	10 - 16 kgf·cm	8.7 - 13.9 in.·lbf
Reused bearing	0.5 - 0.8 N·m	5 - 8 kgf·cm	4.3 - 6.9 in.·lbf
Total preload (at starting)			
New bearing	Drive pinion preload plus 0.3 - 0.4 N·m	2.8 - 4.4 kgf·cm	2.4 - 3.8 in.·lbf
Reused bearing	Drive pinion preload plus 0.1 - 0.2 N·m	1.4 - 2.2 kgf·cm	1.2 - 1.9 in.·lbf
Pinion to side gear backlash	0.05 - 0.20 mm		0.0020 - 0.0079 in.
Side gear thrust washer thickness	1.60 mm		0.0630 in.
	1.70 mm		0.0670 in.
	1.80 mm		0.0709 in.
Side bearing adjusting shim thickness	Mark		
	0	2.00 mm	0.0787 in.
	1	2.05 mm	0.0807 in.
	2	2.10 mm	0.0827 in.
	3	2.15 mm	0.0846 in.
	4	2.20 mm	0.0866 in.
	5	2.25 mm	0.0886 in.
	6	2.30 mm	0.0906 in.
	7	2.35 mm	0.0925 in.
	8	2.40 mm	0.0945 in.
	9	2.45 mm	0.0965 in.
	A	2.50 mm	0.0984 in.
	B	2.55 mm	0.1004 in.
	C	2.60 mm	0.1024 in.
	D	2.65 mm	0.1043 in.
	E	2.70 mm	0.1063 in.
	F	2.75 mm	0.1083 in.
	G	2.80 mm	0.1102 in.
	H	2.85 mm	0.1122 in.

AX04N-03

TORQUE SPECIFICATIONS

Part tightened	N·m	kgf·cm	ft·lbf
Oil cooler pipe union	27	275	20
Oil pan	4.9	50	43 in.·lbf
Valve body x Transaxle case	11	110	8
Accumulator x Cover	10	100	7
Oil pump x Transaxle case	22	225	16
O/D case x Transaxle case	25	250	18
Differential LH side bearing retainer	19	195	14
Differential RH retainer	19	195	14
Differential carrier cover	39	400	29
Oil pump body x Stator shaft	10	100	7
Ring gear x Differential case	124	1,260	91
Upper valve body x Lower valve body	6.6	67	58 in.·lbf
Accumulator cylinder x Valve body	6.6	67	58 in.·lbf
Solenoid x Valve body	6.6	67	58 in.·lbf
Counter drive gear lock nut	280	2,855	206
Carrire cover x Transaxle case	39	400	29
Parking lock pawl bracket	7.4	75	65 in.·lbf
Oil strainer x Transaxle case	11	110	8

DESCRIPTION

GENERAL SPECIFICATIONS

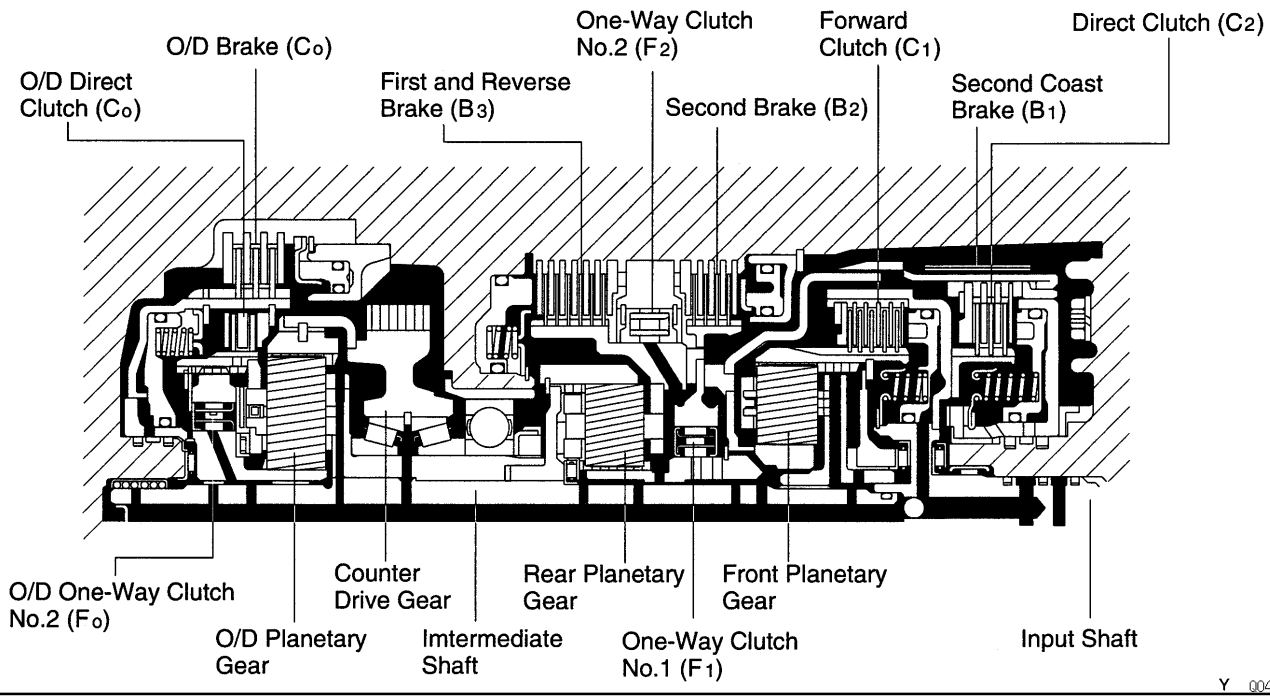
AX0CH-05

Type of Transaxle		A541E
Type of Engine		1MZ-FE
Torque Converter Clutch Stall Torque Ratio		1.8 : 1
Torque Converter Clutch Lock-up Mechanism		Equipped
Gear Ratio	1st Gear	2.810
	2nd Gear	1.549
	3rd Gear	1.000
	O/D Gear	0.735
	Reverse Gear	2.296
Transaxle	Number of Discs and Plates	
	O/D Direct Clutch (C_0)	2 / 2
	Forward Clutch (C_1)	5 / 5
	Direct Clutch (C_2)	3 / 3
	2nd Brake (B_2)	3 / 3
	First and Reverse Brake (B_3)	6 / 6
	O/D Brake (B_0)	3 / 3
B_1 Band Width	mm (in.)	25 (0.98)
ATF Type		ATF D-II or DEXRON® III (DEXRON® II)
Capacity liter (US qts, Imp.qts)	A/T	6.75(7.1, 5.9)
	D/F	0.85 (0.9, 0.7)

OPERATION

1. MECHANICAL OPERATION

AX0RF-01



○ ..... Operating

Shift lever position	Gear Position	C_0	C_1	C_2	B_0	B_1	B_2	B_3	F_0	F_1	F_2
P	Parking	○									
R	Reverse	○		○				○			
N	Neutral	○									
D	1st	○	○						○		○
	2nd	○	○				○		○	○	
	3rd	○	○	○			○		○		
	O/D		○	○	○		○				
2	1st	○	○						○		○
	2nd	○	○			○	○		○	○	
	*3rd	○	○	○			○		○		
L	1st	○	○					○	○		○
	*2nd	○	○			○	○		○	○	

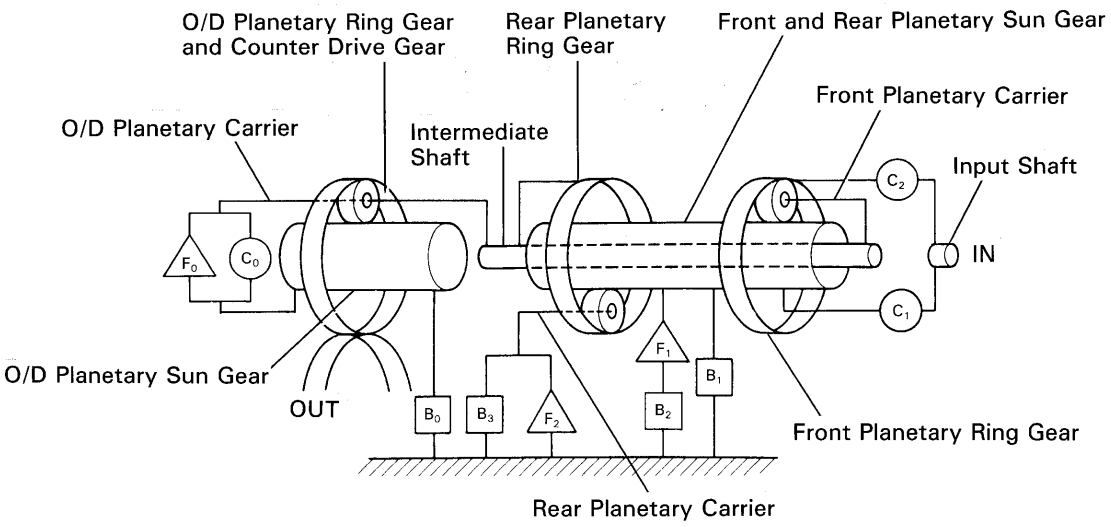
*Down-shift only – no up-shift

V04753

AX019-03

2. FUNCTION OF COMPONENTS

COMPONENT		FUNCTION
Forward Clutch	C_1	Connects input shaft and front planetary ring gear
Direct Clutch	C_2	Connects input shaft and front & rear planetary sun gear
2nd Coast Brake	B_1	Prevents front & rear planetary sun gear from turning either clockwise or counterclockwise
2nd Brake	B_2	Prevents outer race of F_1 from turning either clockwise or counterclockwise, thus preventing front & rear planetary sun gear from turning counterclockwise
1st & Reverse Brake	B_3	Prevents rear planetary carrier from turning either clockwise or counterclockwise
No.1 One-Way Clutch	F_1	When B_2 is operating, prevents front & rear planetary sun gear from turning counterclockwise
No.2 One-Way Clutch	F_2	Prevents rear planetary carrier from turning counterclockwise
O/D Direct Clutch	C_0	Connects overdrive sun gear and overdrive planetary carrier
O/D Brake	B_0	Prevents overdrive sun gear from turning either clockwise or counterclockwise
O/D One-Way Clutch	F_0	When transaxle is being driven by engine, connects overdrive sun gear and overdrive carrier
Planetary Gears		These gears change the route through which driving force is transmitted in accordance with the operation of each clutch and brake in order to increase or reduce the input and output speed

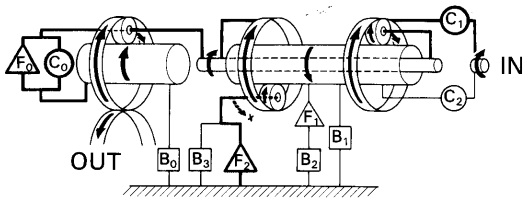


AT3207

V02267

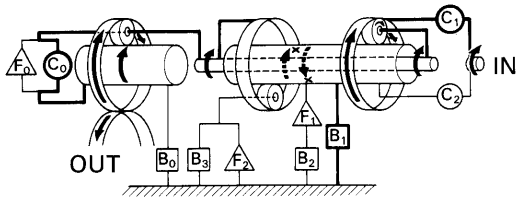
Power from the engine transmitted to the input shaft via the torque converter clutch is then transmitted to the planetary gears by the operation of the clutch.
By operation of the brake and one-way clutch, either the planetary carrier or the planetary sun gear are immobilized, altering the speed of revolution of the planetary gear unit.
Shift change is carried out by altering the combination of clutch and brake operation.
Each clutch and brake operates by hydraulic pressure; gear position is decided according to the throttle opening angle and vehicle speed, and shift change automatically occurs.
The conditions of operation for each gear position are shown on the following illustrations:

D or 2 Position 1st Gear



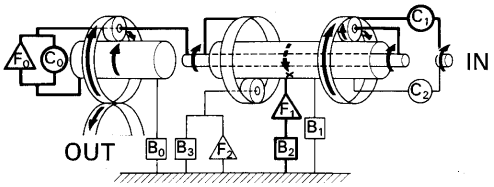
AT1097

2 Position 2nd Gear



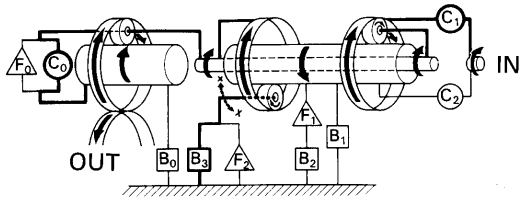
AT1102

D Position 2nd Gear



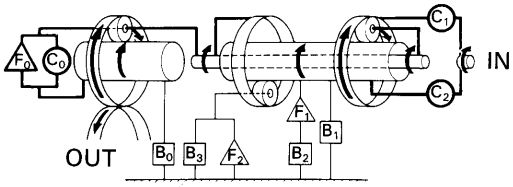
AT1098

L Position 1st Gear



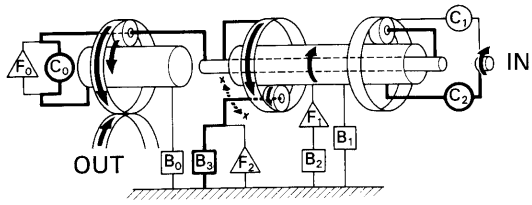
AT1103

D Position 3rd Gear



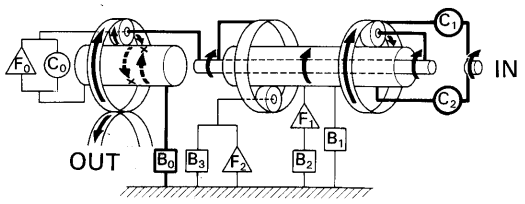
AT1099

R Position Reverse Gear



AT1101

D Position O/D Gear



AT1100

V02268

AX01A-0B

3. HYDRAULIC CONTROL SYSTEM

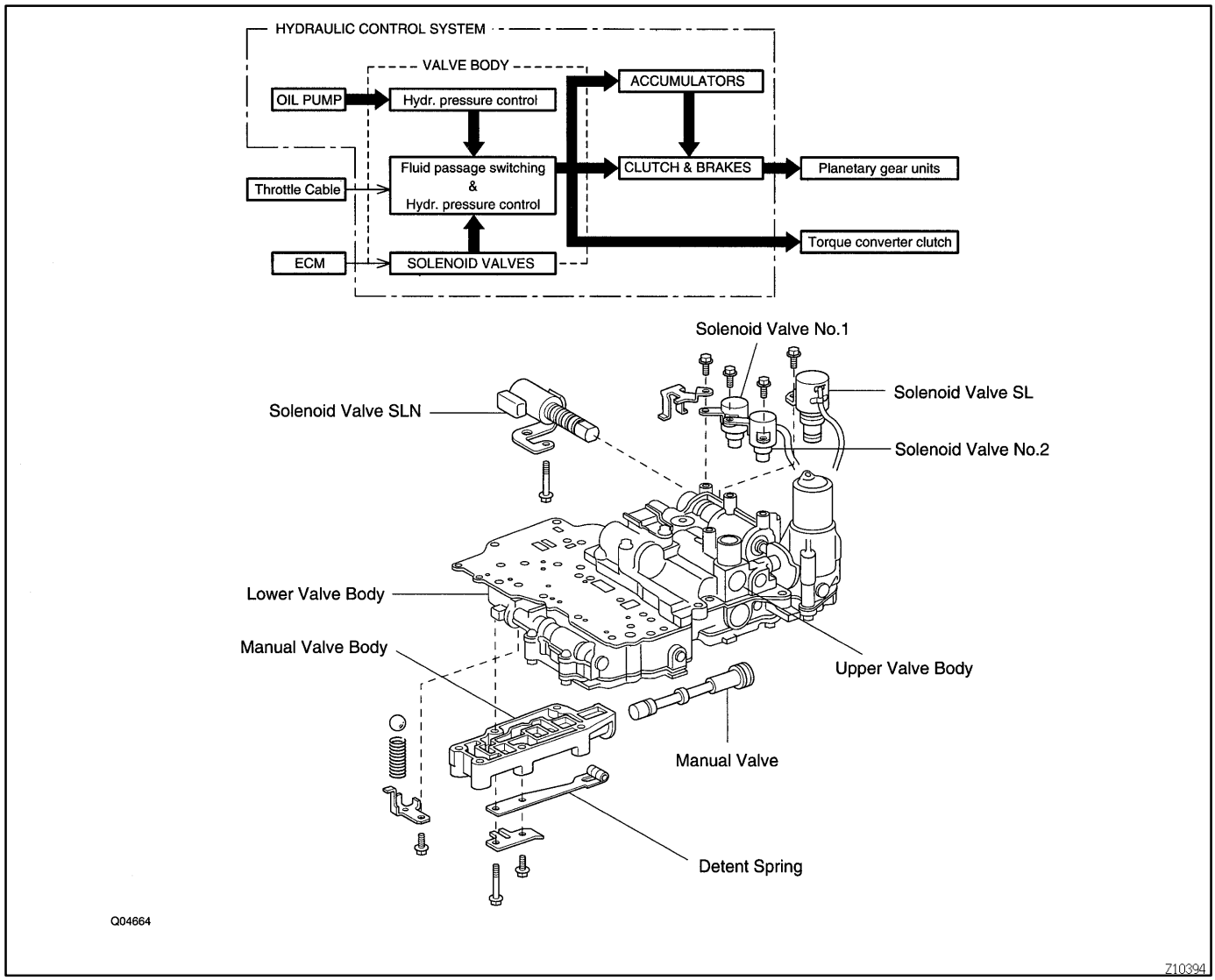
The hydraulic control system is composed of the oil pump, the valve body, the solenoid valves, the accumulators, the clutches and brakes as well as the fluid passages which connect all of these components. Based on the hydraulic pressure created by the oil pump, the hydraulic control system governs the hydraulic pressure acting on the torque converter clutch, clutches and brakes in accordance with the vehicle driving conditions.

There are three solenoid valves on the valve body.

The No.1 and No.2 solenoid vales are turned on and off by signals from the ECM to operate the shift valves and change the gear shift position.

The SL solenoid valve is operated by signals from the ECM to engage or disengage the lock-up clutch of the torque converter clutch.

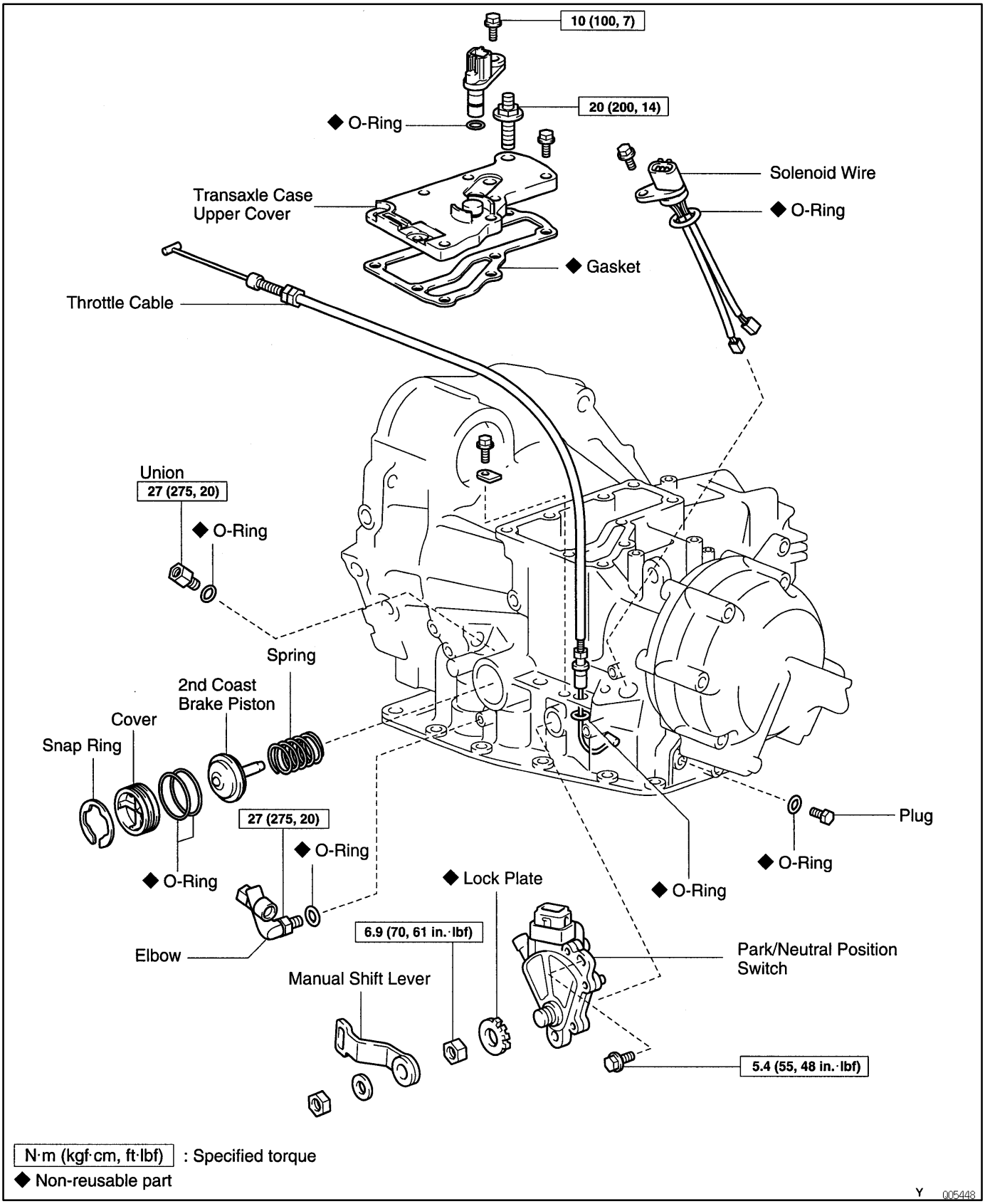
The SLN solenoid valve is operated by signals from the ECM to control the engagement speed and reduce gear shift shock.



COMPONENT PARTS REMOVAL

AX02Q-02

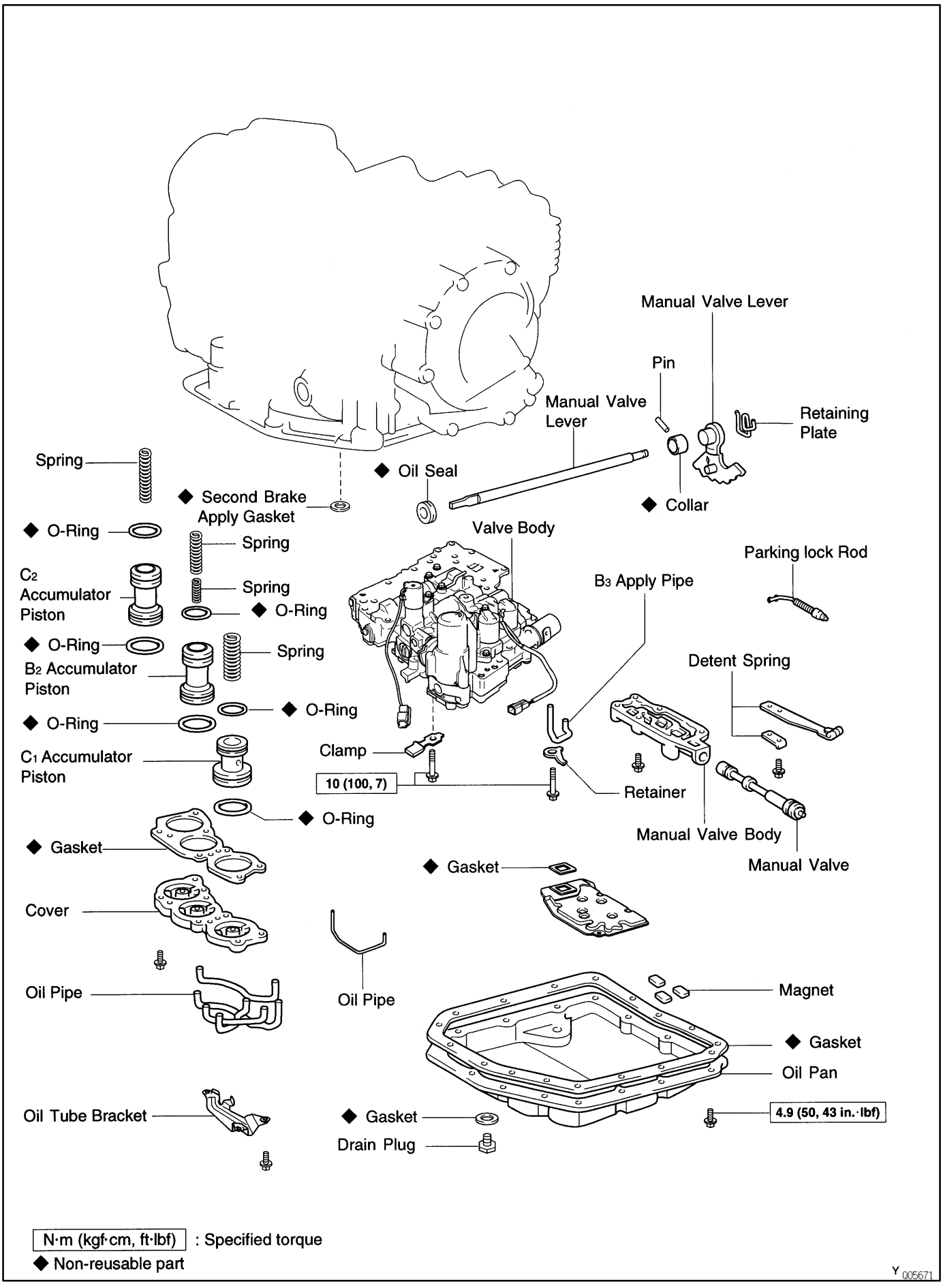
COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

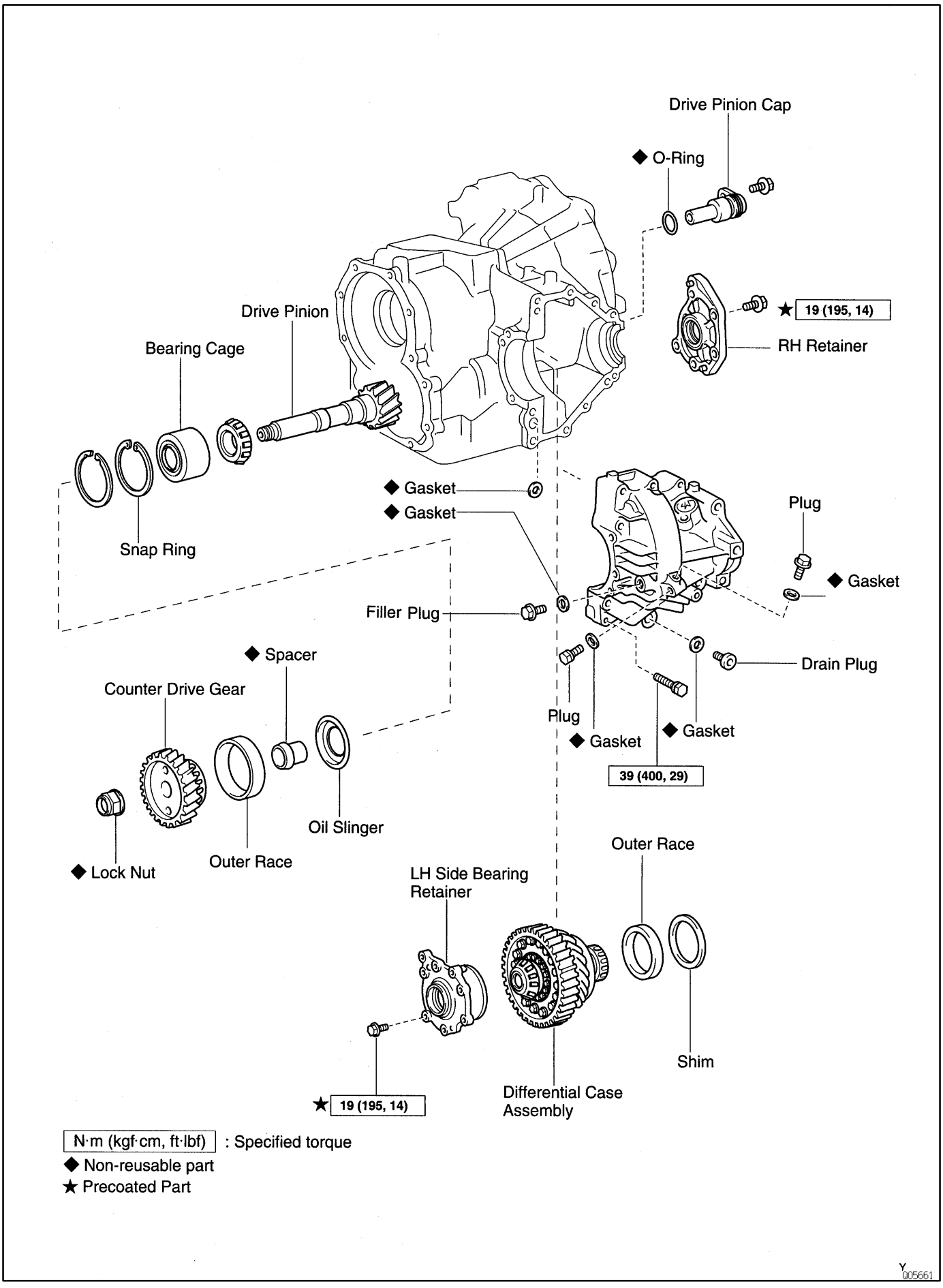
◆ Non-reusable part

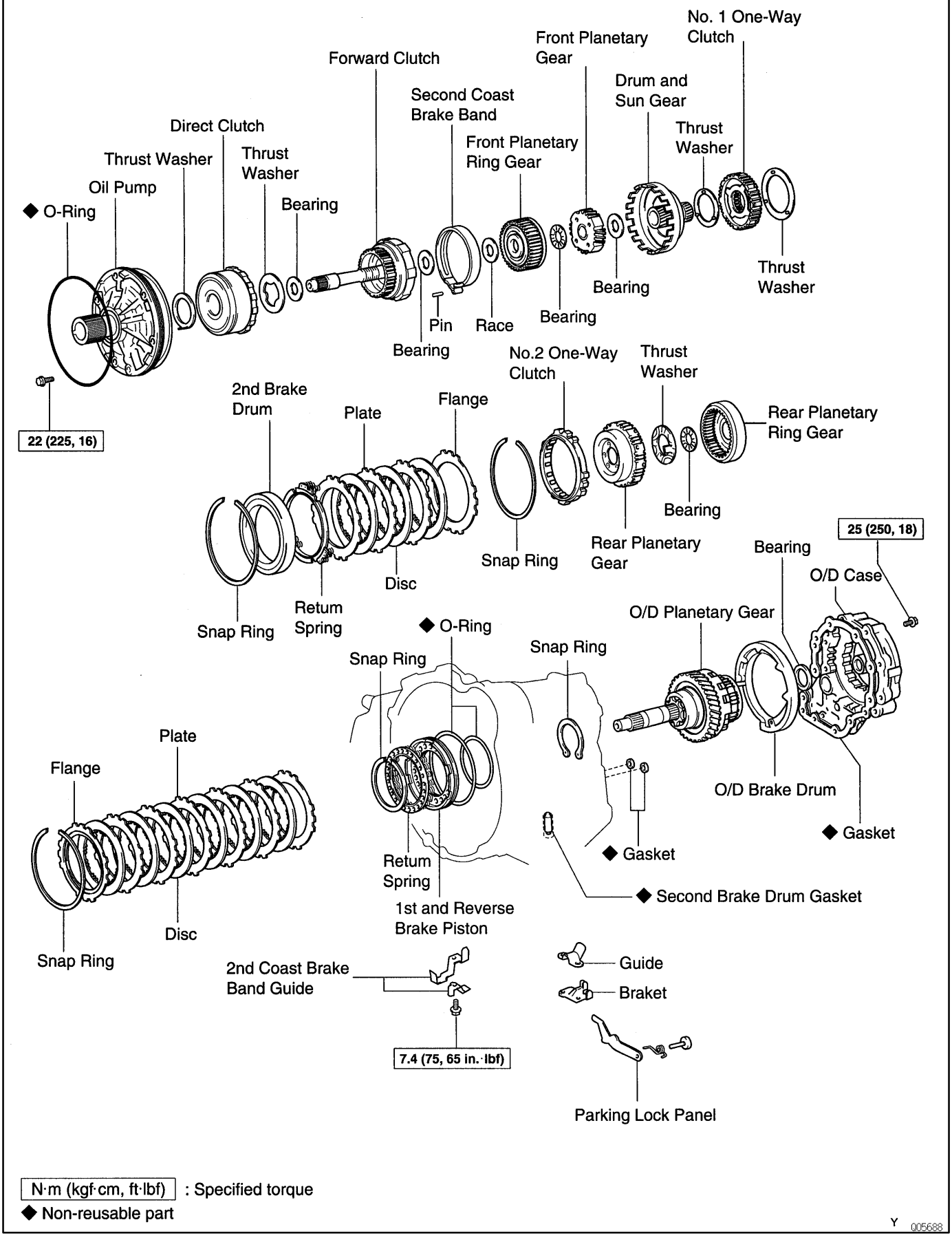
Y 005448



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

Y 005671


Drive Pinion Cap
◆ O-Ring
★ 19 (195, 14)
RH Retainer
Drive Pinion
Bearing Cage
Snap Ring
◆ Gasket
◆ Gasket
Plug
◆ Gasket
Filler Plug
Drain Plug
◆ Spacer
Counter Drive Gear
Plug
◆ Gasket
◆ Gasket
39 (400, 29)
Oil Slinger
Outer Race
◆ Lock Nut
Outer Race
LH Side Bearing Retainer
Shim
★ 19 (195, 14)
Differential Case Assembly
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
★ Precoated Part
Y005661

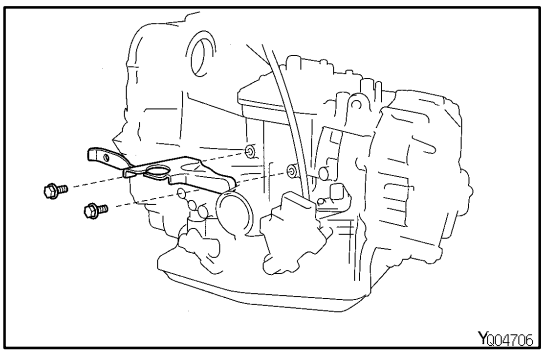


N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

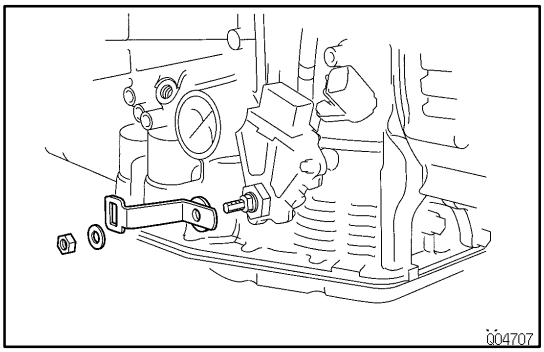
Y 005688

AX0TT-02

SEPARATE BASIC SUBASSEMBLY

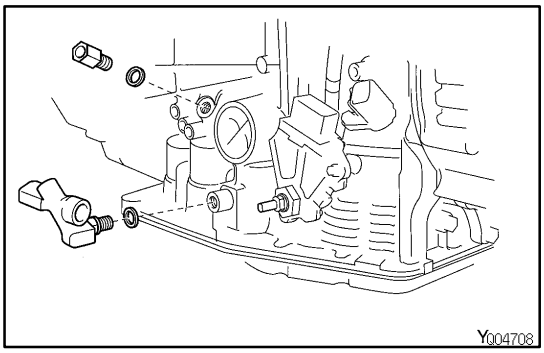


1. REMOVE SHIFT CONTROL CABLE BRACKET

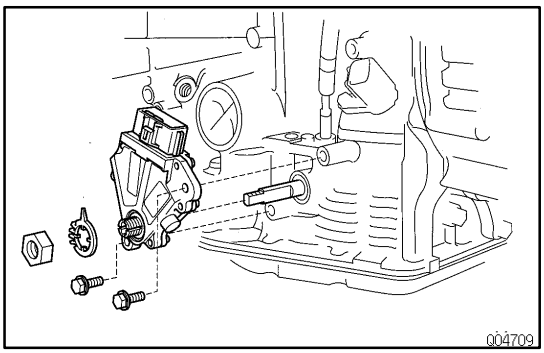


2. REMOVE UNION AND ELBOW

(a) Remove the manual shift lever.

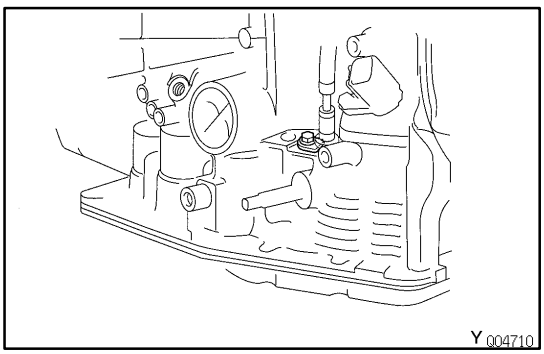


(b) Using a open end wrench, remove the union and elbow.
(c) Remove the O-rings from the union and elbow.

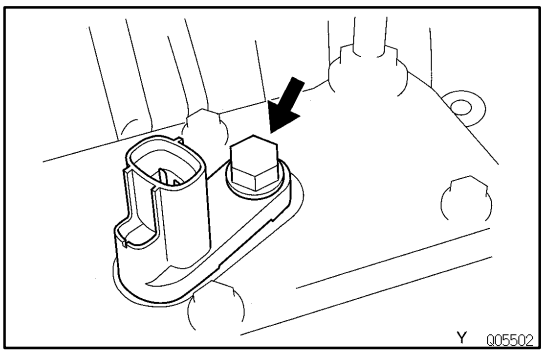


3. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Pry off the lock washer and remove the manual valve shaft nut.
(b) Remove the 2 bolts and pull out the park/neutral position switch.



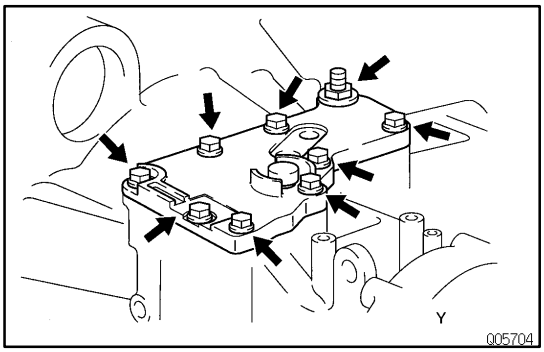
4. REMOVE THROTTLE CABLE RETAINING BOLT AND PLATE



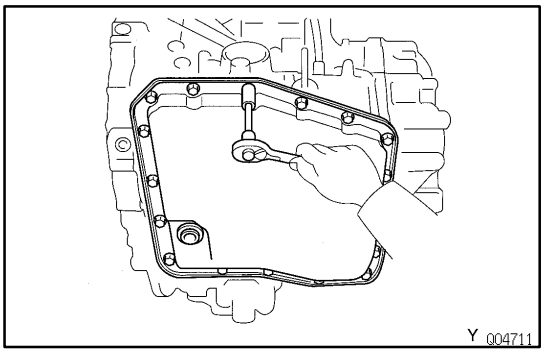
5. REMOVE T/M REVOLUTION SENSOR

(a) Remove the bolt and T/M revolution sensor.

(b) Remove the O-ring from the T/M revolution sensor.



6. REMOVE TRANSAXLE CASE UPPER COVER



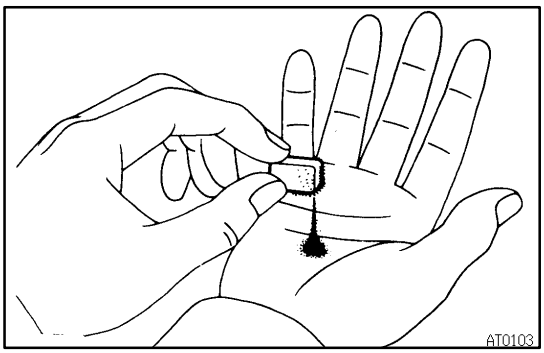
7. REMOVE OIL PAN AND GASKET

(a) Remove the 17 bolts.

(b) Remove the oil pan by lifting transaxle case.

NOTICE: Do not turn the transaxle over as this will contaminate the valve body with the foreign materials in the bottom of the oil pan.

(c) Place the transaxle on wooden blocks to prevent damage to the oil pipe bracket.

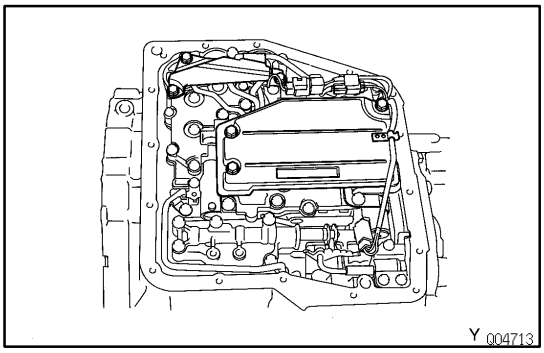


8. EXHAUST PARTICLES IN PAN

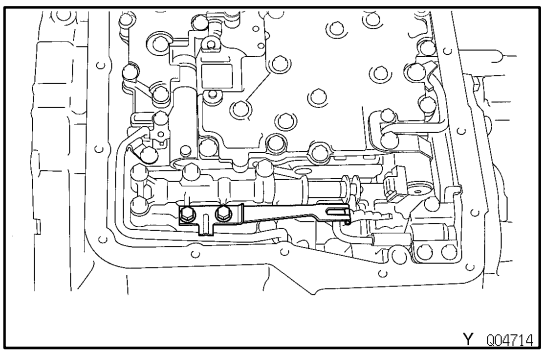
Remove the magnet and use it to collect any steel chips. Lock carefully at the chips and particles in the oil pan and on magnet to anticipate what type of wear you will find in the transaxle.

★ Steel (magnetic): bearing, gear and plate wear

★ Brass (non-magnetic): bushing wear

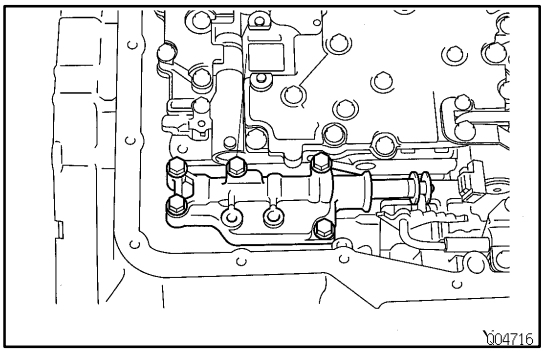


9. REMOVE OIL PIPE BRACKET AND STRAINER



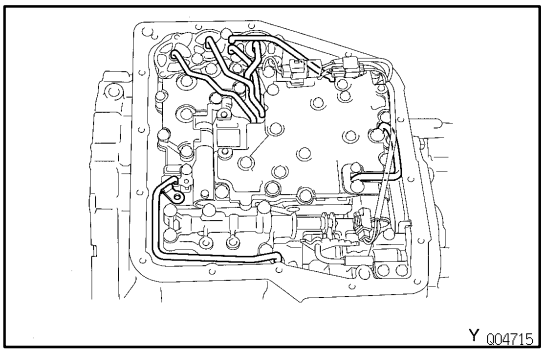
10. REMOVE MANUAL VALVE BODY

(a) Remove the 2 bolts and detent spring.



(b) Remove the 5 bolts and manual valve body with the manual valve.

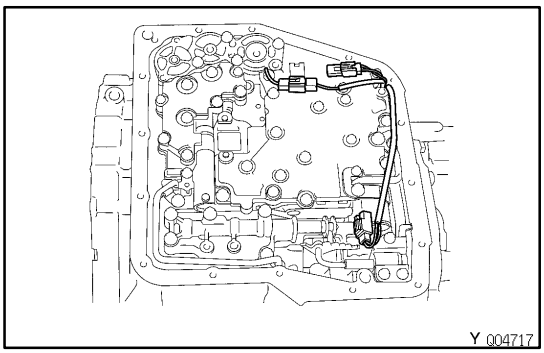
(c) Remove the manual valve from the manual valve body.



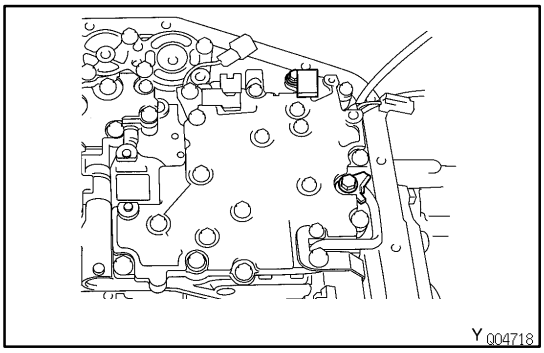
11. REMOVE OIL PIPES

(a) Remove the bolt.

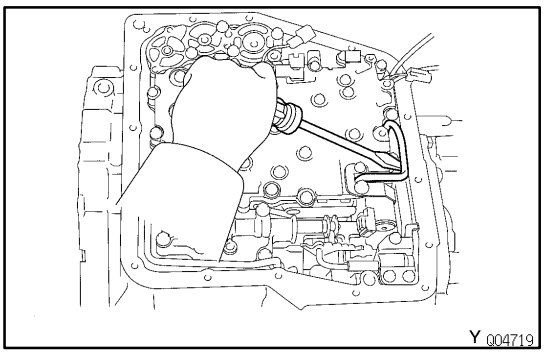
(b) Pry up both pipe ends with a large screwdriver and remove the 6 pipes.



12. DISCONNECT SOLENOID CONNECTORS

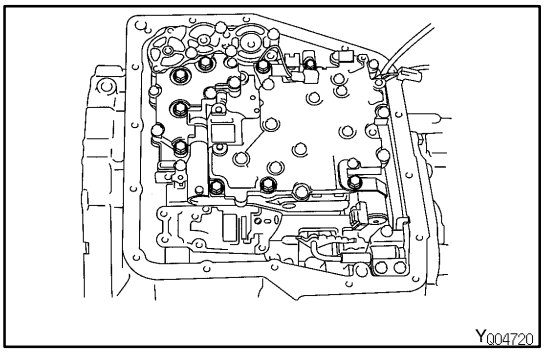


13. REMOVE CONNECTOR CLAMP AND PIPE RETAINER



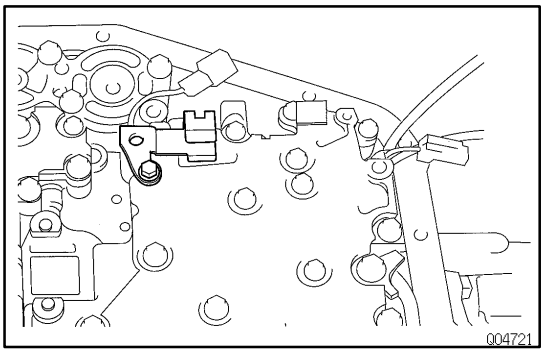
14. REMOVE B_3 APPLY PIPE

Pry up the pipe with a screwdriver and remove the pipe.

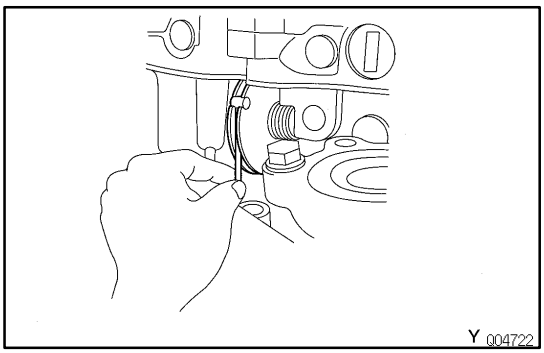


15. REMOVE VALVE BODY

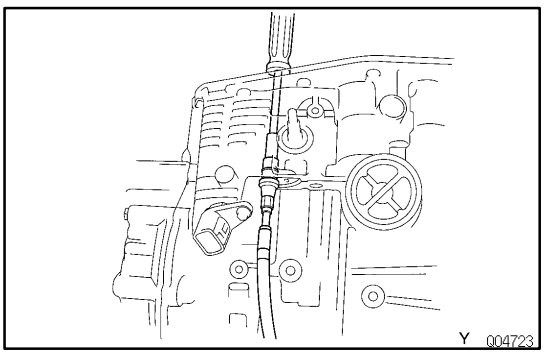
(a) Remove the 9 bolts.



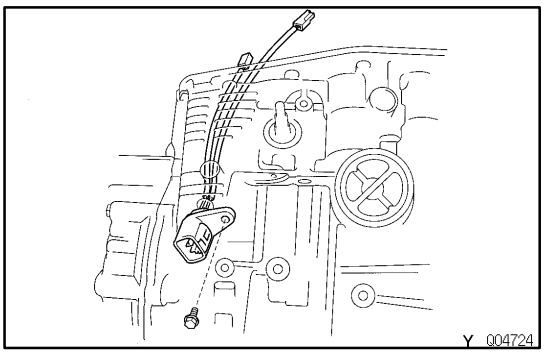
(b) Remove the wire harness clamp.



(c) Disconnect the throttle cable from the cam, and remove the valve body.

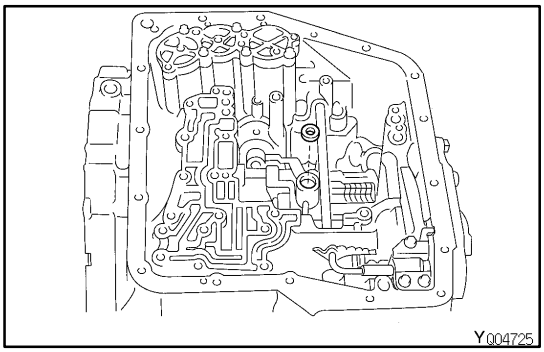


16. REMOVE THROTTLE CABLE

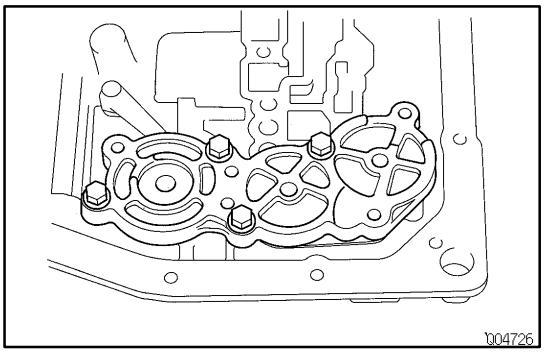


17. REMOVE SOLENOID WIRING

Remove the bolt and the solenoid wiring.



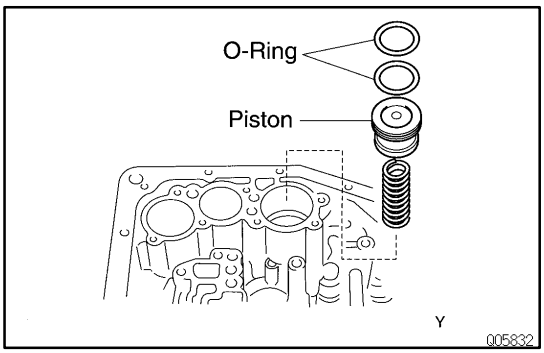
18. REMOVE SECOND BRAKE APPLY GASKET



19. REMOVE ACCUMULATOR PISTONS AND SPRINGS

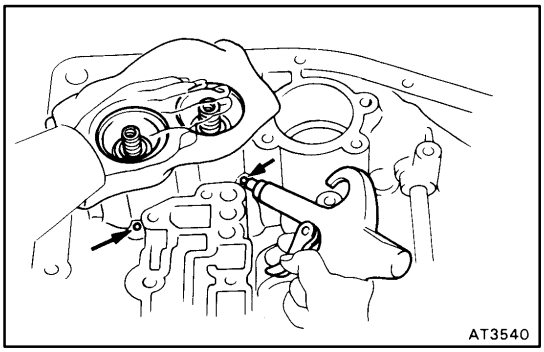
(a) Loosen the 4 bolts one turn at a time until the spring tension is released.

(b) Remove the cover and gasket.



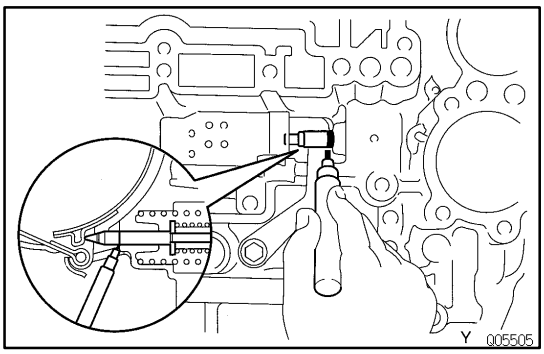
(c) Remove the C_1 accumulator piston and spring.

(d) Remove the 2 O-rings from the piston.



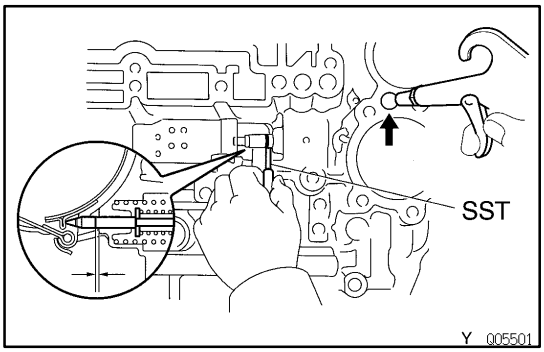
(e) Pop out pistons for C_2 and B_2 into a rag, using low-pressure compressed air (98 kPa, 1 kgf/cm^2, 14 psi).

(f) Remove the O-rings from the pistons.

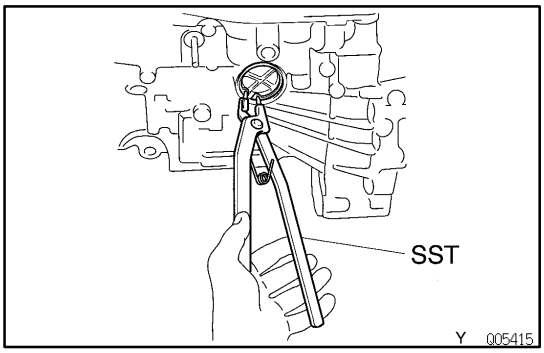


20. MEASURE PISTON STROKE SECOND COAST BRAKE

(a) Apply a small amount of paint to the piston rod at the point it meets the case.

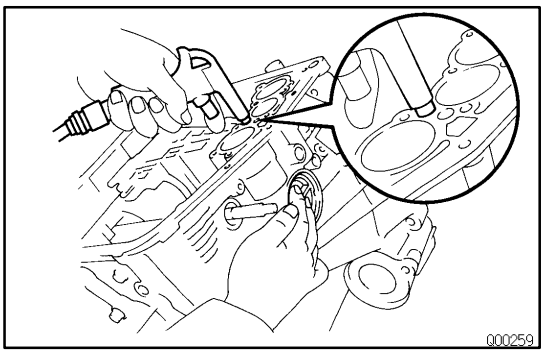


(b) Using SST, measure the piston stroke while applying and releasing compressed air (392-785 kPa, 4-8 kgf/cm^2, 57-1 14 psi).
SST 09240-00020
Maximum thrust clearance:
2.0-3.5 mm (0.079-0.138 in.)
If the piston stroke exceeds the limit, inspect the second coast brake band.



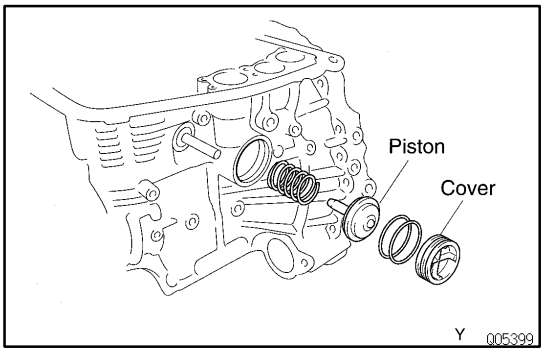
21. REMOVE SECOND COAST BRAKE PISTON

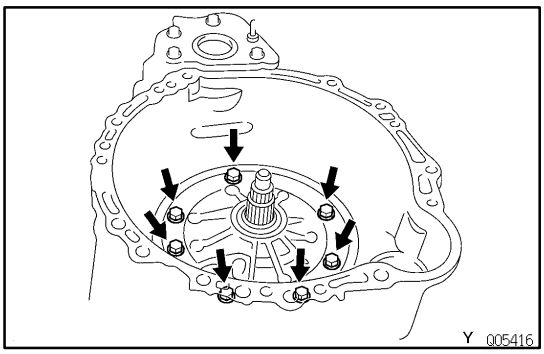
(a) Using SST, remove the snap ring.
SST 09350-32014



(b) Applying compressed air to the oil hole, remove the second coast brake cover, piston assembly and spring.

(c) Remove the 2 O-rings from the cover.



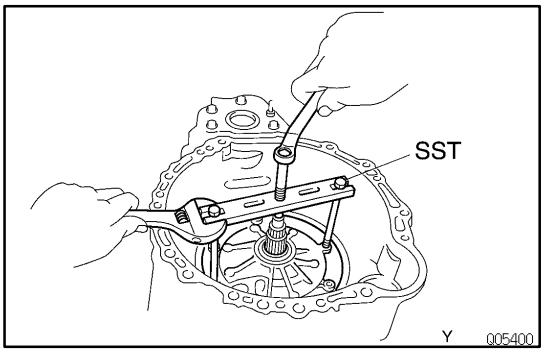


22. STAND TRANSAXLE ENGINE SIDE UPWARD

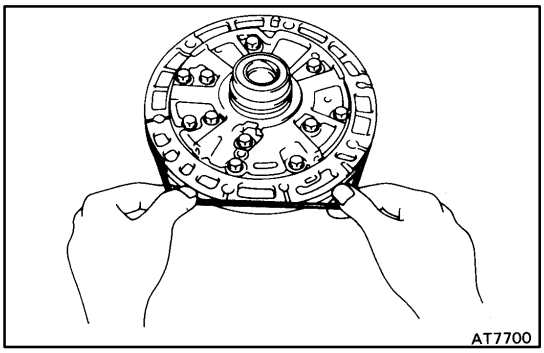
23. REMOVE OIL PUMP

NOTICE: Before removing the oil pump, remove the second coast brake piston.

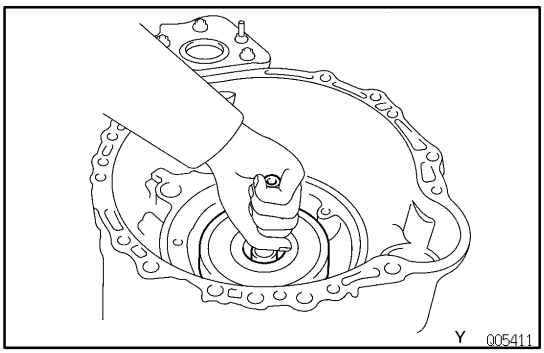
(a) Remove the 7 bolts.



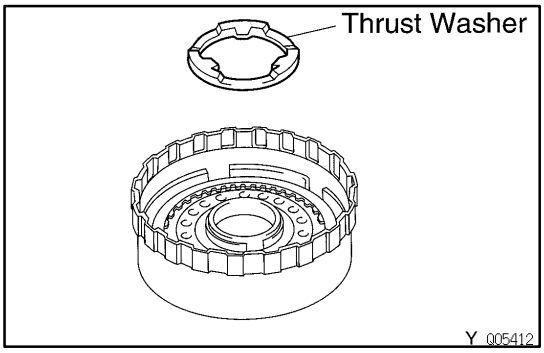
(b) Using SST, pull out the oil pump from the transaxle case.
SST 09350-32014



24. REMOVE O-RING FROM OIL PUMP



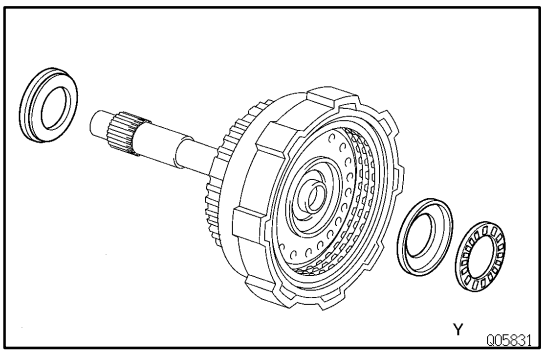
25. REMOVE DIRECT CLUTCH AND FORWARD CLUTCH



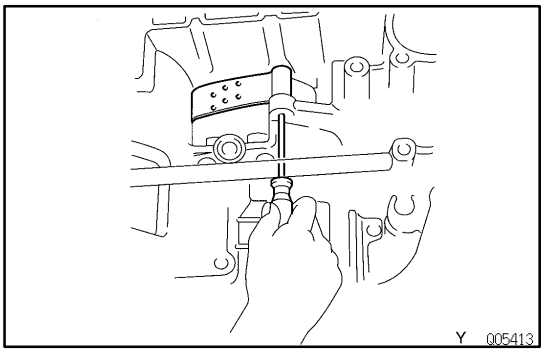
26. SEPARATE DIRECT CLUTCH AND FORWARD CLUTCH

(a) Separate the direct clutch and forward clutch.

(b) Remove the thrust washer from direct clutch.



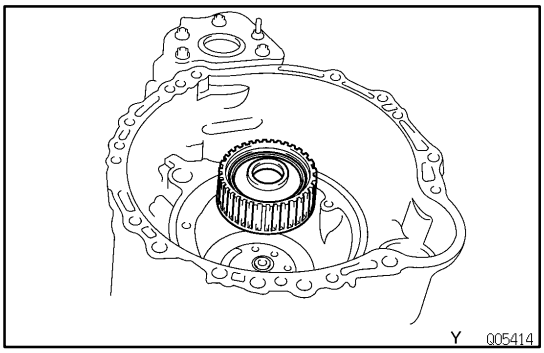
27. REMOVE BEARING FROM FORWARD CLUTCH



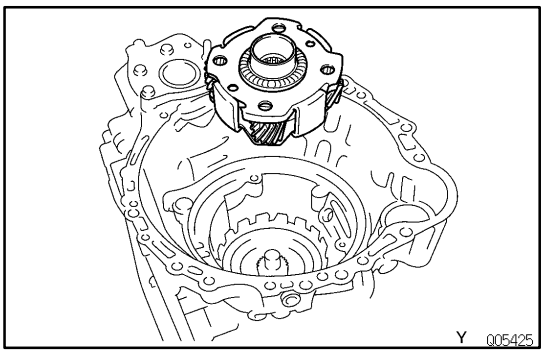
28. REMOVE SECOND COAST BRAKE BAND

(a) Push the pin with a small screwdriver and remove it from the bolt hole of the oil pump mounting.

(b) Remove the brake band.

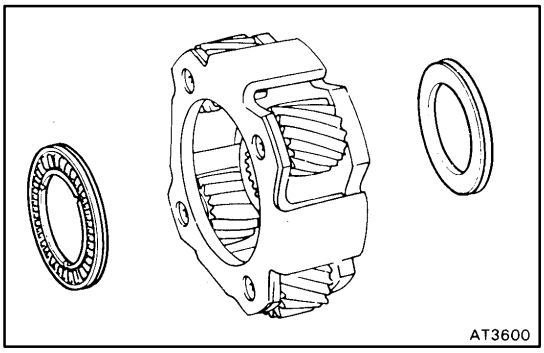


29. REMOVE FRONT PLANETARY RING GEAR

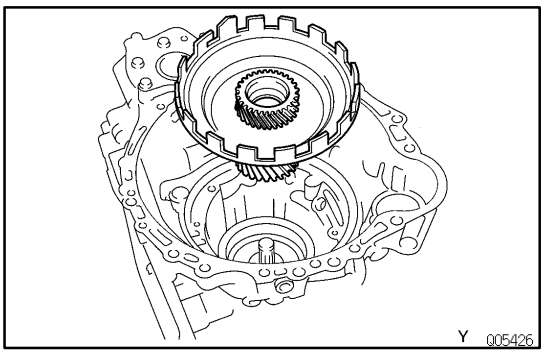


30. REMOVE FRONT PLANETARY GEAR

(a) Remove the front planetary gear.

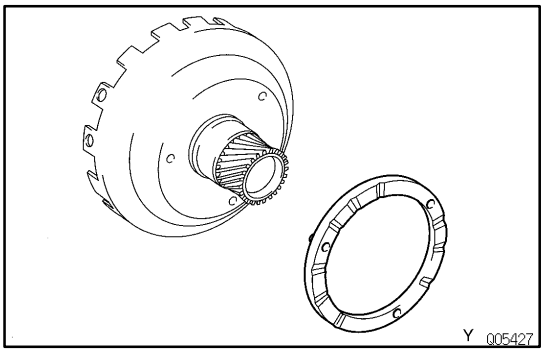


(b) Remove the 2 bearings from the planetary gear.

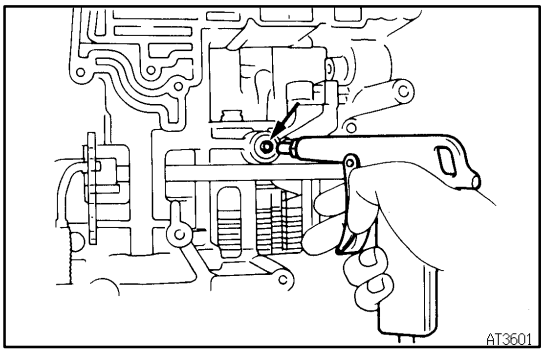


31. REMOVE SUN GEAR AND SUN GEAR INPUT DRUM

(a) Remove the sun gear and the sun gear input drum.



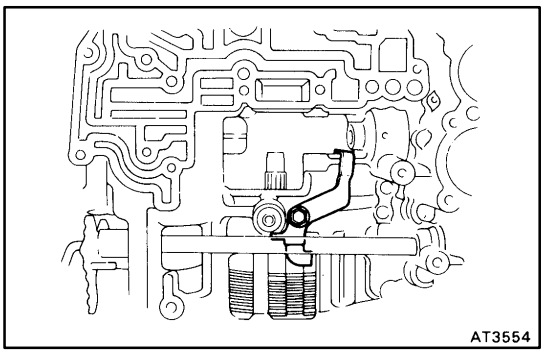
(b) Remove the thrust washer from sun gear input drum.



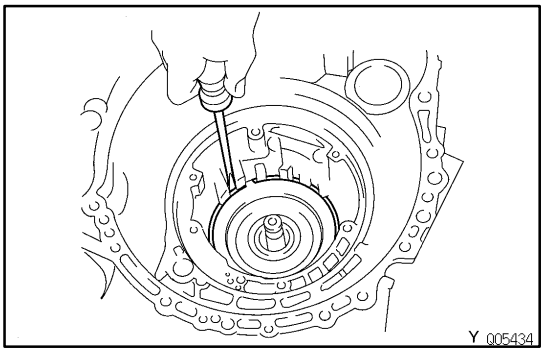
32. CHECK OPERATION OF SECOND BRAKE PISTON

Apply compressed air into the case passage and confirm that the piston moves.

If the piston does not move, disassembe and inspect.

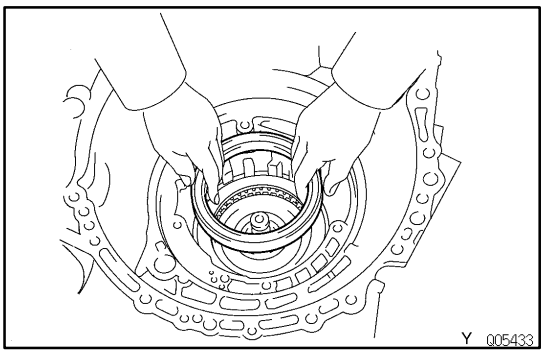


33. REMOVE SECOND COAST BRAKE BAND GUIDE

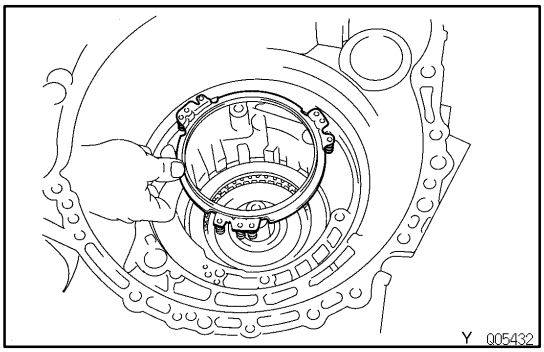


34. REMOVE SECOND BRAKE DRUM

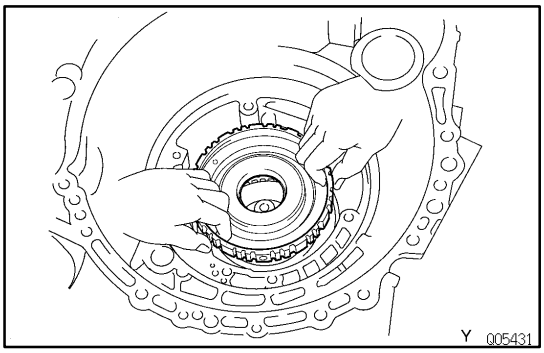
(a) Remove the snap ring.



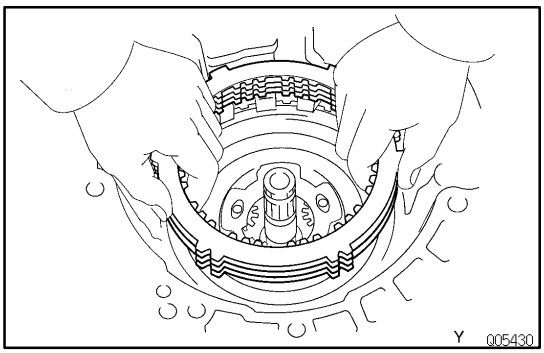
(b) Remove the second brake drum.



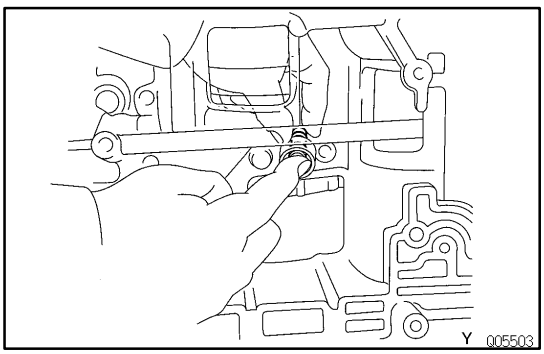
35. REMOVE SECOND BRAKE PISTON RETURN SPRING



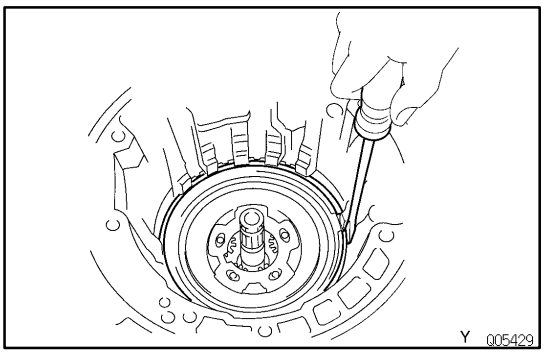
36. REMOVE NO.1 ONE-WAY CLUTCH



37. REMOVE PLATES, DISCS AND FLANGE

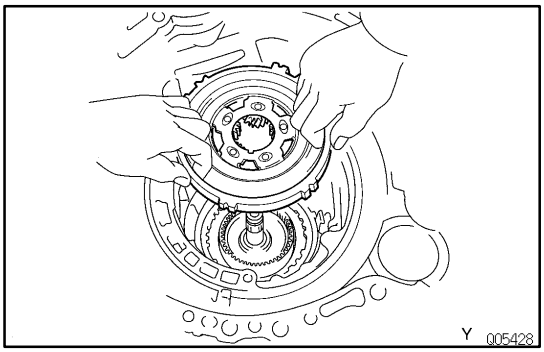


38. REMOVE SECOND BRAKE DRUM GASKET
Remove the gasket.

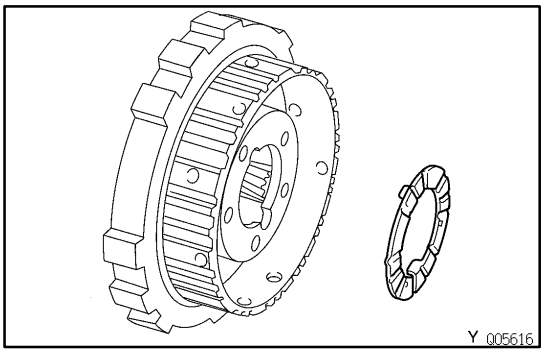


39. REMOVE NO.2 ONE-WAY CLUTCH AND REAR PLANETARY GEAR

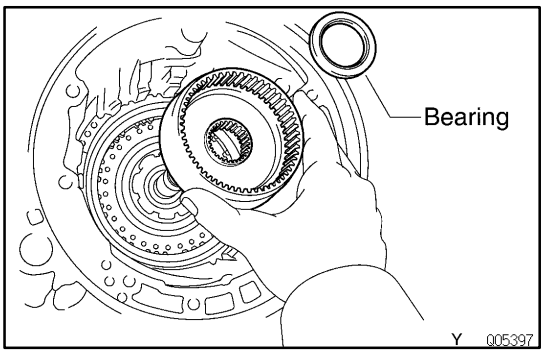
(a) Remove the snap ring.



(b) Remove the No.2 one-way clutch and rear planetary gear.



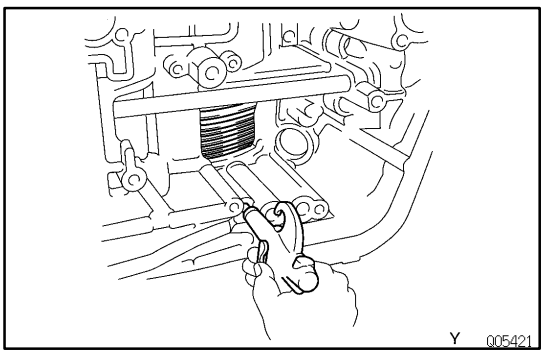
(c) Remove the thrust washer from the rear planetary gear.



40. REMOVE REAR PLANETARY RING GEAR

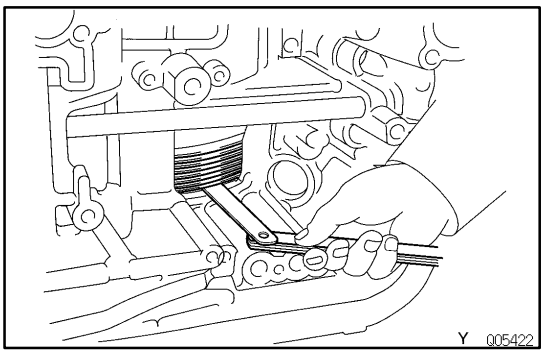
(a) Remove the rear planetary ring gear.

(b) Remove the bearing from the ring gear.

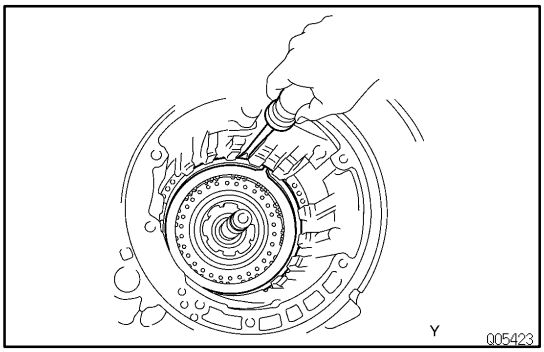


41. CHECK FIRST AND REVERSE BRAKE

(a) Check the operation of the first and reverse brake piston.
Apply compressed air into the case passage and confirm that the piston moves.
If the piston does not move, disassemble and inspect.

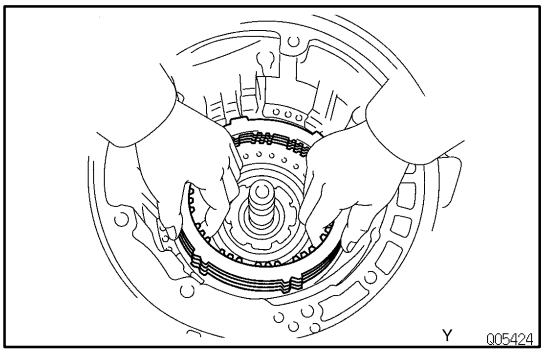


(b) Using a filler gauge, check the pack clearance of the first and reverse brake.
Clearance: 1.92-2.68 mm (0.0756-0.1055 in.)

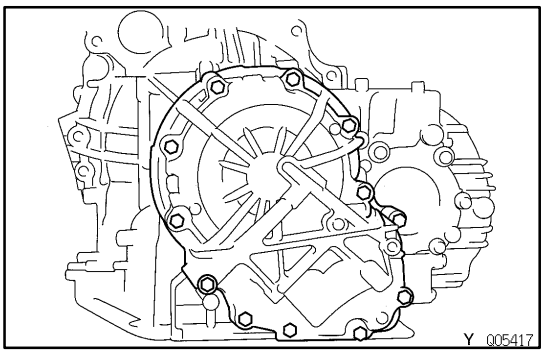


42. REMOVE FLANGE, DISCS AND PLATES OF FIRST AND REVERSE BRAKE

(a) Remove the snap ring.



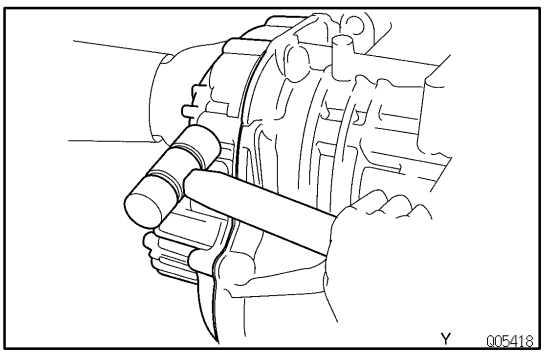
(b) Remove the flange, 6 discs and plates.



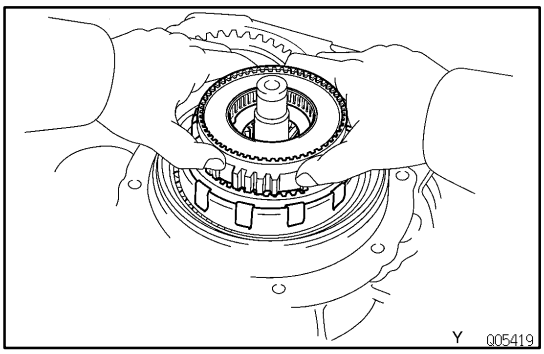
43. TURN TRANSAXLE CASE AROUND

44. REMOVE OVERDRIVE UNIT

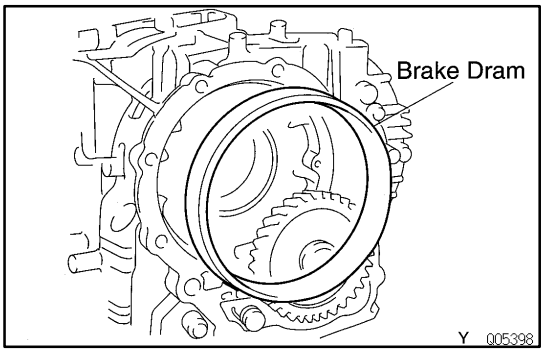
(a) Remove the 13 bolts.



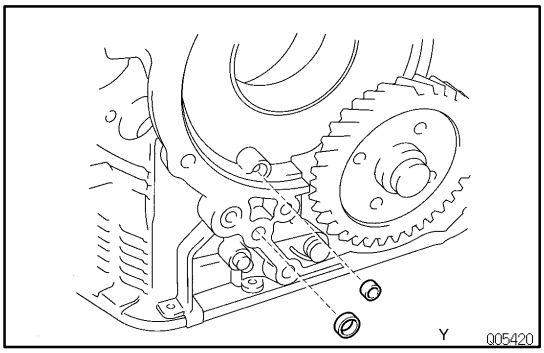
(b) Tap on the circumference of the overdrive case with a plastic hammer to remove the overdrive case and gasket.



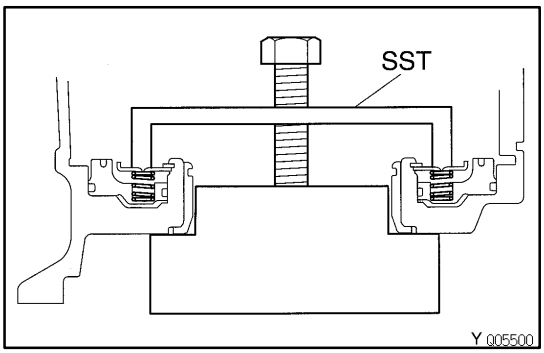
(c) Remove the overdrive planetary gear from transaxle case.



(d) Remove the overdrive brake drum from the transaxle case.



(e) Remove the overdrive clutch apply gasket and overdrive brake apply gasket.

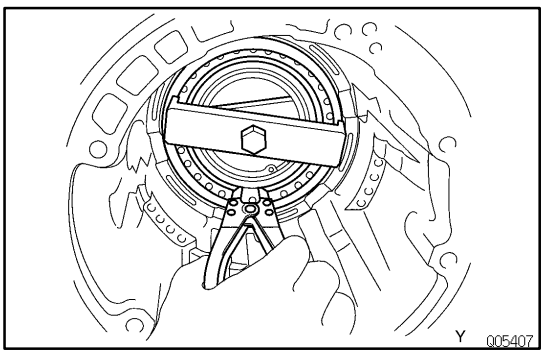


45. REMOVE FIRST AND REVERSE BRAKE PISTON

(a) Remove the piston return spring.

★ Place SST, compress the return spring evenly by tightening the bolt gradually.

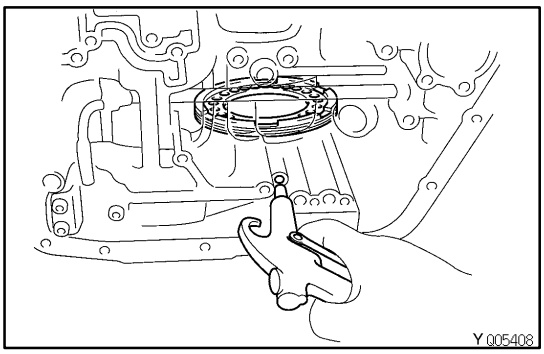
SST 09350-32014 (09351-32040)



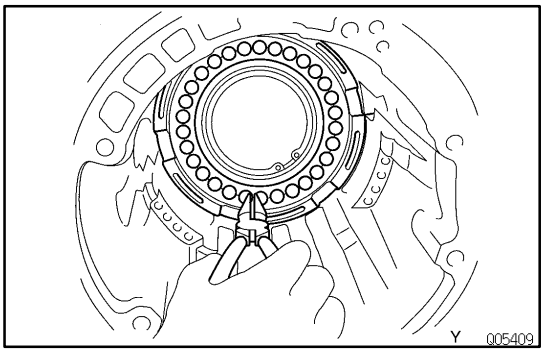
★ Using snap ring pliers, remove the snap ring.

★ Remove the SST.

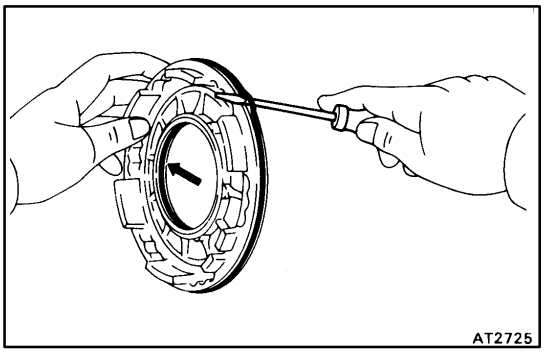
★ Remove the return spring from the case.



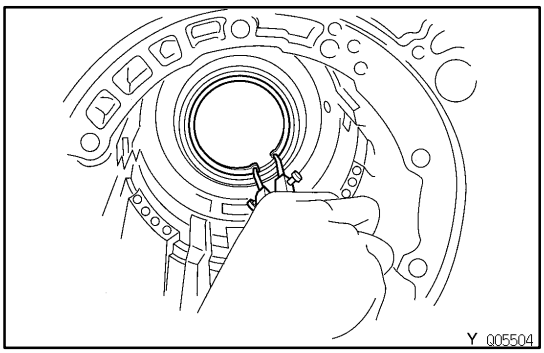
(b) Apply compressed air into the passage of the case to remove the piston.
HINT: Hold the piston so it is not slanted and blow with the gun slightly away from the oil hole.



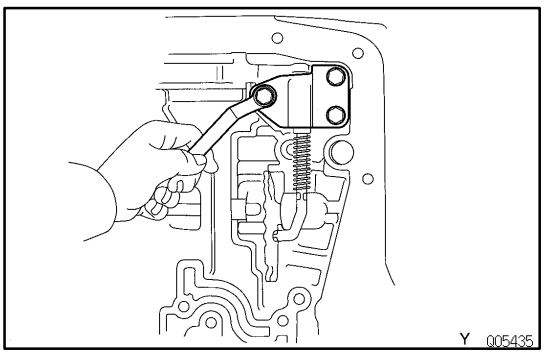
(c) If the piston does not pop out with compressed air, use needle-nose pliers to remove it.



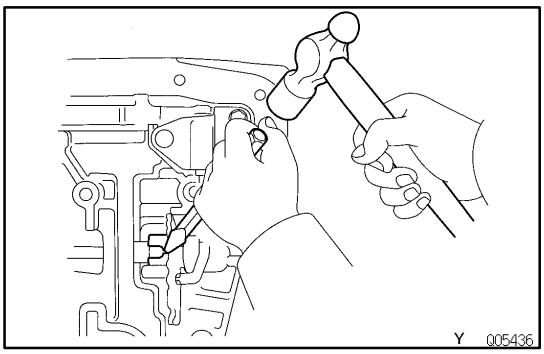
(d) Remove the 2 O-rings from the piston.



(e) Remove the snap ring.

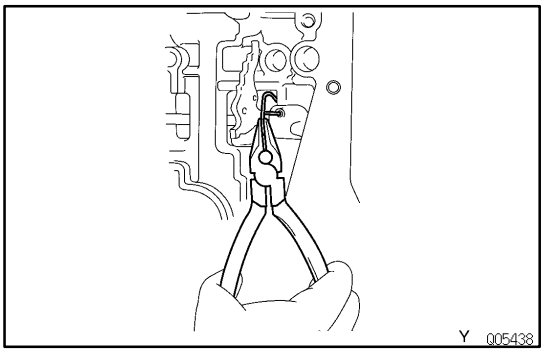


46. REMOVE PARKING LOCK PAWL BRACKET AND GUIDE

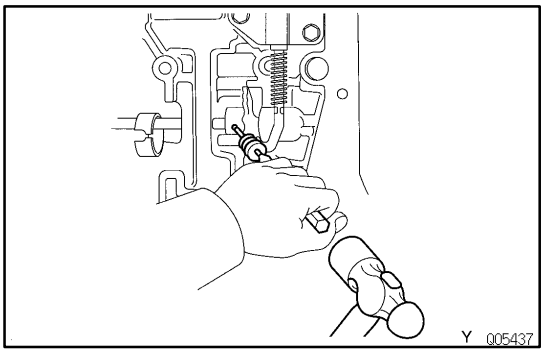


47. REMOVE MANUAL VALVE SHAFT

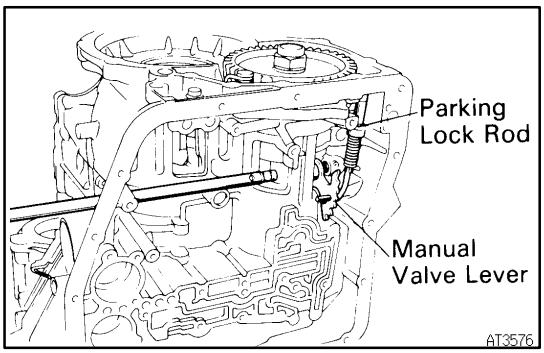
(a) Using a chisel and hammer, cut the collar.



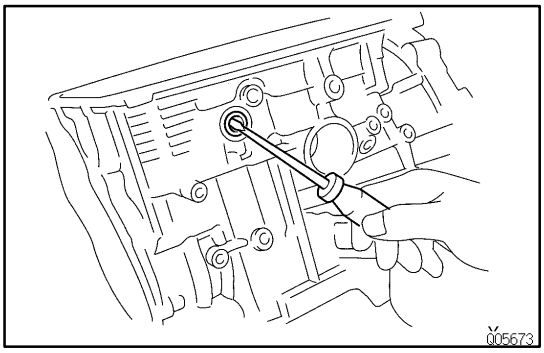
(b) Remove the retaining spring.



(c) Using a pin punch and hammer, drive out the pin.

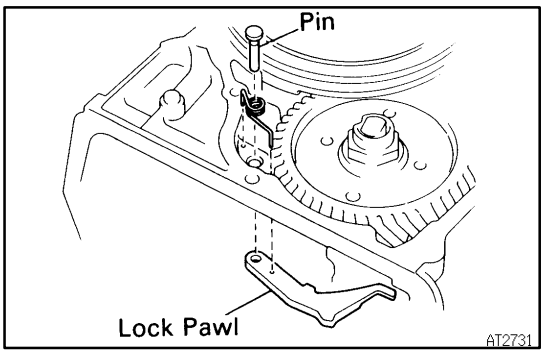


(d) Slide out the shaft from the transaxle case and remove the manual valve lever and parking lock rod.



48. REMOVE MANUAL VALVE SHAFT OIL SEAL

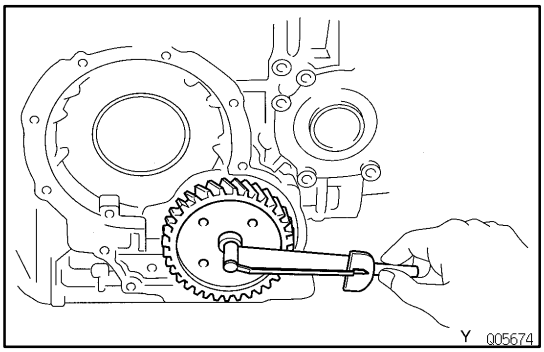
Using a screwdriver, remove the oil seal.



49. REMOVE PIN, SPRING AND PARKING LOCK PAWL

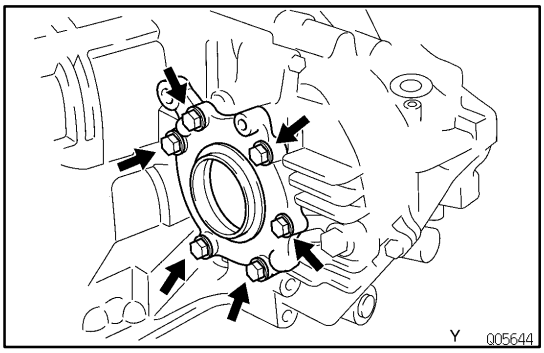
AX02S-04

DIFFERENTIAL COMPONENT PARTS REMOVAL



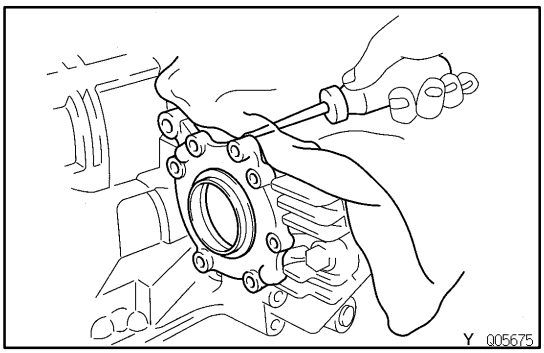
1. MEASURE DIFFERENTIAL TOTAL PRELOAD

Using a small torque wrench, measure the total preload and make a note of it.



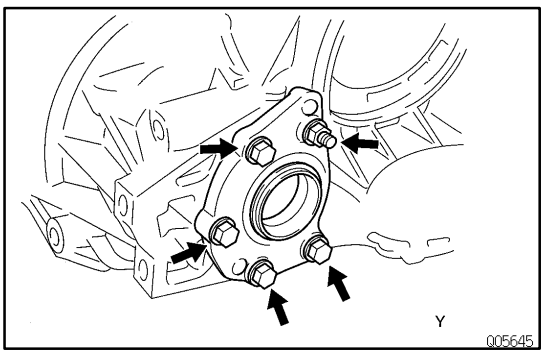
2. REMOVE LH BEARING RETAINER

(a) Remove the 6 bolts.



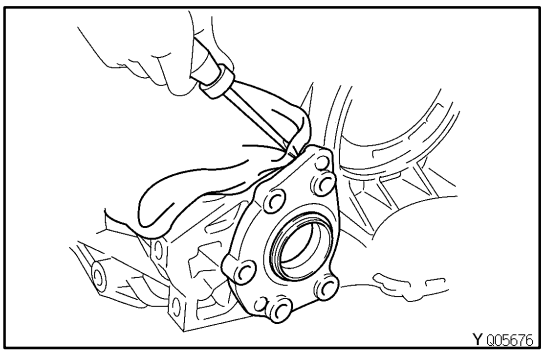
(b) Using a large screwdriver, remove the LH bearing retainer.

NOTICE: Wrap the screwdriver tip in a rag, etc. to avoid damaging the case and retainer.

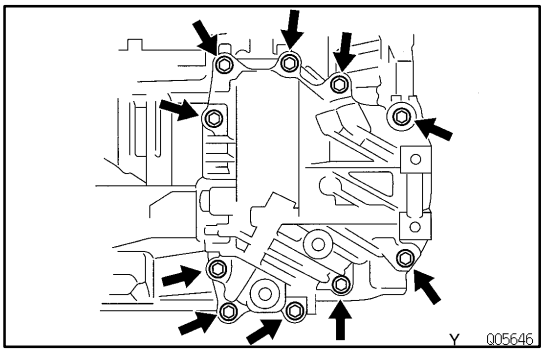


3. REMOVE RH RETAINER

(a) Remove the 5 bolts.

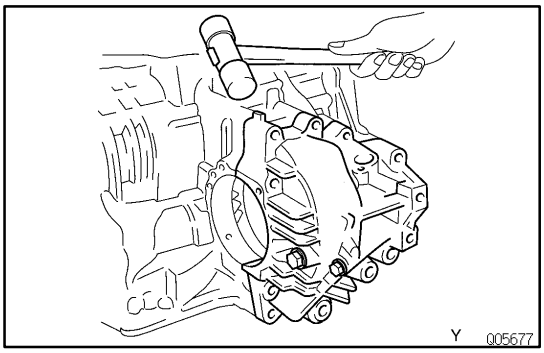


(b) Using a large screwdriver, remove the RH retainer.
NOTICE: Wrap the screwdriver tip in a rag, etc. to avoid damaging the case and retainer.

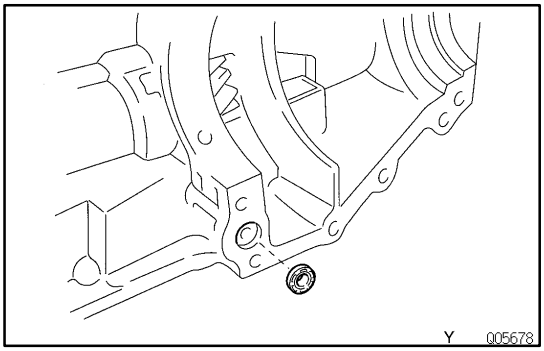


4. REMOVE CARRIER COVER

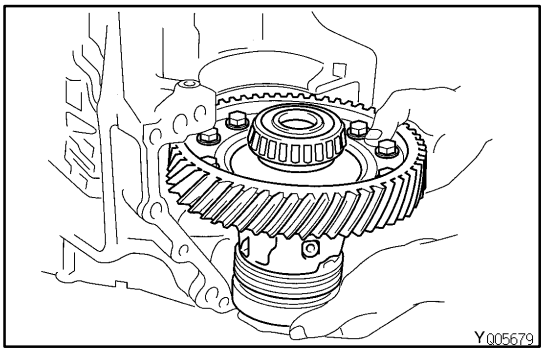
(a) Remove the 10 bolts.



(b) Tap the carrier cover with a plastic hammer to remove it.

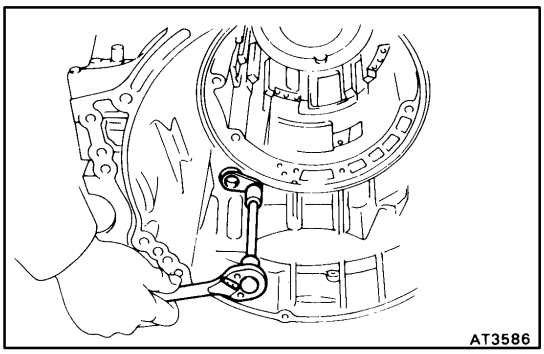


(c) Remove the apply gasket.



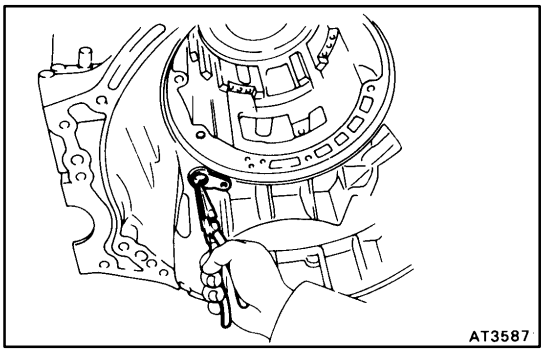
5. REMOVE DIFFERENTIAL CASE

Remove the differential case, outer case and shim from the transaxle case.



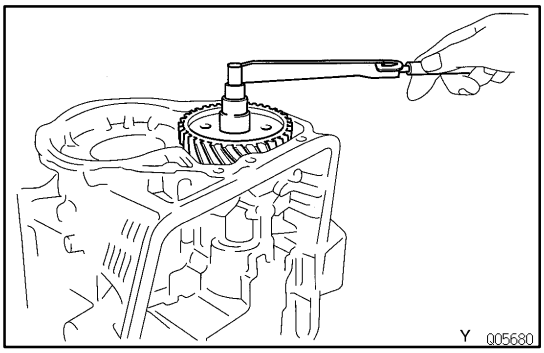
6. REMOVE TRANSAXLE CAP

(a) Remove the bolt.



(b) Using pliers, pull out the drive pinion cap.

(c) Remove the O-rings from the cap.



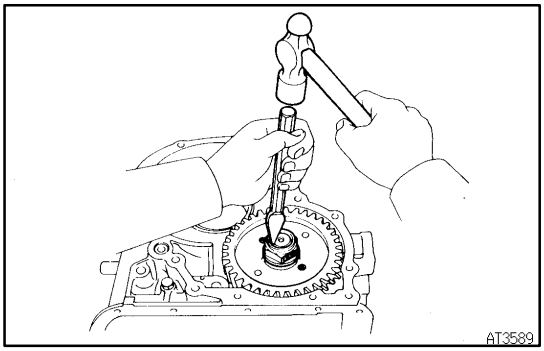
7. MEASURE DRIVE PINION PRELOAD

Using a small torque wrench, measure the drive pinion preload.

Preload (Reused bearing at starting):

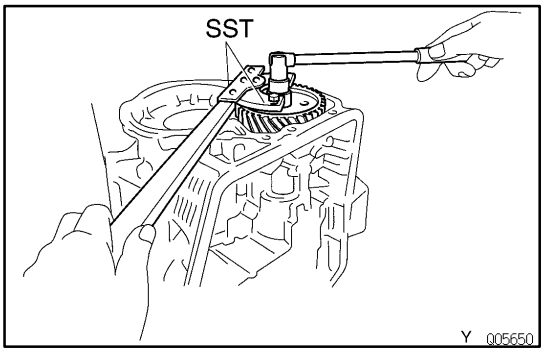
0.5-0.8 N·m (5-8 kgf·cm, 4.3-6.9 in.·lbf)

The total preload measured in step 1 minus the drive pinion preload equals 0.1-0.2 N·m (1.3-2.0 kgf·cm, 1.1-1.7 in.·lbf). If the result is not within this specification, the side bearing preload is suspect.

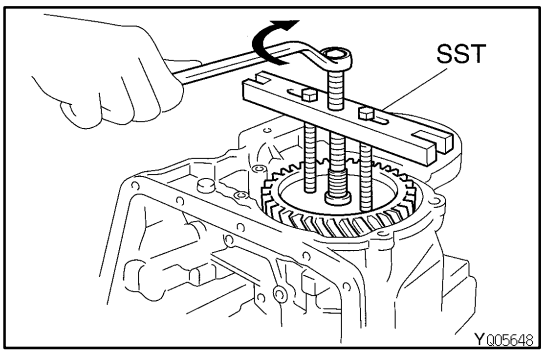


8. REMOVE COUNTER DRIVEN GEAR

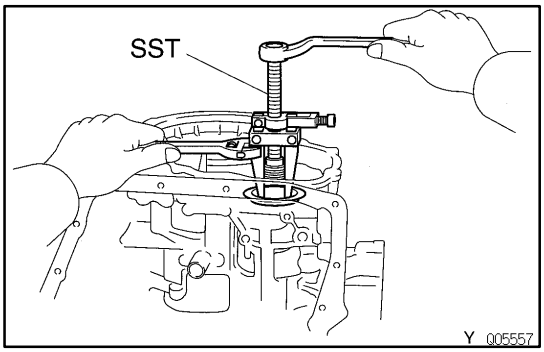
(a) Using a chisel and hammer, loosen the staked part of the nut.



(b) Using SST to hold the gear, remove the nut.
SST 09330-00021, 09350-32014 (09351-32032)

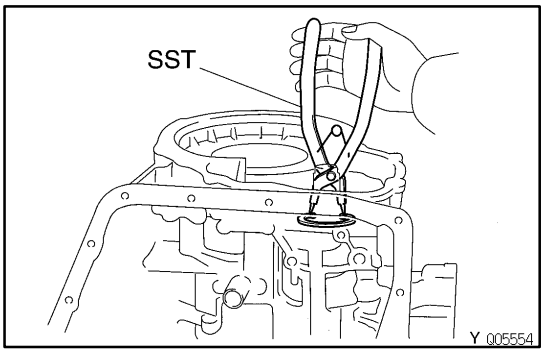


(c) Using SST, remove the gear and bearing.
SST 09350-32014 (09351-32061)

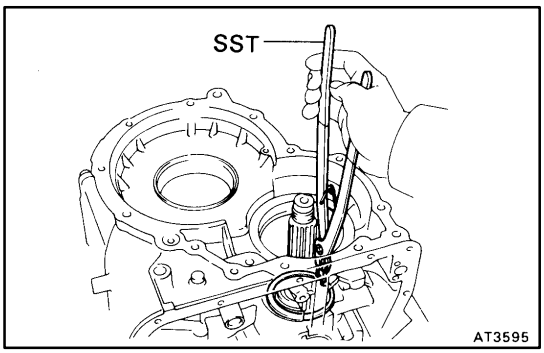


9. REMOVE OUTER RACE, SPACER AND OIL SLINGER

(a) Using SST, remove the outer race with oil slinger and spacer.
SST 09350-32014 (09308-10010)

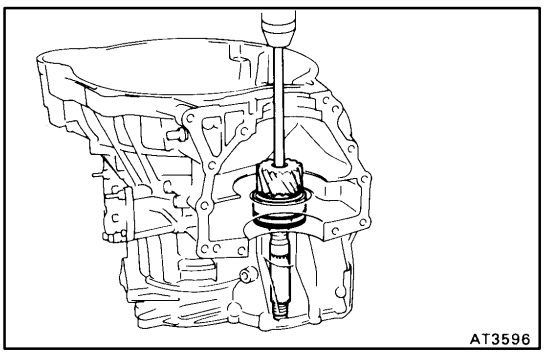


(b) Using SST, remove the snap ring.
SST 09350-32014 (09351-32050)



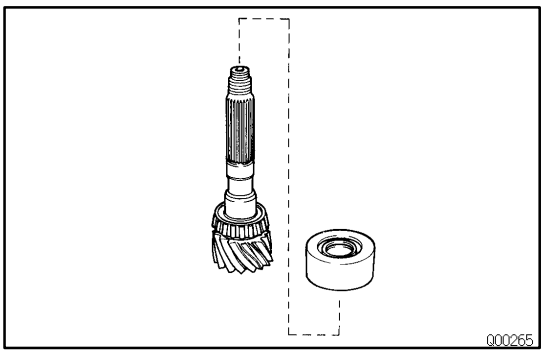
10. REMOVE DRIVE PINION

(a) Using SST, remove the snap ring.
SST 09350-32014 (09351-32050)

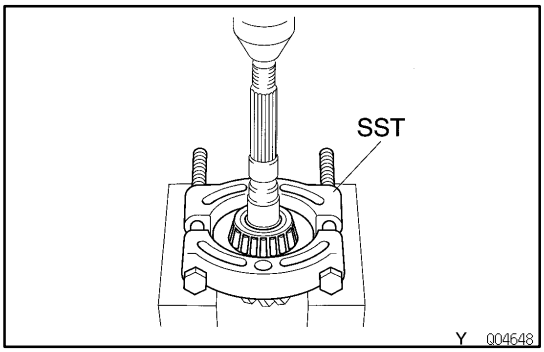


(b) Install the bar into the case hole to drive out the drive pinion.

(c) Using a press, drive out the drive pinion from transaxle case.



(d) Remove the bearing cage from drive pinion.



(e) Using SST, press out the bearing.
SST 09950-00020

AX02T-07

GENERAL NOTES

The instructions here are organized so that you work on only one component group at a time.

This will help avoid confusion from similar-looking parts of different subassemblies being on your workbench at the same time.

The component groups are inspected and repaired from the converter housing side.

As much as possible, complete the inspection, repair and assembly before proceeding to the next component group. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of that group in a separate container while proceeding with disassembly, inspection, repair and assembly of other component groups.

Recommended fluid for the automatic transaxle: ATF D-@@@@@: [g 2] or DEXRON®@@@@@: [g 3](DEXRON®@@@@@: [g 2])

1. GENERAL CLEANING NOTES:

(a) All disassembled parts should be washed clean and any fluid passages and holes blown through with compressed air.

(b) When using compressed air to dry parts, always aim away from yourself to prevent accidentally spraying automatic transaxle fluid or kerosene in your face.

(c) The recommended automatic transaxle fluid or kerosene should be used for cleaning.

2. PARTS ARRANGEMENT:

(a) After cleaning, the parts should be arranged in the correct order to allow efficient inspection, repairs, and reassembly.

(b) When disassembling a valve body, be sure to keep each valve together with the corresponding spring.

(c) New brakes and clutches that are to be used for replacement must be soaked in transaxle fluid for at least fifteen minutes before assembly.

3. GENERAL ASSEMBLY:

(a) All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with transmission fluid prior to reassembly.

(b) All gaskets and rubber O-rings should be replaced.

(c) Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.

(d) If a worn bushing is to be replaced, the subassembly containing that bushing must be replaced.

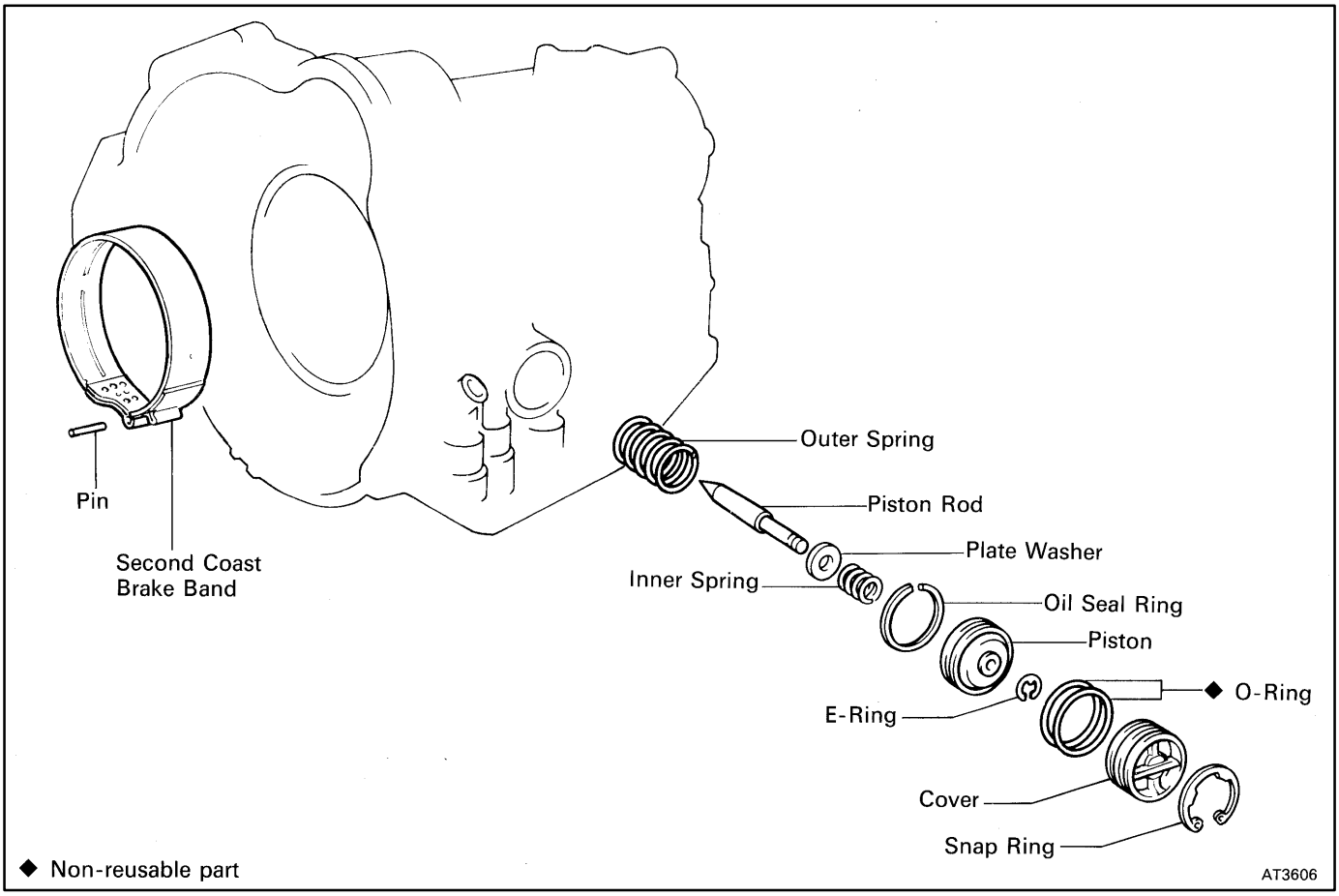
(e) Check thrust bearings and races for wear or damage. Replace if necessary.

(f) Use petroleum jelly to keep parts in place.

SECOND COAST BRAKE

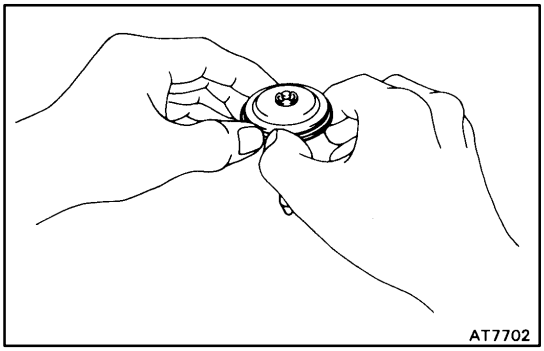
AX02U-02

COMPONENTS



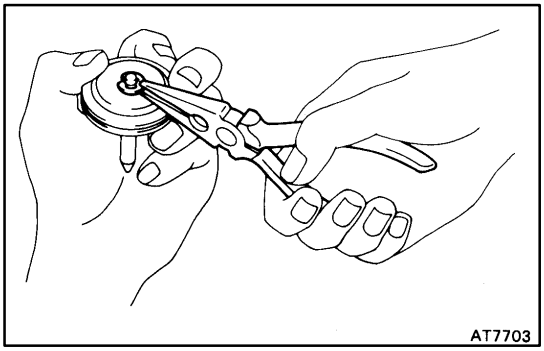
AX02V-02

SECOND COAST BRAKE PISTON DISASSEMBLY



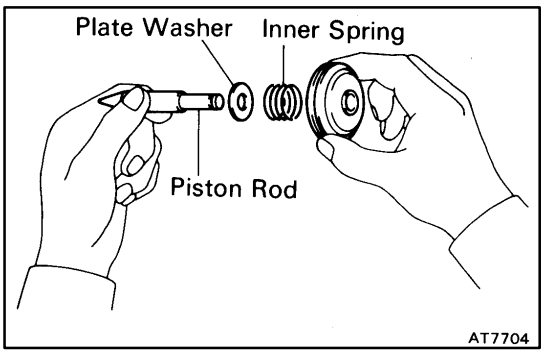
1. REMOVE OIL SEAL RING

Remove the oil seal ring from the piston.

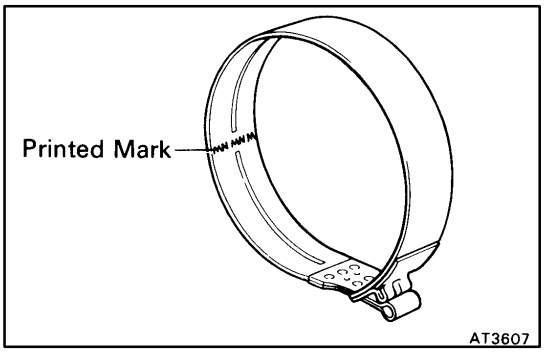


2. REMOVE PISTON ROD

(a) Remove the E-ring while pushing the piston with needle-nose pliers.



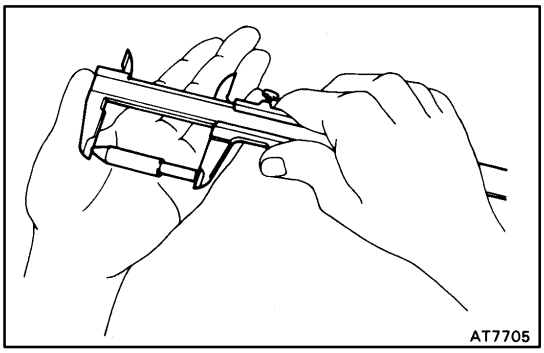
(b) Remove the inner spring, plate washer and piston rod.



AX02W-03

SECOND COAST BRAKE COMPONENT INSPECTION

If the lining of the brake band is peeling off or discolored, or even part of the printed mark is defaced, replace the brake band.



AX02X-03

SECOND COAST BRAKE PISTON ASSEMBLY

1. SELECT PISTON ROD

If the band is OK but piston stroke not within the standard value, select a new piston rod.

Piston stroke:

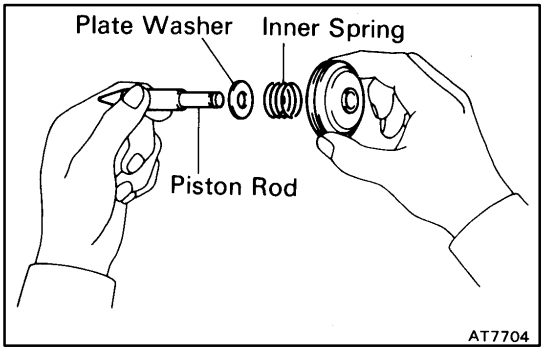
2.0-3.5 mm (0.079-0.138 in.)

There are 2 lengths of piston rod.

Piston rod length:

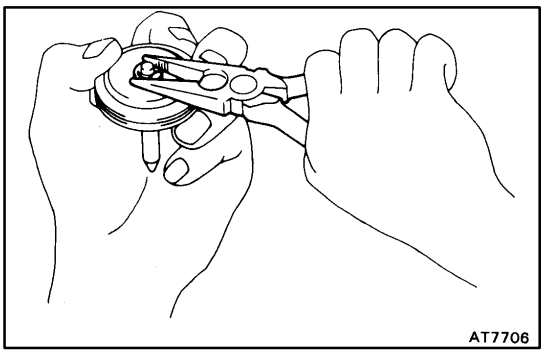
95.2 mm (3.748 in.)

96.3 mm (3.791 in.)

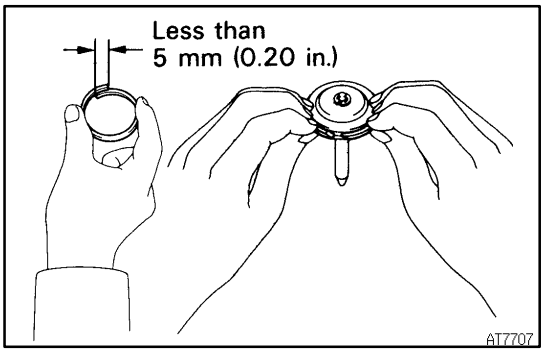


2. INSTALL PISTON ROD

(a) Install the plate washer and inner spring to the piston rod.



(b) Install the E-ring while pushing the piston.



3. INSTALL OIL SEAL RING

(a) Apply ATF to the oil seal ring.

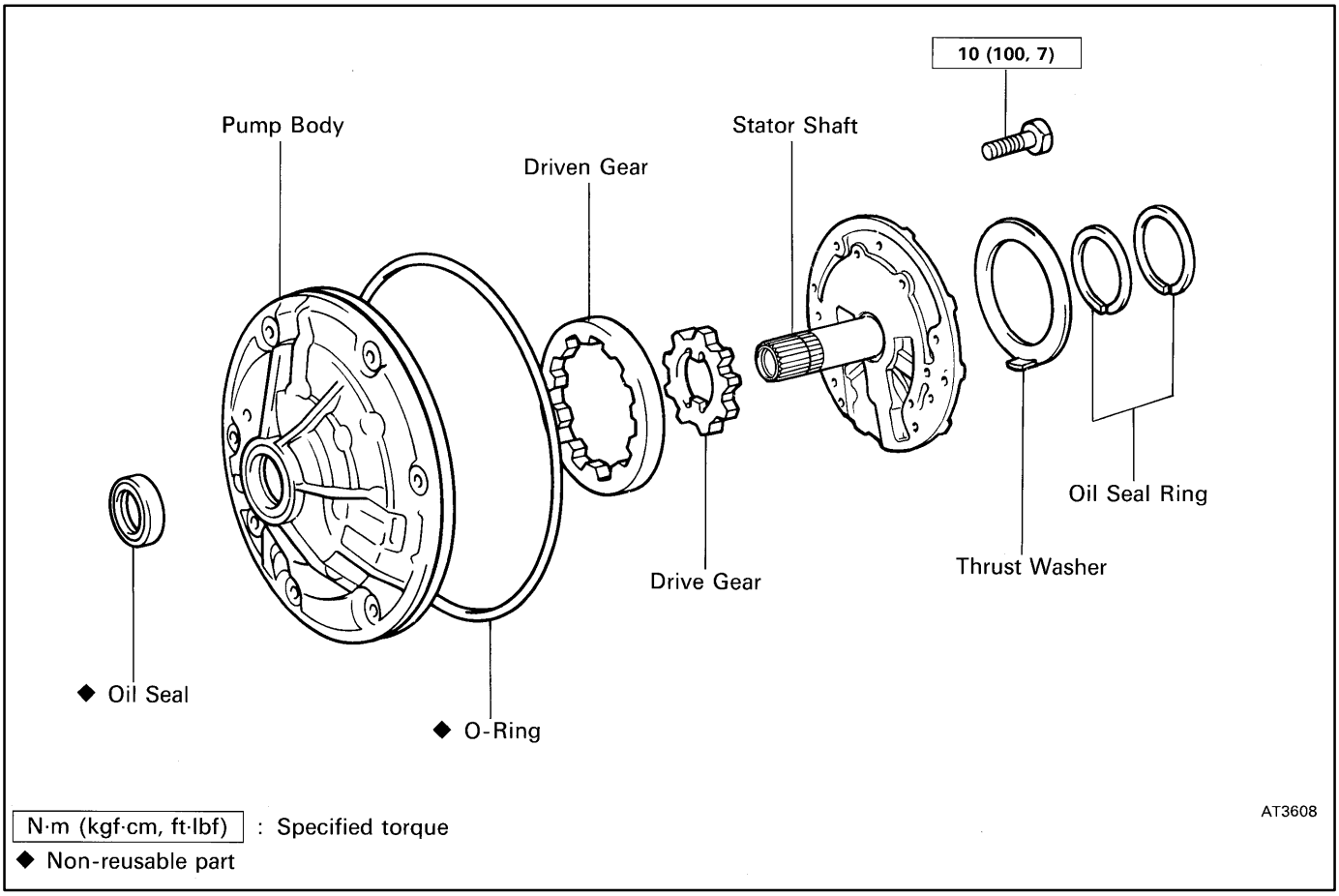
(b) Install the oil seal ring to the piston.

NOTICE: Do not spread the ring ends more than necessary.

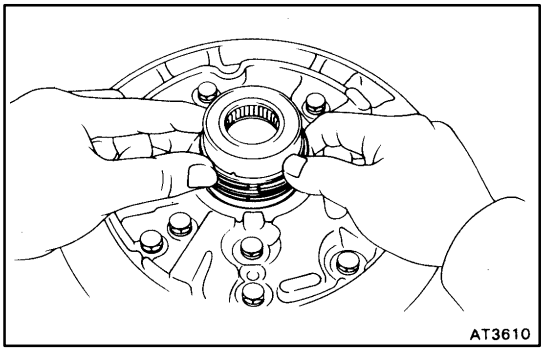
OIL PUMP

COMPONENTS

AX02Y-02



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

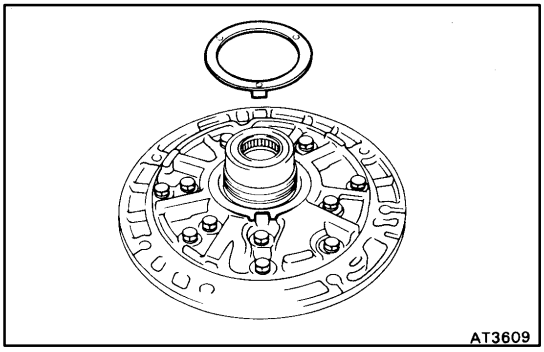


AX02Z-02

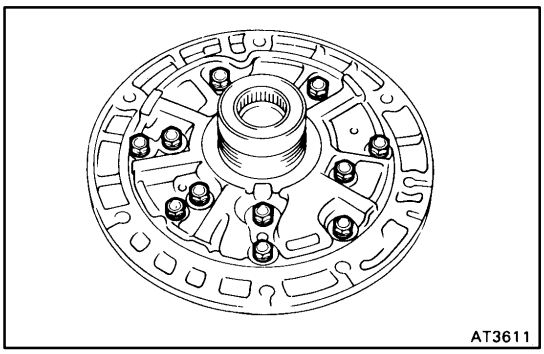
OIL PUMP DISASSEMBLY

1. REMOVE OIL SEAL RINGS

Remove the 2 oil seal rings from the stator shaft back side.



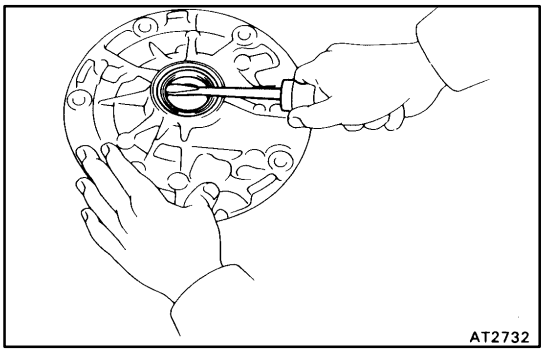
2. REMOVE THRUST WASHER FROM STATOR SHAFT BACK SIDE



3. REMOVE STATOR SHAFT

Remove the 11 bolts and stator shaft.

HINT: Keep the gears in assembly order.

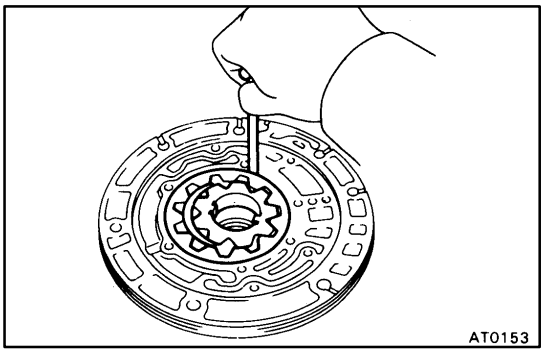


4. REMOVE FRONT OIL SEAL

Pry off the oil seal with a screwdriver.

AX030-06

OIL PUMP BUSHING INSPECTION



1. CHECK BODY CLEARANCE OF DRIVEN GEAR

Push the driven gear to one side of the body.

Using a feeler gauge, measure the clearance.

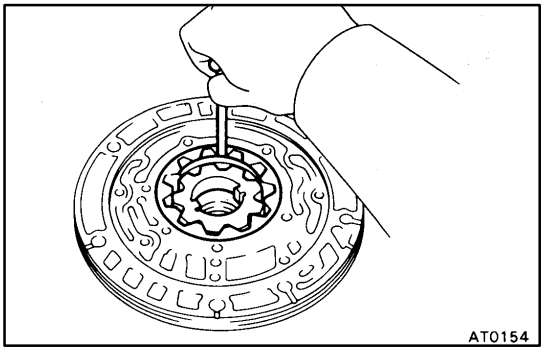
Standard body clearance:

0.07-0.15 mm (0.0028-0.0059 in.)

Maximum body clearance:

0.30 mm (0.0118 in.)

If the body clearance is greater than the maximum, replace the oil pump body subassembly.



2. CHECK TIP CLEARANCE OF DRIVEN GEAR

Measure between the driven gear teeth and the crescent-shaped part of the pump body.

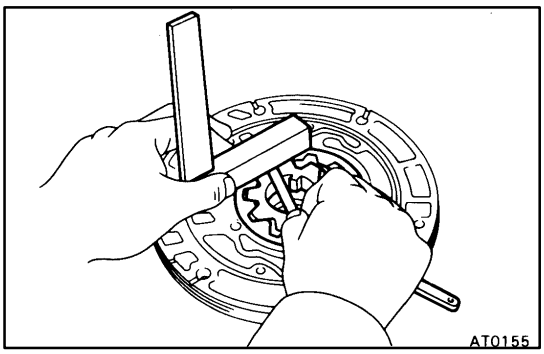
Standard tip clearance:

0.11-0.14 mm (0.0043-0.0055 in.)

Maximum tip clearance:

0.30 mm (0.0118 in.)

If the tip clearance is greater than the maximum, replace the oil pump body subassembly.



3. CHECK SIDE CLEARANCE OF BOTH GEARS

Using a steel straightedge and feeler gauge, measure the side clearance of both gears.

Standard side clearance:

0.002-0.005 mm (0.0008-0.0020 in.)

Maximum side clearance:

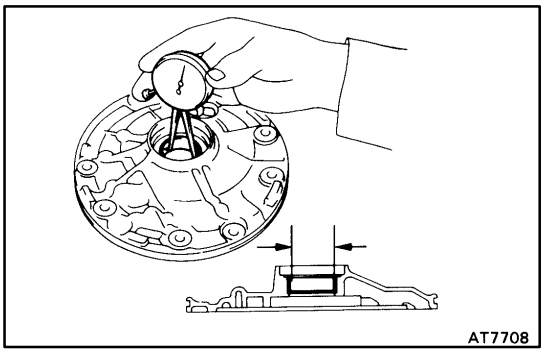
0.100 mm (0.0039 in.)

There are 3 different thicknesses for drive and driven gears.

Drive and driven gear thickness

Mark	Thickness mm (in.)
A	9.440-9.456 (0.3717-0.3723)
B	9.456-9.474 (0.3723-0.3730)
C	9.474-9.490 (0.3730-0.3736)

If the thickest gear can not make the side clearance within standard specification, replace the oil pump body subassembly.



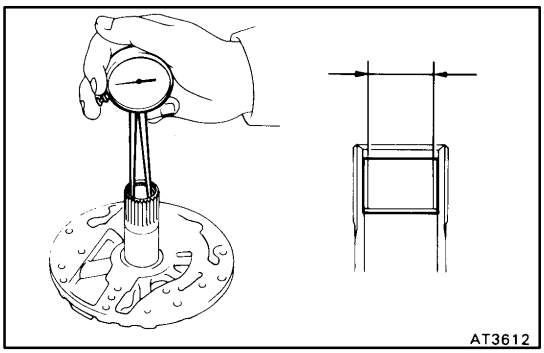
4. CHECK OIL PUMP BODY BUSHING

Using a dial indicator, measure the inside diameter of the oil pump body bushing.

Maximum inside diameter:

38.18 mm (1.5031 in.)

If the inside diameter is greater than the maximum, replace the oil pump body subassembly.



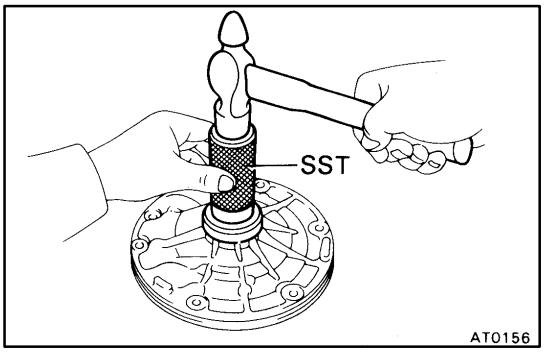
5. CHECK STATOR SHAFT BUSHING

Using a dial indicator, measure the inside diameter stator shaft bushing.

Maximum inside diameter:

21.57 mm (0.8492 in.)

If the inside diameter is greater than the maximum, replace the stator shaft.



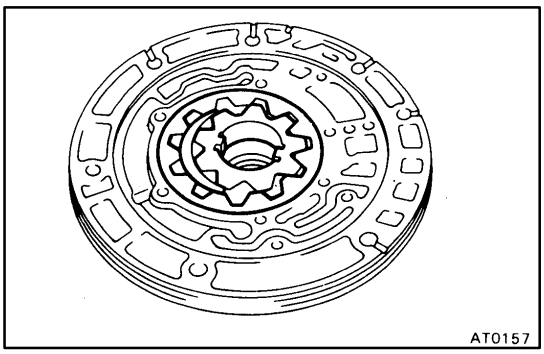
AX031-02

OIL PUMP ASSEMBLY

1. INSTALL FRONT OIL SEAL

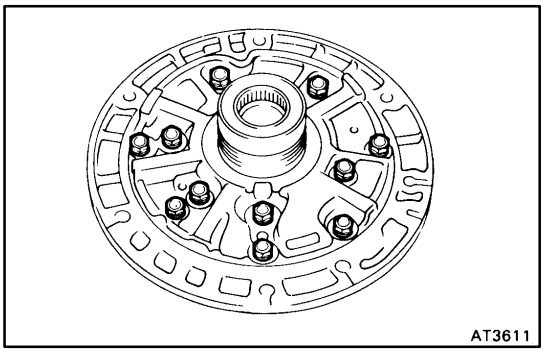
Using SST and a hammer, install a new oil seal. The seal end should be flush with the outer edge of the pump body.

SST 09350-32014 (09351-32140)



2. INSTALL DRIVEN GEAR AND DRIVE GEAR

Make sure the top of the gears are facing upward.

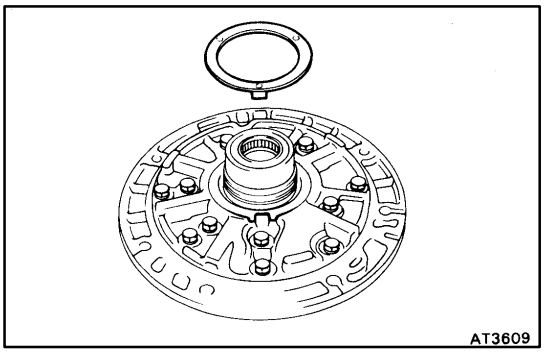


3. INSTALL STATOR SHAFT TO PUMP BODY

(a) Align the stator shaft with each bolt hole.

(b) Torque the 11 bolts.

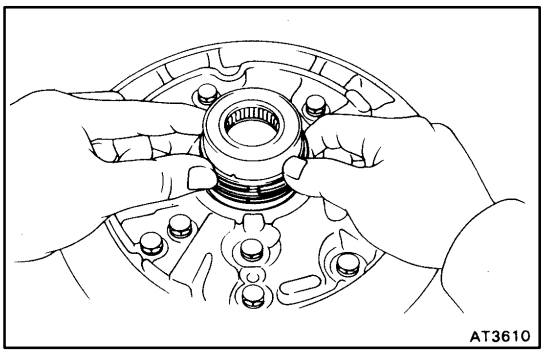
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



4. INSTALL THRUST WASHER

(a) Coat the thrust washer with petroleum jelly.

(b) Align the tab of the washer with the hollow of the pump body.

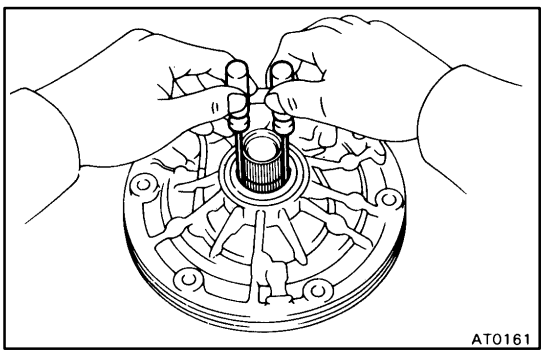


5. INSTALL OIL SEAL RINGS

Install the 2 oil seal rings to the stator shaft back side.

NOTICE: Do not spread the ring ends more than necessary.

HINT: After installing the oil seal rings, check that they move smoothly.



6. CHECK PUMP DRIVE GEAR ROTATION

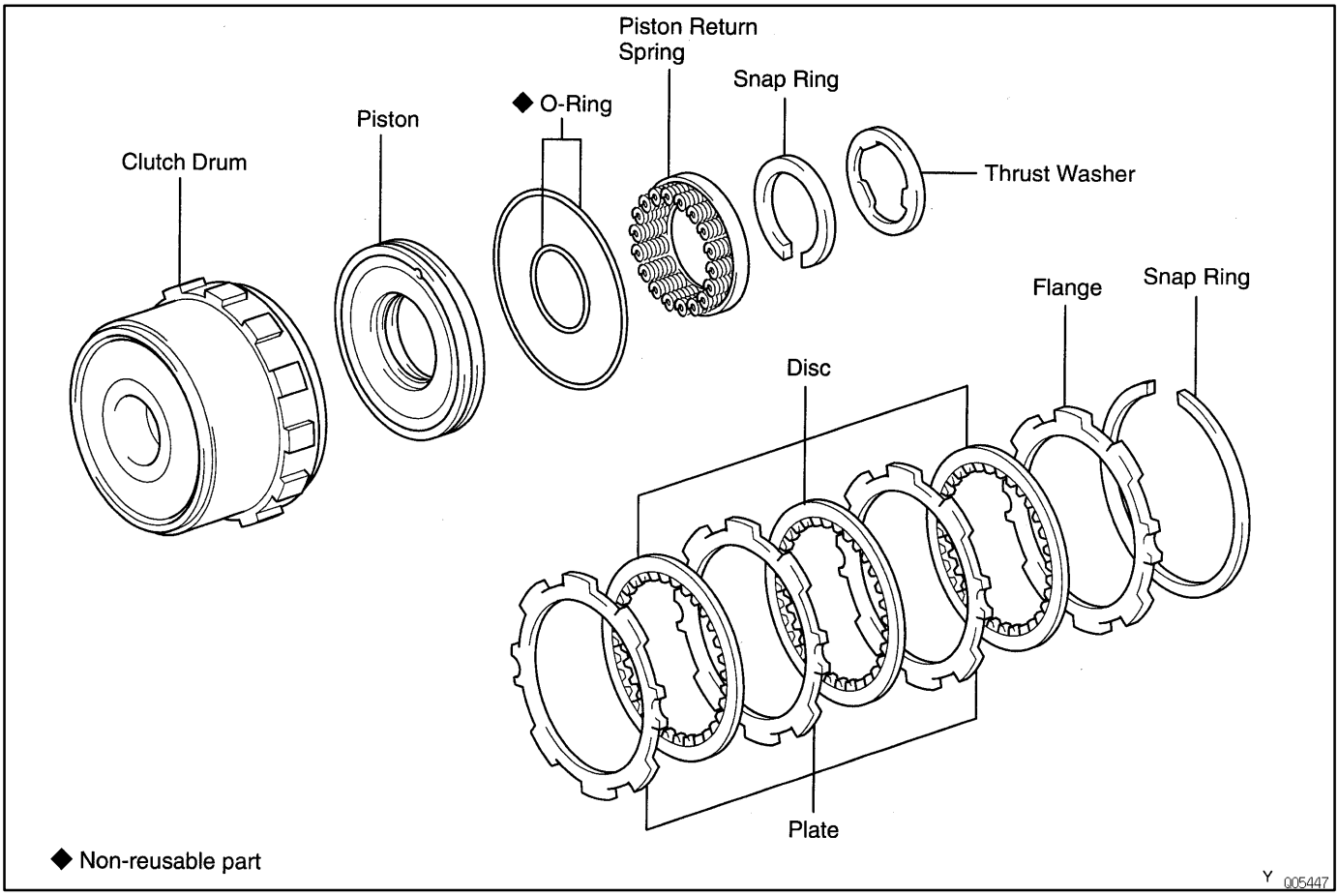
Turn the drive gear with 2 screwdrivers and make sure it rotates smoothly.

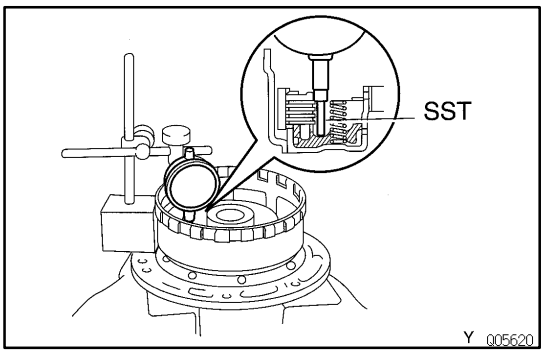
NOTICE: Be careful not to damage the oil seal lip.

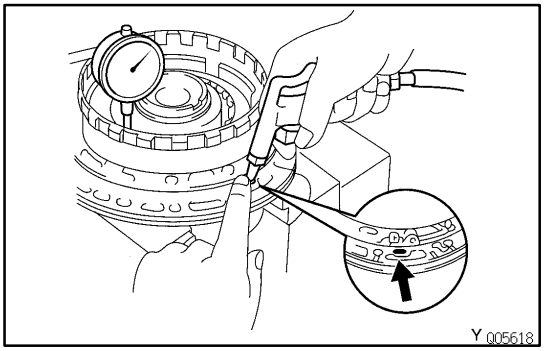
DIRECT CLUTCH

AX032-02

COMPONENTS







AX033-05

DIRECT CLUTCH DISASSEMBLY

1. CHECK PISTON STROKE OF DIRECT CLUTCH

(a) Install the direct clutch on the oil pump.

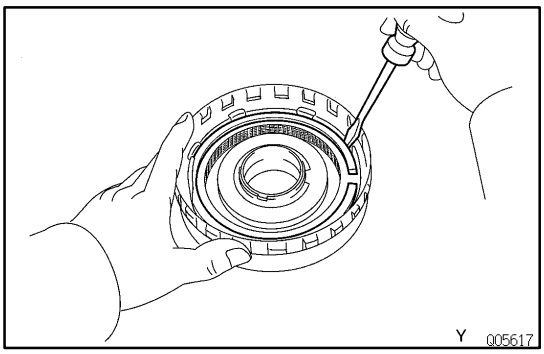
(b) Install a dial indicator and measuring terminal (SST) together, measure the direct clutch piston stroke while applying and releasing compressed air (392-785 kPa, 4-8 kg/cm^2, 57-114 psi).

SST 09350-32014 (09351-32190)

Piston stroke:

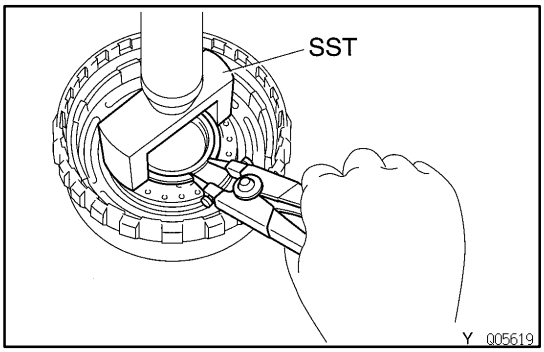
0.91-1.35 mm (0.0358-0.0531 in.)

If the piston stroke is greater than the maximum, inspect each component.



2. REMOVE SNAP RING FROM CLUTCH DRUM

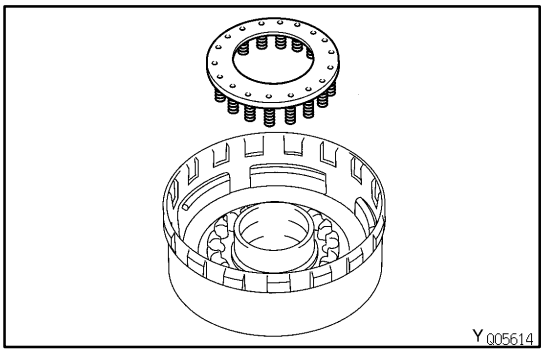
3. REMOVE FLANGE, DISCS AND PLATES



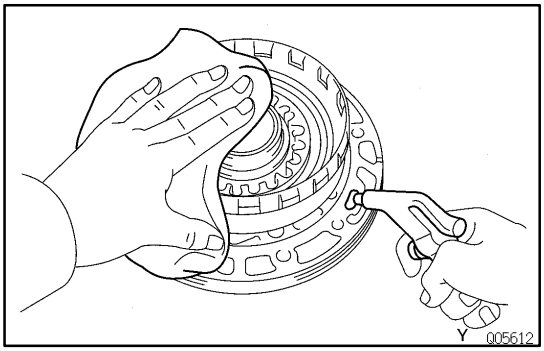
4. REMOVE PISTON RETURN SPRING

(a) Place SST on the spring retainer and compress the springs with a press.
SST 09350-32014 (09351-32070)

(b) Remove the snap ring with snap ring pliers.



(c) Remove the piston return spring.

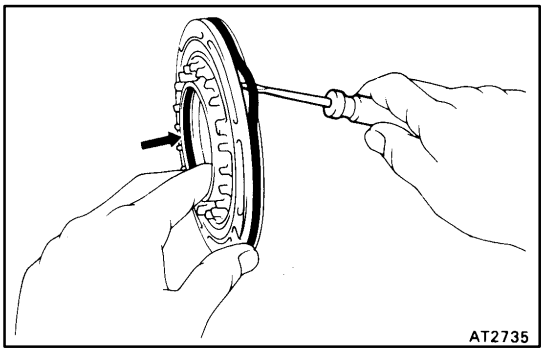


5. REMOVE CLUTCH PISTON

(a) Install the direct clutch onto the oil pump.

(b) Apply compressed air to the oil pump to remove the piston (if the piston does not come out completely, use needle-nose pliers to remove it).

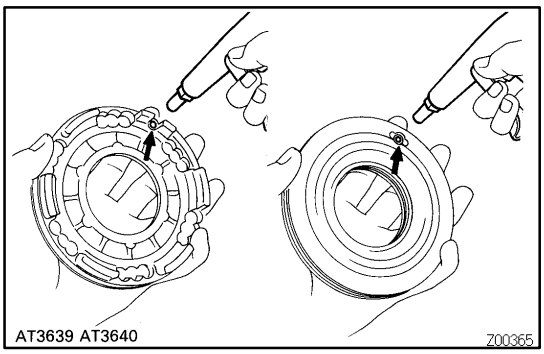
(c) Remove the direct clutch from the oil pump.



(d) Remove the 2 O-rings from the piston.

AX034-03

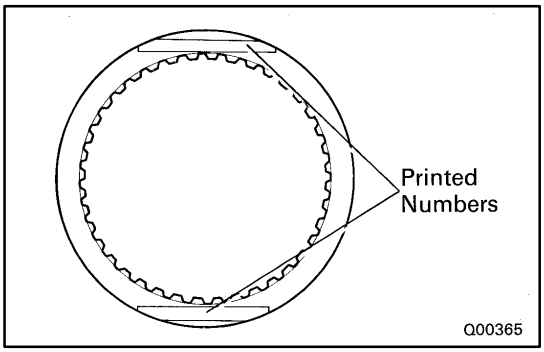
DIRECT CLUTCH INSPECTION



1. INSPECT CLUTCH PISTON

(a) Check that the check ball is free by shaking the piston.

(b) Check that the valve does not leak by applying low-pressure compressed air.



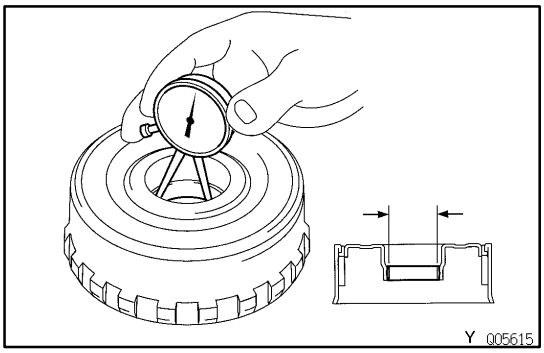
2. INSPECT DISCS, PLATES AND FLANGE

Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

★ Before assembling new discs, soak them in ATF for at least 15 minutes.



3. CHECK DIRECT CLUTCH BUSHING

Using a dial indicator, measure the inside diameter of the direct clutch bushing.

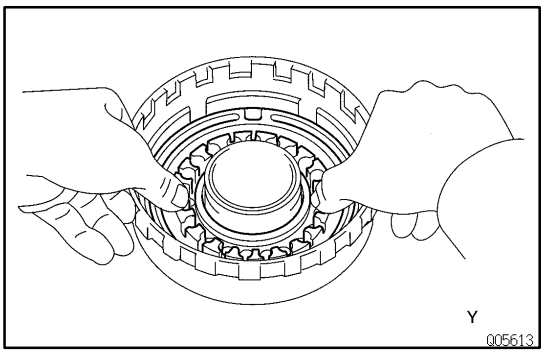
Maximum inside diameter:

48.27 mm (1.9004 in.)

If the inside diameter is greater than the maximum, replace the direct clutch.

AX035-06

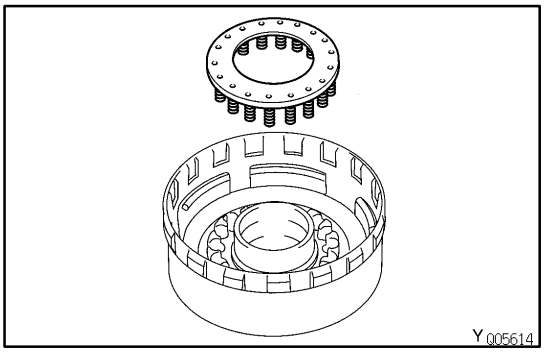
DIRECT CLUTCH ASSEMBLY



1. INSTALL CLUTCH PISTON IN DIRECT CLUTCH DRUM

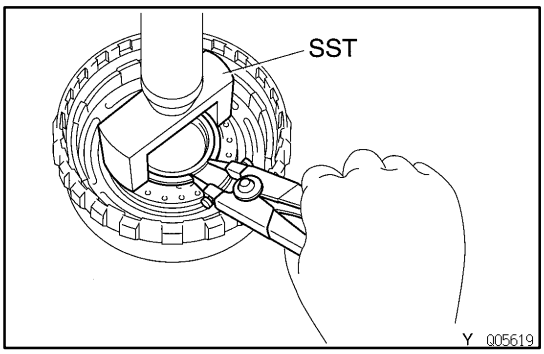
(a) Install new O-rings to the piston. Coat the O-rings with ATF.

(b) Being careful not to damage the O-rings, press the piston into the drum with the cup side up.



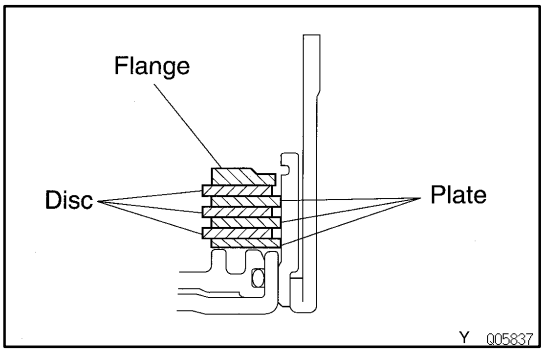
2. INSTALL PISTON RETURN SPRING

(a) Place the return spring and snap ring onto the piston.



(b) Place SST on the spring retainer, and compress the return spring with a press.
SST 09350-32014 (09351-32070)

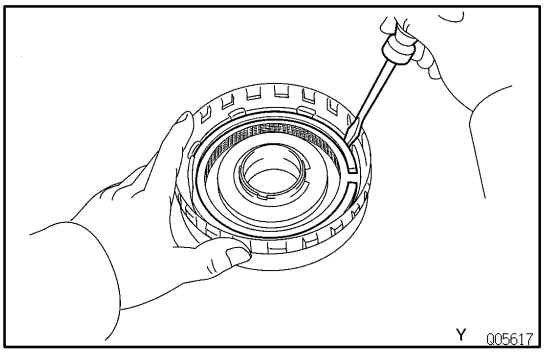
(c) Install the snap ring using snap ring pliers. Be sure the end gap of snap ring is aligned with the spring retainer claw.



3. INSTALL PLATES, DISCS AND FLANGE

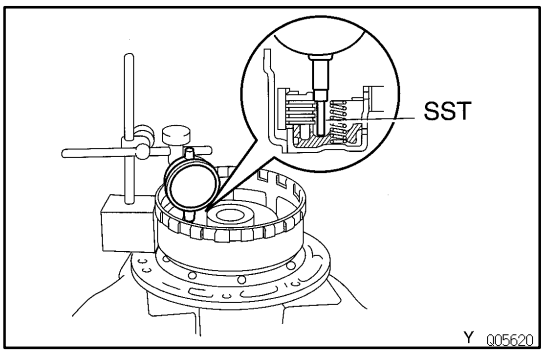
(a) Install plates and discs.
Install in order:
P=Plate D=Disc
P-D-P-D-P-D

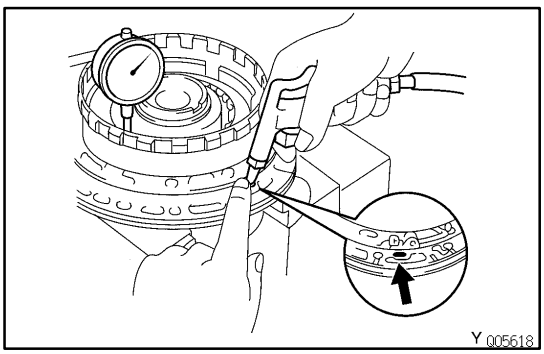
(b) Install the flange with the flat end facing downward.



4. INSTALL SNAP RING

Check that the end gap of the snap ring is not aligned with one of the cutouts.





5. RECHECK PISTON STROKE OF DIRECT CLUTCH

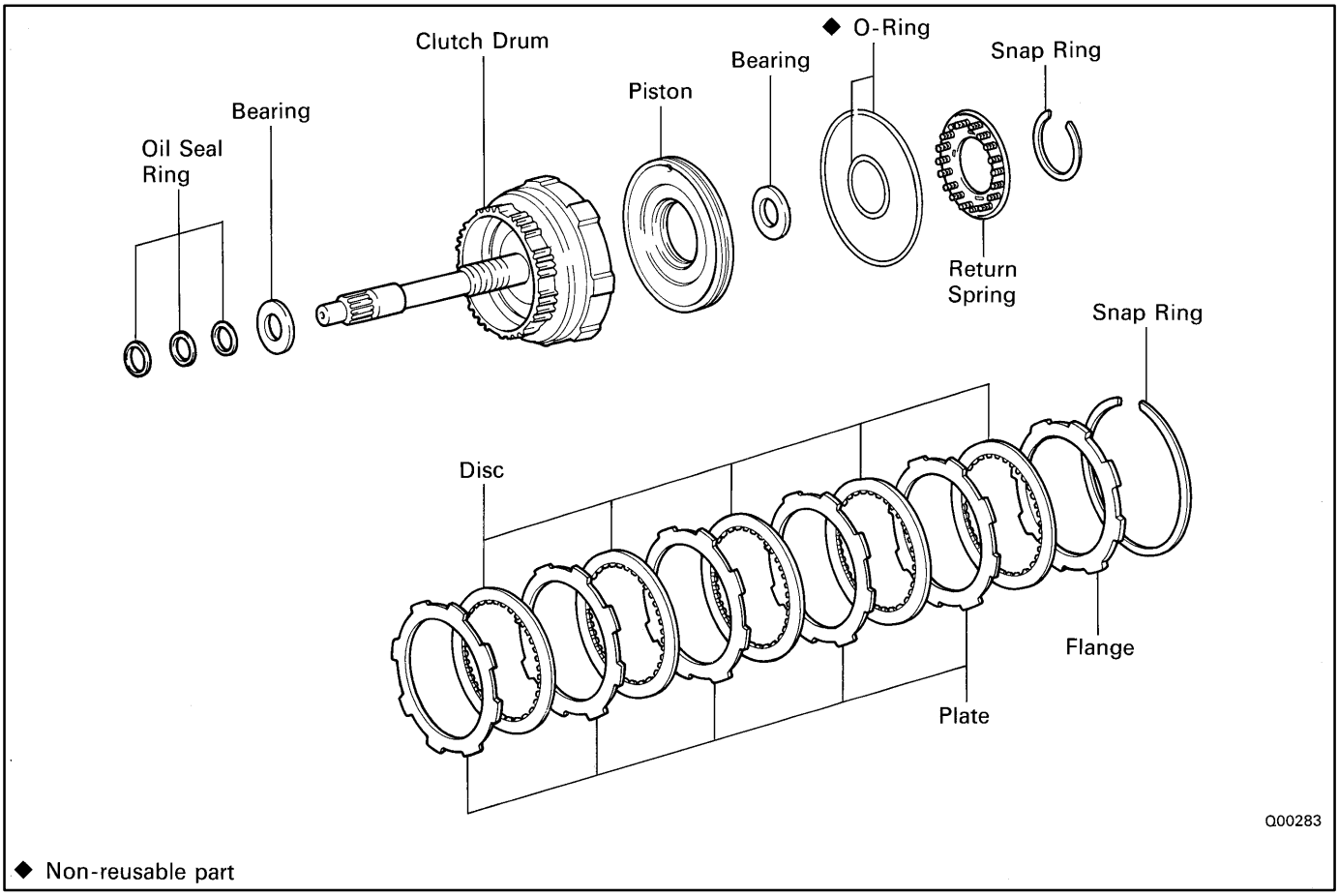
(a) Install the direct clutch on the oil pump.

(b) Install a dial indicator and measuring terminal (SST) together, measure the direct clutch piston stroke while applying and releasing compressed air (392-785 kPa, 4-8 kgf/cm^2, 57-114 psi).
SST 09350-32014 (09351-32190)
Piston stroke:
0.91-1.35 mm (0.0358-0.0531 in.)
If the piston stroke is non- standard, select another flange.
HINT: There are 2 different thickness for the flange.
Flange thickness:
2.70 mm (0.1063 in.)
3.00 mm (0.1181 in.)

FORWARD CLUTCH

AX036-02

COMPONENTS



◆ Non-reusable part

AX037-04

FORWARD CLUTCH DISASSEMBLY

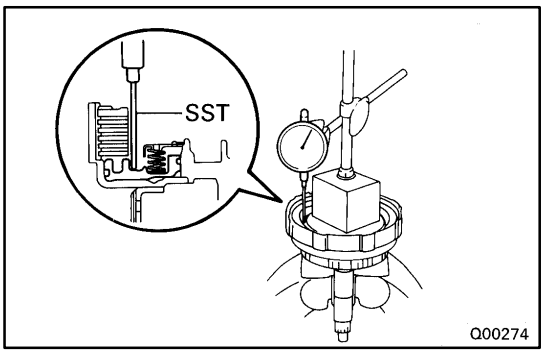
1. CHECK PISTON STROKE OF FORWARD CLUTCH

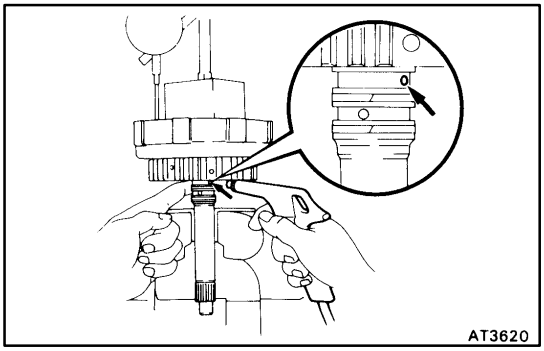
Install a dial indicator and measuring terminal (SST) together, measure the forward clutch piston stroke while applying and releasing compressed air (392-785 kPa, 4-8 kgf/cm^2, 57-114 psi).

SST 09350-32014 (09351-32190)

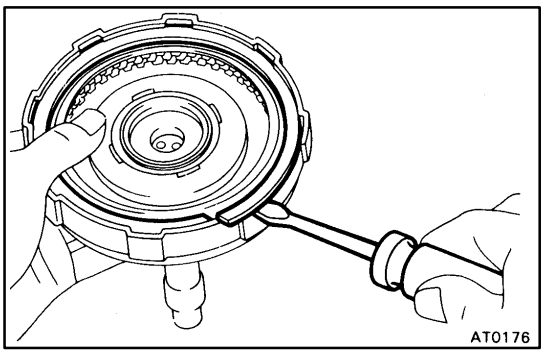
Piston stroke:

1.79-2.21 mm (0.0704-0.0870 in.)

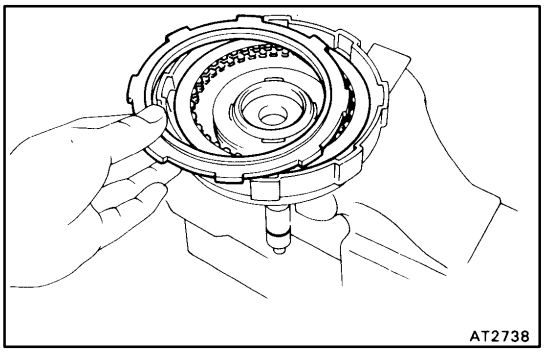




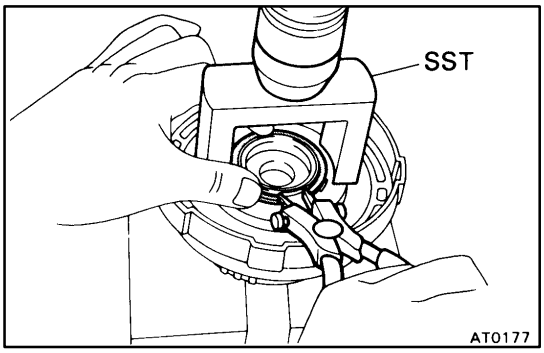
each component.



2. REMOVE SNAP RING FROM CLUTCH DRUM



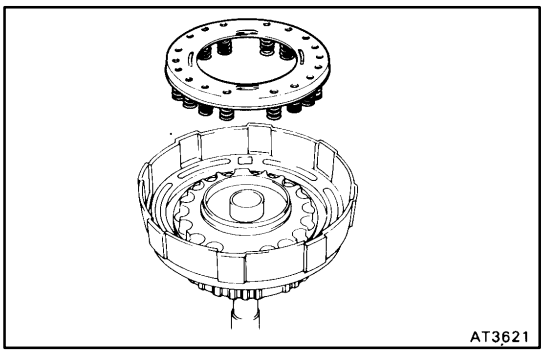
3. REMOVE FLANGE, DISCS AND PLATES



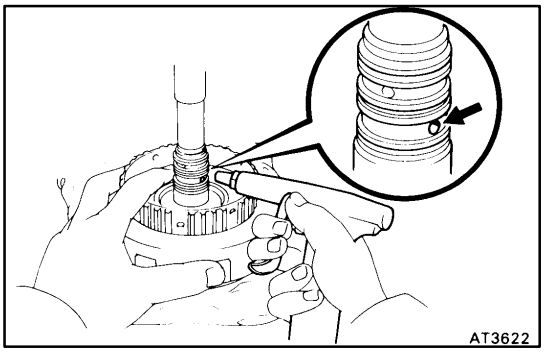
4. REMOVE RETURN SPRING

(a) Place SST on the spring retainer and compress the springs with a press.
SST 09350-32014 (09351-32070)

(b) Using snap ring pliers, remove the snap ring.

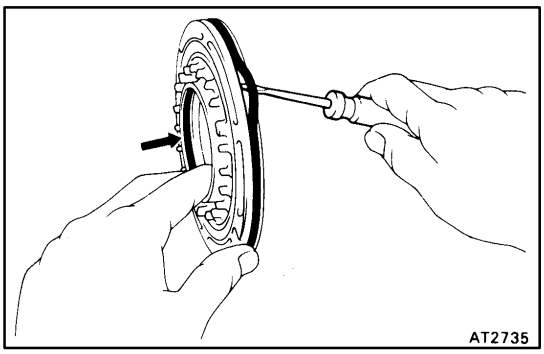


(c) Remove the return spring.

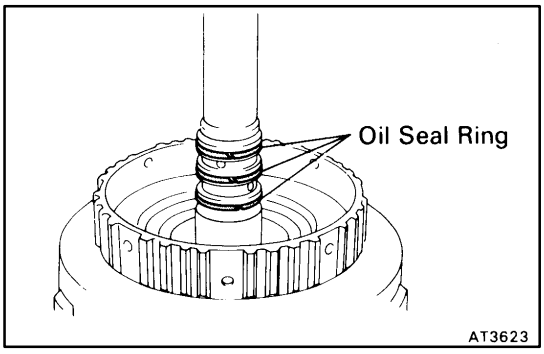


5. REMOVE CLUTCH PISTON

(a) Apply compressed air into the oil passage to remove the piston.
If the piston does not come out, use needle-nose pliers to remove it.



(b) Remove the 2 O-rings from the piston.

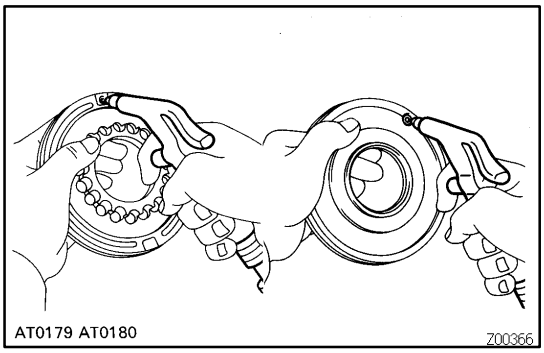


6. IF NECESSARY, REMOVE OIL SEAL RINGS

Remove the 3 oil seal rings from the shaft.

AX038-03

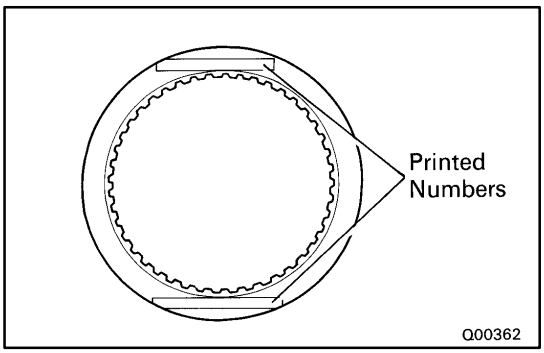
FORWARD CLUTCH INSPECTION



1. INSPECT CLUTCH PISTON

(a) Check that the check ball is free by shaking the piston.

(b) Check that the valve does not leak by applying low-pressure compressed air.



2. INSPECT DISCS, PLATES AND FLANGE

Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

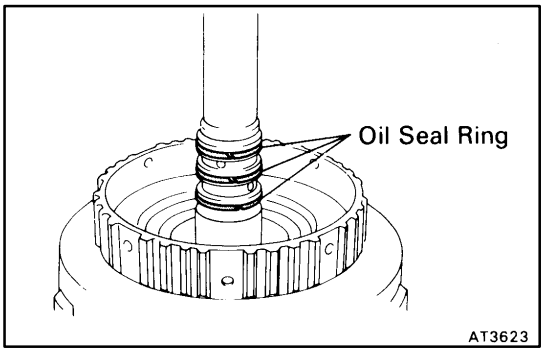
HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

★ Before assembling new discs, soak them in ATF for at least 15 minutes.

AX039-04

FORWARD CLUTCH ASSEMBLY

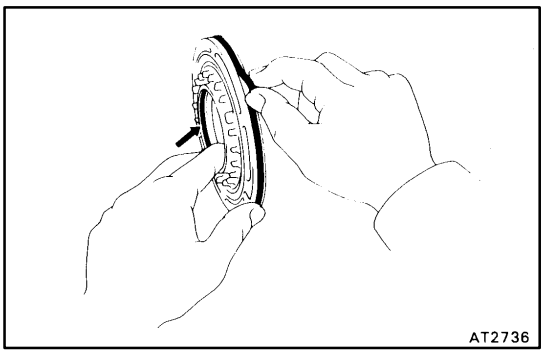


1. INSTALL OIL SEAL RINGS

Install the 3 oil seal rings to the shaft.

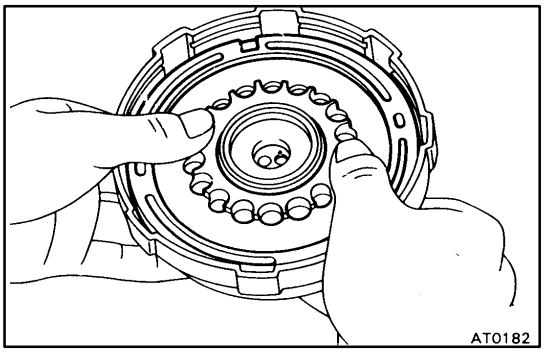
NOTICE: Do not spread the ring ends more than necessary.

HINT: After installing the oil seal rings, check that they move smoothly.



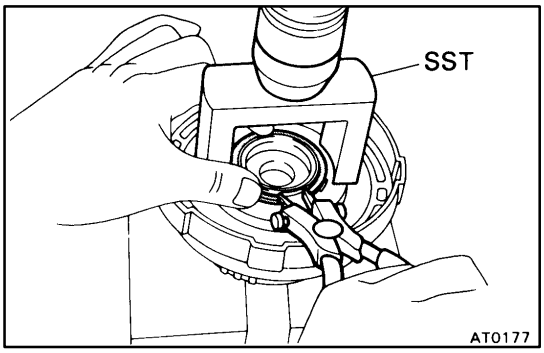
2. INSTALL CLUTCH PISTON TO CLUTCH DRUM

(a) Install the 2 new O-rings to the piston.



(b) Coat the O-ring with ATF.

(c) Press the piston into the drum with the cup side up, being careful not to damage the O-rings.

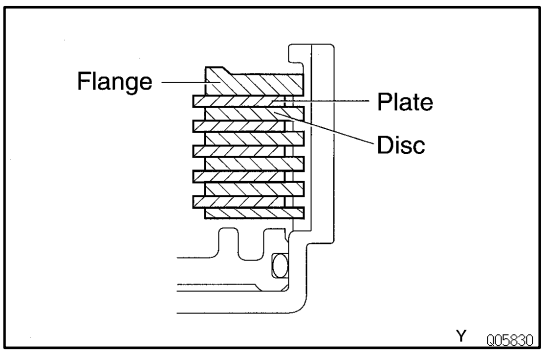


3. INSTALL PISTON RETURN SPRINGS

(a) Place the return spring and snap ring onto the piston.

(b) Place SST on the spring retainer, and compress the springs with a press.
SST 09350-32014 (09351-32070)

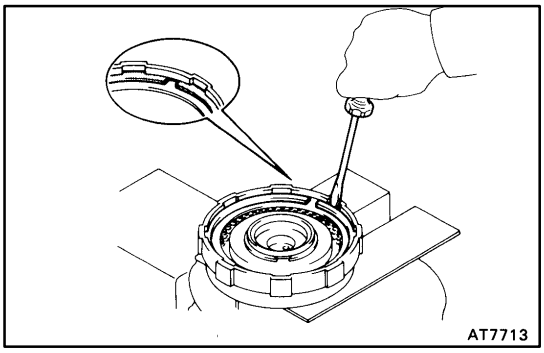
(c) Install the snap ring with snap ring pliers.
Be sure the end gap of the snap ring is not aligned with the spring retainer claw.



4. INSTALL PLATES, DISCS AND FLANGE

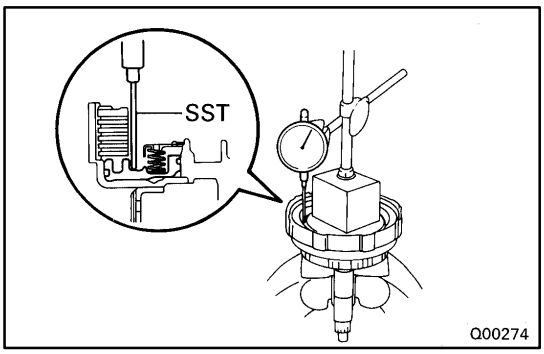
(a) Install the plates and discs.
Install in order:
P=Plate D=Disc
P-D-P-D-P-D-P-D-P-D

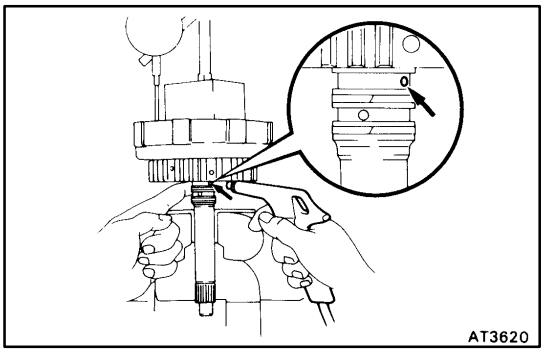
(b) Install the flange with the flat end facing downward.



5. INSTALL SNAP RING

Check that the end gap of snap ring is not aligned with one of the cutouts.





6. RECHECK PISTON STROKE OF FORWARD CLUTCH

Install a dial indicator and measuring terminal (SST) together, measure the forward clutch piston stroke while applying and releasing compressed air (392-785 kPa, 4-8 kgf/cm^2, 57-114 psi).

SST 09350-32014 (09351-32190)

Piston stroke:

1.79-2.21 mm (0.0704-0.0870 in.)

If the piston stroke is non- standard, select another flange.

HINT: There are 2 different thicknesses for the flange.

Flange thickness:

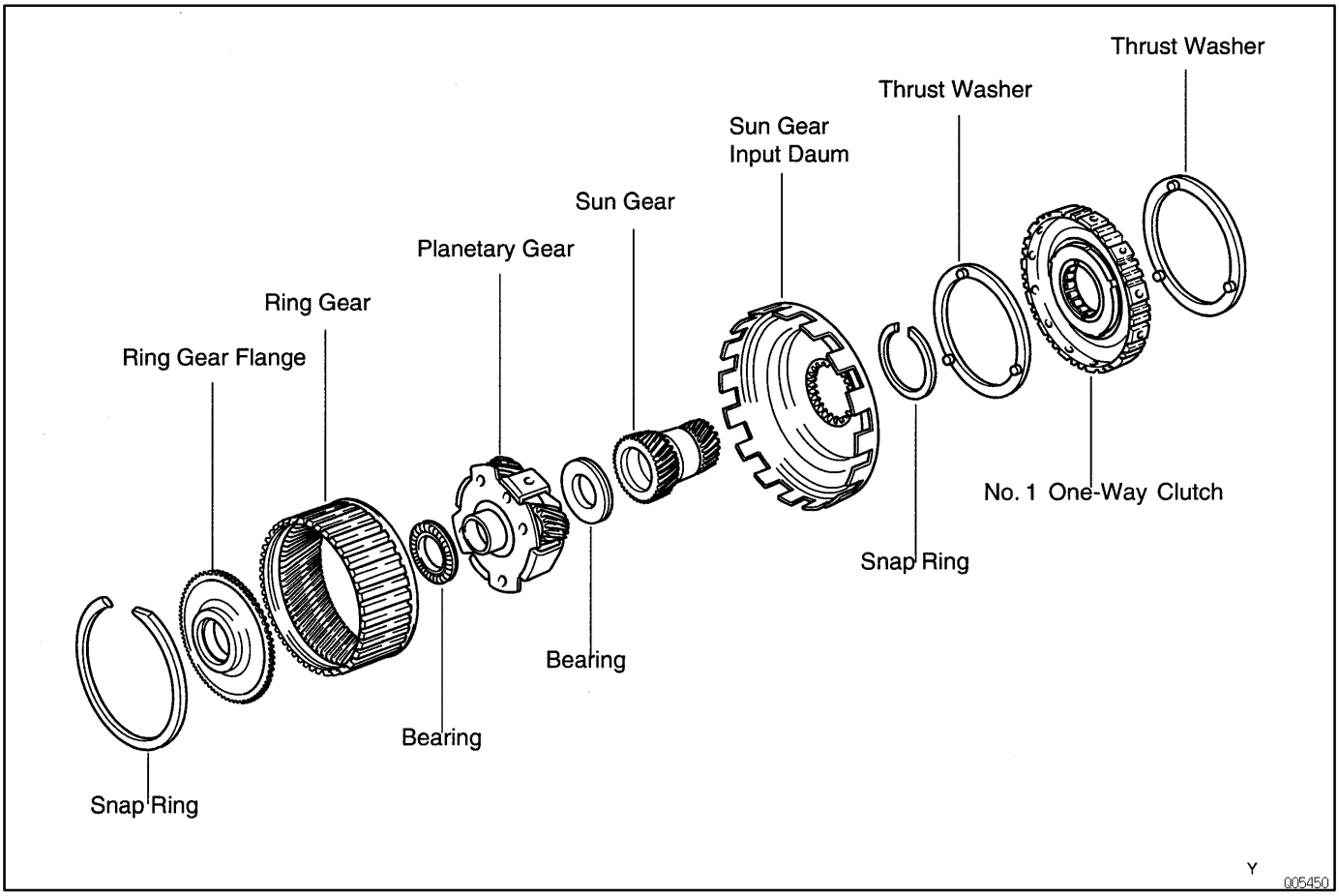
2.30 mm (0.0906 in.)

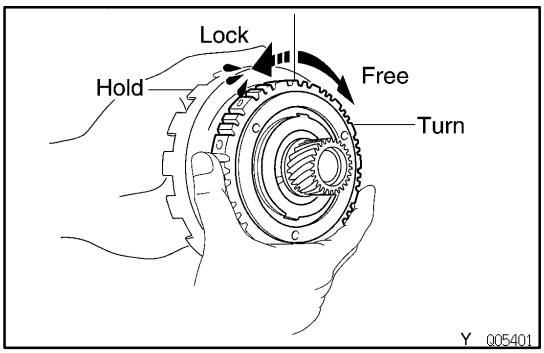
2.70 mm (1.0630 in.)

FRONT PLANETARY GEAR

AX03A-02

COMPONENTS



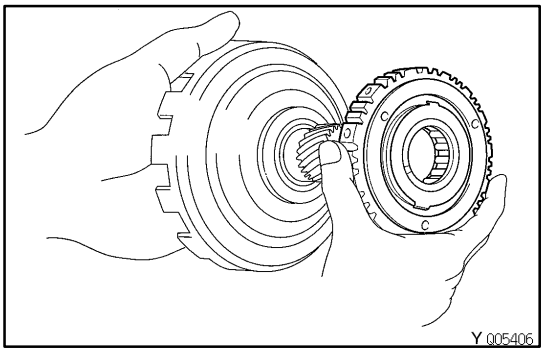


AX0TU-03

NO.1 ONE-WAY CLUTCH AND SUN GEAR DISASSEMBLY

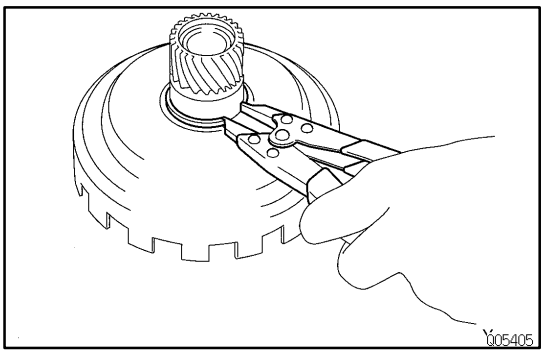
1. CHECK OPERATION OF NO.1 ONE-WAY CLUTCH

Hold the sun gear and turn the hub. The hub should turn freely clockwise and should lock counterclockwise.



2. REMOVE NO.1 ONE-WAY CLUTCH FROM SUN GEAR

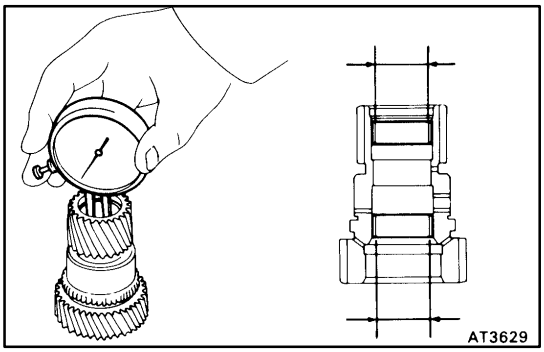
While turning the hub clockwise, remove the No.1 one-way clutch from the sun gear.



3. REMOVE SUN GEAR FROM DRUM

(a) Using snap ring pliers, remove the snap ring from the drum.

(b) Remove the sun gear from the drum.



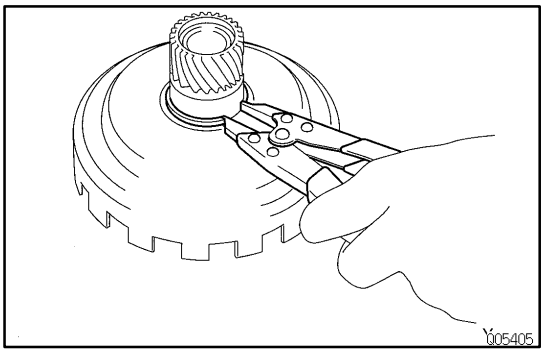
4. CHECK SUN GEAR BUSHINGS

Using a dial indicator, measure the inside diameter of the sun gear bushings.

Maximum inside diameter:

22.59 mm (0.8894 in.)

If the inside diameter is greater than the maximum, replace the sun gear.



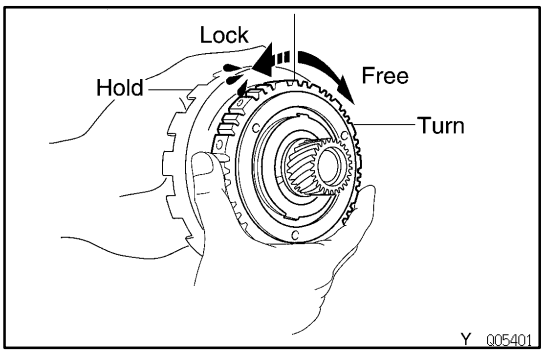
NO.1 ONE-WAY CLUTCH AND SUN GEAR ASSEMBLY

AX0TV-01

1. INSTALL SUN GEAR TO DRUM

(a) Install the sun gear to the drum.

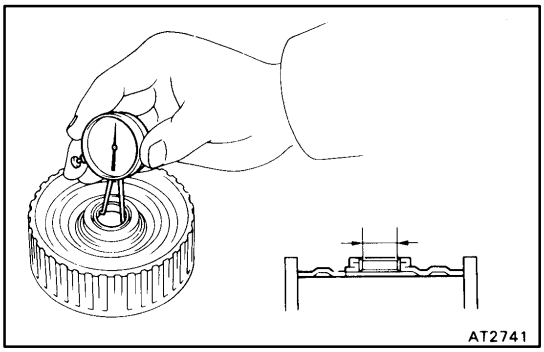
(b) Using snap ring pliers, install the snap ring to drum.



2. INSTALL NO.1 ONE-WAY CLUTCH ON SUN GEAR

While turning the hub clockwise, slide the No.1 one-way clutch onto the sun gear.

3. RECHECK OPERATION OF NO.1 ONE-WAY CLUTCH



PLANETARY RING GEAR INSPECTION

AX03D-02

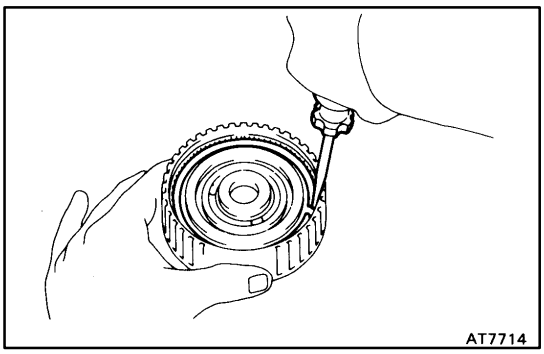
1. INSPECT RING GEAR FLANGE BUSHING

Using a dial indicator, measure the inside diameter of the flange bushing.

Maximum inside diameter:

30.08 mm (1.1842 in.)

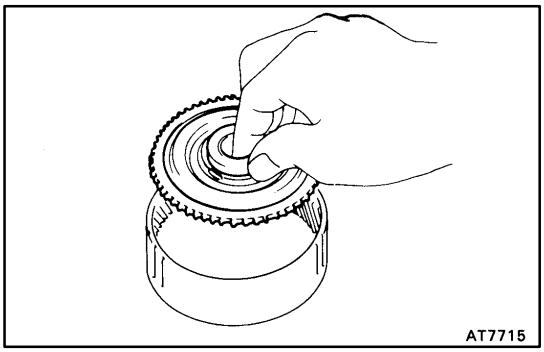
If the inside diameter is greater than the maximum, replace the flange.



2. REMOVE RING GEAR FLANGE

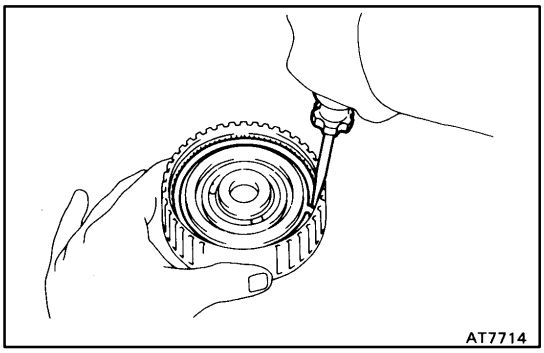
(a) Using a screwdriver, remove the snap ring.

(b) Remove the flange from the ring gear.

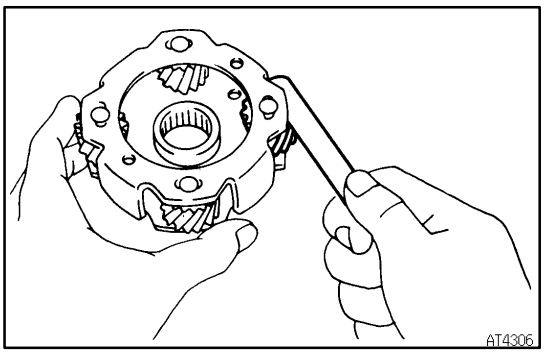


3. INSTALL RING GEAR FLANGE

(a) Position the flange into the ring gear.



(b) Using a screwdriver, install the snap ring.



FRONT PLANETARY GEAR INSPECTION AX03E-03

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance:

0.16-0.56 mm (0.0063-0.0220 in.)

Maximum clearance:

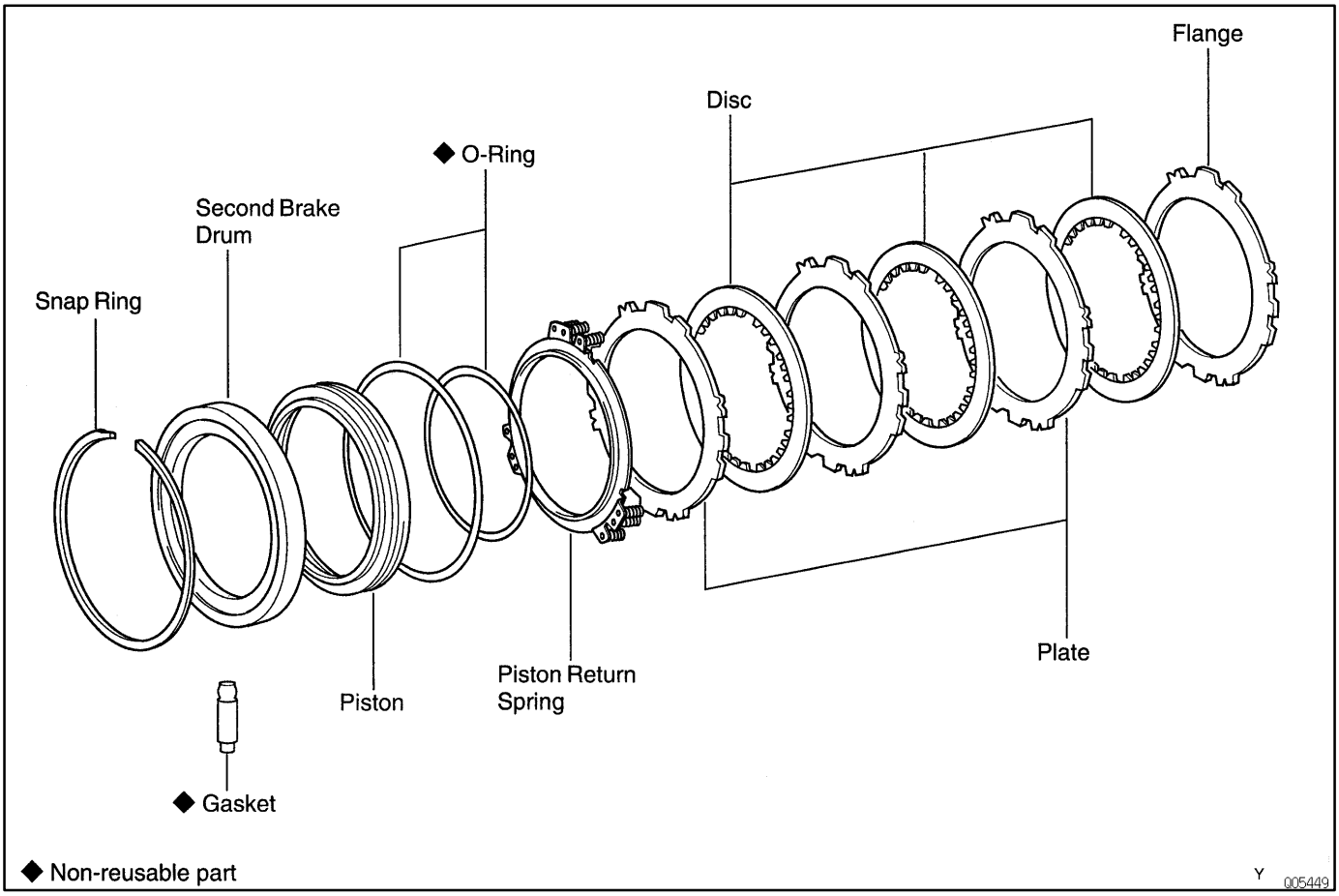
0.61 mm (0.0240 in.)

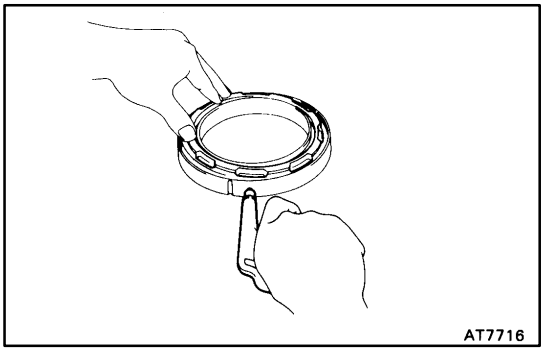
If the clearance is greater than the maximum, replace the planetary gear assembly.

SECOND BRAKE

AX03F-02

COMPONENTS



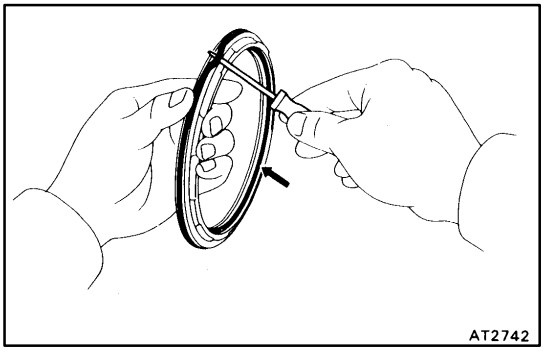


SECOND BRAKE PISTON DISASSEMBLY

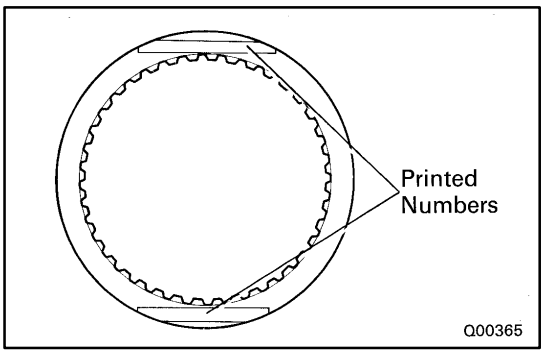
AX03G-03

REMOVE SECOND BRAKE PISTON

(a) Apply compressed air to the oil hole to remove the piston.



(b) Remove the 2 O-rings from the piston.



AX03H-03

SECOND BRAKE COMPONENT INSPECTION

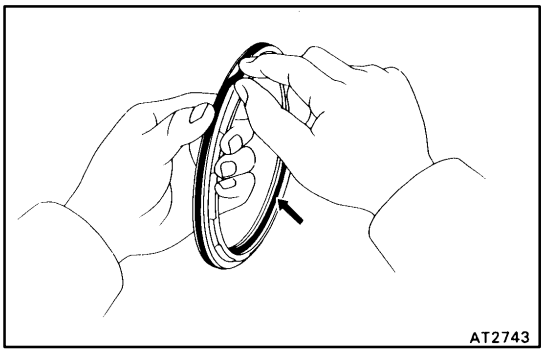
INSPECT DISCS, PLATES AND FLANGE

Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

★ Before assembling new discs, soak them in ATF for at least 15 minutes.



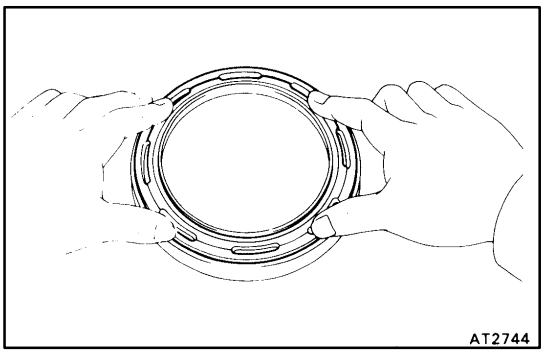
AX03J-06

SECOND BRAKE PISTON ASSEMBLY

INSTALL PISTON

(a) Coat a new O-ring with ATF.

(b) Install the 2 new O-rings on the piston.

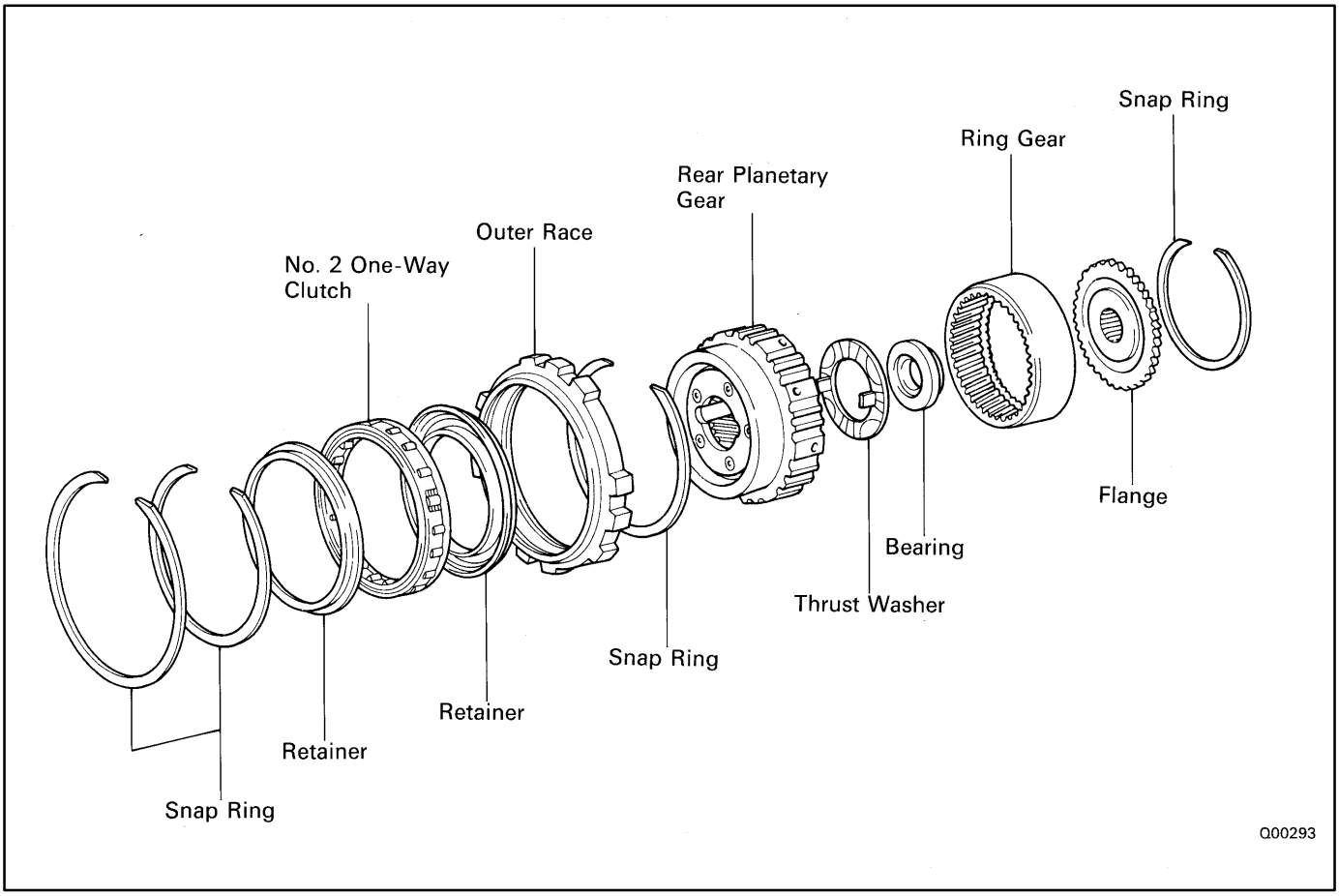


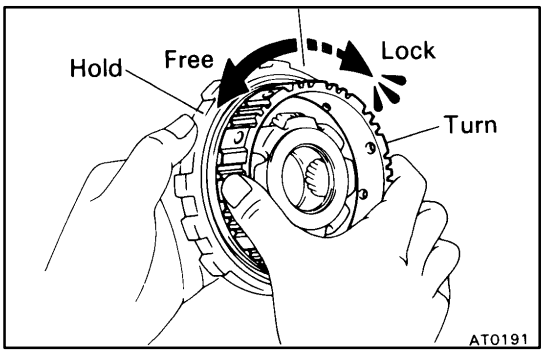
(c) Press the piston into the drum, being careful not to damage the O-rings.

REAR PLANETARY GEAR

AX03K-02

COMPONENTS



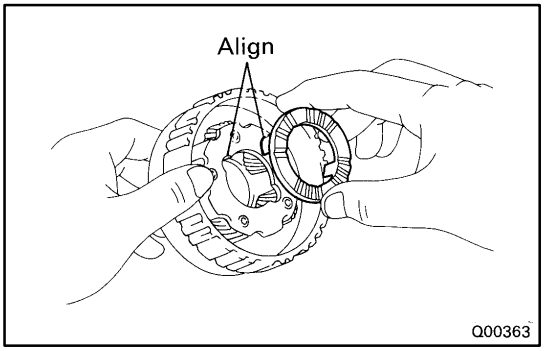


NO.2 ONE-WAY CLUTCH DISASSEMBLY

AX03L-02

1. CHECK OPERATION OF NO.2 ONE-WAY CLUTCH

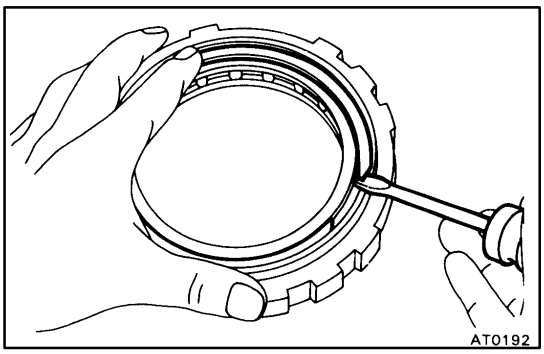
Hold the outer race and turn the rear planetary gear. The rear planetary gear should turn freely counterclockwise and should lock clockwise.



2. SEPARATE NO.2 ONE- WAY CLUTCH AND REAR PLANETARY GEAR

3. REMOVE THRUST WASHER

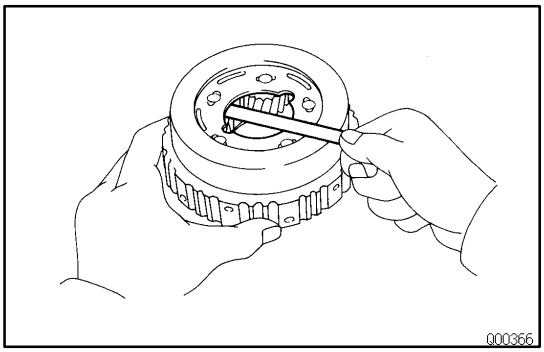
Remove the thrust washer from the rear side of planetary gear.



4. REMOVE NO.2 ONE-WAY CLUTCH FROM OUTER RACE

(a) Remove the 2 snap rings and retainers from both sides.

(b) Remove the No.2 one-way clutch from the outer race.



REAR PLANETARY GEAR INSPECTION

AX03M-03

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

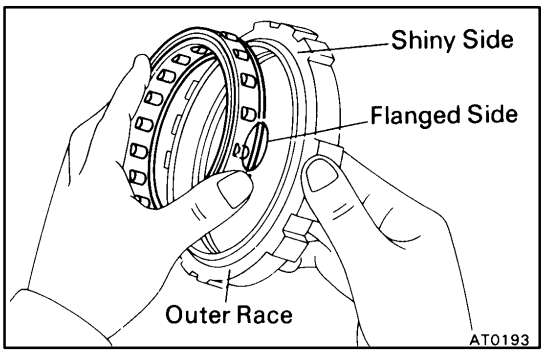
Standard clearance:

0.16-0.56 mm (0.0063-0.0220 in.)

Maximum clearance:

0.61 mm (0.0240 in.)

If the clearance is greater than the maximum, replace the planetary gear assembly.

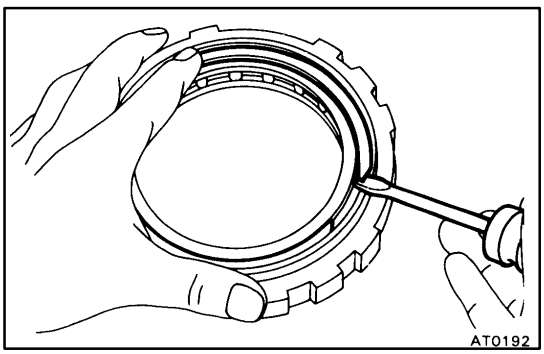


NO.2 ONE-WAY CLUTCH ASSEMBLY

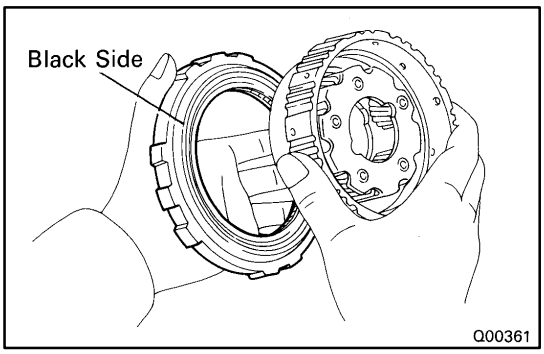
AX03N-02

1. INSTALL ONE-WAY CLUTCH

(a) Install the No.2 one-way clutch into the outer race, facing the flange side of the No.2 one-way clutch toward the shiny side of the outer race.

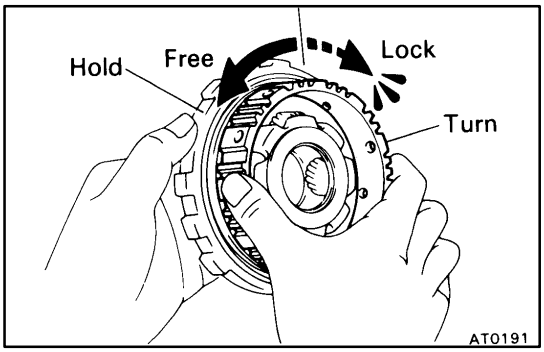


(b) Install the 2 retainers and snap rings to both sides.

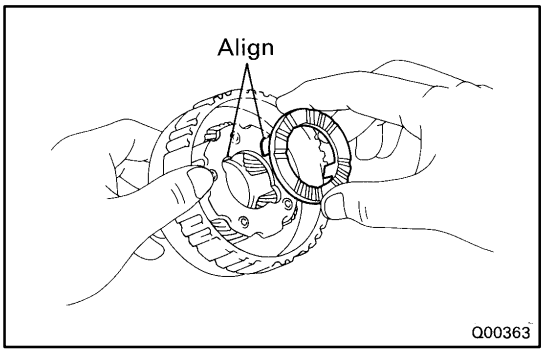


2. INSTALL PLANETARY GEAR INTO NO.2 ONE-WAY CLUTCH

Install the planetary gear into the No.2 one-way clutch, facing the inner race of the rear planetary gear toward the black side of the No.2 one-way clutch outer race.



3. CHECK OPERATION OF NO.2 ONE-WAY CLUTCH

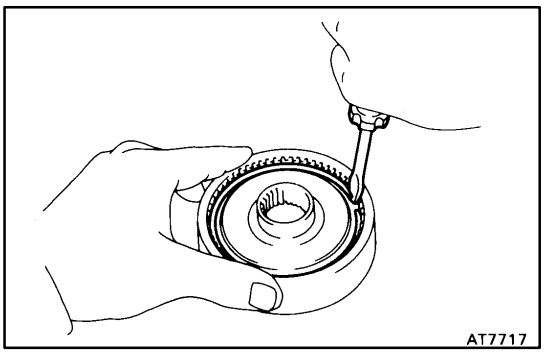


4. INSTALL THRUST WASHER

(a) Coat the thrust washer with petroleum jelly.
(b) Align the tab of the washer with the hollows of the carrier.

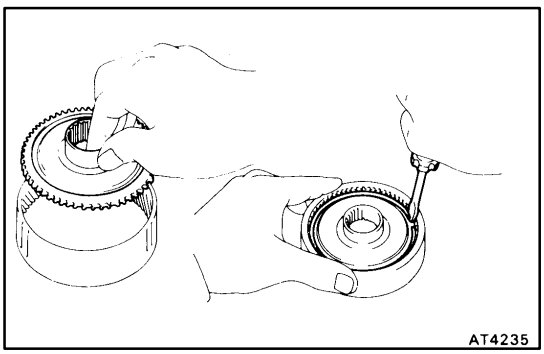
AX03P-02

RING GEAR FLANGE REPLACEMENT



1. REMOVE RING GEAR FLANGE

(a) Using a screwdriver, remove the snap ring.
(b) Remove the flange from the ring gear.



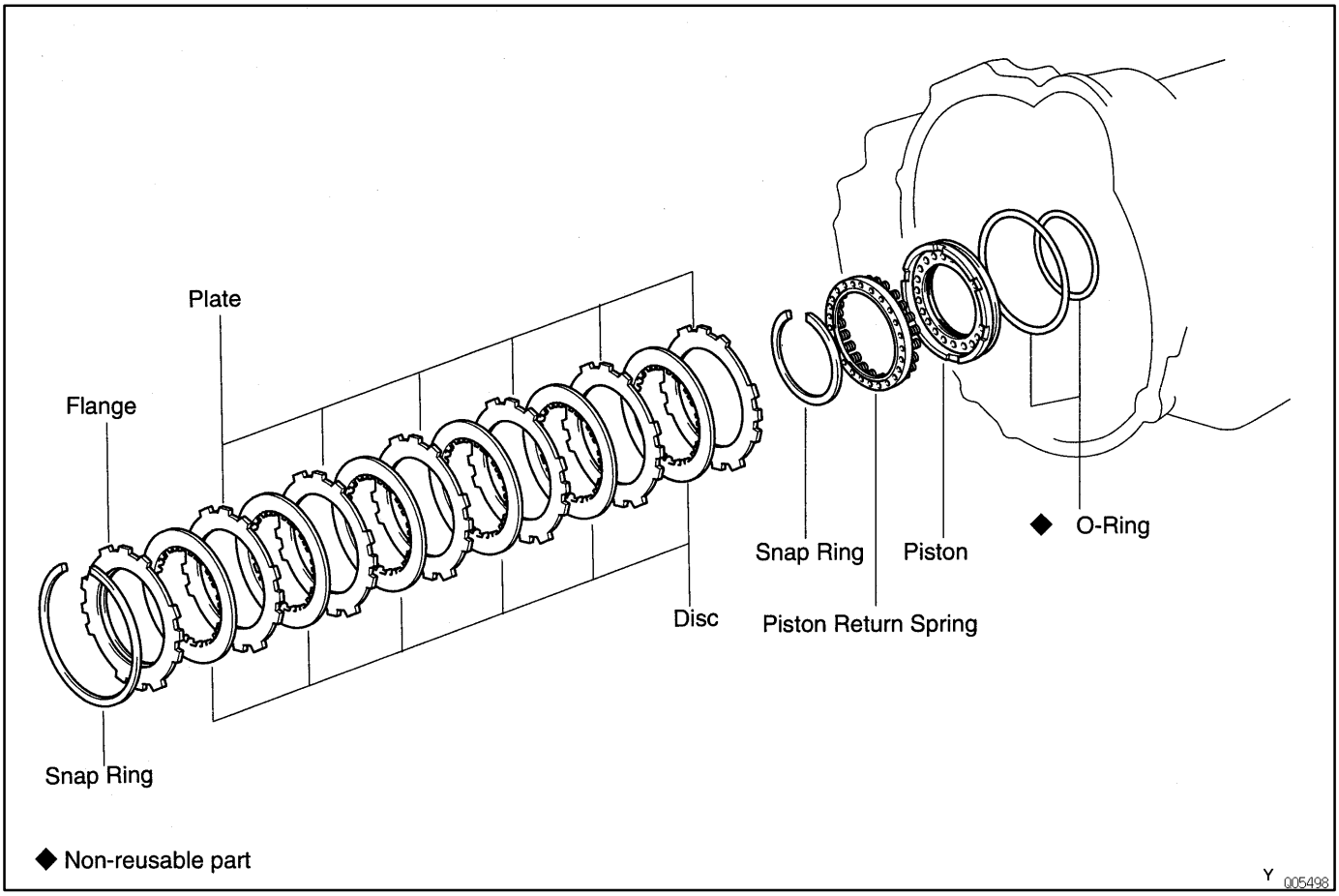
2. INSTALL RING GEAR FLANGE

(a) Position the flange into the ring gear.
(b) Using a screwdriver, install the snap ring.

FIRST AND REVERSE BRAKE

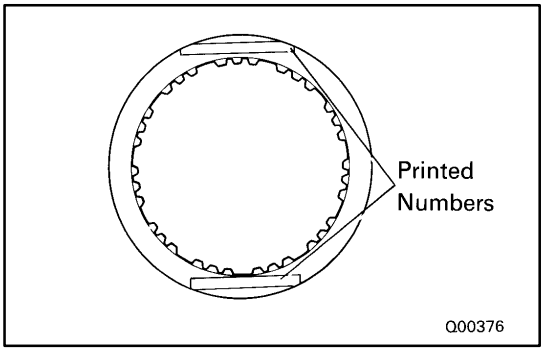
AX03Q-02

COMPONENTS



AX03R-03

FIRST AND REVERSE BRAKE COMPONENTS INSPECTION



INSPECT DISCS, PLATES AND FLANGES

Check if the sliding surfaces of the discs, plates and flanges are worn or burnt. If necessary, replace them.

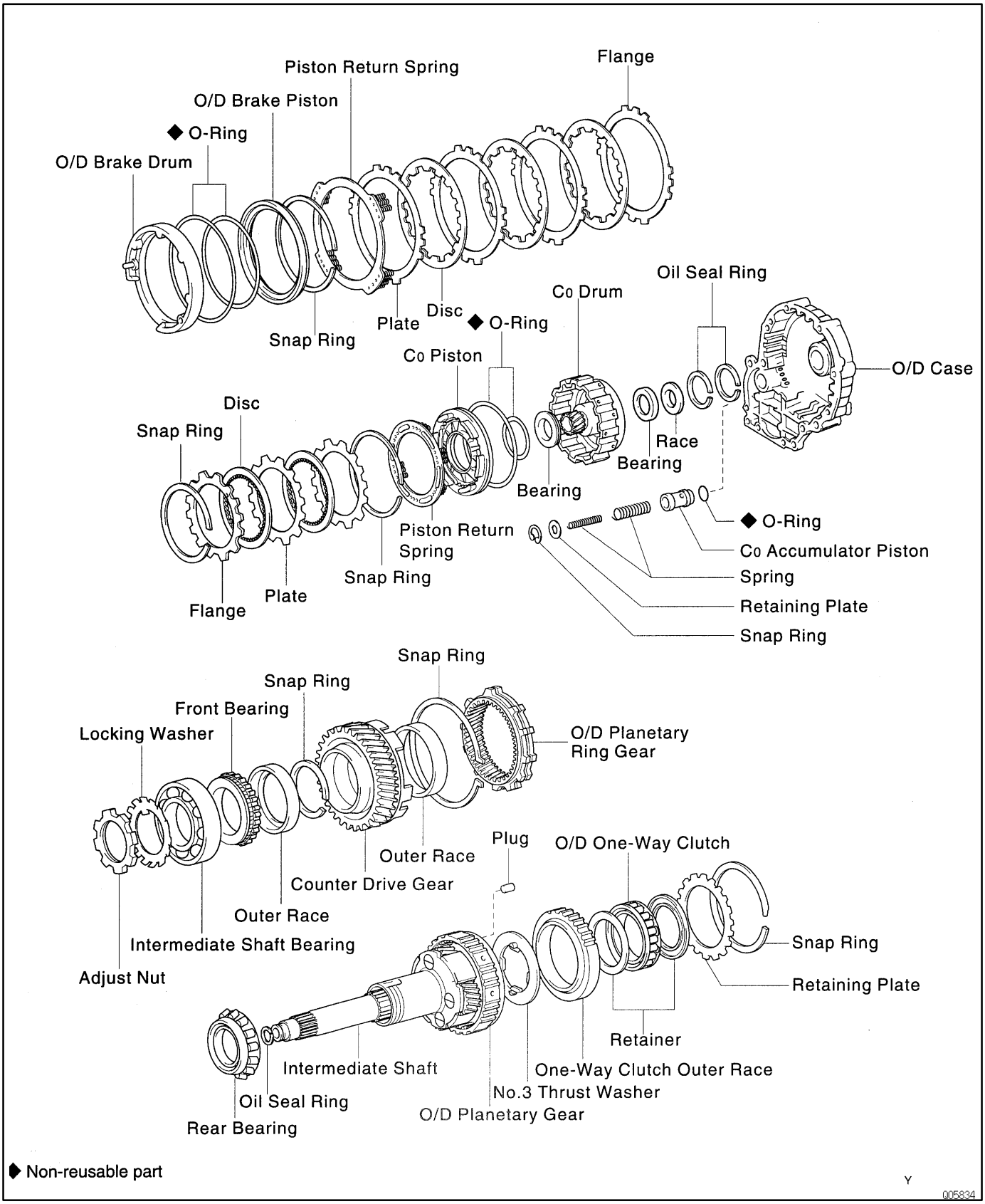
HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

★ Before assembling new discs, soak them in ATF for at least 15 minutes.

OVERDRIVE UNIT
COMPONENTS

AX03S-02



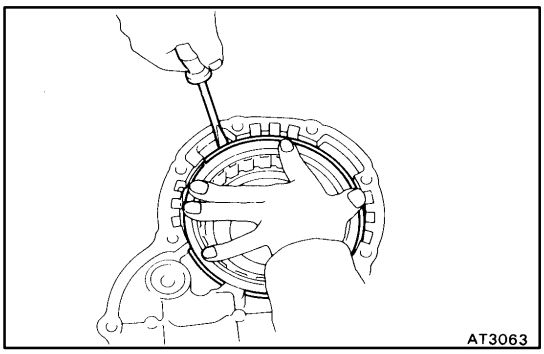
◆ Non-reusable part

Y

005834

AX03T-03

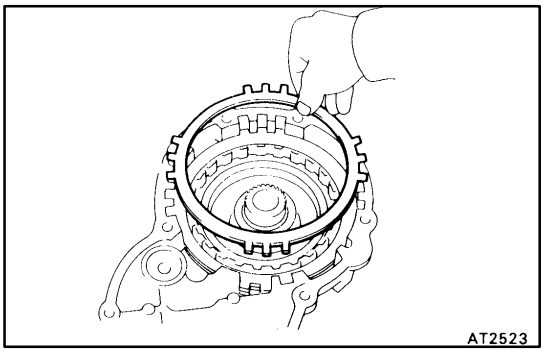
OVERDRIVE BRAKE DISASSEMBLY



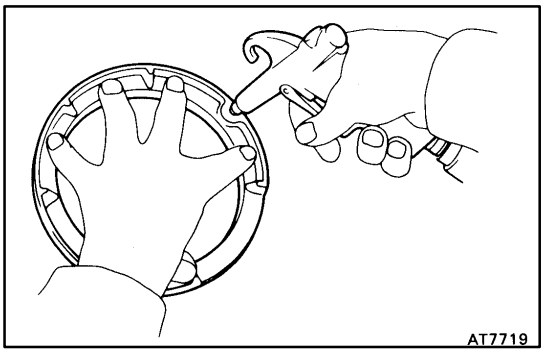
1. REMOVE PISTON RETURN SPRING

(a) While pushing the return spring, remove the snap ring with a screwdriver.

(b) Remove the piston return spring.



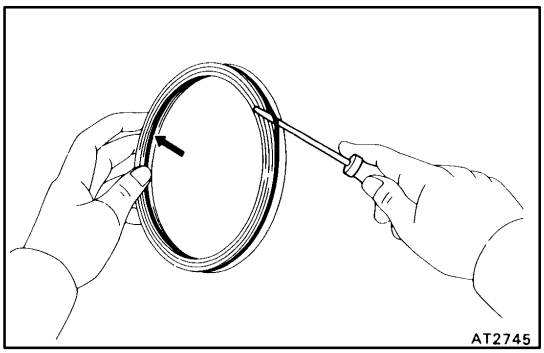
2. REMOVE PLATES, DISCS AND FLANGE



3. REMOVE PISTON FROM DRUM

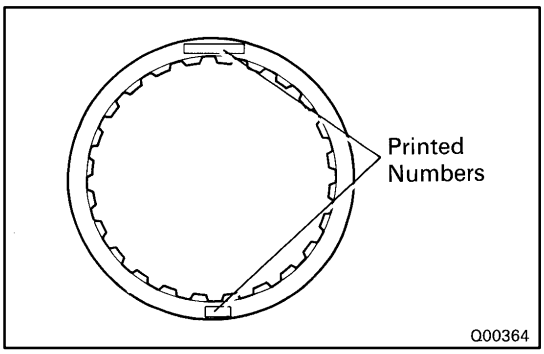
Apply compressed air to oil hole to remove the piston.

HINT: Blow with the gun slightly away from the oil hole, and be careful that the piston does not tilt.



4. REMOVE O-RINGS

Remove the inner and outer O-rings from the piston.



AX03U-03

OVERDRIVE BRAKE INSPECTION

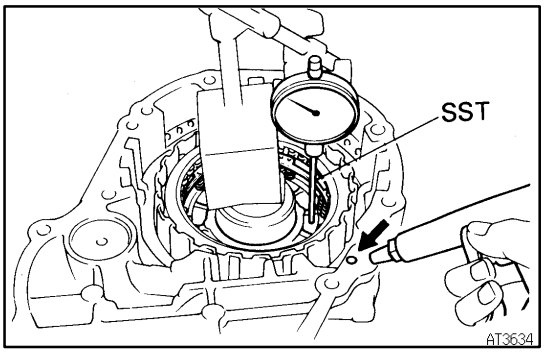
INSPECT DISCS, PLATES AND FLANGE

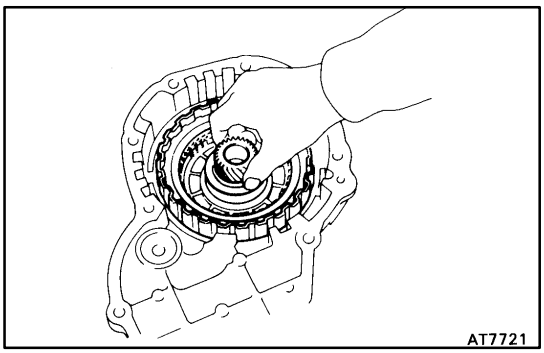
Check if the sliding surfaces of the discs, plates and flange are worn or burnt. If necessary, replace them.

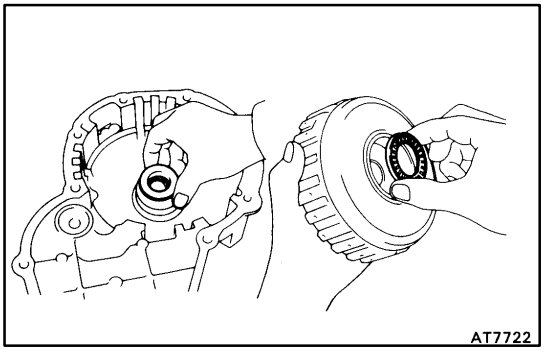
HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

★ Before assembling new discs, soak them in ATF for at least 15 minutes.







AX03V-05

OVERDRIVE DIRECT CLUTCH DISASSEMBLY

1. CHECK PISTON STROKE OF DIRECT CLUTCH

Install a dial indicator and measuring terminal (SST) together, measure the piston stroke while applying and releasing compressed air (392- 785 kPa, 5- 8 kgf/cm^2, 57-1 14 psi).

Piston stroke:

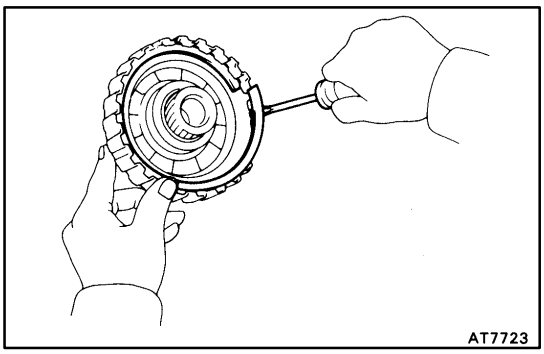
1.75-2.49 mm (0.0689-0.0980 in.)

SST 09350-32014 (09351-32190)

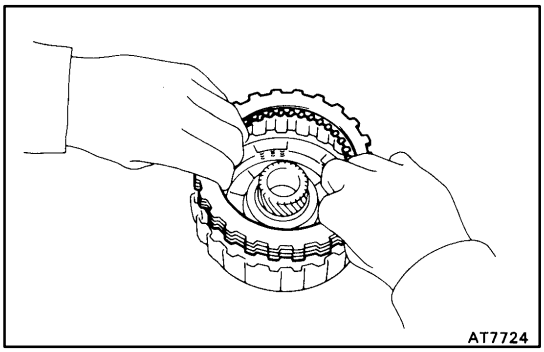
If the piston stroke is greater than the maximum, inspect each component.

2. REMOVE OVERDRIVE DIRECT CLUTCH FROM CASE

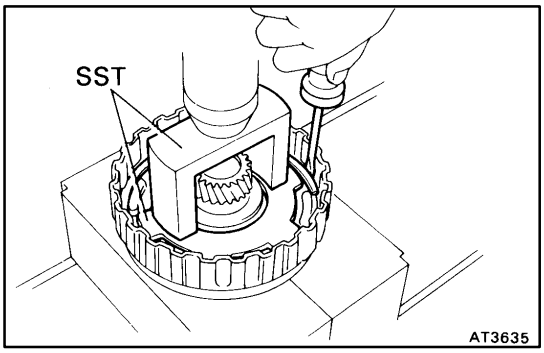
3. REMOVE BEARING AND RACE FROM CLUTCH DRUM AND CASE



4. REMOVE SNAP RING WITH SCREWDRIVER



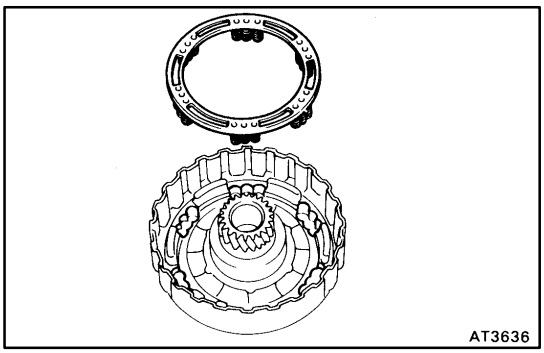
5. REMOVE FLANGES, DISCS AND PLATES



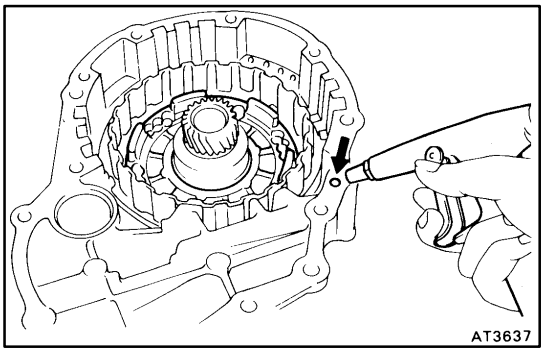
6. REMOVE PISTON RETURN SPRING

(a) Place SST on the spring retainer and compress the spring with a press.
SST 09350-32014 (09351-32070, 09351-32200)

(b) Remove the snap ring.



(c) Remove the piston return spring.



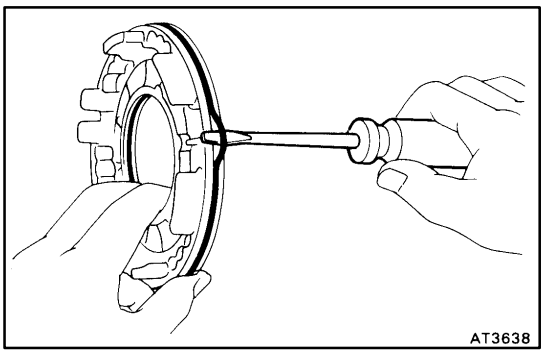
7. REMOVE PISTON FROM CLUTCH DRUM

(a) Install the clutch drum on the case.

(b) Apply compressed air to the pressure apply hole of the case.

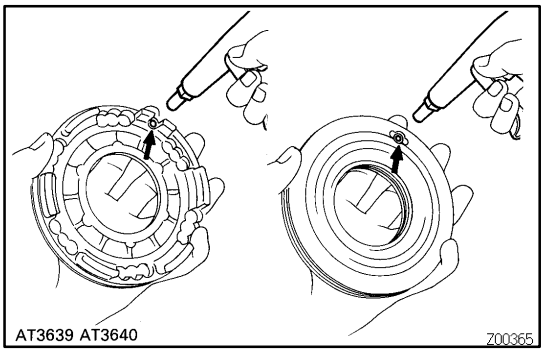
(c) Remove the piston from the clutch drum.
If the piston does not come out completely, use needle-nose pliers to remove it.

(d) Remove the clutch drum from the case.



8. REMOVE O-RINGS

Remove the 2 O-rings from the piston.



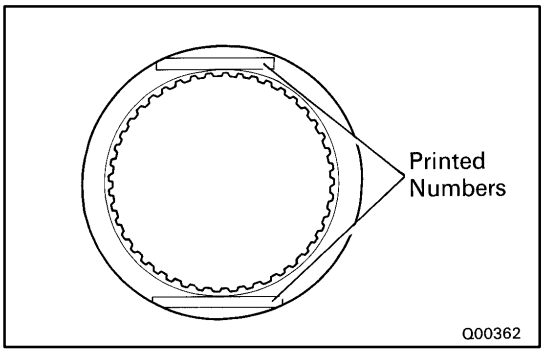
OVERDRIVE DIRECT CLUTCH INSPECTION

AX03W-03

1. INSPECT OVERDRIVE DIRECT CLUTCH

(a) Check that the check ball is free by shaking the piston.

(b) Check that the valve does not leak by applying low-pressure compressed air.



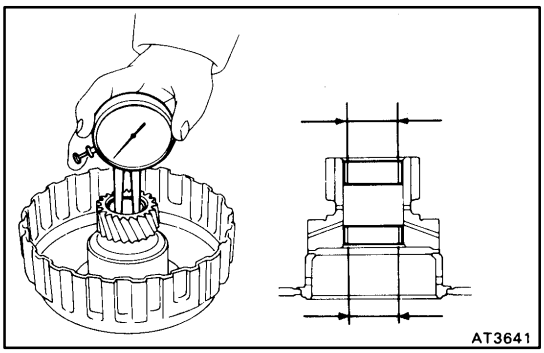
2. INSPECT DISCS, PLATES AND FLANGES

Check if the sliding surfaces of the discs, plates and flanges are worn or burnt. If necessary, replace them.

HINT:

★ If the lining of the disc is peeling off or discolored, or even if a part of the printed numbers are defaced, replace all discs.

★ Before assembling new discs, soak them in ATF for at least 15 minutes.



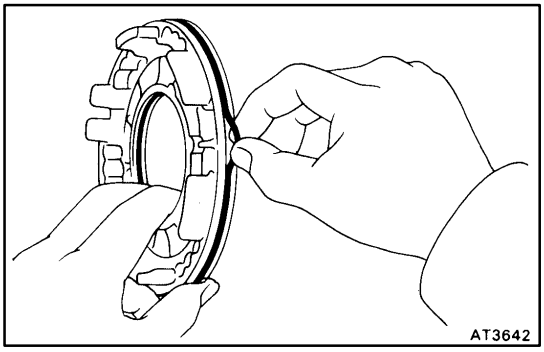
3. CHECK DIRECT CLUTCH BUSHING

Using a dial indicator, measure the inside diameter of the 2 direct clutch bushings.

Maximum inside diameter:

22.13 mm (0.8713 in.)

If the inside diameter is greater than the maximum, replace the direct clutch drum.

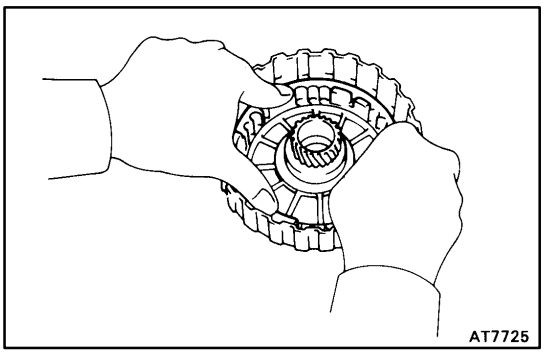


OVERDRIVE DIRECT CLUTCH ASSEMBLY

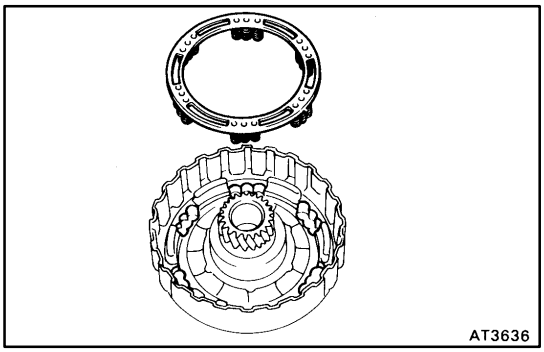
AX03X-06

1. INSTALL CLUTCH PISTON

(a) Install new O-rings to the piston. Coat the O-rings with ATF.

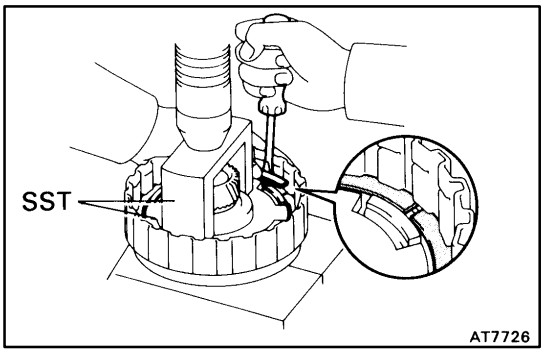


(b) Press the piston into the drum with the cup side up, being careful not to damage the O-ring.



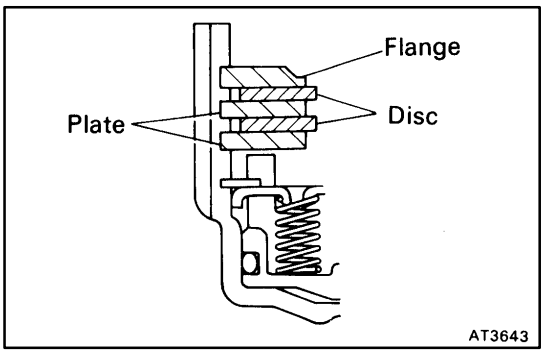
2. INSTALL PISTON RETURN SPRING

(a) Install the return spring and seat snap ring in place.



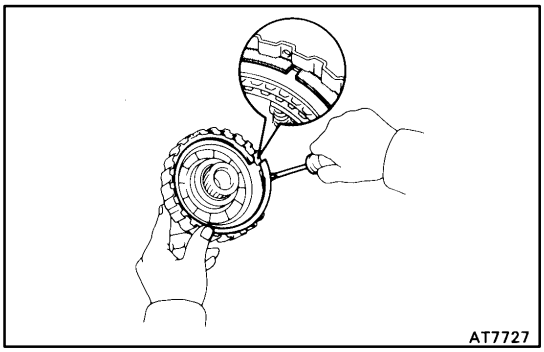
(b) Place SST on the spring retainer, and compress the spring with a press.
SST 09350-32014 (09351-32070, 09351-32200)

(c) Install the snap ring with a screwdriver. Be sure end gap of snap ring is aligned with the groove of the clutch drum.



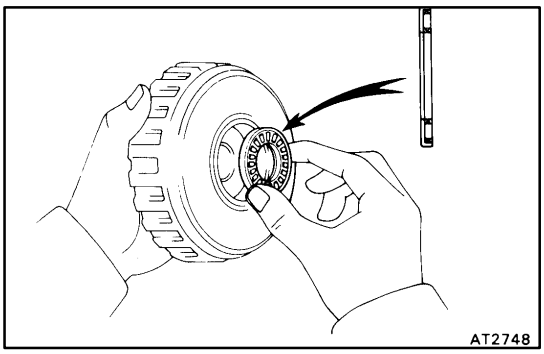
3. INSTALL PLATES, DISCS AND FLANGE

Install in order:
P=Plate D=Disc
P-D-P-D-Flange



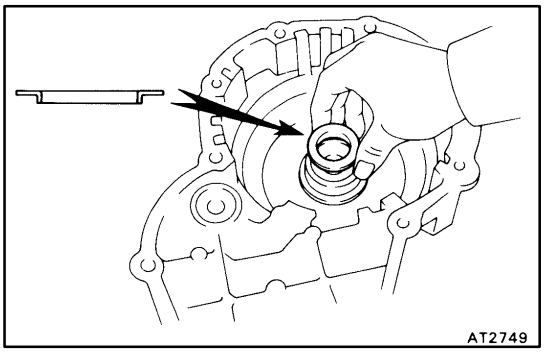
4. INSTALL SNAP RING

Be sure end gap of the snap ring is not aligned with the groove of the clutch drum.

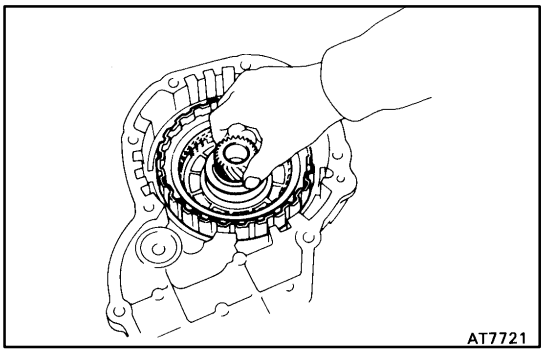


5. INSTALL BEARING AND RACE

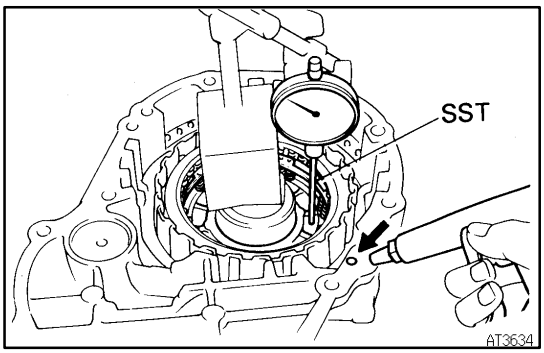
(a) Coat the bearing with petroleum jelly and install it facing the race side downward to the clutch drum.
Bearing outer diameter: 46.3 mm (1.823 in.)
Bearing inner diameter: 26.2 mm (1.031 in.)



(b) Coat the race with petroleum jelly and install it to the case.
Race outer diameter: 43.0 mm (1.693 in.)
Race inner diameter: 24.5 mm (0.965 in.)

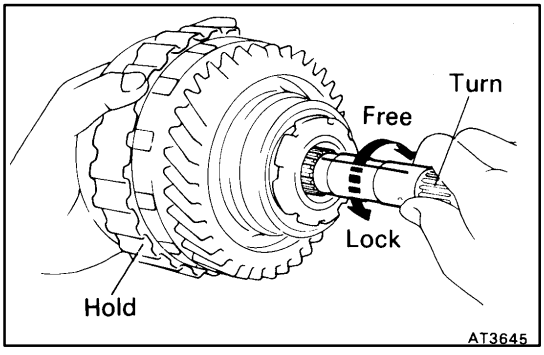


6. INSTALL DIRECT CLUTCH ON CASE



7. RECHECK PISTON STROKE OF DIRECT CLUTCH

Install a dial indicator and measuring terminal (SST) together, measure the piston stroke while applying and releasing compressed air (392- 785 kPa, 4- 8 kgf/cm^2, 57-1 14 psi).
Piston stroke:
1.75-2.49 mm (0.0689-0.0980 in.)
SST 09350-32014 (09351-32190)

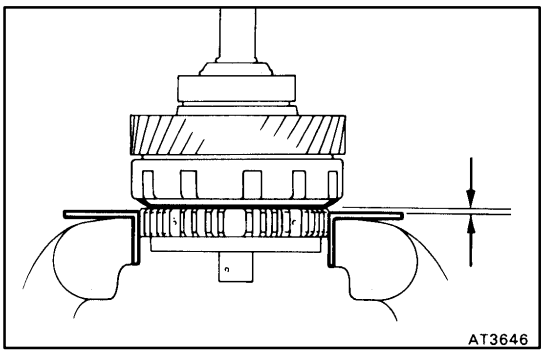


COUNTER DRIVE GEAR DISASSEMBLY

AX03Y-03

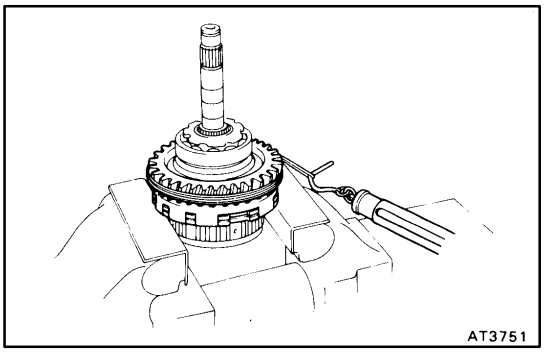
1. CHECK OPERATION OF ONE-WAY CLUTCH

(a) Install the O/D direct clutch into the one-way clutch.
(b) Hold the O/D direct clutch and turn the intermediate shaft. The shaft should turn freely clockwise and should lock counterclockwise.
(c) Remove the O/D direct clutch.

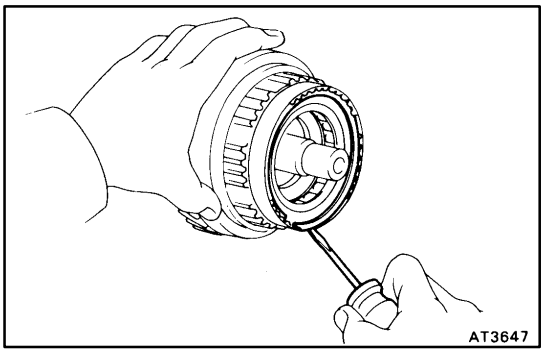


2. CHECK COUNTER DRIVE GEAR PRELOAD

(a) Hold the O/D planetary gear in a vise with soft jaws.
HINT: Do not let the counter drive gear touch the vise.

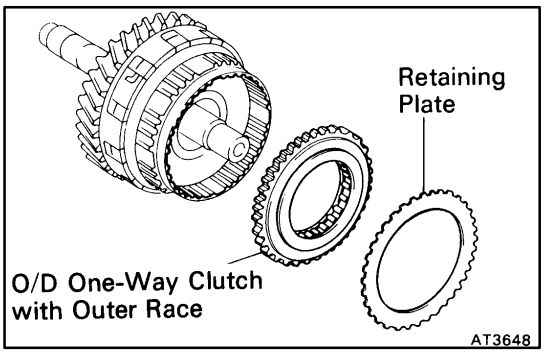


(b) Using a tension gauge, measure the preload.
Preload (at starting):
9.2-15.3 N (940-1,560 g, 2.1-3.4 lb)
HINT: Turn the counter drive gear right and left several times before measuring the preload.

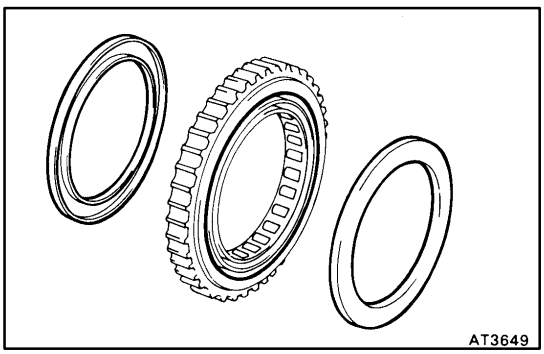


3. REMOVE O/D ONE-WAY CLUTCH AND OUTER RACE

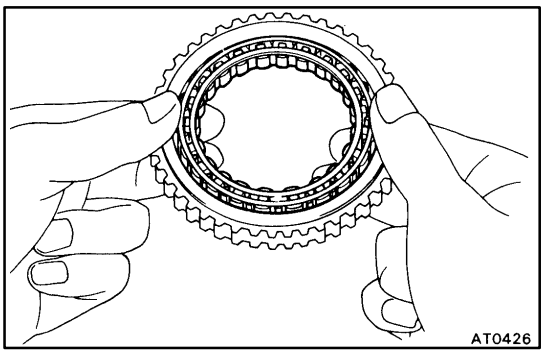
(a) Remove the snap ring.



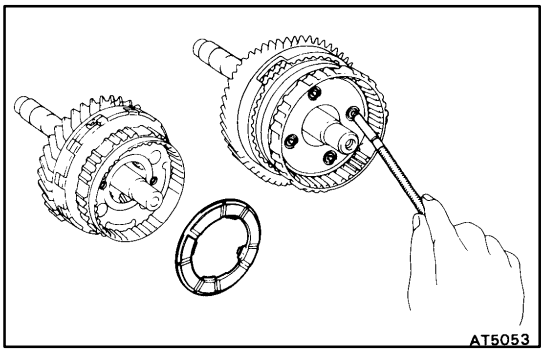
(b) Remove the retaining plate.
(c) Remove the O/D one-way clutch with outer race.



(d) Remove the 2 retainers from both sides of the O/D one-way clutch.



(e) Remove the O/D one-way clutch from the outer race.
HINT: Note the direction of the one-way clutch.

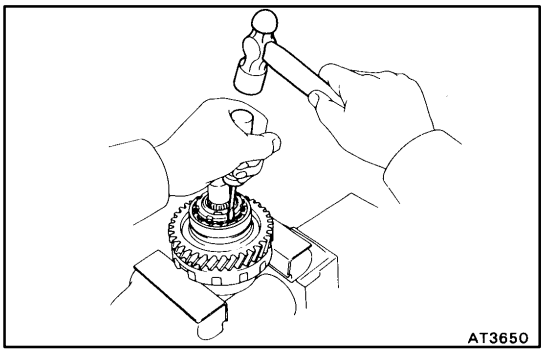


4. REMOVE NO.3 PLANETARY THRUST WASHER

5. REMOVE PLUGS FROM PLANETARY GEAR

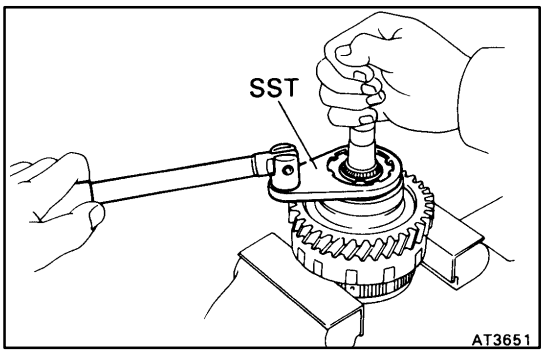
Remove the 4 plugs with a magnetic finger.

NOTICE: Be careful not to lose them.



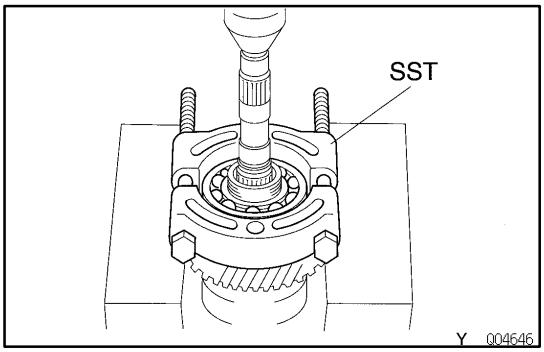
6. REMOVE ADJUSTING NUT AND LOCKING WASHER

(a) Pry off the locking washer.



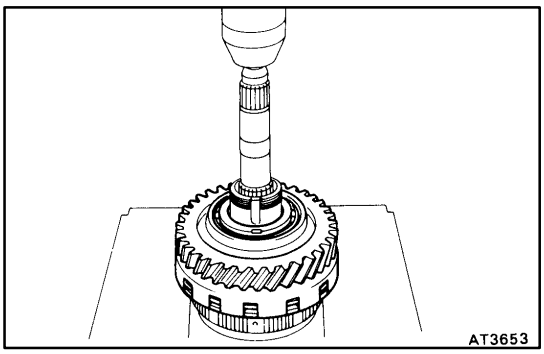
(b) Using SST, loosen the adjusting nut.
SST 09350-32014 (09351-32080)

(c) Remove the adjusting nut and locking washer.



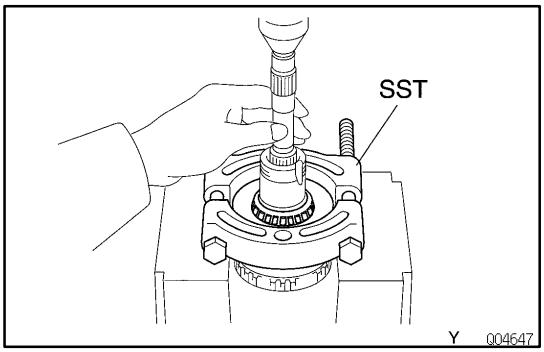
7. REMOVE INTERMEDIATE SHAFT BEARING

Using SST, press out the bearing from the shaft.
SST 09950-00020



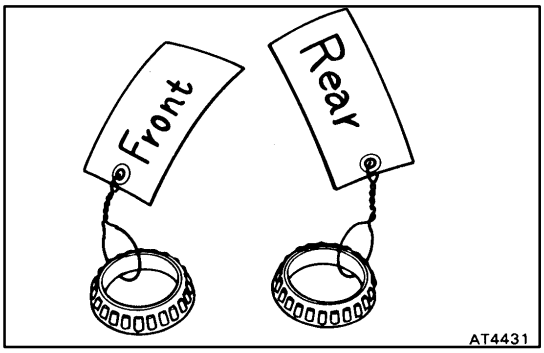
8. REMOVE COUNTER DRIVE GEAR AND FRONT BEARING

Press out the gear and bearing together.

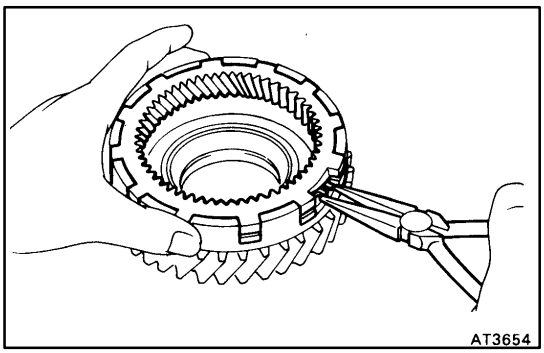


9. REMOVE REAR BEARING

(a) Using SST, press out the bearing.
SST 09950-00020

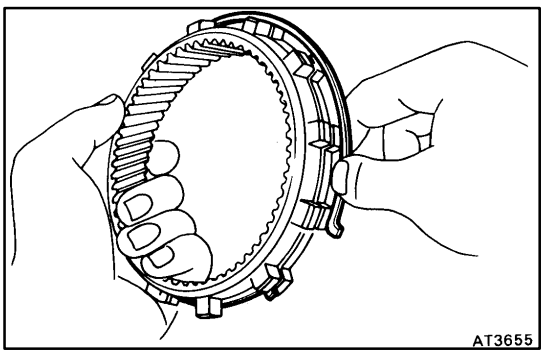


(b) Tag the bearings to show the location for reassembly.

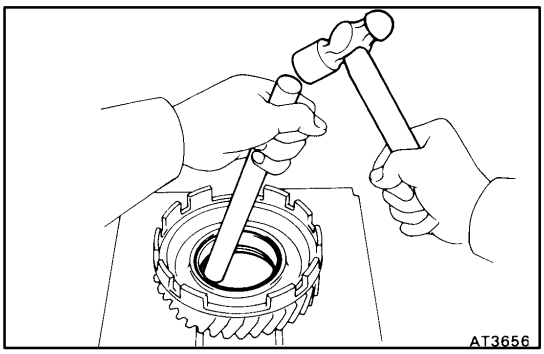


10. REMOVE O/D PLANETARY RING GEAR FROM COUNTER DRIVE GEAR

(a) While pulling up the ring gear, compress the snap ring with needle-nose pliers and remove it from the groove.
(b) Remove the ring gear from the counter drive gear.

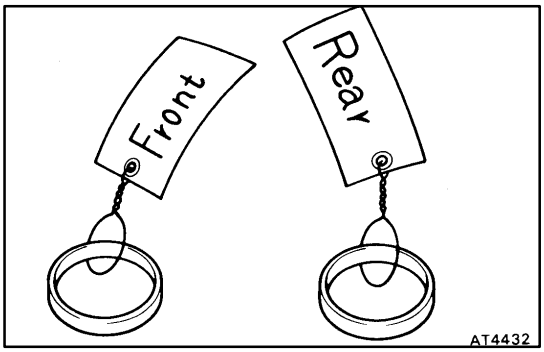


(c) Remove the snap ring from the ring gear.

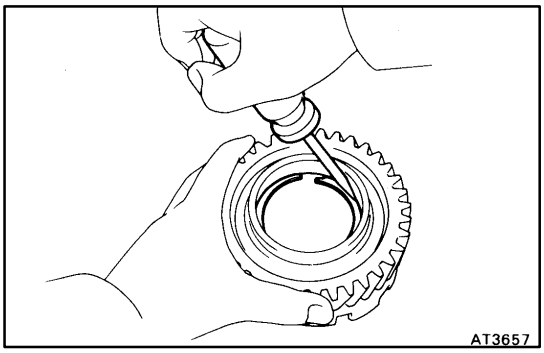


11. REMOVE OUTER RACES FROM COUNTER DRIVE GEAR

(a) Drive out the 2 races with a brass bar and hammer.

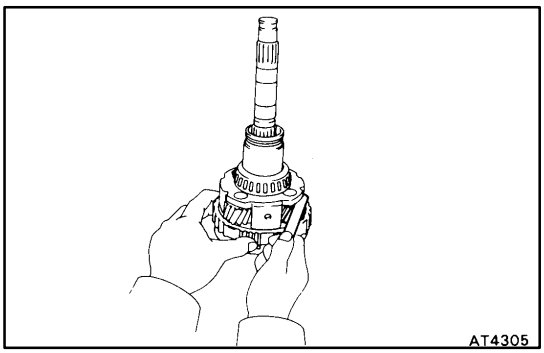


(b) Tag the races to show the location for reassembly.



12. REMOVE SNAP RING FROM COUNTER DRIVE GEAR

Using a screwdriver, remove the snap ring.



AX03Z-03

OVERDRIVE PLANETARY GEAR INSPECTION

MEASURE PLANETARY PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the planetary pinion gear thrust clearance.

Standard clearance:

0.16-0.56 mm (0.0063-0.0220 in.)

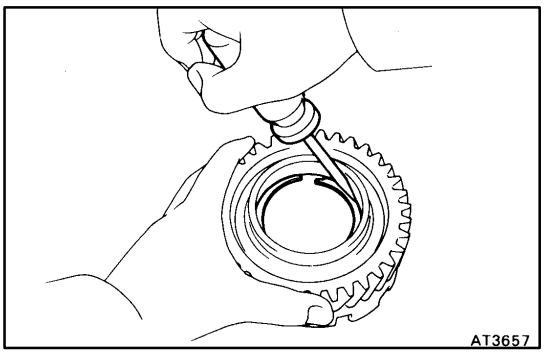
Maximum clearance:

0.61 mm (0.0240 in.)

If the clearance is greater then the maximum, replace the planetary gear assembly.

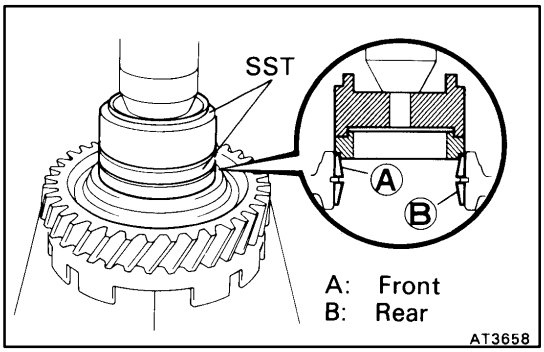
AX040-03

COUNTER DRIVE GEAR ASSEMBLY



1. INSTALL SNAP RING INTO COUNTER GEAR

Install the snap ring with a screwdriver.

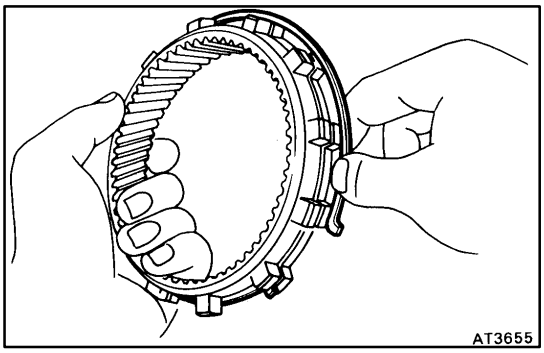


2. INSTALL OUTER RACES INTO COUNTER DRIVE GEAR

Using SST, press in the 2 outer races to both sides of the gear.

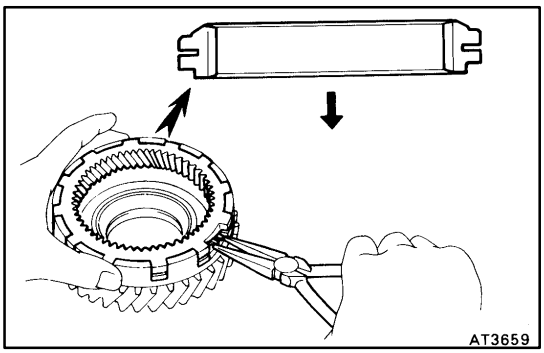
SST 09350-32014 (09351-32120, 09351-32150)

HINT: Press in the 2 outer races until they touch the snap ring. Tap the races in straight, so that they do not tilt.

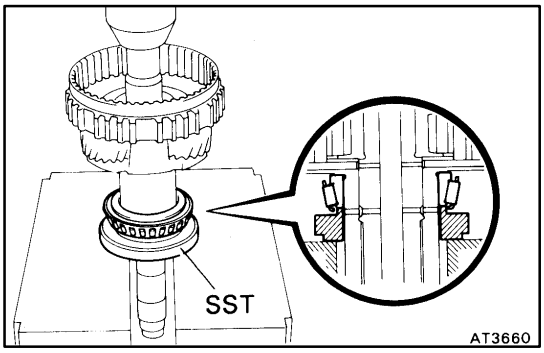


3. INSTALL OVERDRIVE PLANETARY RING GEAR INTO COUNTER DRIVE GEAR

(a) Install the snap ring to the ring gear.



(b) While pushing down the ring gear, squeeze the snap ring end with needle-nose pliers, and install it into the groove.

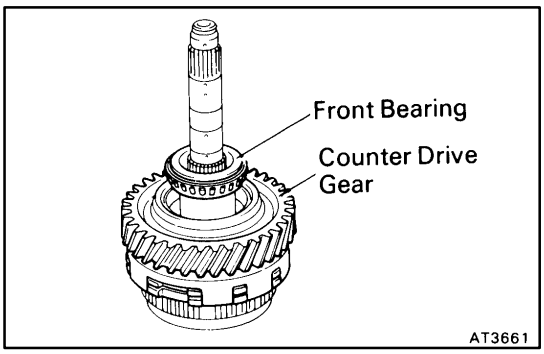


4. INSTALL REAR BEARING

Using SST, press in the bearing onto the shaft.

SST 09350-32014 (09351-32120)

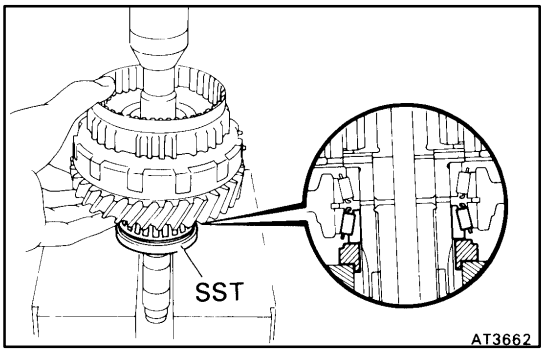
HINT: Press in the bearing until the side surface of the inner race touches the planetary carrier.



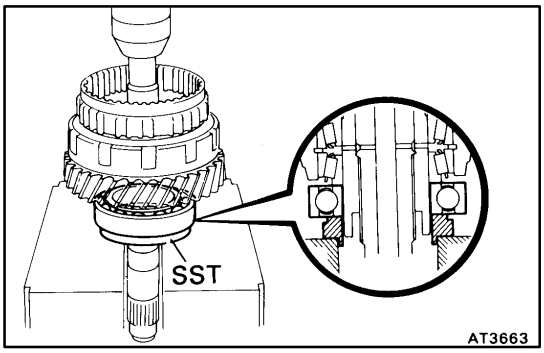
5. INSTALL COUNTER DRIVE GEAR AND FRONT BEARING

(a) Install the gear onto the shaft, and mesh the ring gear with the planetary pinions.

(b) Place the front bearing on to the shaft.

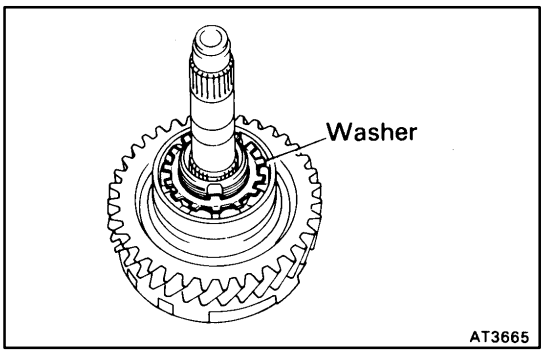


(c) Using SST, press in the bearing until there is slight play between the bearings.
SST 09350-32014 (09351-32120)
HINT: Hold the ring gear to prevent it from falling.

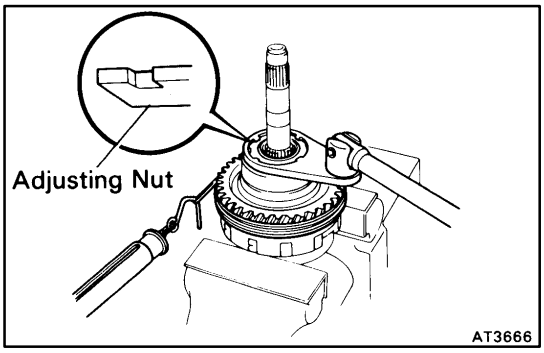


6. INSTALL INTERMEDIATE SHAFT BEARING

Using SST, press in the bearing until it slightly touches the front bearing of the counter drive gear.
SST 09350-32014 (09351-32120)
HINT: The counter drive gear can be turned lightly.



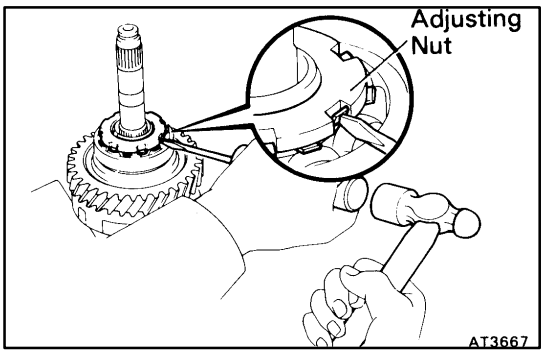
7. PLACE NEW LOCKING WASHER



8. INSTALL ADJUSTING NUT AND ADJUST PRELOAD OF COUNTER DRIVE GEAR

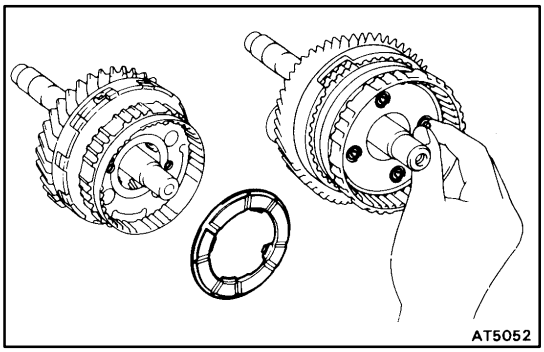
(a) Hold the overdrive planetary gear in a vise with soft jaws.

(b) Using SST, tighten the adjusting nut until the following gear starting load is reached on the tension gauge.
SST 09350-32014 (09351-32080)
Preload (at starting):
9.2-15.3 N (940-1,560 g, 2.1-3.4 lb)



HINT: Turn the counter drive gear right and left several times before measuring the preload.

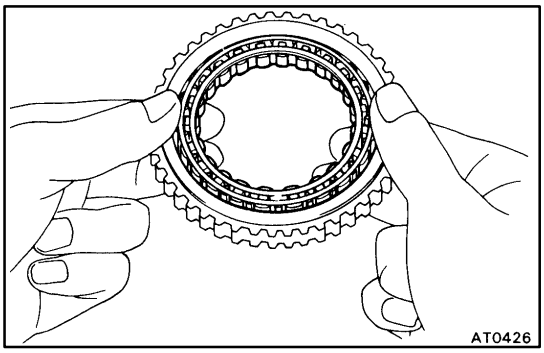
(c) Lock the adjusting nut with one locking washer tab. Bend the locking washer tab until it is flat with the adjusting nut groove.



9. INSTALL NO.3 OVERDRIVE PLANETARY THRUST WASHER

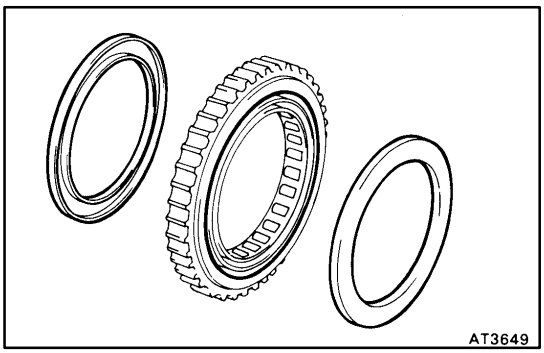
10. INSTALL PINION SHAFT PLUGS

Install the 4 plugs into the pinion shaft.

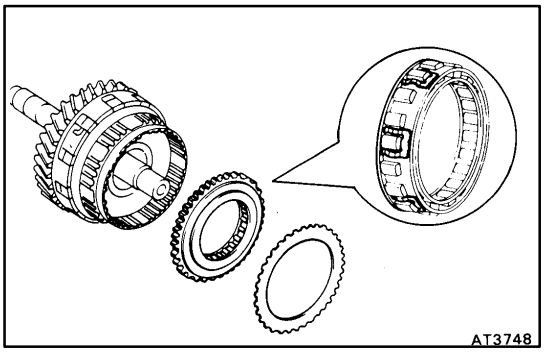


11. INSTALL OVERDRIVE ONE-WAY CLUTCH AND RETAINING PLATE

(a) Install the one-way clutch into the outer race.



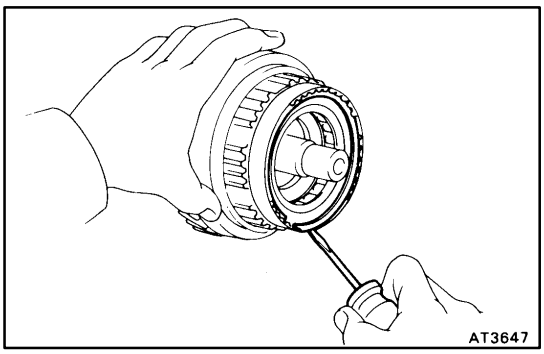
(b) Install the 2 retainers on both sides of the one-way clutch.



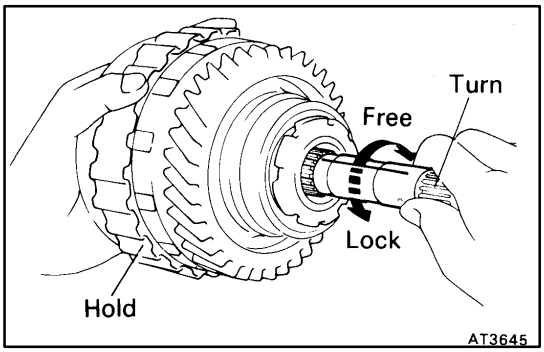
(c) Install the one-way clutch into the overdrive planetary gear.

HINT: Be sure that the one-way clutch is installed in the correct direction.

(d) Install the retaining plate.



(e) Install the snap ring.

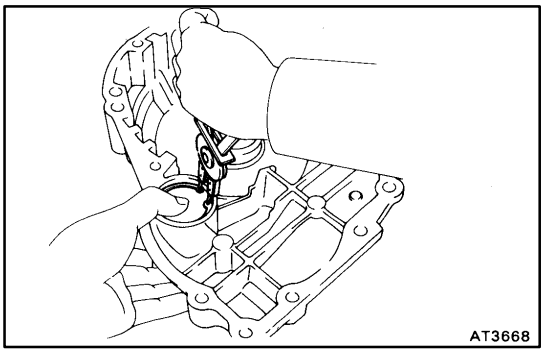


12. CHECK OPERATION OF O/D ONE-WAY CLUTCH

(a) Install the overdrive direct clutch into the one-way clutch.
(b) Hold the overdrive direct clutch and turn the intermediate shaft. The shaft should turn freely clockwise and should lock counterclockwise.
(c) Remove the overdrive direct clutch.

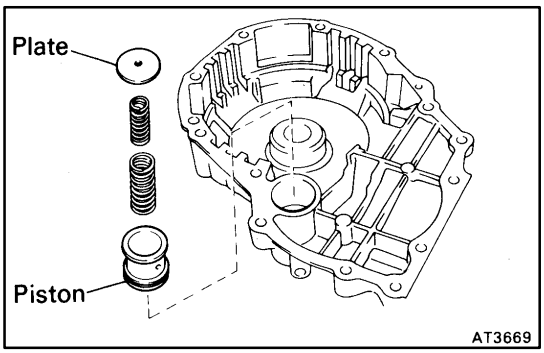
AX041-02

OVERDRIVE CASE DISASSEMBLY

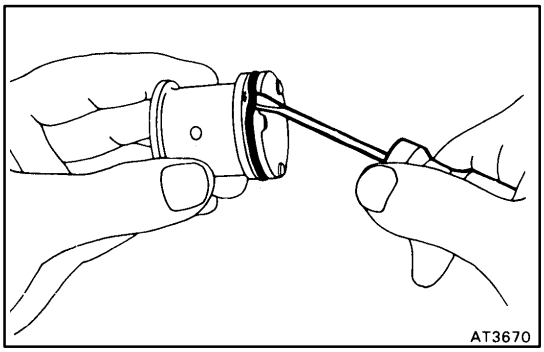


1. REMOVE C_0 ACCUMULATOR PISTON FROM OVERDRIVE CASE

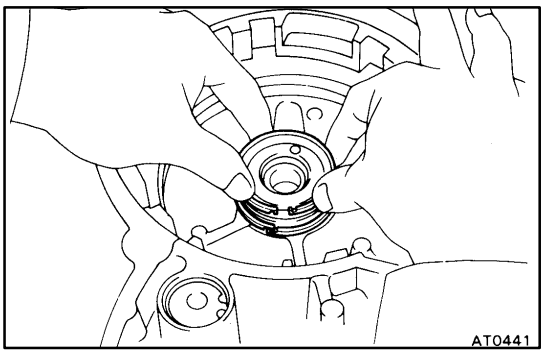
(a) Using snap ring pliers, remove the snap ring.



(b) Remove the retaining plate and 2 springs.
(c) Remove the accumulator piston.



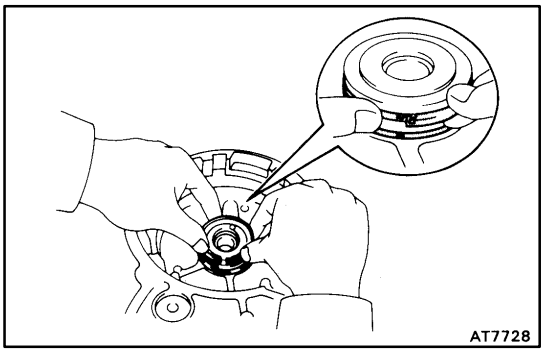
(d) Remove the O-ring from the piston.



2. REMOVE OIL SEAL RINGS

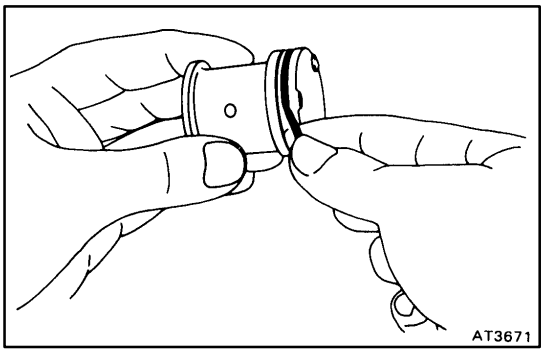
AX042-02

OVERDRIVE CASE ASSEMBLY



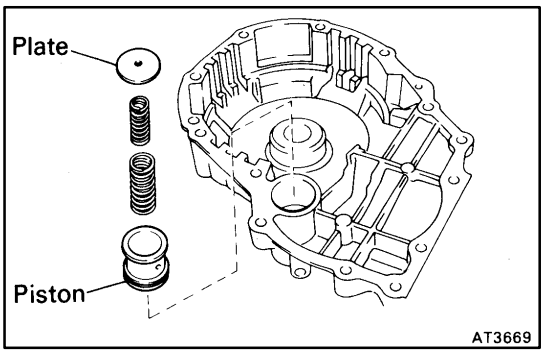
1. INSTALL OIL SEAL RINGS ON OVERDRIVE CASE

Install the 2 oil seal rings to the overdrive case groove, then snug them down by squeezing their ends together.
HINT: After installing the oil seal rings, check that they move smoothly.

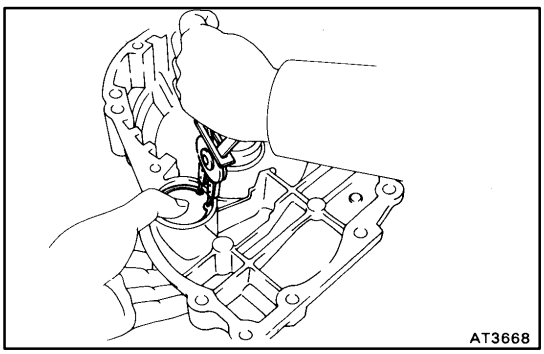


2. INSTALL C0 ACCUMULATOR PISTON TO OVERDRIVE CASE

(a) Install a new O-ring to the accumulator piston.
(b) Coat the O-ring with ATF.



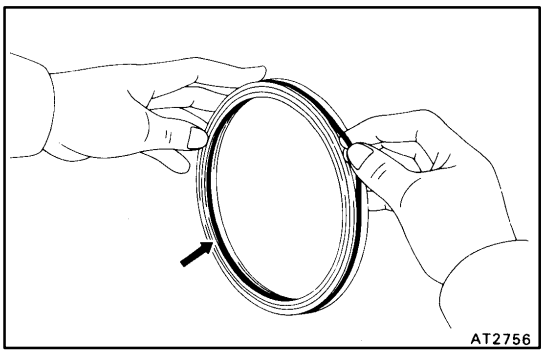
(c) Install the accumulator piston, 2 springs and retaining plate.



(d) Using snap ring pliers, install the snap ring.

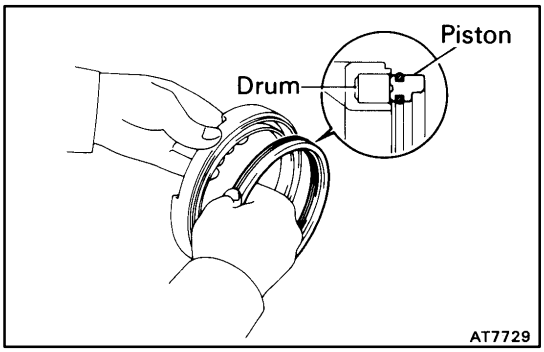
AX043-05

OVERDRIVE BRAKE ASSEMBLY

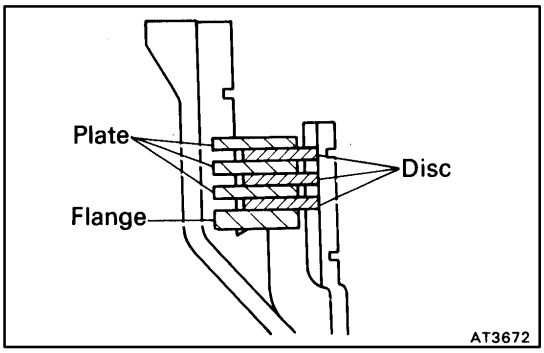


1. INSTALL PISTON INTO DRUM

(a) Install new O-rings to the piston.
Coat the new O-rings with ATF.

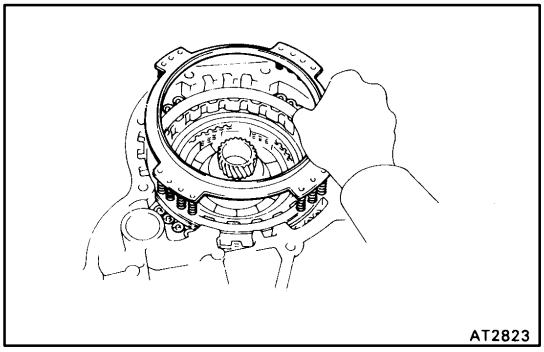


(b) Press the piston into the drum, being careful not to damage the O-rings.

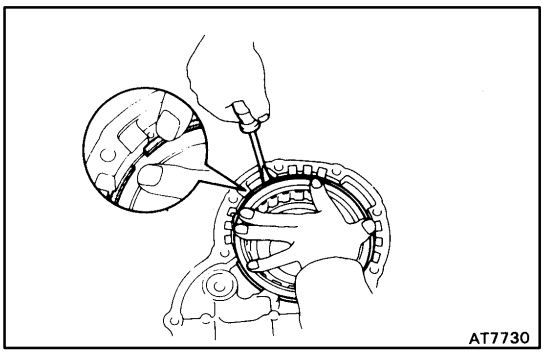


2. INSTALL FLANGE, DISCS AND PLATES

Install the flange, discs and plates.
Install in order:
P=Plate D=Disc
Flange-D-P-D-P-D-P

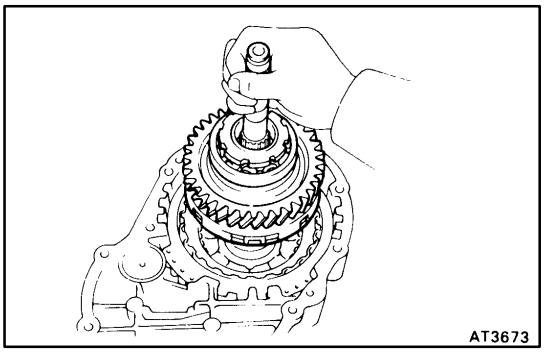


3. POSITION PISTON RETURN SPRING



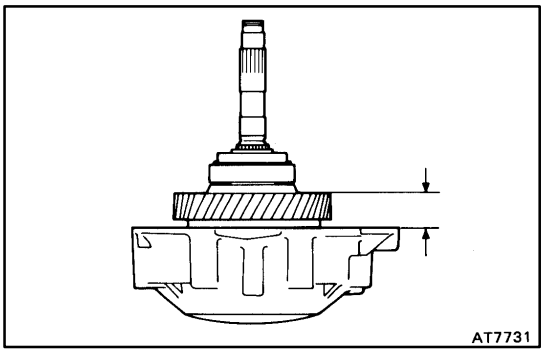
4. INSTALL SNAP RING INTO CASE

Be sure the end gap of the snap ring is not aligned with one of cutouts.



5. INSTALL OVERDRIVE PLANETARY GEAR ONTO OVERDRIVE DIRECT CLUTCH

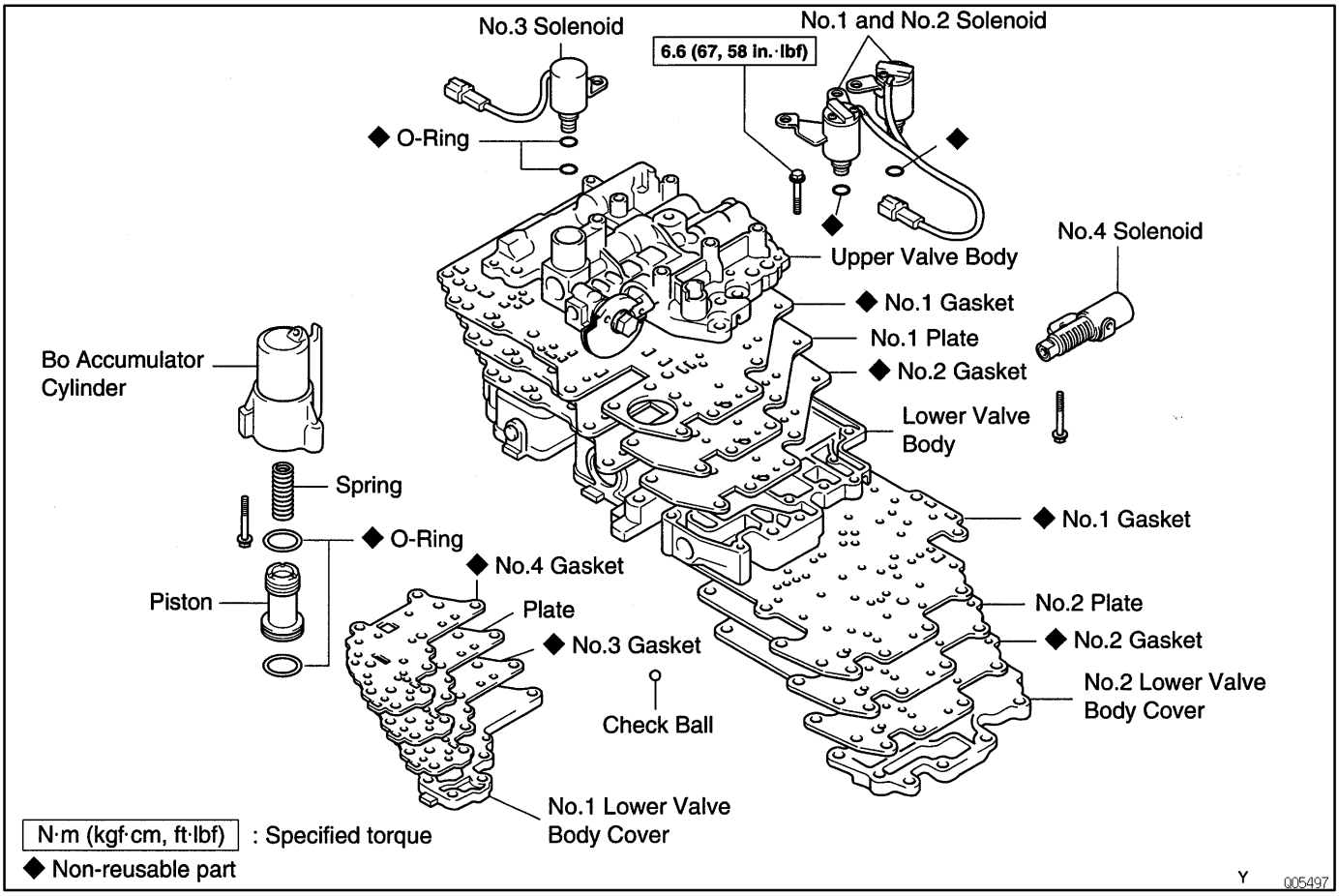
While turning the overdrive planetary gear clockwise, install it onto the overdrive direct clutch.

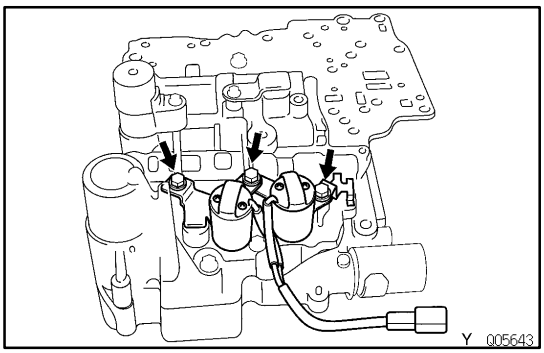


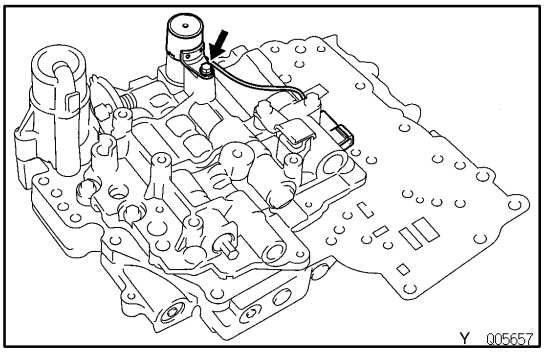
HINT: If the overdrive planetary gear is properly installed onto the direct clutch, the counter drive gear height from the overdrive case will be about 24 mm (0.94 in.).

VALVE BODY
COMPONENTS

AX044-02







AX0TW-01

VALVE BODY DISASSEMBLY

NOTICE: When disassembling the valve body, be careful not to damage or deform the plate which overhangs the valve body.

1. REMOVE SOLENOIDS

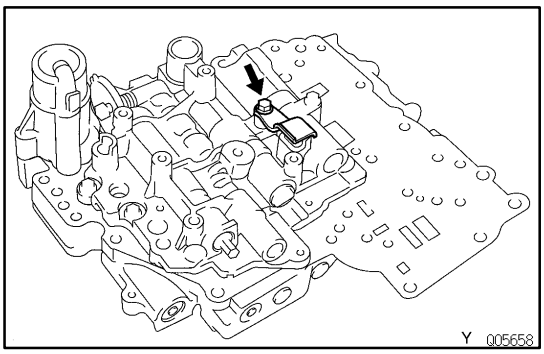
(a) Remove No.1 and No.2 solenoids with the retainer.

NOTICE: When removing the solenoid, do not use a screwdriver, etc. to pry up the solenoid.

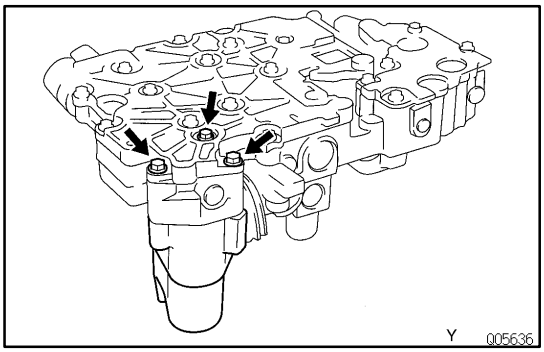
(b) Remove the O-ring from each solenoid.

(c) Remove the No.3 solenoid.

(d) Remove the O-ring from the solenoid.

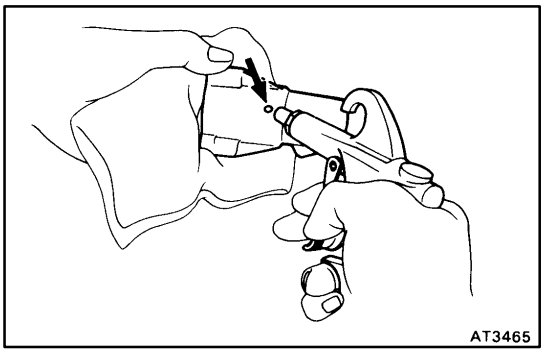


2. REMOVE LOCK PLATE



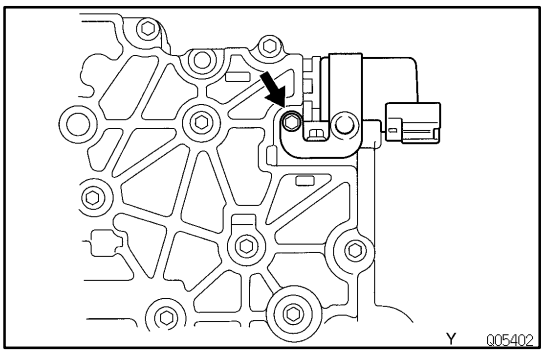
3. REMOVE B_0 ACCUMULATOR ASSEMBLY

(a) Remove the 3 bolts.
(b) Remove the B_0 accumulator assembly.



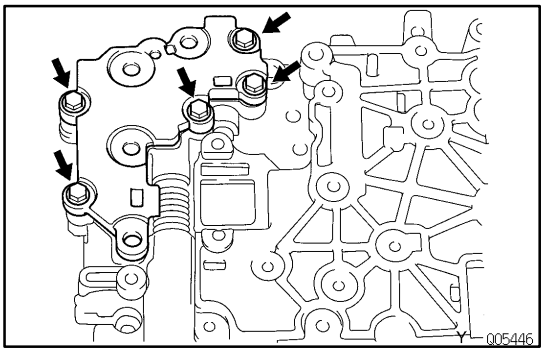
4. DISASSEMBLE B_0 ACCUMULATOR ASSEMBLY

(a) Applying compressed air to the cylinder hole, remove the piston and spring.
(b) Remove the 2 O-rings from the piston.



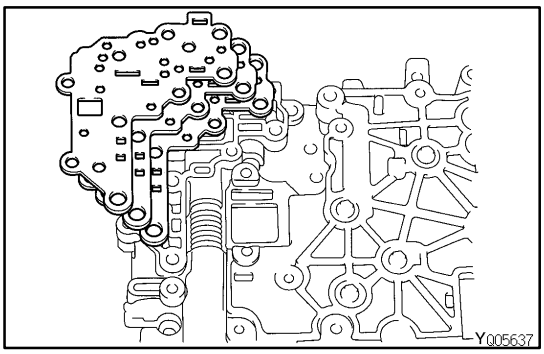
5. REMOVE NO.4 SOLENOID

(a) Remove the No.4 solenoid.
(b) Remove the O-ring from the solenoid.



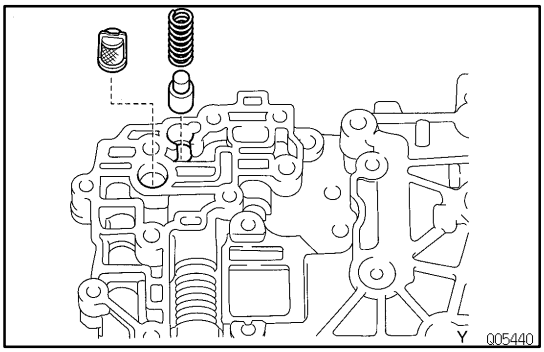
6. REMOVE NO.1 LOWER VALVE BODY COVER

Remove the 5 bolts and No.1 lower valve body cover.

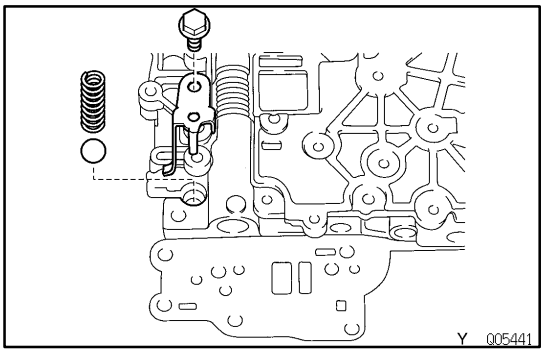


7. REMOVE OIL STRAINER, NO.1 LOWER VALVE BODY COVER GASKETS AND CHECK VALVE

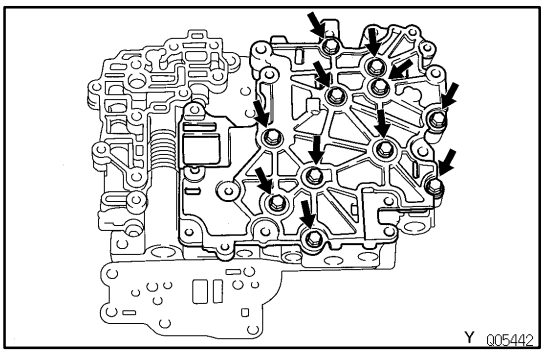
(a) Remove the 2 gaskets and plate from the lower valve body.



(b) Remove the oil strainer, check valve and spring.

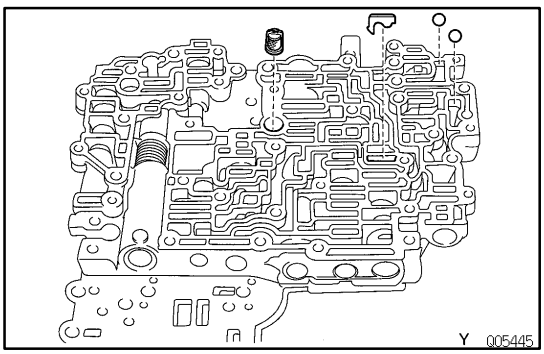


8. REMOVE PRESSURE RELIEF VALVE

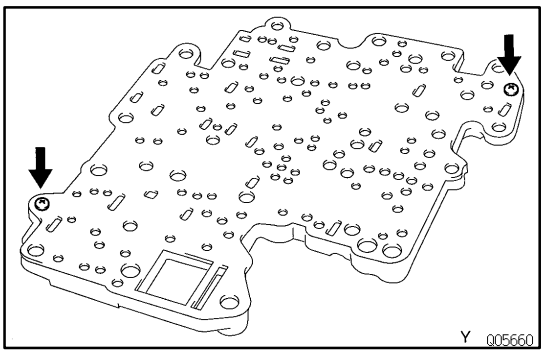


9. REMOVE NO.2 LOWER VALVE BODY COVER, OIL STRAINER, CHECK BALLS AND VIBRATING STOPPER

Remove the 11 bolts and lower valve body cover.

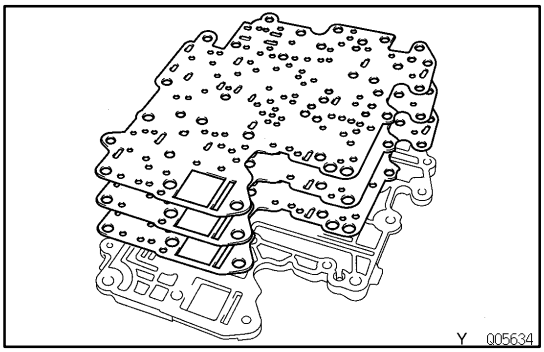


(b) Remove the 2 check balls, oil strainer and vibrating stopper.

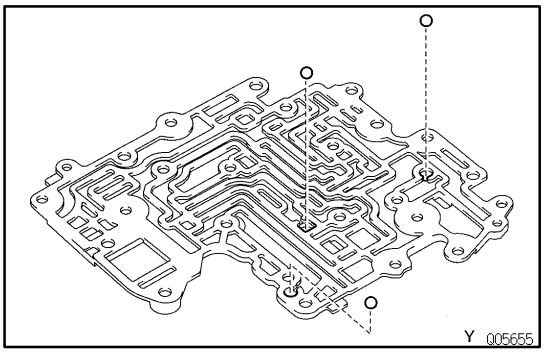


10. REMOVE NO.2 LOWER VALVE BODY COVER GASKETS AND CHECK BALLS

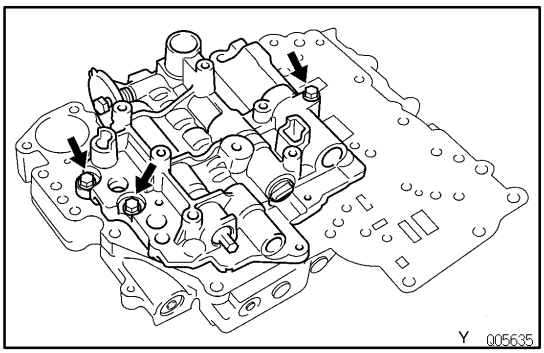
(a) Remove the 2 screws from the lower valve body cover.



(b) Remove the 2 gaskets and plate.

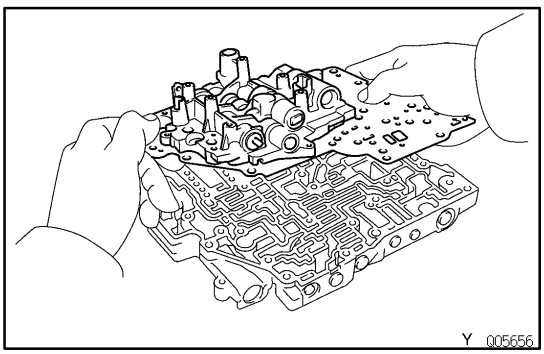


(c) Remove the 3 check balls from the cover.



11. REMOVE BOLTS FROM UPPER VALVE BODY

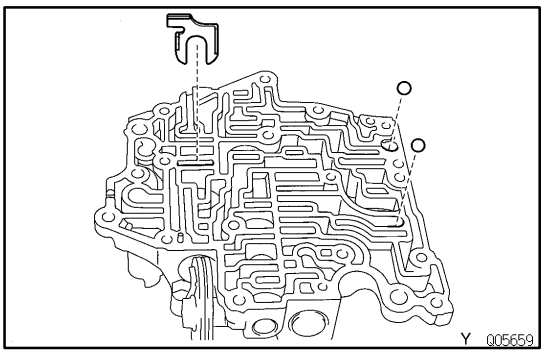
Remove the 3 bolts.



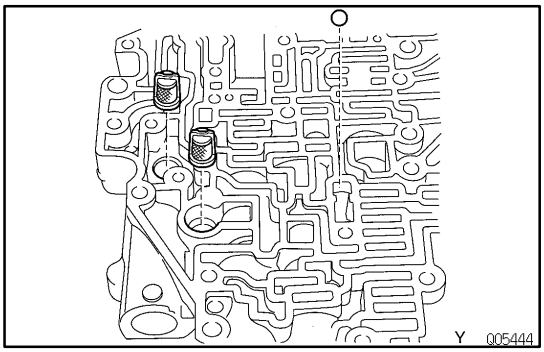
12. LIFT OFF UPPER VALVE BODY AND NO.1 PLATE AS A SINGLE UNIT

Hold No.1 plate to the upper valve body and lift off the upper valve body.

HINT: Be careful that the check balls and oil strainer do not fall out.



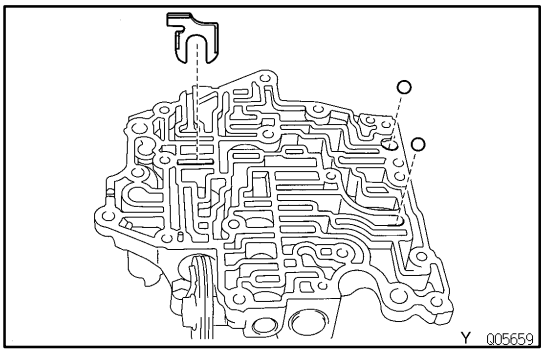
13. REMOVE 2 CHECK BALLS AND VIBRATING STOPPER FROM UPPER VALVE BODY



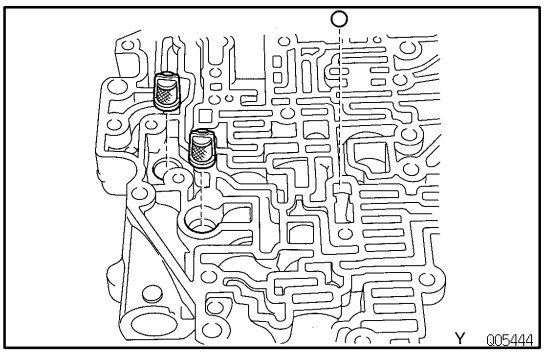
14. REMOVE 2 OIL STRAINERS AND CHECK BALL FROM LOWER VALVE BODY

AX0TX-01

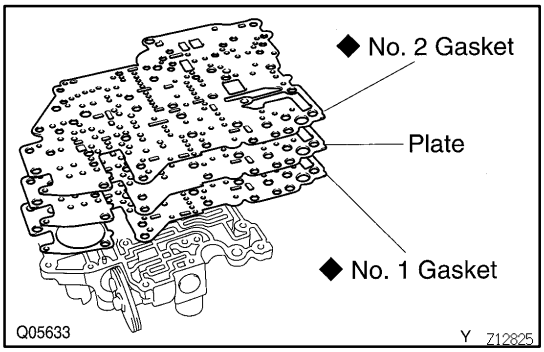
VALVE BODY ASSEMBLY



1. INSTALL 2 CHECK BALLS AND VIBRATING STOPPER TO UPPER VALVE BODY



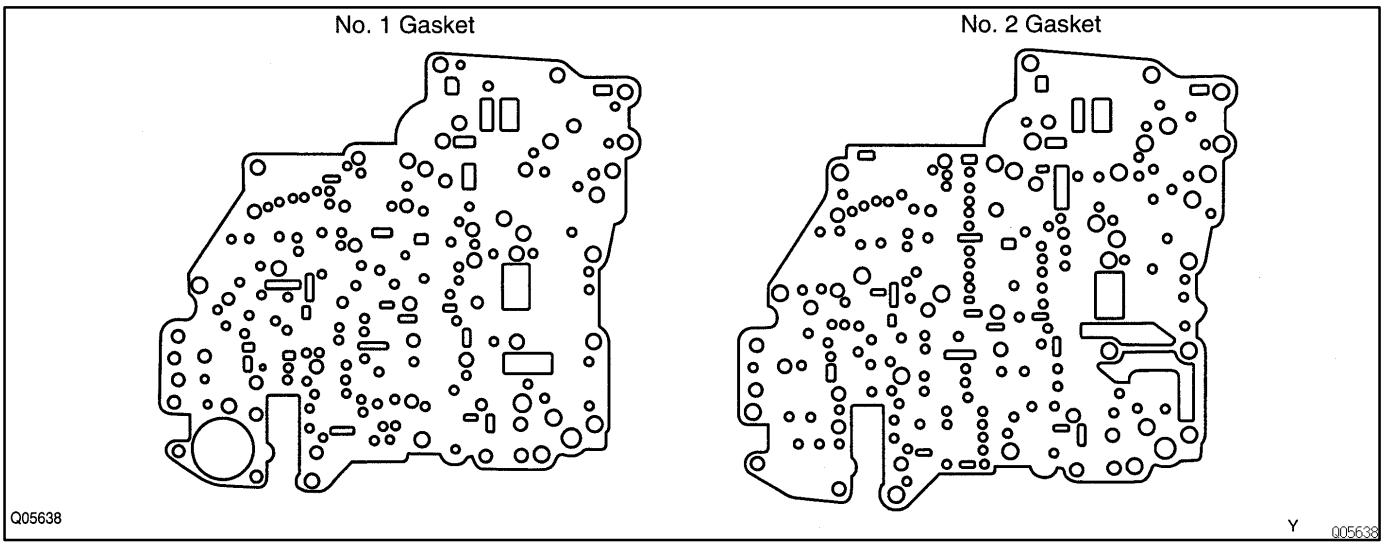
2. INSTALL 2 OIL STRAINERS AND CHECK BALL TO LOWER VALVE BODY

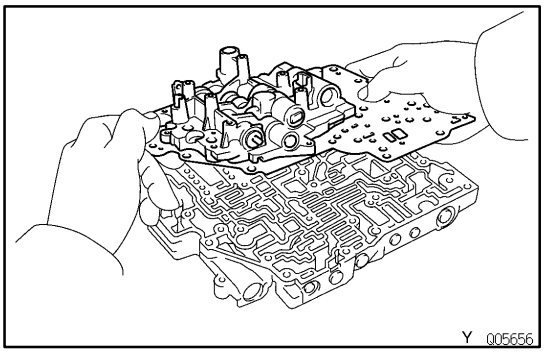


3. POSITION PLATE AND NEW GASKETS ON UPPER VALVE BODY

Position new No.1 gasket, plate and the new No.2 gasket on the upper valve body.

HINT: Since No.1 gasket and No.2 gasket are similar, use the illustration below to discriminate between them.

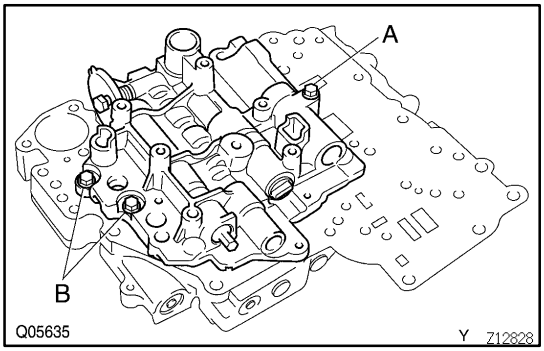




4. PLACE UPPER VALVE BODY WITH PLATE AND GASKETS ON LOWER VALVE BODY

Hold the upper valve body, plate and gaskets securely so they do not separate.

Align each bolt hole in the valve bodies with the gaskets and plate.



5. INSTALL AND FINGER TIGHTEN BOLTS IN UPPER VALVE BODY TO SECURE LOWER VALVE BODY

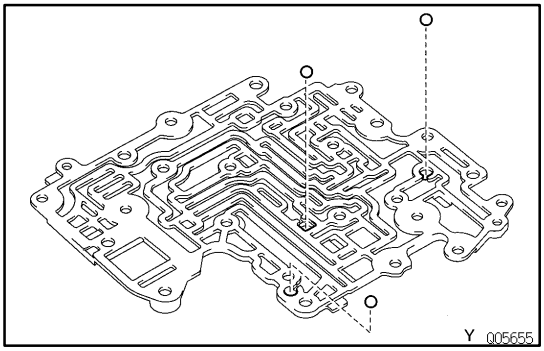
Install and finger tighten the 3 bolts.

HINT: Each bolt length is indicated below.

Bolt length:

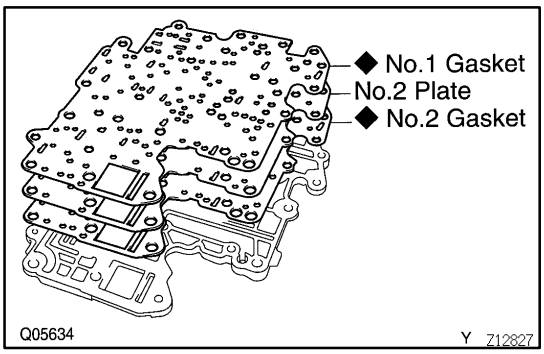
Bolt A: 44 mm (1.732 in.)

Bolt B: 16 mm (0.630 in.)

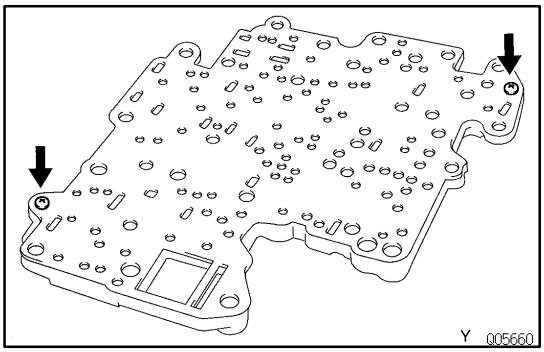


6. INSTALL NO.2 LOWER VALVE BODY COVER GASKETS, PLATE AND 3 CHECK BALLS

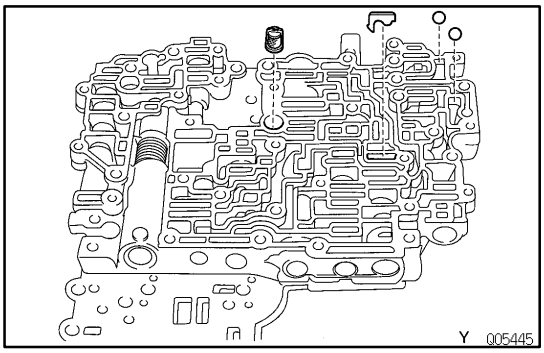
(a) Install the 3 check balls into the No.2 lower valve body cover.

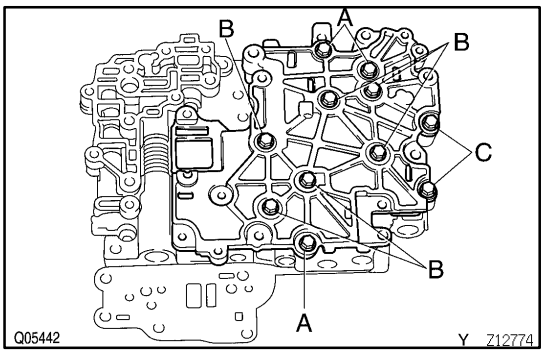


(b) Position a new gasket and plate and then another new gasket.
HINT: Both gaskets are identical.



(c) Install the 2 screws.

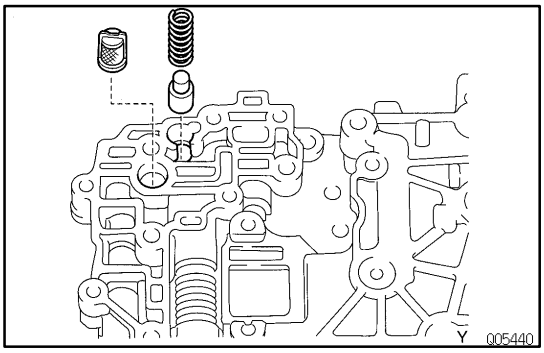




8. INSTALL NO.2 LOWER VALVE BODY COVER

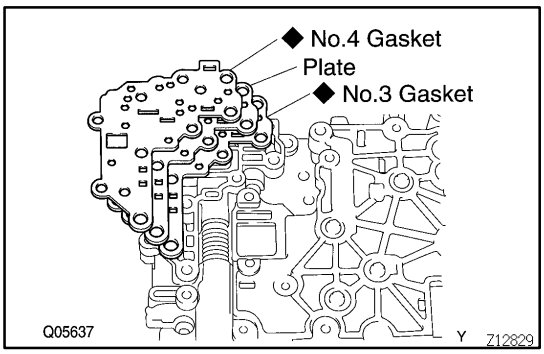
(a) Position the No.2 lower valve body cover.

(b) Install and finger tighten the 11 bolts.
HINT: Each bolt length is indicated below.
Bolt length:
Bolt A: 40 mm (1.575 in.)
Bolt B: 44 mm (1.732 in.)
Bolt C: 14 mm (0.551in.)



9. INSTALL OIL STRAINER AND CHECK VALVE

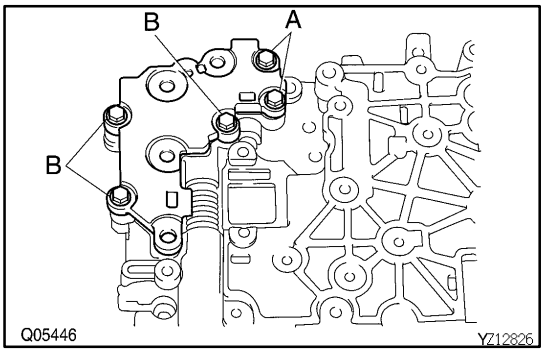
Install the oil strainer and check valve into the lower valve body.



10. INSTALL LOWER VALVE BODY COVER GASKETS AND NO.2 PLATE

Position a new gasket and plate and then another new gasket.

HINT: Both gaskets are identical.



11. INSTALL LOWER VALVE BODY COVER

(a) Position the lower valve body cover.

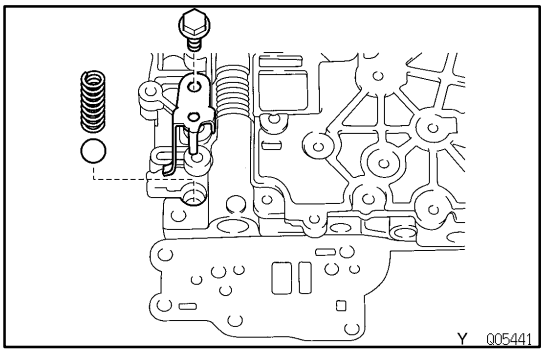
(b) Install and finger tighten the 5 bolts.

HINT: Each bolt length is indicated below.

Bolt length

Bolt A: 47 mm (1.850 in.)

Bolt B: 14 mm (0.551 in.)

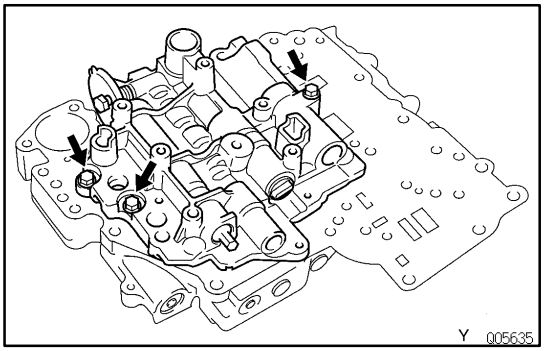


12. INSTALL PRESSURE RELIEF VALVE

13. TIGHTEN BOLTS OF UPPER AND LOWER VALVE BODIES

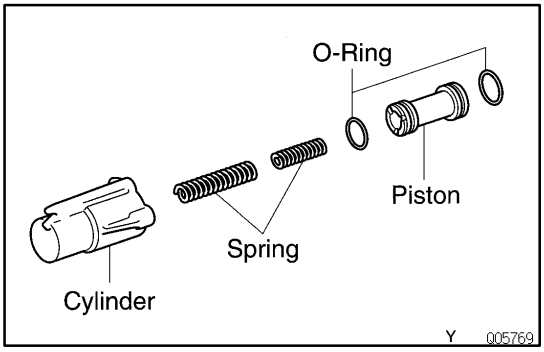
(a) Tighten the 16 bolts in the lower valve body.

Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)



(b) Tighten the 3 bolts in the upper valve body.

Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)



14. INSTALL B_0 ACCUMULATOR ASSEMBLY

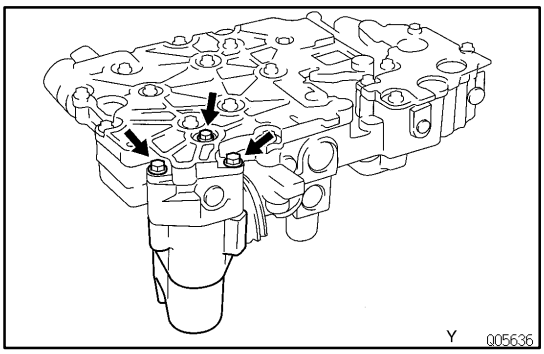
(a) Coat new O-rings with ATF and install them to the piston.

(b) Install the spring and piston into the cylinder.

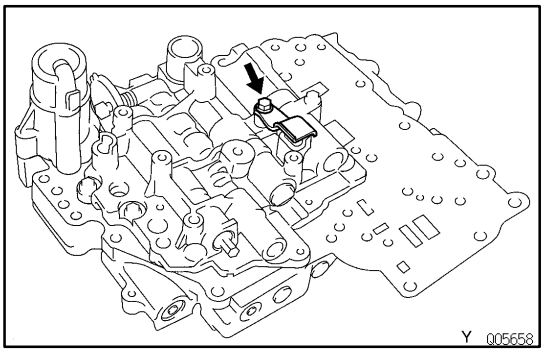
Spring dimensions

mm (in.)

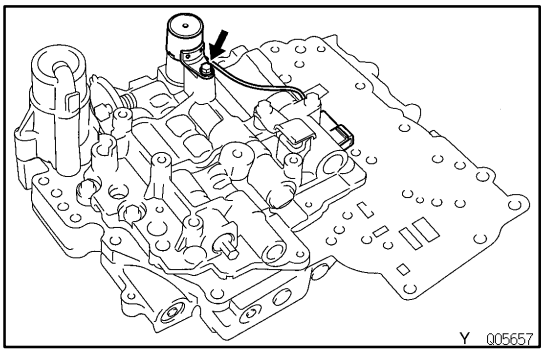
	Color	Free length	Coil outer diameter
Inner	White	47.5 (1.870)	18.9 (0.744)
Outer	None	16.3 (0.642)	20.7 (0.815)



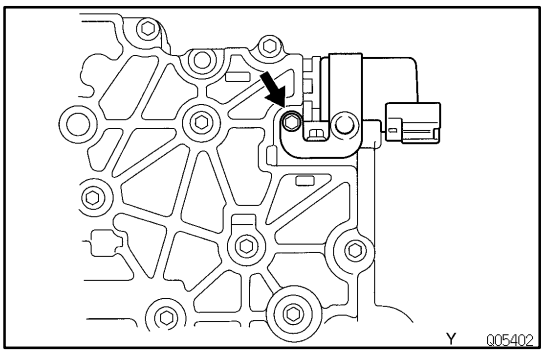
(d) Install the B_0 accumulator assembly.
(e) Install the torque the 3 bolts.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)



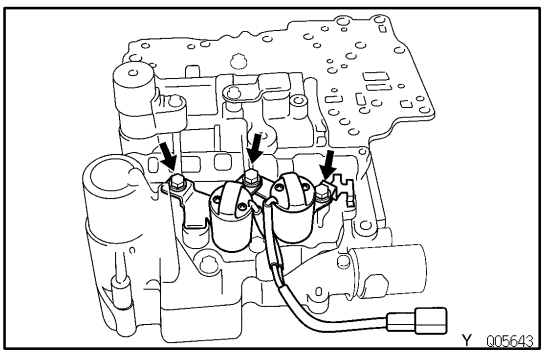
15. INSTALL LOCK PLATE



16. INSTALL SOLENOIDS
(a) Coat new O-rings with ATF and install them to the solenoids.
(b) Install the lock-up solenoid.
(c) Install and torque the bolt.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)



(d) Install the No.4 solenoid.
(e) Install and torque the bolt.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)

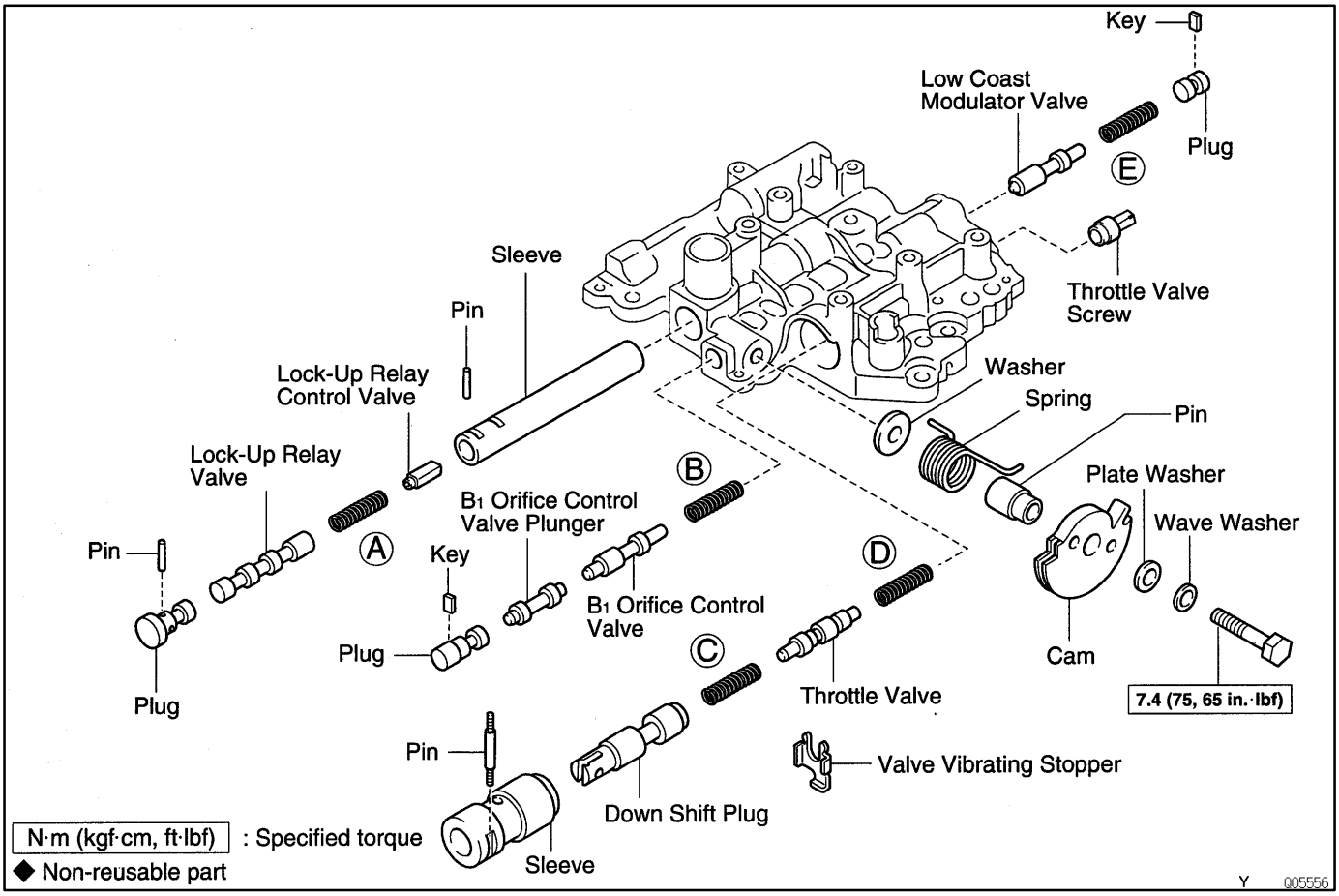


(d) Install No.1 and No.2 solenoids.
(e) Install and torque the 3 bolts.
Torque: 6.6 N·m (67 kgf·cm, 58 in.·lbf)

UPPER VALVE BODY

AX047-03

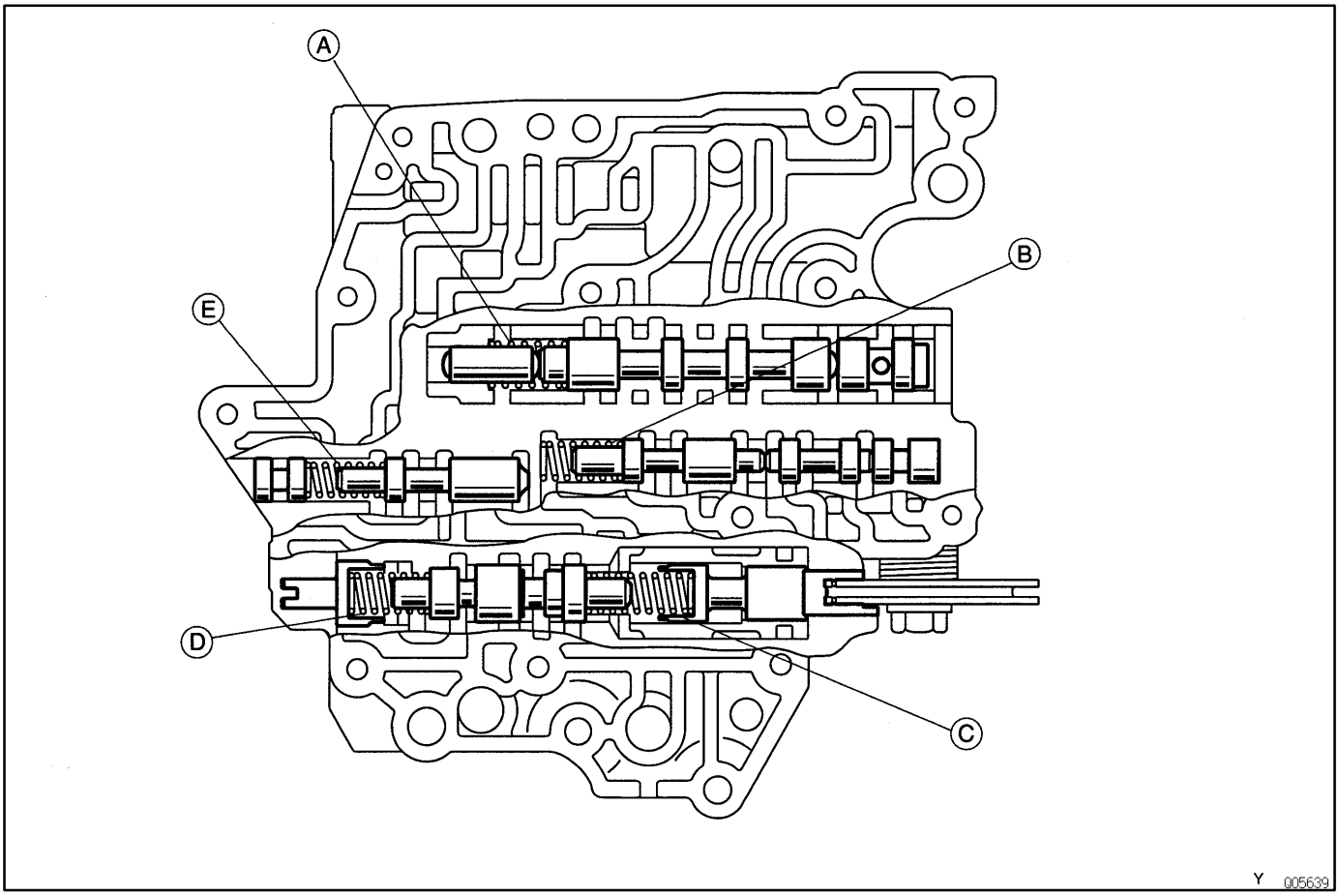
COMPONENTS



AX048-03

VALVE BODY SPRINGS SPECIFICATIONS

HINT: During reassembly please refer to the spring specifications above to help discriminate between the different springs.

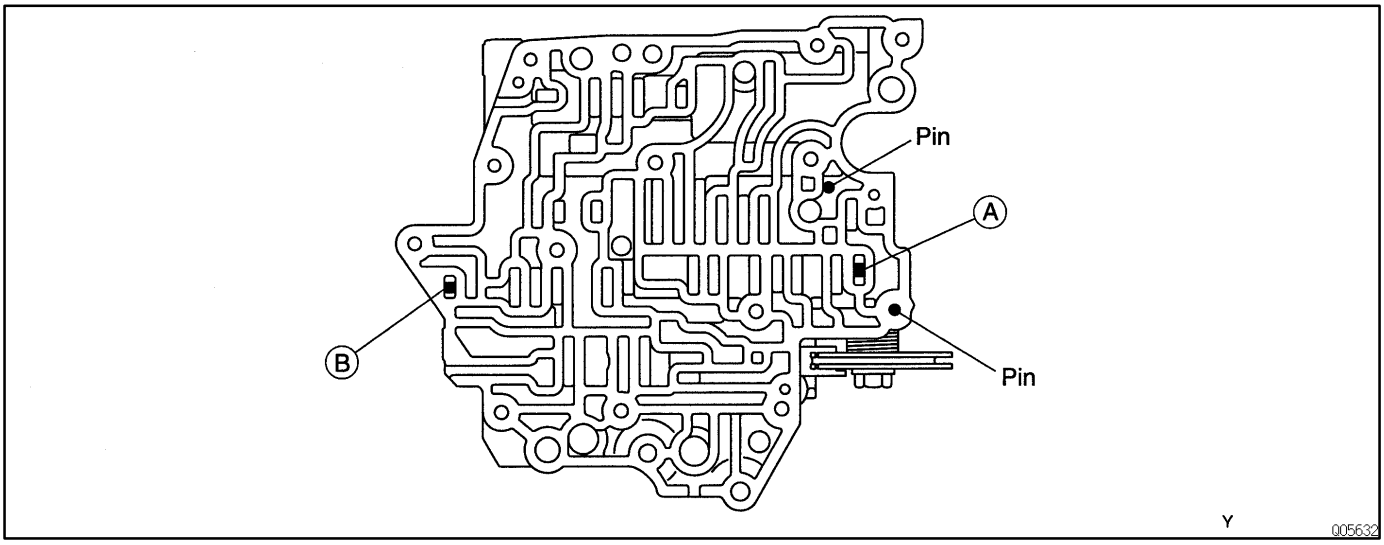


Mark	Name (Color)	Free Length / Outer Diameter mm (in.)	Total No. of Coils
(A)	Lock-Up Relay Valve (Yellow)	26.8 (1.055) / 10.2 (0.402)	10.8
(B)	B_1 Orifice Control Valve (White)	24.8 (0.976) / 6.4 (0.252)	12.0
(C)	Throttle Valve (Green)	31.5 (1.240) / 7.0 (0.276)	11.4
(D)	Down-Shift Plug (None)	15.0 (0.591) / 11.0 (0.433)	7.0
(E)	Low Coast Modulator Valve (Purple)	20.2 (0.795) / 7.9 (0.311)	11.9

AX0GZ-02

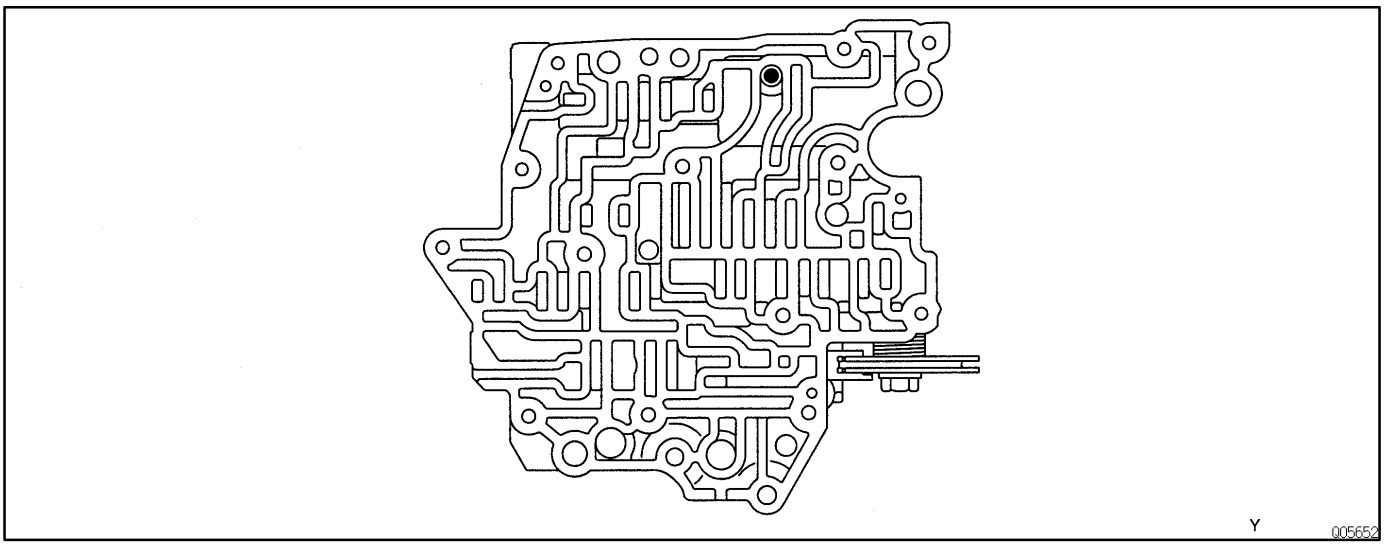
RETAINERS, PIN, AND CHECK BALLS LOCATION

1. PIN, RETAINERS



Mark	Name	Height / Width / Thickness mm (in.)
(A)	B_1 Orifice Control Valve	8.9 (0.350) / 5.0 (0.197) / 3.2 (0.126)
(B)	Low Coast Modulator Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)

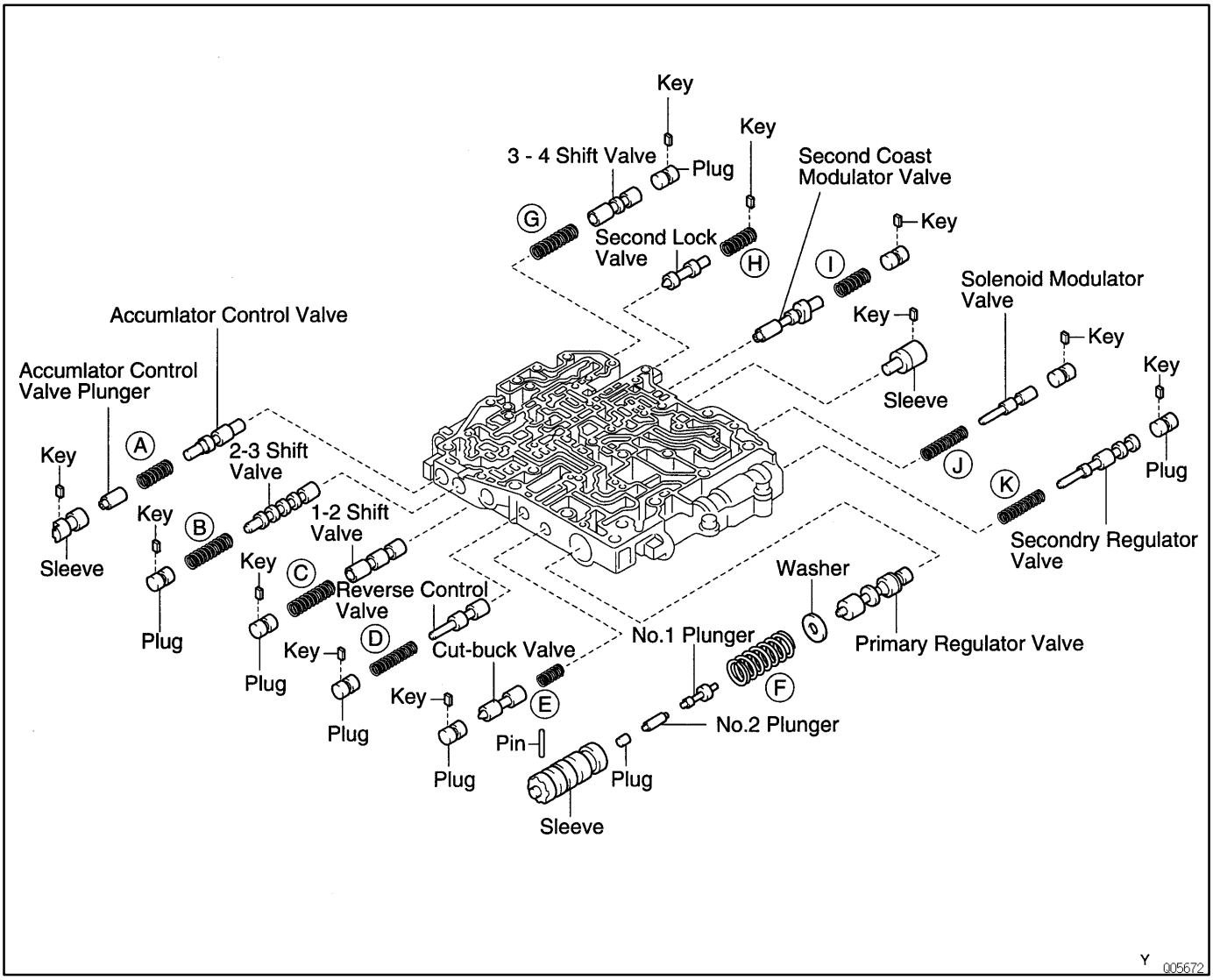
2. CHECK BALLS



LOWER VALVE BODY

COMPONENTS

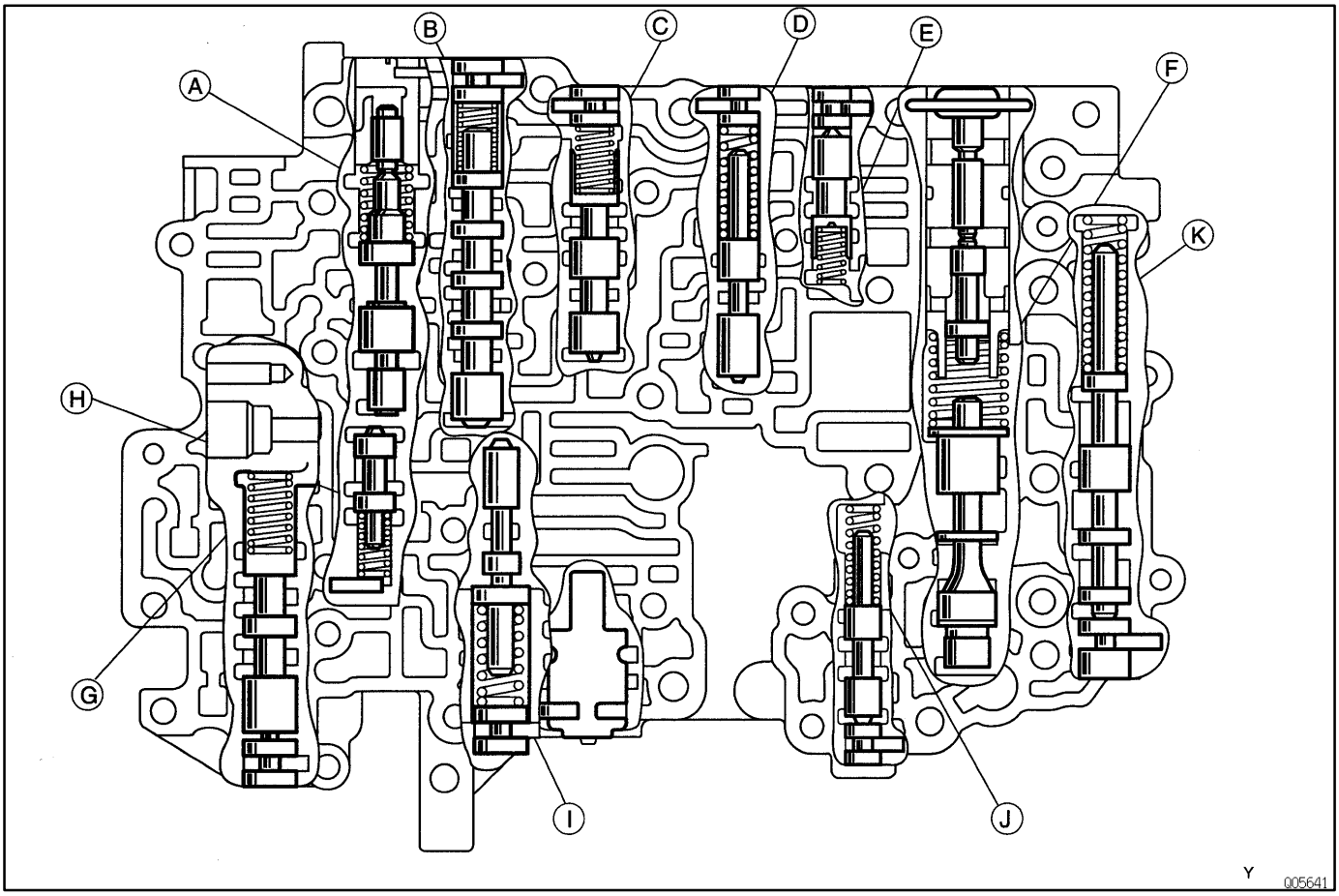
AX04A-03



AX04B-03

VALVE BODY SPRINGS SPECIFICATIONS

HINT: During reassembly please refer to the spring specifications above to help discriminate between the different springs.

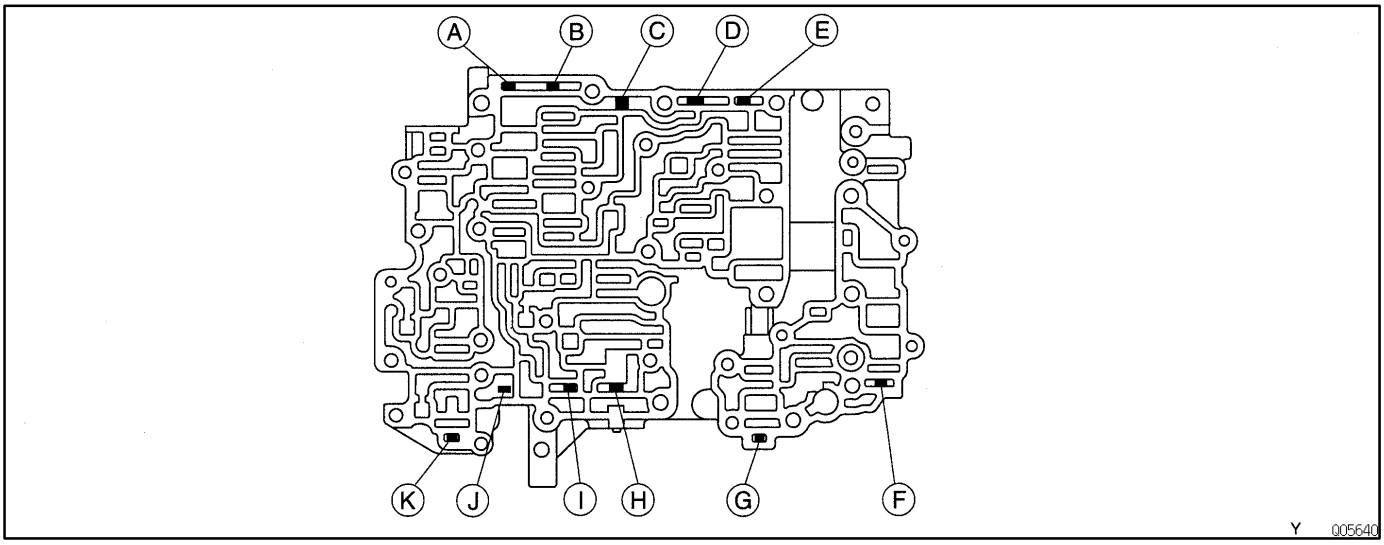


Mark	Name (Color)	Free Length / Outer Diameter mm (in.)	Total No. of Coils
(A)	Accumulator Control Valve (Red)	25.1 (0.988) / 8.6 (0.339)	8.0
(B)	2-3 Shift Valve (None)	28.0 (1.102) / 7.6 (0.299)	10.3
(C)	1-2 Shift Valve (Light Green)	29.2 (1.150) / 8.9 (0.350)	12.0
(D)	Reverse Control Valve (White/Purple)	38.1 (1.500) / 6.5 (0.256)	19.0
(E)	Cut-Back Valve (None)	21.8 (0.858) / 6.0 (0.236)	13.5
(F)	Primary Regulator Valve (None)	36.6 (1.441) / 16.1 (0.634)	6.3
(G)	3-4 Shift Valve (None)	28.0 (1.102) / 7.6 (0.299)	10.3
(H)	Second Lock Valve (None)	20.7 (0.815) / 7.4 (0.291)	9.5
(I)	Second Coast Modulator Valve (White)	32.2 (1.268) / 9.0 (0.354)	11.4
(J)	Solenoid Modulator Valve (Purple/Pink)	30.2 (1.189) / 5.6 (0.220)	15.3
(K)	Secondary Regulator Valve (None)	46.9 (1.846) / 5.9 (0.232)	21.8

AX0TY-01

RETAINERS AND CHECK BALLS LOCATION

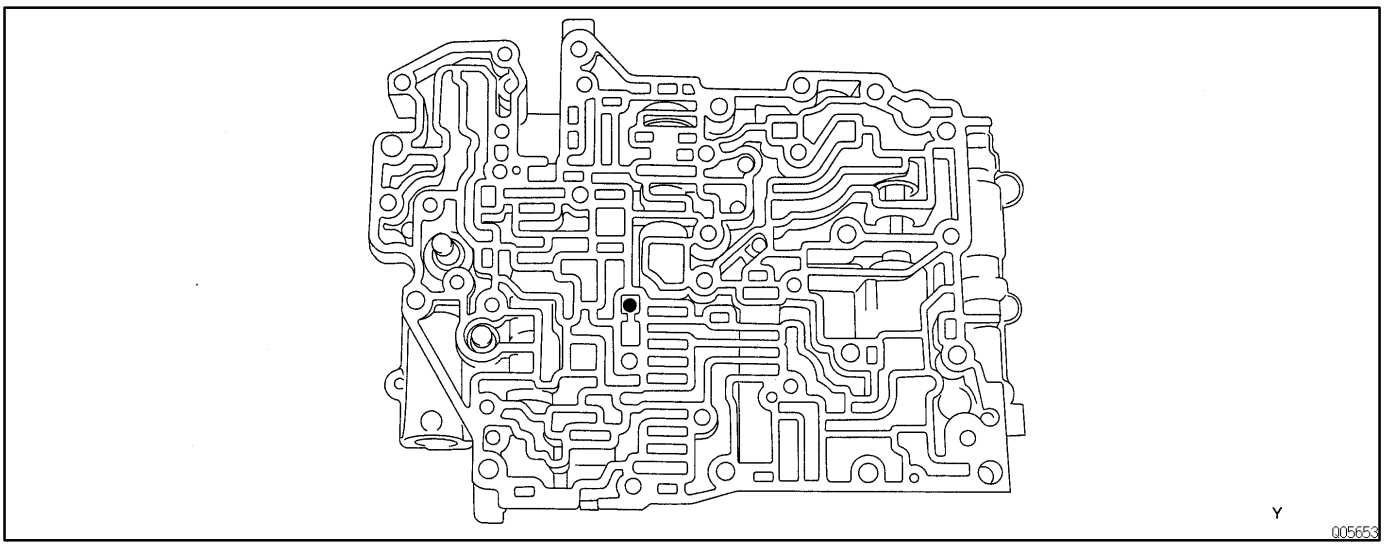
1. RETAINERS



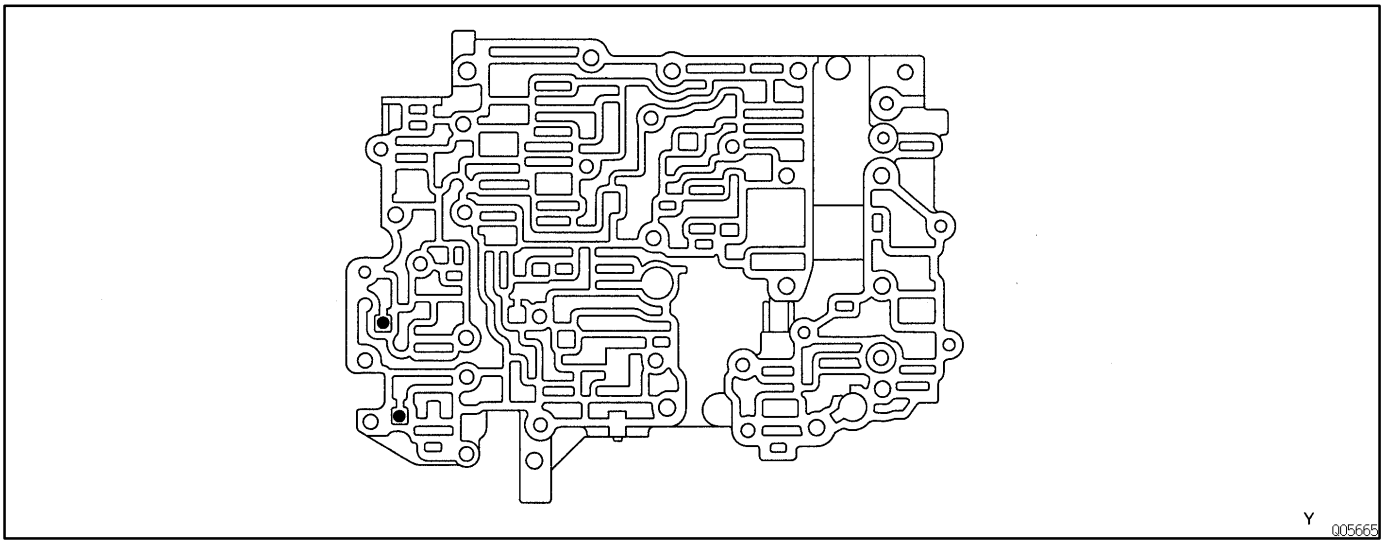
Mark	Name	Height / Width / Thickness mm (in.)
(A)	Accumulator Control Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
(B)	2-3 Shift Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
(C)	1-2 Shift Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
(D)	Reverse Control Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
(E)	Cut-Back Valve	6.5 (0.256) / 5.0 (0.197) / 3.2 (0.126)
(F)	Secondary Regulator Valve	11.0 (0.433) / 5.0 (0.197) / 3.2 (0.126)
(G)	Solenoid Modulator Valve	8.5 (0.335) / 5.0 (0.197) / 3.2 (0.126)
(H)	Lock-Up Control Valve	9.2 (0.362) / 5.0 (0.197) / 3.2 (0.126)
(I)	Second Coast Modulator Valve	8.0 (0.315) / 5.0 (0.197) / 3.2 (0.126)
(J)	Second Lock Valve	9.2 (0.362) / 11.5 (0.453) / 3.2 (0.126)
(K)	3-4 Shift Valve	6.5 (0.256) / 5.0 (0.197) / 3.2 (0.126)

2. CHECK BALLS

Upper Side



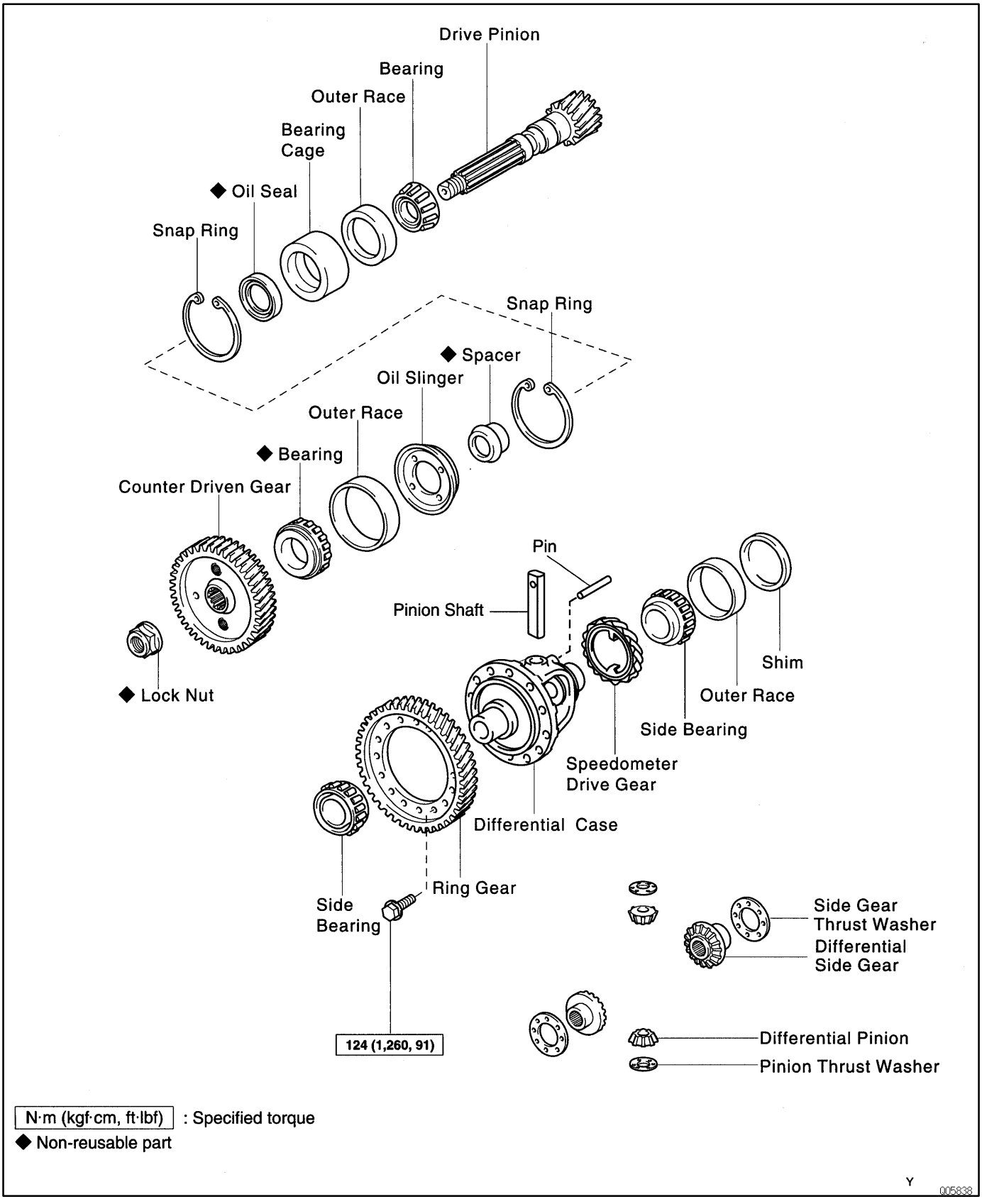
Lower Side



DIFFERENTIAL ASSEMBLY

AX04D-02

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

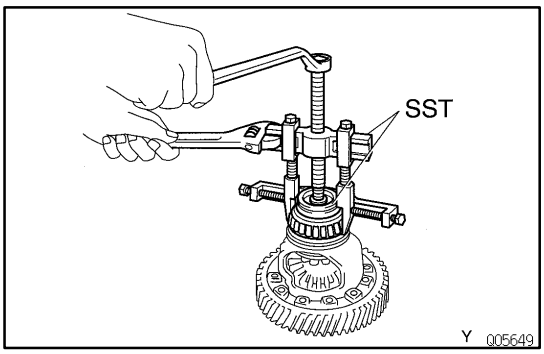
◆ Non-reusable part

Y

005838

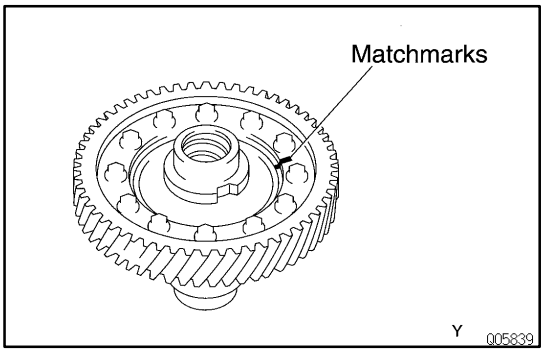
AX0TZ-02

DIFFERENTIAL CASE DISASSEMBLY



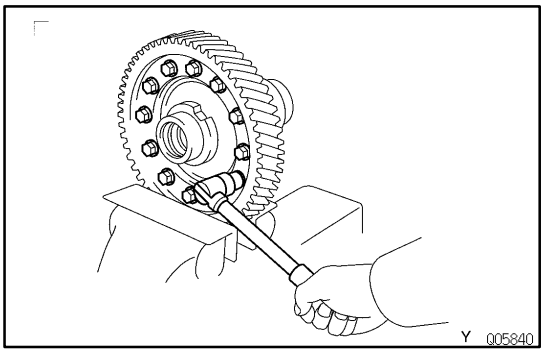
1. REMOVE SIDE BEARING

Using SST, remove the 2 side bearings.
SST 09608-1601 1, 09550-40010

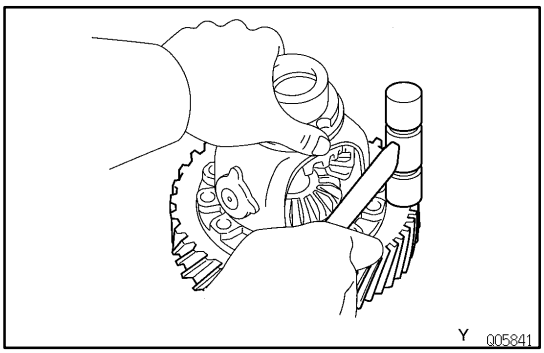


2. REMOVE RING GEAR

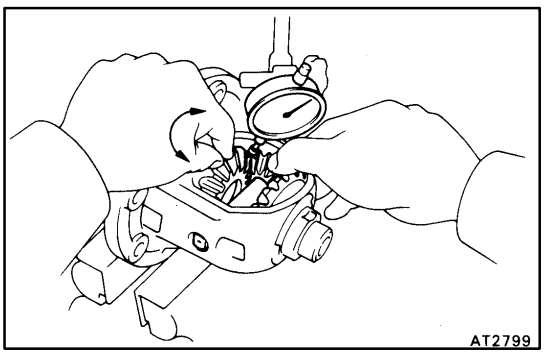
(a) Place matchmarks on both the differential case and ring gear.



(b) Remove the 12 bolts.



(c) Using a plastic hammer, tap out the ring gear.

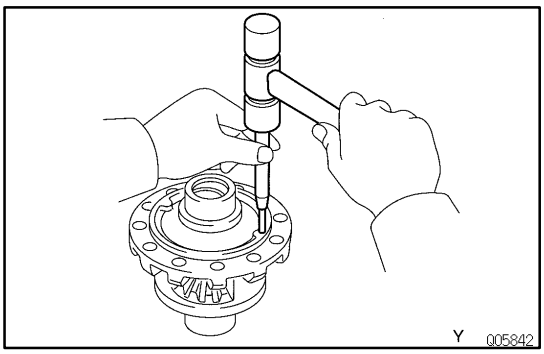


3. CHECK SIDE GEAR BACKLASH

Using a dial gauge, measure the backlash of each side gear while holding one pinion toward the case.

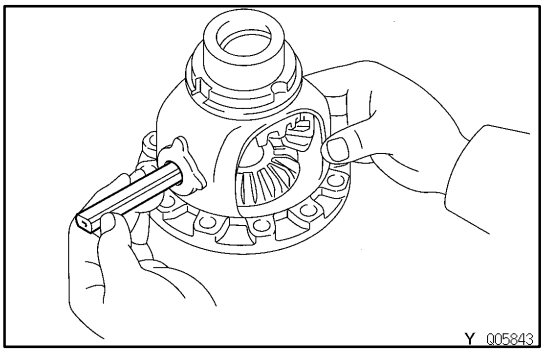
Standard backlash:

0.05 - 0.20 mm (0.0020 - 0.0079 in.)



4. DISASSEMBLE DIFFERENTIAL CASE

(a) Drive out the pinion shaft lock pin from the side on which the ring gear is installed.

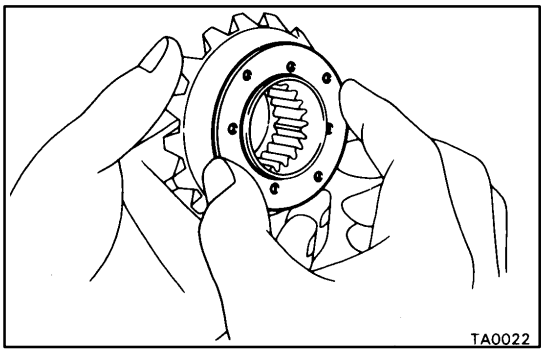


(b) Remove the pinion shaft from the case.

(c) Remove the 2 pinions and side gears with the 4 thrust washers.

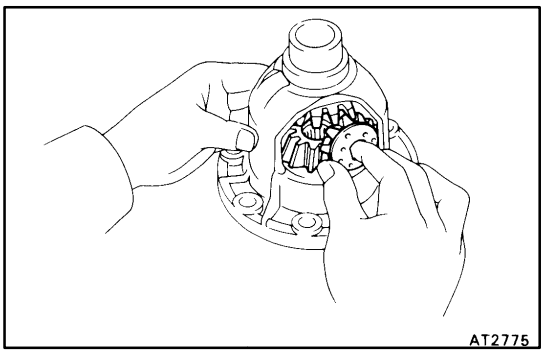
AX0U0-02

DIFFERENTIAL CASE ASSEMBLY

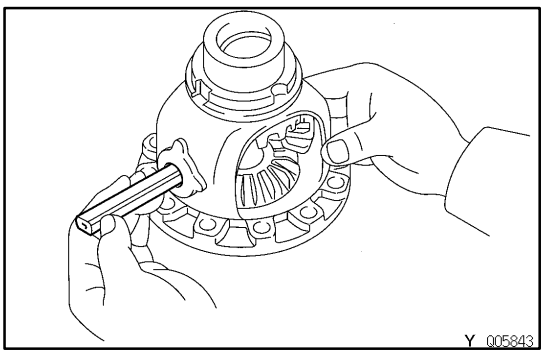


1. ASSEMBLE DIFFERENTIAL CASE

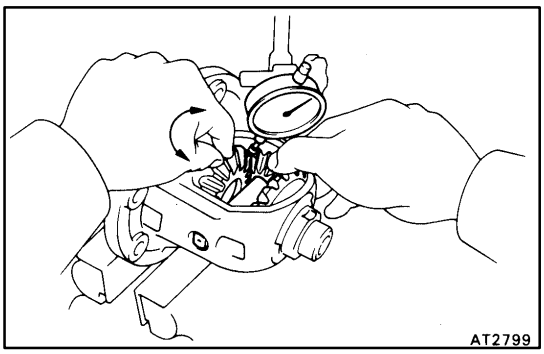
(a) Install the removed thrust washers to the side gears.



(b) Install the side gears with thrust washers, pinion thrust washers and pinion gears.



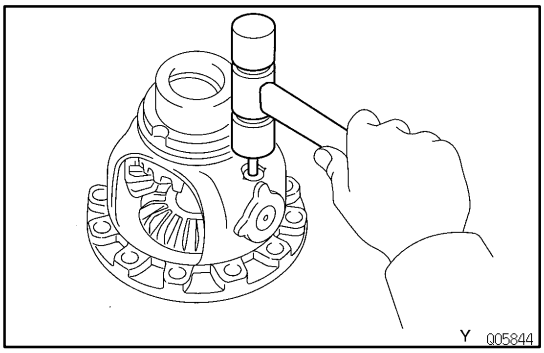
(c) Install the pinion shaft.



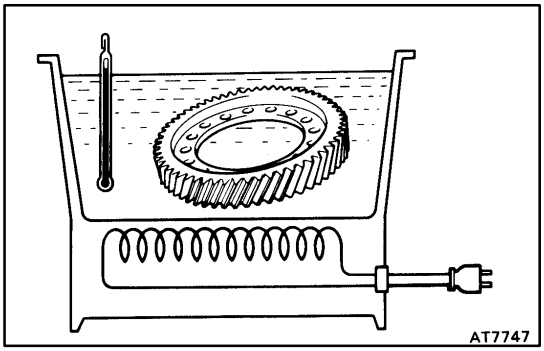
(d) Check the side gear backlash.
Measure the side gear backlash while holding one pinion gear toward the case.
Standard backlash:
0.05-0.20 mm (0.0020-0.0079 in.)
Refering to the table below, select thrust washers which will ensure that the backlash is within specification. Try to select washers of the same size for both sides.
Thrust washer thickness
mm (in.)

Thickness mm (in.)	Thickness mm (in.)
1.60 (0.0630)	1.70 (0.0670)
1.80 (0.0709)	

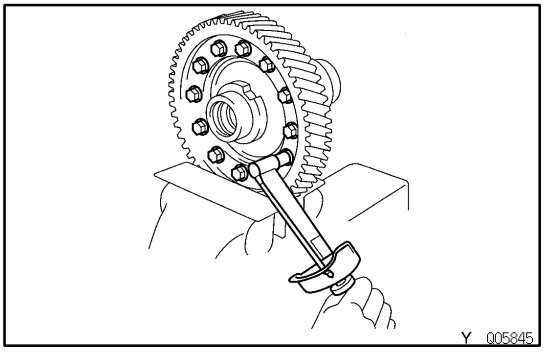
If the backlash is not within specification, install a thrust washer of a different thickness.



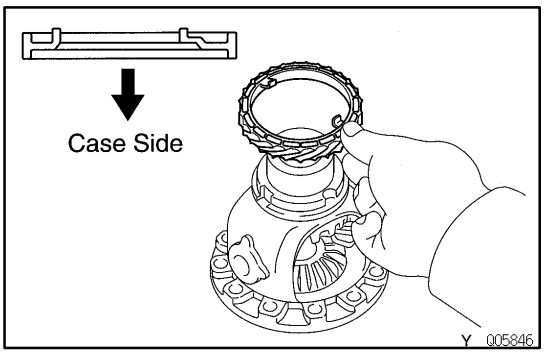
(e) Using a pin punch and hammer, drive the lock pin through the case and hole in the pinion shaft.
(f) Stake the differential case.



2. INSTALL RING GEAR
(a) Clean the contact surface of the differential case.
(b) Heat the ring gear to about 100˚C (212˚F) in an oil bath.
NOTICE: Do not heat the ring gear above 110˚C (230˚F).
(c) Carefully remove the ring gear from the oil bath.
(d) Clean the contact surface of the ring gear with cleaning solvent.

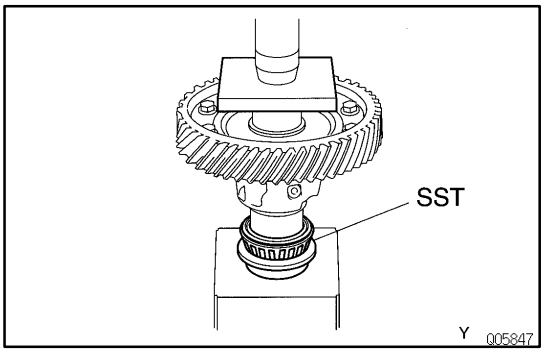


(e) Quickly install the ring gear on the differential case.
Install the 12 bolts.
HINT: Align the matchmarks on the differential left case and contact the ring gear.
(f) Tighten the set bolts uniformly a little at a time.
Torque the bolts.
Torque: 124 N·m (1,260 kgf·cm, 91 ft·lbf)

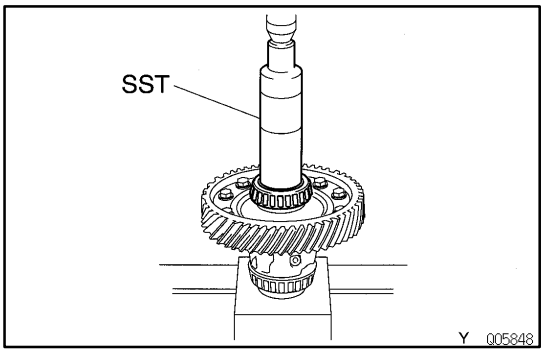


3. INSTALL SIDE BEARING

(a) Install the speedometer drive gear onto the differential case.



(b) Using SST and a press, press in the RH side bearing onto the differential case.
SST 09316-20011



(c) Using SST and a press, press in the LH side bearing onto the differential case.
SST 09316-60010 (09316-00010)

COMPONENT PARTS INSTALLATION

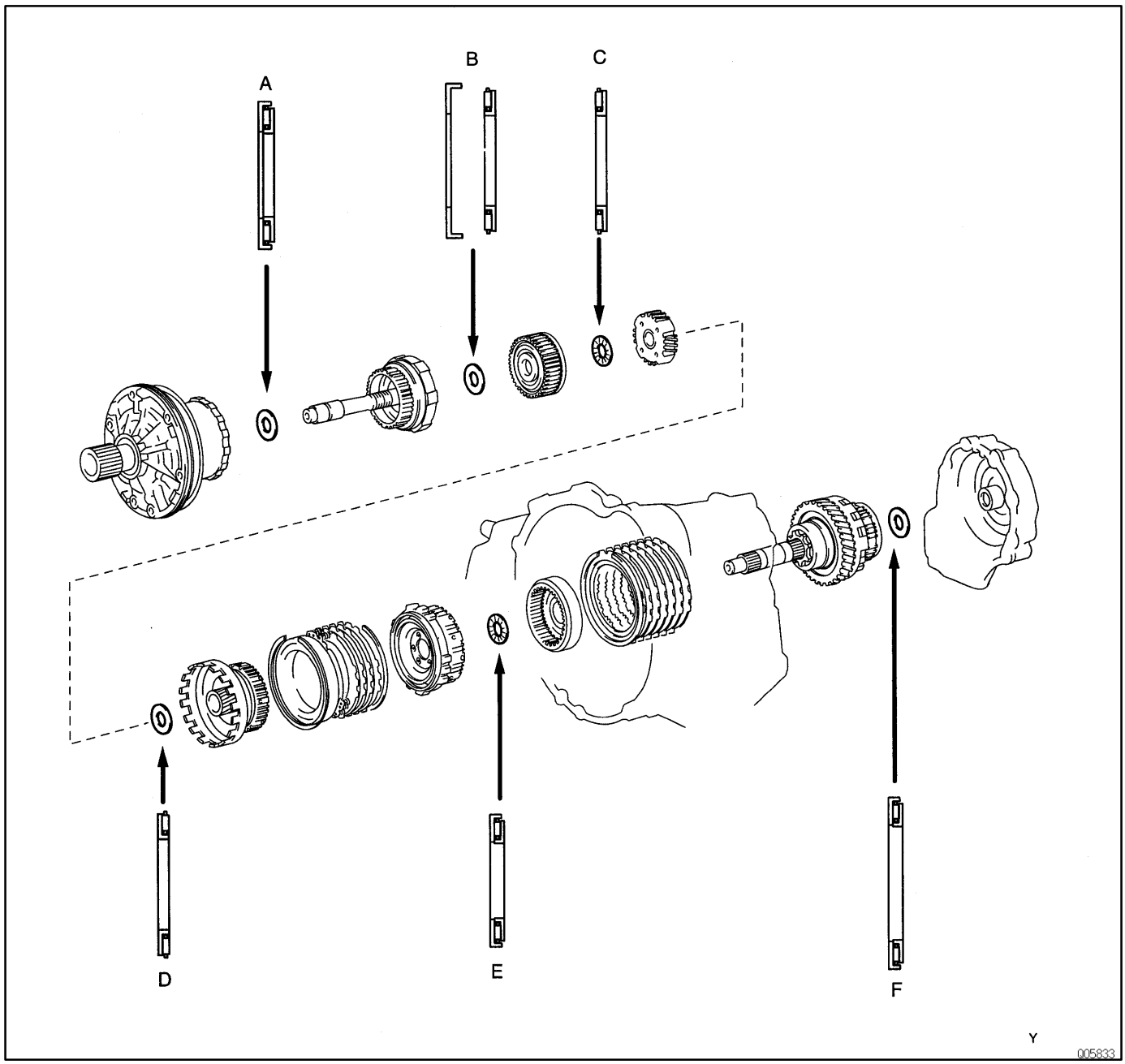
AX04G-06

Disassembly, inspection and assembly of each component group have been indicated in the preceding chapter. Before assembly, make sure, again, that all component groups are assembled correctly.
If something wrong is found in a certain component group during assembly, inspect and repair this group immediately.
Recommended ATF: D-II or DEXRON® III (DEXRON® II)

AX04H-03

GENERAL INSTALLATION NOTES:

(a) The automatic transaxle is composed of highly precision-finished parts, necessitating careful inspection before assembly because even a small nick could cause fluid leakage or affect performance.
(b) Before assembling new clutch discs, soak them in automatic transaxle fluid for at least 15 minutes.
(c) Apply automatic transaxle fluid on the sliding or rotating surfaces of parts before assembly.
(d) Use petroleum jelly to keep small parts in their places.
(e) Do not use adhesive cements on gaskets and similar parts.
(f) When assembling the transaxle, be sure to use new gaskets and O-rings.
(g) Dry all parts with compressed air-never use shop rags.
(h) Be sure to install the thrust bearings and races in the correct direction and position.

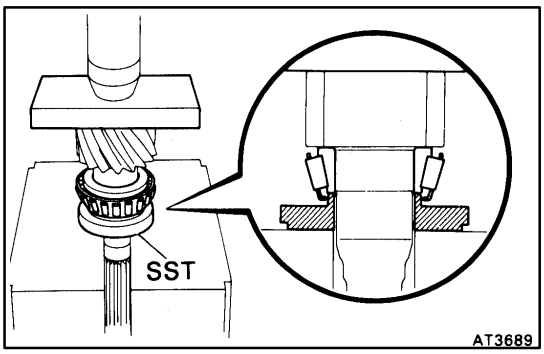


Mark	Thrust Bearing Outside Diameter mm (in.)	Thrust Bearing Inside Diameter mm (in.)
A	See page AX-118	27.7 (1.091)
B	47.6 (1.874)	31.4 (1.236)
C	45.5 (1.791)	30.1 (1.185)
D	45.5 (1.791)	30.1 (1.185)
E	38.7 (1.524)	22.6 (0.890)
F	46.3 (1.823)	28.6 (1.126)

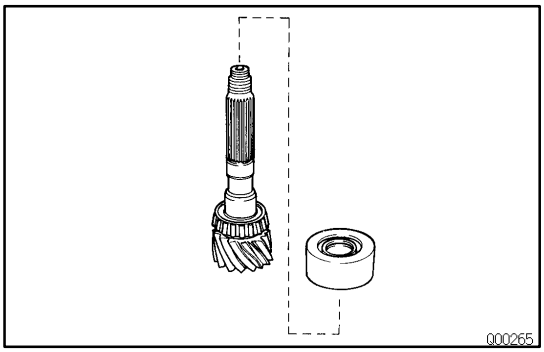
AX0U1-02

DIFFERENTIAL AND DRIVE PINION INSTALLATION

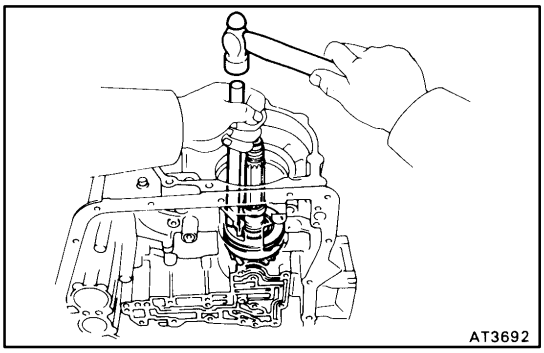
1. INSTALL DRIVE PINION INTO TRANSAXLE CASE



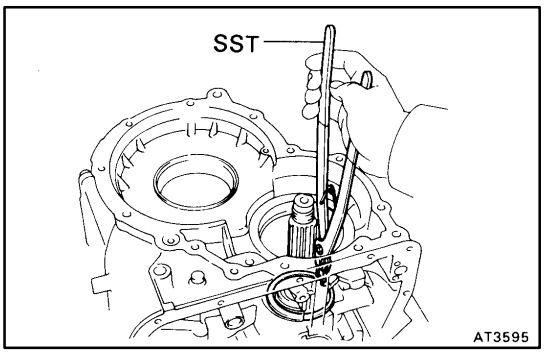
(a) Using SST, install the bearing to the drive pinion shaft.
SST 09350-32014 (09351-32120)



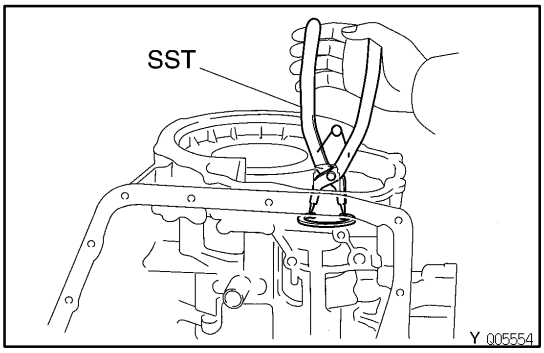
(b) Place the bearing cage onto the drive pinion shaft.
NOTICE: Be careful not to damage the oil seals with the pinion shaft.



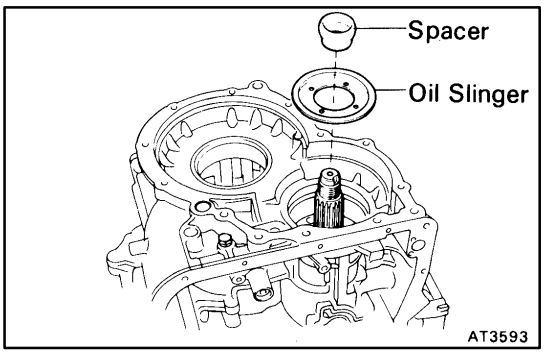
(c) Using a brass bar and hammer, slightly tap the bearing cage into the transaxle case until the snap ring groove in the bore can be seen.



(d) Using SST, install snap ring into the bore.
SST 09350-32014 (09351-32050)

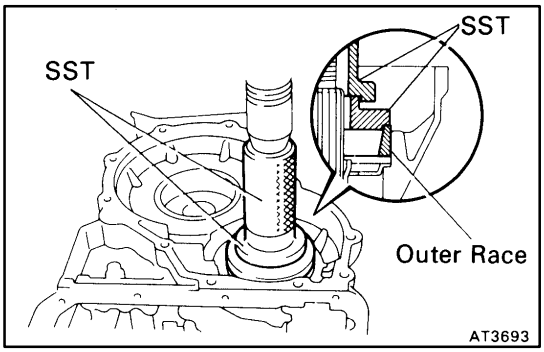


(e) Using SST, install the snap ring.
SST 09350-32014 (09351-32050)



2. PLACE OIL SLINGER AND NEW SPACER

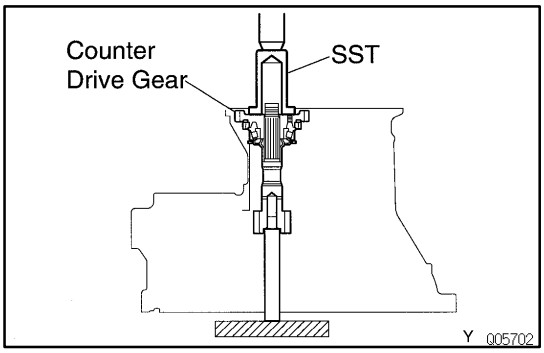
HINT: Install the spacer with the small end downward.



3. INSTALL OUTER RACE TO TRANSAXLE CASE

Using SST, press in the outer race.

SST 09350-32014 (09351-32100, 09351-32140)

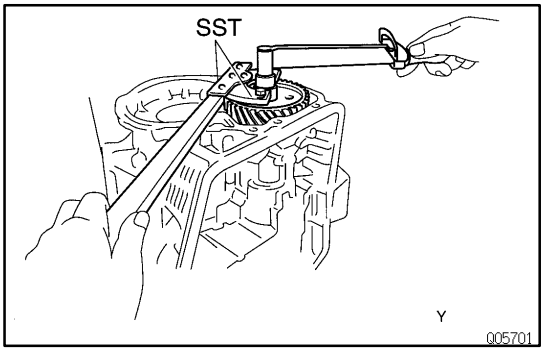


4. INSTALL COUNTER DRIVE GEAR

(a) Place a brass bar into the transaxle hole to hold the drive pinion shaft.

(b) Using SST, press in the counter driven gear until the counter driven gaer bearing almost touches the counter gear.

SST 09350-32014 (09351-32140)



5. INSTALL NEW LOCK NUT AND ADJUST DRIVE PINION PRELOAD

(a) Install the new lock nut.

(b) Using SST to hold the gear, tighten the nut.

Torque: 280 N·m (2,855 kgf·cm, 206 ft·lbf)

SST 09330-00021, 09350-32014 (09351-32032)

(c) Turn the gear counterclockwise and clockwise several times.

(d) Using a small torque wrench, measure the preload of the drive pinion.

Drive pinion preload (at starting):

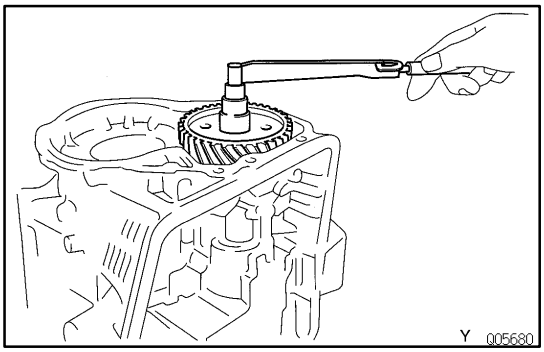
New bearing

1.0-1.6 N·m (10-16 kgf·cm, 8.7-13.9 in.·lbf)

Reused bearing

0.5-0.8 N·m (5-8 kgf·cm, 4.3-6.9 in.·lbf)

★ If the preload is greater than specified, replace the bearing spacer.

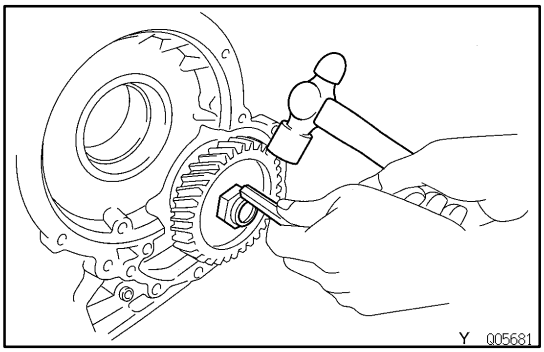


★ If the preload is less then specified, retighten the nut 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure.

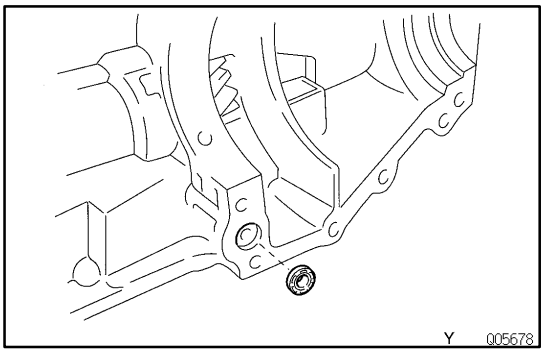
Do not back off the nut to reduce the preload.

Maximum torque: 353 N·m (3,600 kgf·cm, 260 ft·lbf)

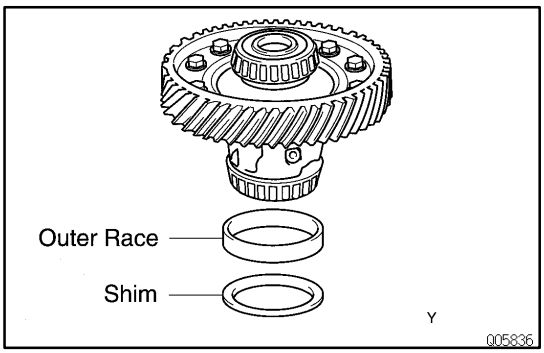


(e) If the preload is adjusted within specification, make a note of it.

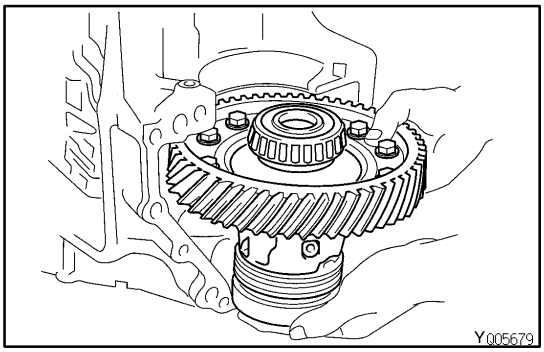
(f) Stroke the lock nut.



6. INSTALL APPLY GASKET

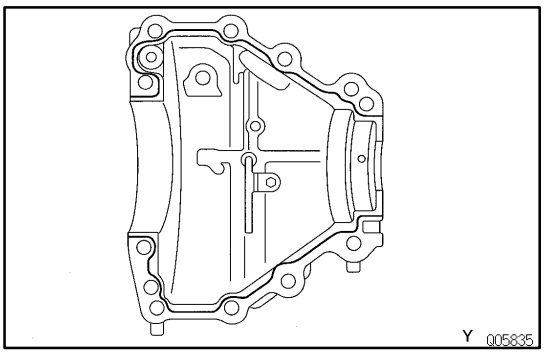


7. PLACE OUTER RACE AND SHIM ONTO RH SIDE BEARING



8. PLACE DIFFERENTIAL CASE INTO TRANSAXLE CASE

Be sure to install the shim and outer race into place.



9. INSTALL CARRIER COVER

(a) Remove any packing material and be careful not to drop oil on the contacting surfaces of the carrier cover and transaxle case.

(b) Apply seal packing to the carrier cover.

Seal packing:

Part No.08826-00090, THREE BOND 1281 or equivalent

HINT: Install the carrier cover within 10 minutes after applying seal packing.

(c) Install and torque the 11 bolts.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

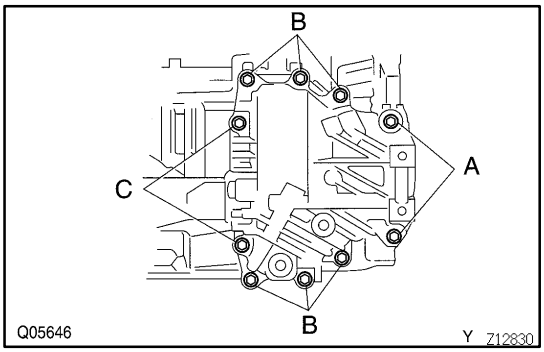
HINT: Each bolt length is indicated below.

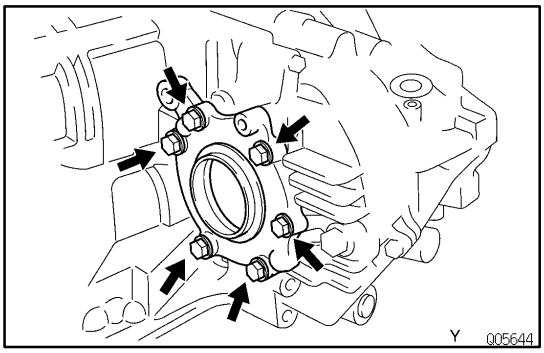
Bolt length:

Bolt A: 100 mm (3.937 in.)

Bolt B: 65 mm (2.559 in.)

Bolt C: 75 mm (2.953 in.)





10. ADJUST SIDE BEARING PRELOAD

(a) Remove any packing material on the contacting surfaces of the LH bearing retainer and transaxle case.

HINT: Do not apply seal packing yet.

(b) Install the LH bearing retainer and torque the 6 bolts.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

(c) Snap down the bearings by turning the differential case several times.

(d) Using a small torque wrench, measure the differential total preload.

Total preload (at starting):

New bearing

Drive pinion preload plus 0.2-0.4 N·m

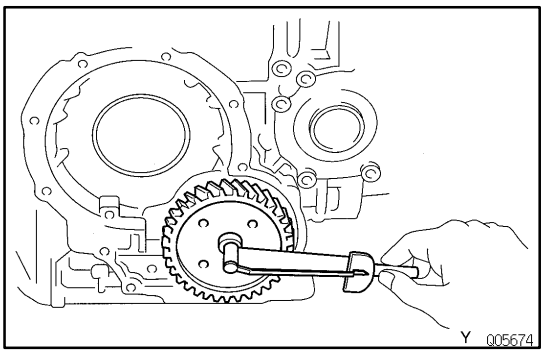
(2.5-5.1 kgf·cm, 2.2-3.6 in.·lbf)

Reused bearing

Drive pinion preload plus 0.1-0.2 N·m

(1.3-2.0 kgf·cm, 1.1-1.7 in.·lbf)

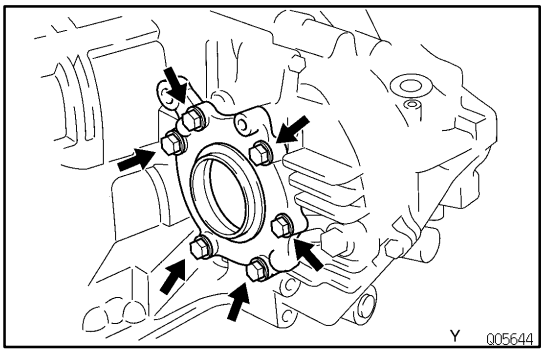
If the preload is not within specification, replace the adjusting shim in the LH bearing retainer with one of a different thickness.



AT3700:Adjusting shim thickness

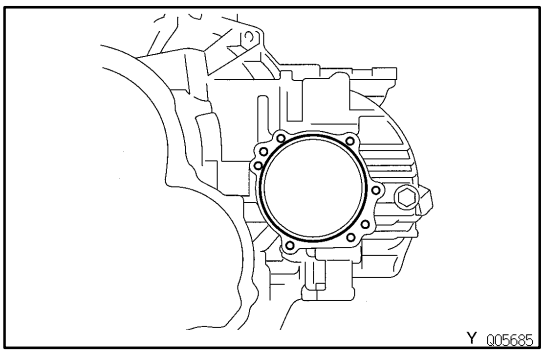
mm (in.)

Mark	Thickness	Mark	Thickness
0	2.00 (0.0787)	9	2.45 (0.0965)
1	2.05 (0.0807)	A	2.50 (0.0984)
2	2.10 (0.0827)	B	2.55 (0.1004)
3	2.15 (0.0846)	C	2.60 (0.1024)
4	2.20 (0.0866)	D	2.65 (0.1043)
5	2.25 (0.0886)	E	2.70 (0.1063)
6	2.30 (0.0906)	F	2.75 (0.1083)
7	2.35 (0.0925)	G	2.80 (0.1102)
8	2.40 (0.0945)	H	2.85 (0.1122)



11. INSTALL LH BEARING RETAINER

(a) Remove the 6 bolts and LH bearing retainer.



(b) Remove any FIPG material on the contacting surfaces of LH bearing retainer, transaxle case and carrier cover.

(c) Apply FIPG to the transaxle case and carrier cover.

FIPG: Part No.08826-00090, THREE BOND 1281 or equivalent

HINT: Install the LH bearing retainer within 10 minutes after applying FIPG.

(d) Install the LH bearing retainer.

(e) Coat the threads of bolts with sealer.

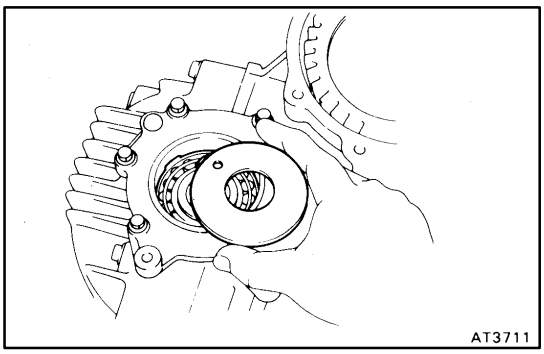
Sealer: Part No.08833-00070, THREE BOND 1324 or equivalent

(f) Tighten the bolts.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

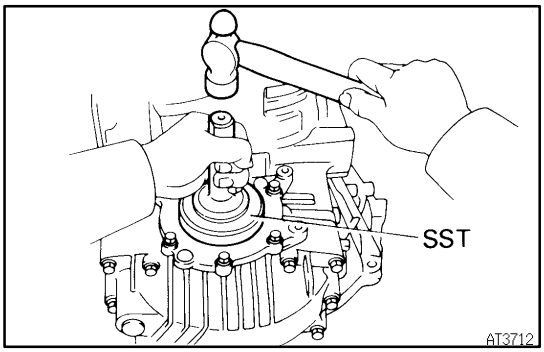
(g) Snap down the bearings.

(h) Recheck the differential total preload.

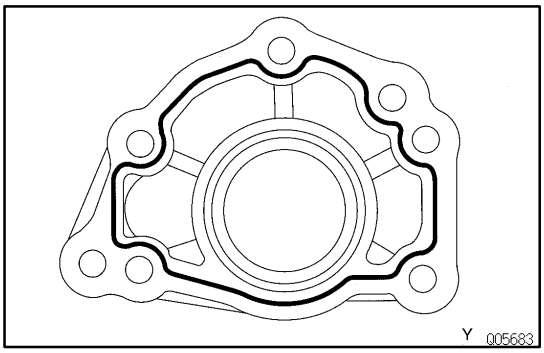


12. INSTALL NEW OIL SEAL

(a) Place the oil baffle onto the LH bearing retainer.



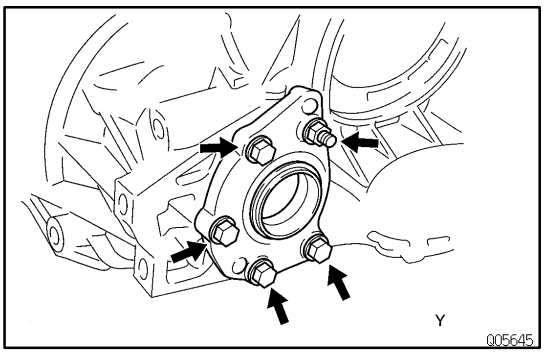
(b) Using SST, drive in a new oil seal unit its end is flush with surface of the LH bearing retainer.
SST 09223-15010



13. INSTALL RH RETAINER

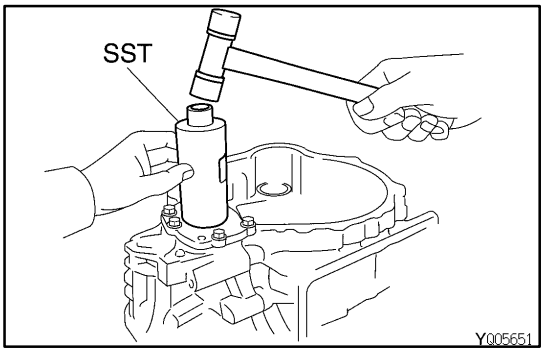
(a) Remove any FIPG material on the contacting surfaces of RH retainer and transaxle case.

(b) Apply FIPG to the RH retainer.
FIPG: Part No.08826-00090, THREE BOND 1281 or equivalent
HINT: Install the RH retainer within 10 minutes after applying FIPG.

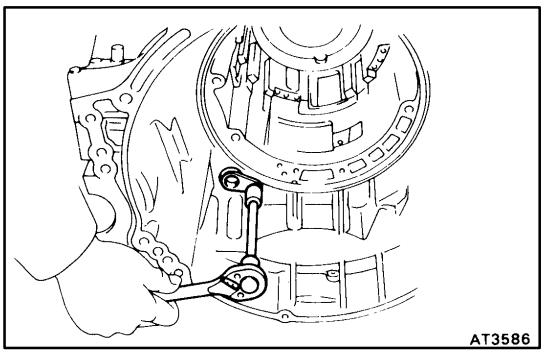


(c) Coat the bolts' threads with sealer.
Sealer: Part No.08833-00070, THREE BOND 1324 or equivalent

(d) Tighten the bolts.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)



(e) Using SST, press in the oil seal.
SST 09226-10010



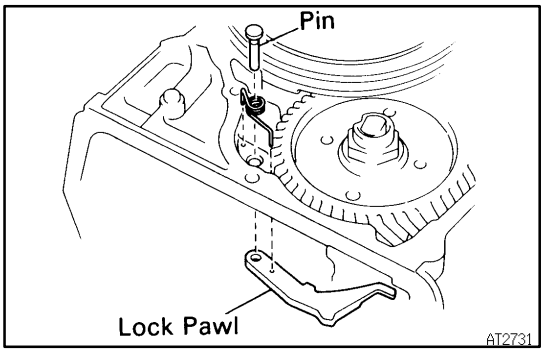
14. INSTALL DRIVE PINION CAP

(a) Install a new O-ring to the cap.

(b) Install the drive pinion cap to the transaxle case.

AX0U2-03

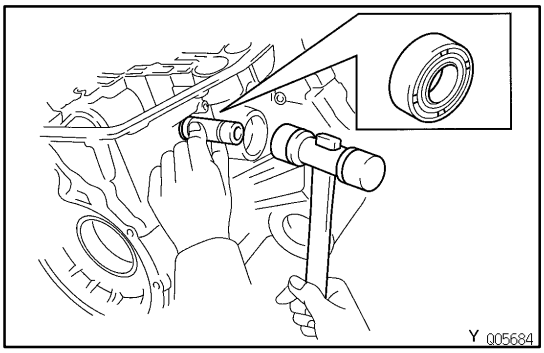
4-SPEED GEAR UNIT INSTALLATION



1. INSTALL PARKING LOCK PAWL

(a) Place the parking lock pawl onto the case.
Hook the spring ends to the case and pawl.

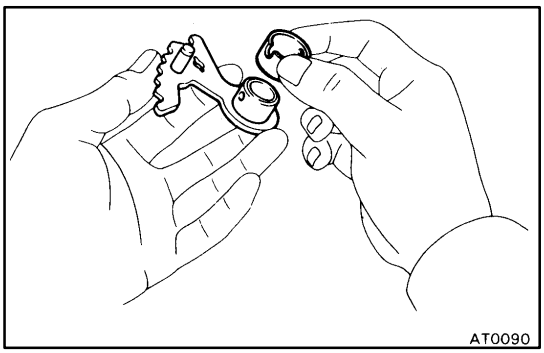
(b) Instal the pin into the hole of the case through the spring and pawl.



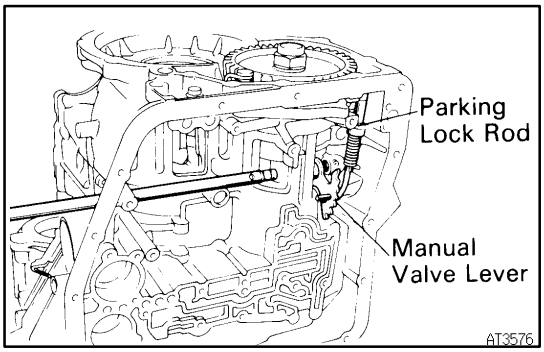
2. INSTALL MANUAL VALVE SHAFT

(a) Coat the oil seal lip with MP grease.

(b) Install the manual valve shaft oil seal to the case.

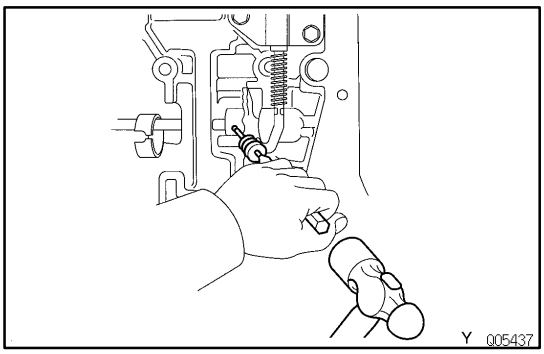


(c) Assembly a new collar to the manual valve lever.

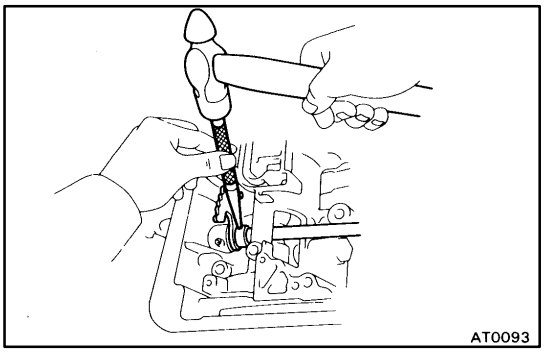


(d) Install the manual valve shaft to the transmission case through the manual lever.

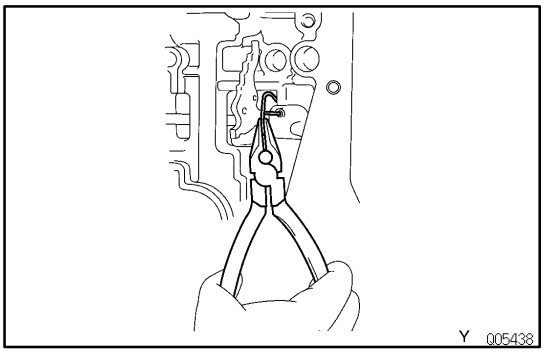
(e) Install the parking lock rod.



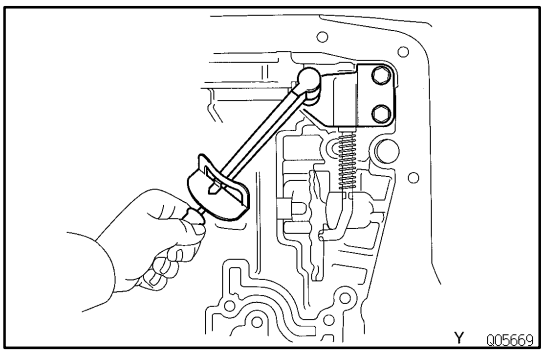
(f) Using a pin punch, drive in the roll pin until its surface is flush with the manual valve lever surface.



(g) Match the collar hole to the lever caulking hollow and caulk the collar to the lever.

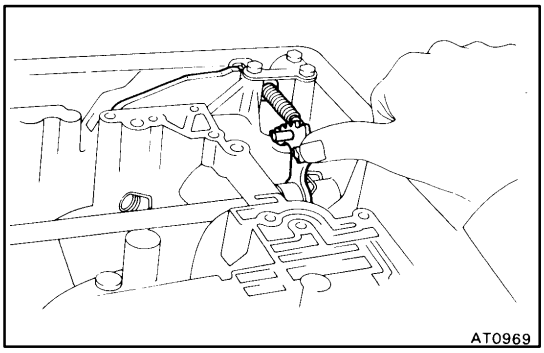


(h) Install the retaining spring.



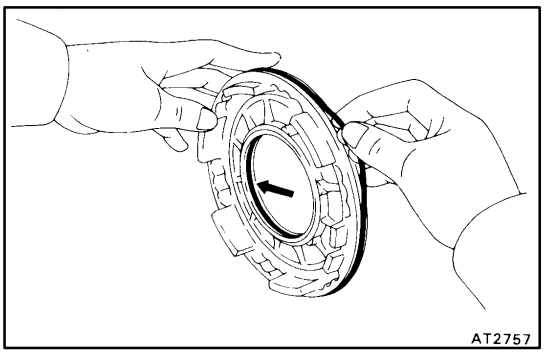
3. INSTALL PARKING LOCK PAWL BRACKET AND GUIDE

Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)



4. CHECK OPERATION OF PARKING LOCK PAWL

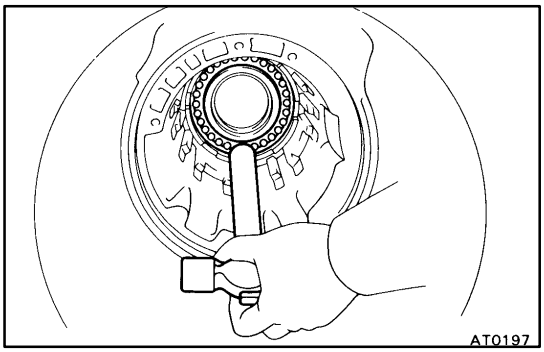
Make sure the counter driven gear is locked when the manual valve lever is in the P position.



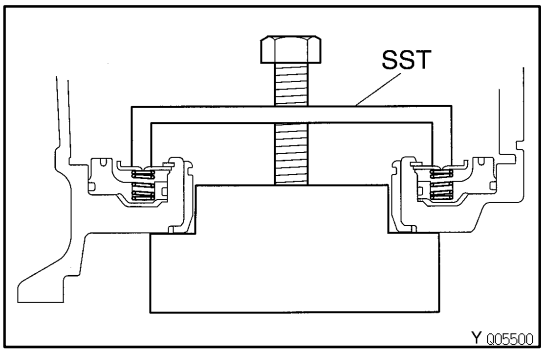
5. INSTALL FIRST AND REVERSE BRAKE PISTON TO TRANSMISSION CASE

(a) Coat the new O-rings with ATF.

(b) Install the 2 O-rings on the piston.



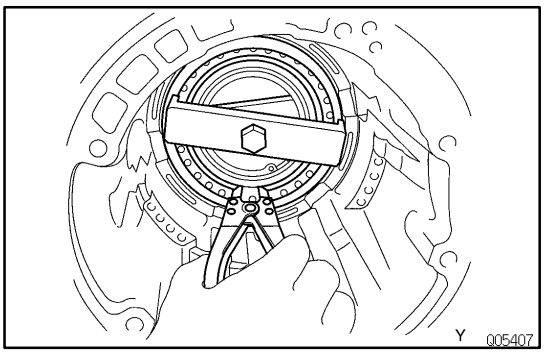
(c) Push the piston into the bore of the case, facing the spring seat upward.



6. INSTALL PISTON RETURN SPRING

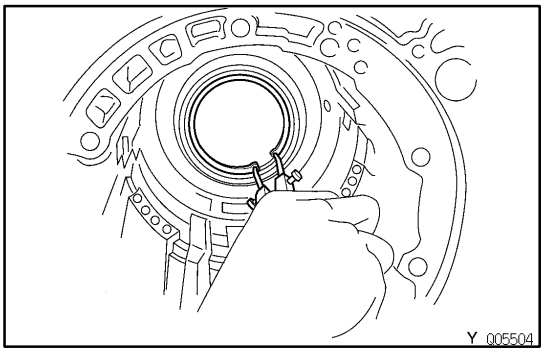
(a) Place the return spring and snap ring on the piston.

(b) Place SST, and compress the return spring evenly by tightening the bolt gradually.
SST 09350-32014 (09351-32040)

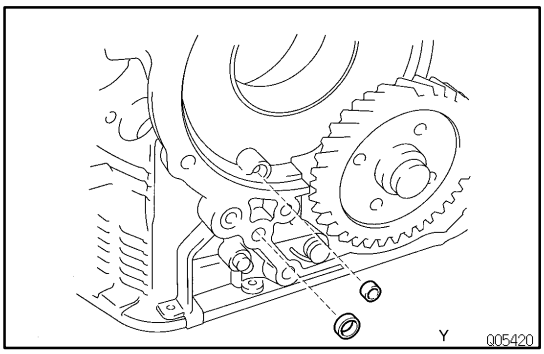


(c) Install snap ring. Visually check to make sure it is fully seated and centered by the 3 lugs on the spring retainer. Be sure the end gap of snap ring is not aligned with the spring retainer claw.

(d) Remove the SST.

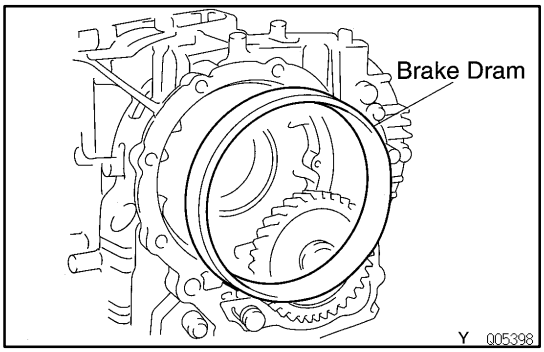


7. INSTALL SNAP RING TO TRANSAXLE CASE

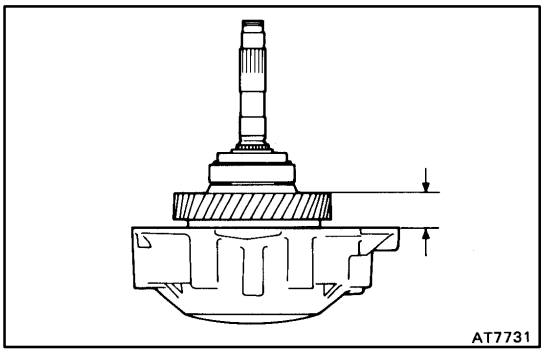


8. INSTALL OVERDRIVE UNIT

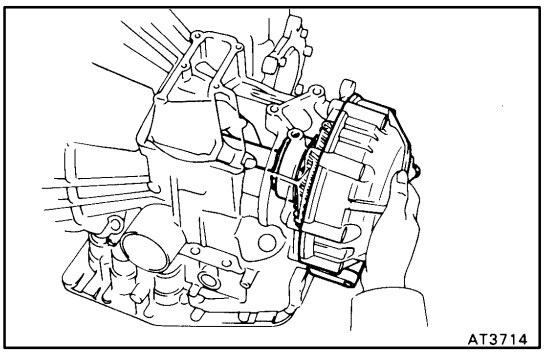
(a) Install the overdrive brake apply gasket and overdrive clutch apply gasket.



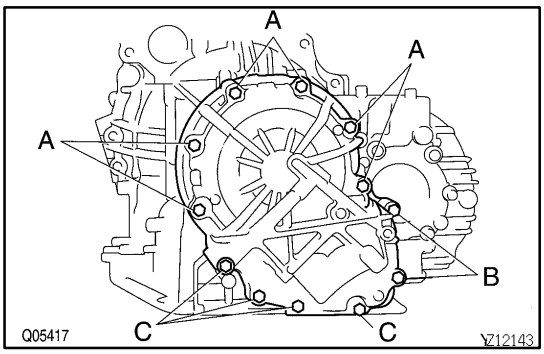
(b) Install the overdrive brake drum to the case.
(c) Install the new case gasket to the case.



(d) Make sure that the length from the top surface of the case to the counter driven gear surface should be about 24 mm (0.94 in.).

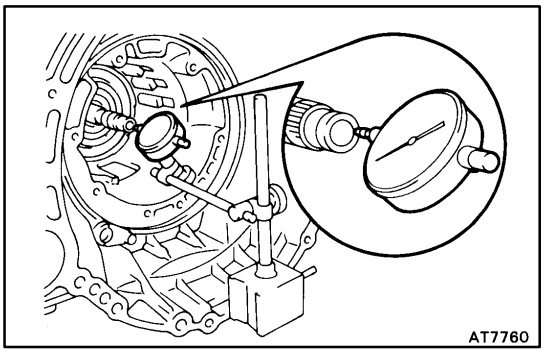


(e) Place the new gasket onto the transaxle case.
(f) Install the overdrive assembly with overdrive case to the transaxle case.



(g) Coat the threads of 23 mm (0.91 in.) bolts with sealer.
Sealer:
Part No.08833-00070, THREE BOND 1324 or equivalent

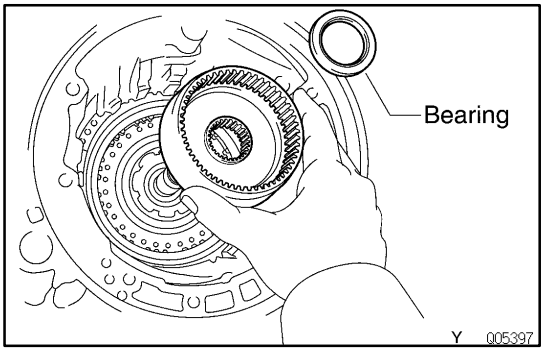
(h) Install and tighten the 13 bolts.
HINT: Each bolt length is indicated below.
Bolt length:
Bolt A: 61 mm (2.402 in.)
Bolt B 38 mm (1.496 in.)
Bolt C: 23 mm (0.906 in.)
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)



9. CHECK INTERMEDIATE SHAFT END PLAY

(a) Make sure that the intermediate shaft as end play in axial direction.
End play: 0.47-1.50 mm (0.0185-0.0591 in.)
If the end play is not within specification, check the installation of intermediate shaft.

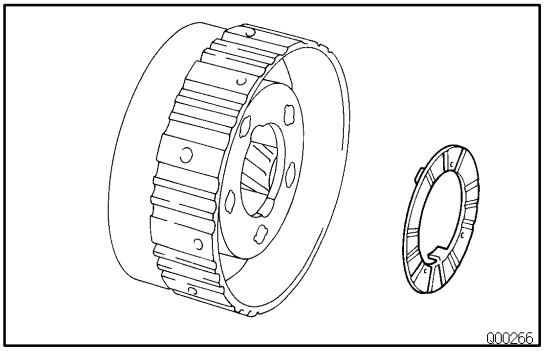
(b) Make sure that the intermediate shaft turns smoothly.



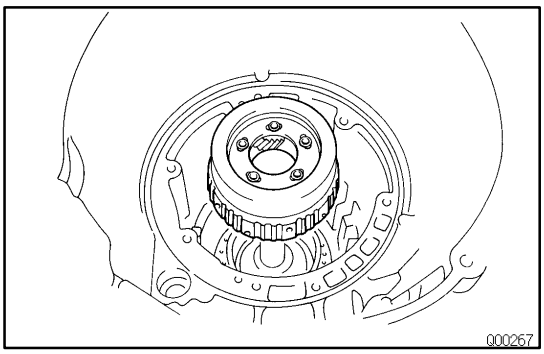
10. INSTALL REAR PLANETARY GEAR

(a) Install the rear planetary ring gear.

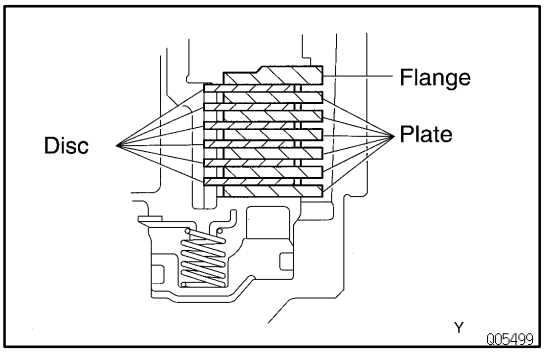
(b) Place the bearing onto the ring gear.
Bearing outer diameter: 38.7 mm (1.524 in.)
Bearing inner diameter: 22.6 mm (0.890 in.)



(c) Coat the thrust washer with petroleum jelly and place it onto the rear planetary gear.



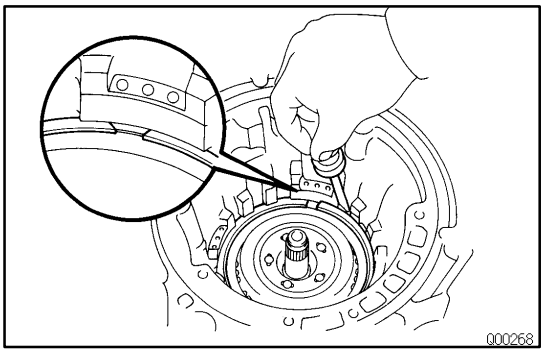
(d) Install the rear planetary gear.



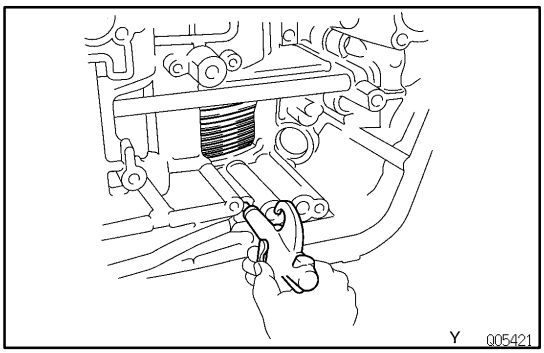
11. INSTALL DISCS, PLATES AND FLANGE OF FIRST AND REVERSE BRAKE

(a) Install the 6 plates and discs.
Install in order:
P=Plate D=Disc
P-D-P-D-P-D-P-D-P-D-P-D

(b) Install the flange, facing the flat end downward.

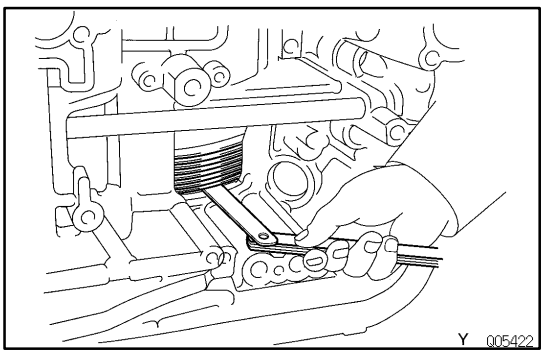


(c) Install the snap ring.
HINT: Be sure that the end gap of the snap ring is not aligned with one of the cutouts.

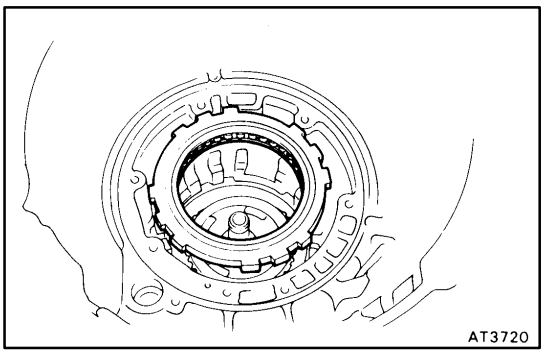


12. CHECK FIRST AND REVERSE BRAKE

(a) Check the operation of the first and reverse brake piston.
Apply compressed air into the case passage and confirm that the piston moves.

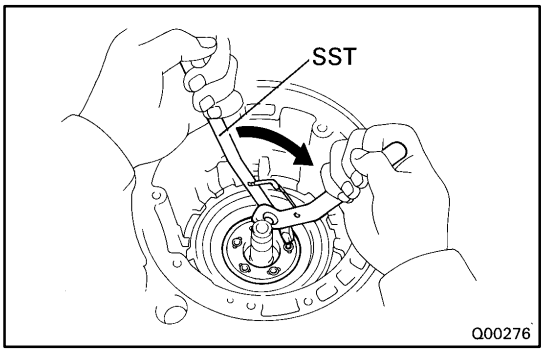


(b) Using a filler gauge, check that pack clearance of the first and reverse brake.
Clearance:
1.92-2.68 mm (0.0756-0.1055 in.)

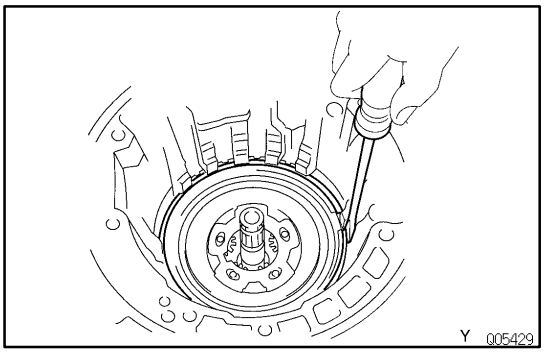


13. INSTALL NO.2 ONE-WAY CLUTCH INTO CASE

(a) Place the No.2 one-way clutch with the shiny side of flange upward.

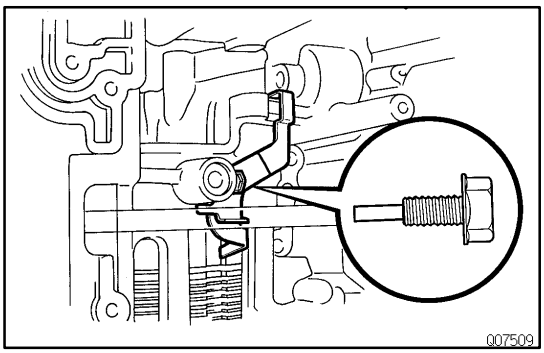


(b) Install the one-way clutch while turning the planetary gear clockwise with SST.
SST 09350-32014 (09351-32050)
If the planetary gear cannot turn clockwise, check the installation of the one-way clutch.

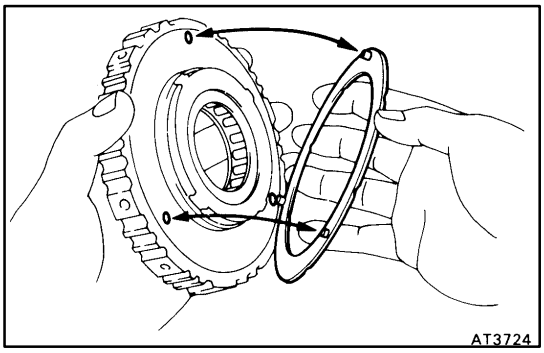


(c) Install the snap ring.
HINT: Be sure that the end gap of the snap ring is not aligned with one of cutouts.

(d) Coat the thrust washer with petroleum jelly and install it onto the rear planetary gear.

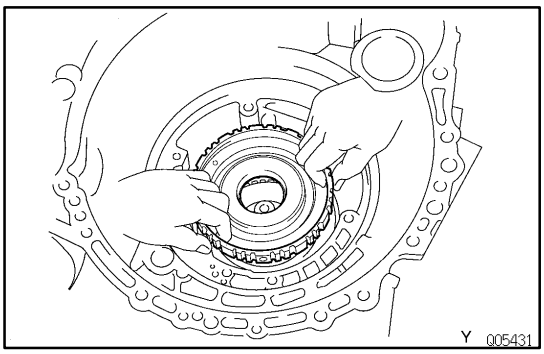


14. INSTALL SECOND COAST BRAKE BAND GUIDE

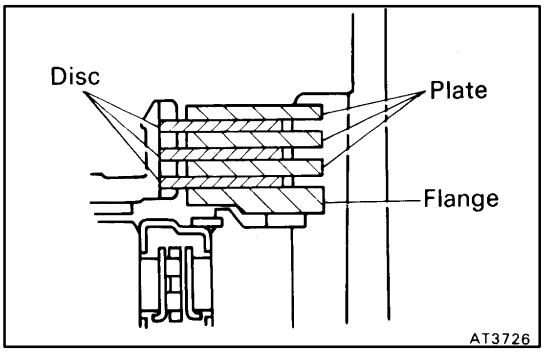


15. PLACE NO.1 ONE-WAY CLUTCH

(a) Coat the thrust washer with petroleum jelly and install it on the No.1 one-way clutch.



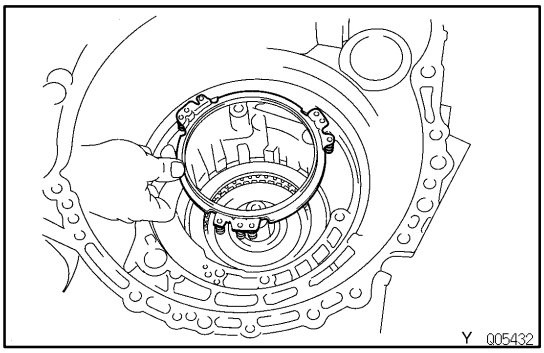
(b) Place the No.1 one-way clutch onto the rear planetary gear.



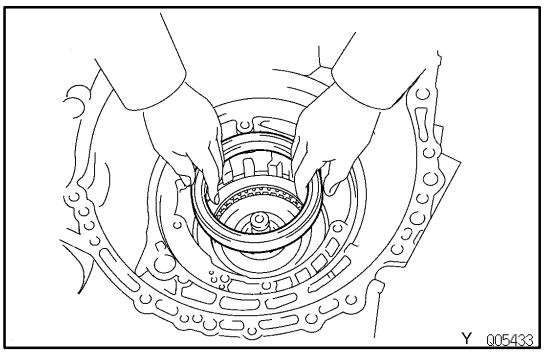
16. INSTALL SECOND BRAKE

(a) Install the flange, facing the flat end upward.

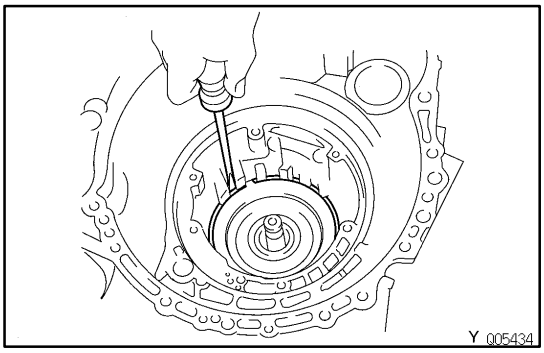
(b) Install the 3 discs and plates.
Install in order:
P=Plate D=Disc
D-P-D-P-D-P



(c) Place the piston return spring into the case.



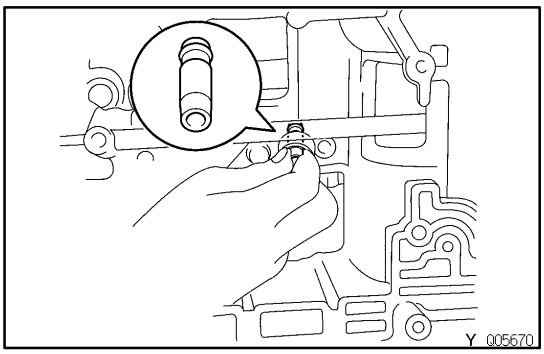
(d) Place the second brake drum into the case.
HINT: Align the groove of the drum with the bolt.



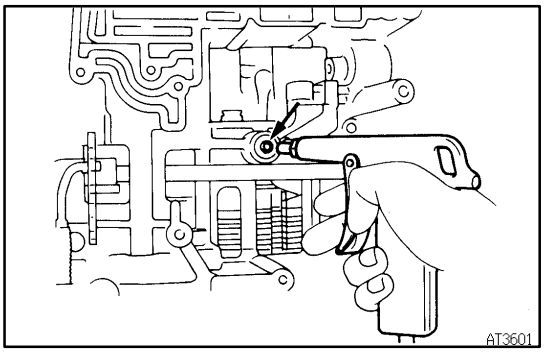
(e) Place the snap ring into the case so that end gap is installed into the groove.

(f) While compressing the piston return spring over the drum with screwdriver, install the snap ring into the groove.

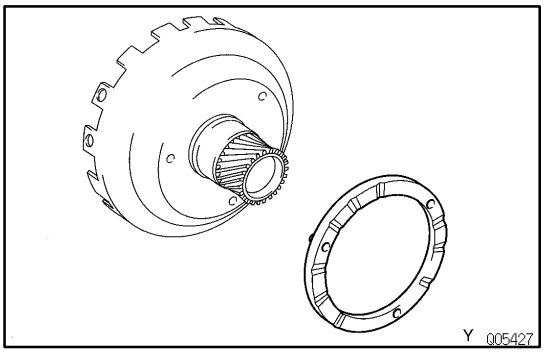
(g) Be sure that the end gap of the snap ring is not aligned with one of cutouts.



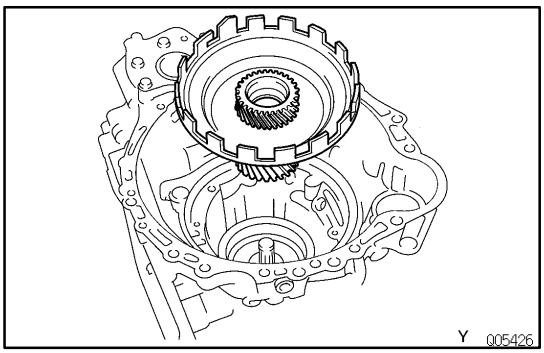
17. INSTALL NEW SECOND BRAKE GASKET
Install a new gasket until it makes contact with the second brake drum.



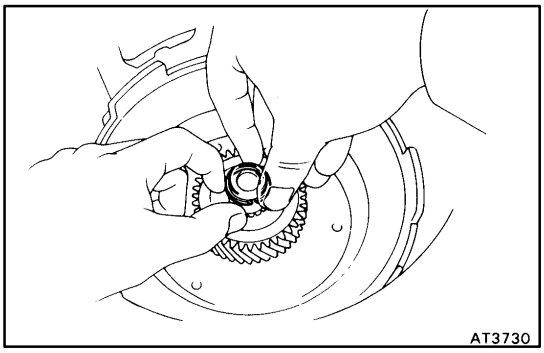
18. CHECK OPERATION OF SECOND BRAKE
Apply compressed air into the second brake gasket and confirm that the piston moves.



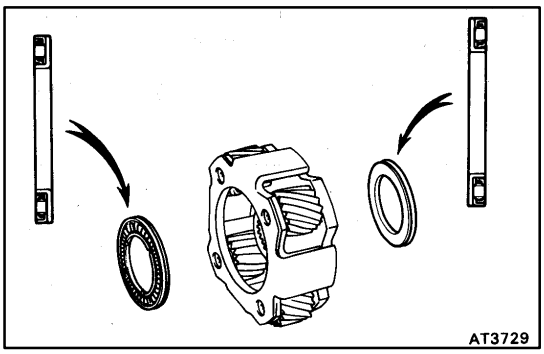
19. INSTALL SUN GEAR AND SUN GEAR INPUT DRUM
(a) Coat the thrust washer with petroleum jelly and install it on the sun gear input drum.



(b) While turning the sun gear clockwise, install it into the No.1 one-way clutch.

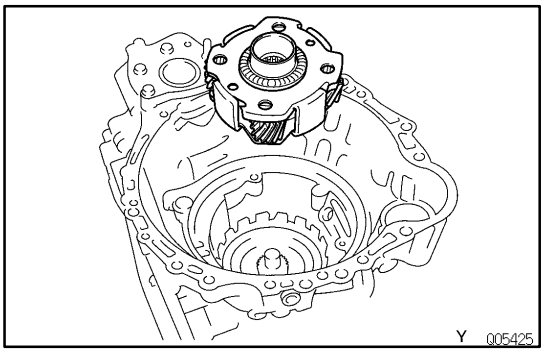


20. INSTALL OIL SEAL RING TO INTERMEDIATE SHAFT
HINT: After installing the oil seal ring, check that it moves smoothly.

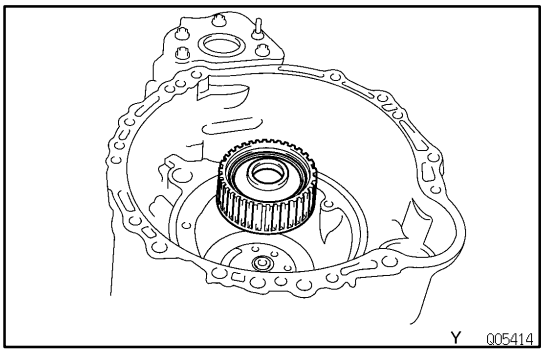


21. INSTALL FRONT PLANETARY GEAR

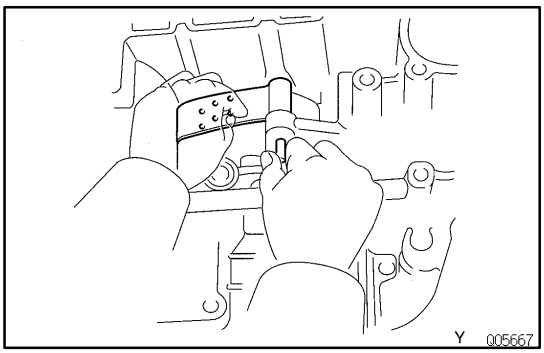
(a) Coat the bearings with petroleum jelly, and install them onto the both sides of planetary gear.
Bearing outer diameter: 45.5 mm (1.791 in.)
Bearing inner diameter: 30.1 mm (1.185 in.)



(b) Install the planetary gear onto the sun gear.

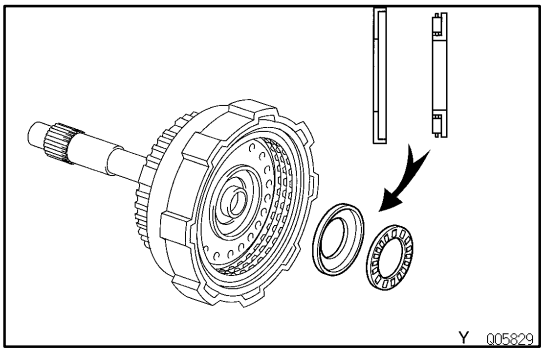


22. INSTALL FRONT PLANETARY RING GEAR



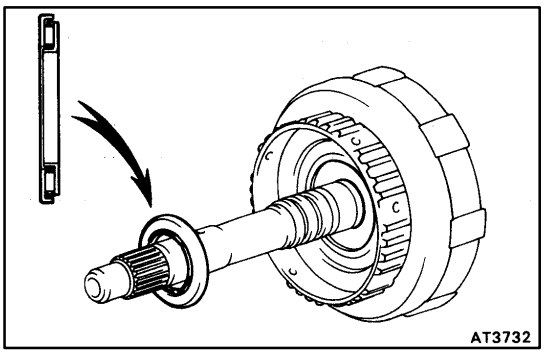
23. INSTALL SECOND COAST BRAKE BAND

(a) Place the band into the case.
(b) Install the pin through the oil pump mounting bolt hole.



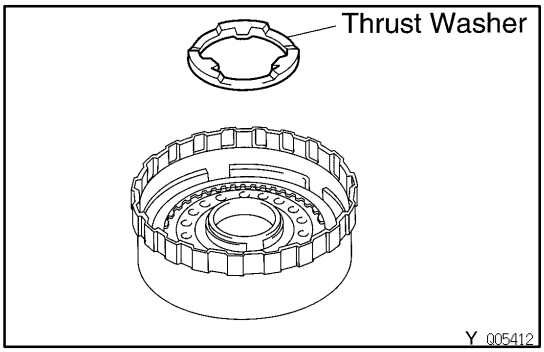
24. INSTALL FORWARD CLUTCH AND DIRECT CLUTCH

(a) Coat the bearing with petroleum jelly and install it onto rear side of the forward clutch.
Bearing outer diameter: 47.6 mm (1.874 in.)
Bearing inner diameter: 31.4 mm (1.236 in.)

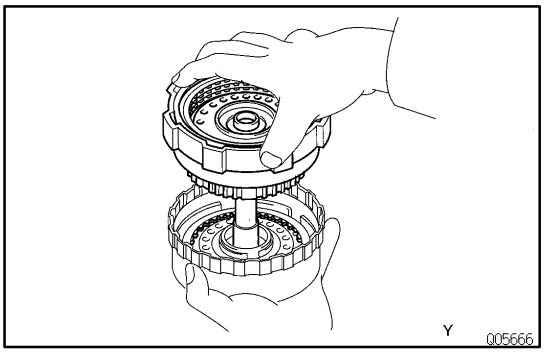


(b) Coat the bearing with petroleum jelly and install it onto the front side of the forward clutch.
HINT: There are 2 different thickness bearings for adjustment of the input shaft thrust play.
Bearing thickness
mm (in.)

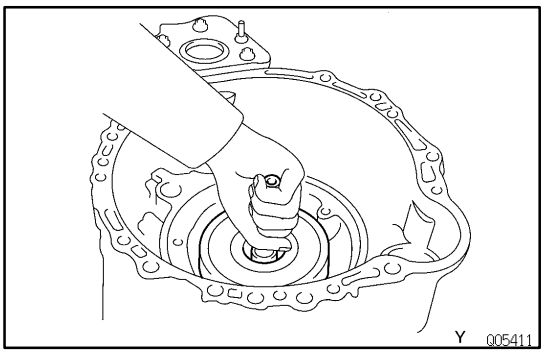
Thickness	Outer diameter	Inner diameter
3.60 (0.1417)	45.9 (1.807)	27.7 (1.091)
4.19 (0.1650)	47.1 (1.854)	27.7 (1.091)



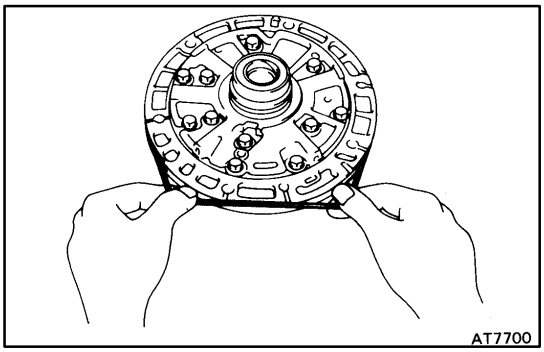
(c) Coat the thrust washer with petroleum jelly and install it with the oil groove facing upward onto the direct clutch drum.



(d) Mesh the hub of the forward clutch flukes with the direct clutch discs.
HINT: Be careful that the bearing and thrust washer do not get out of place.

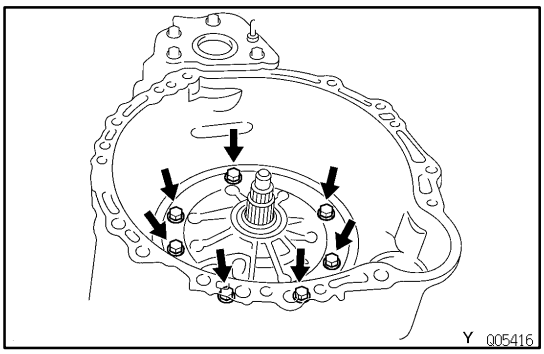


(e) Install the direct clutch and forward clutch into the case.
HINT: Hold the direct clutch toward the forward clutch to prevent the thrust washer from getting out of place.



25. INSTALL OIL PUMP INTO CASE

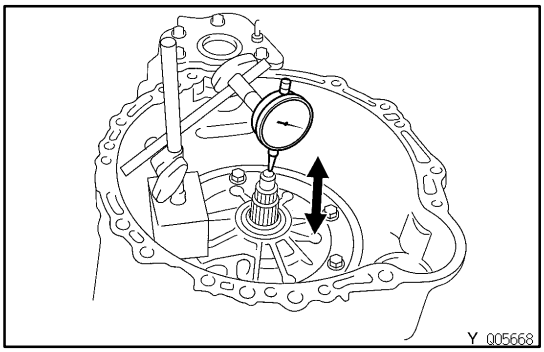
(a) Coat a new O-ring with ATF and install it to the oil pump.

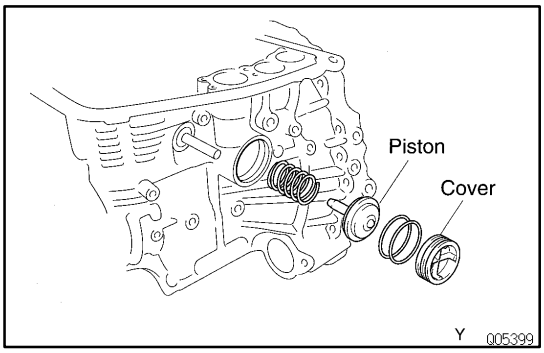


(b) Place the oil pump through the input shaft, and align the bolt holes of the pump body with the transmission case.
NOTICE: Do not push on the oil pump strongly or the oil seal ring will stick to the direct clutch drum.
Torque: 22 N·m (225 kgf·cm, 16 ft·lbf)

26. MEASURE END PLAY OF INPUT SHAFT

Measure the end play with a dial gauge.
End play:
0.25-0.90 mm (0.0098-0.0354 in.)
HINT: There are 2 different thickness bearings for end of stator shaft. If the end play is in excess of standard, select one of them.
Bearing thickness:
3.60 mm (0.1417 in.)
4.19 mm (0.1650 in.)



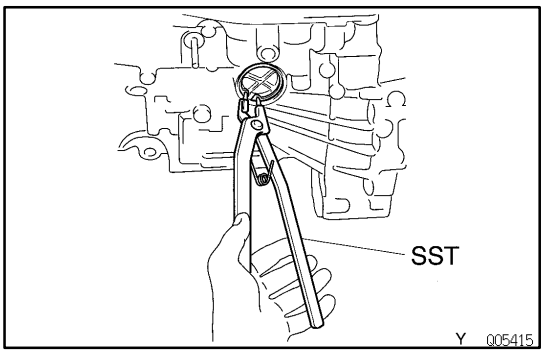


27. CHECK INPUT SHAFT ROTATION

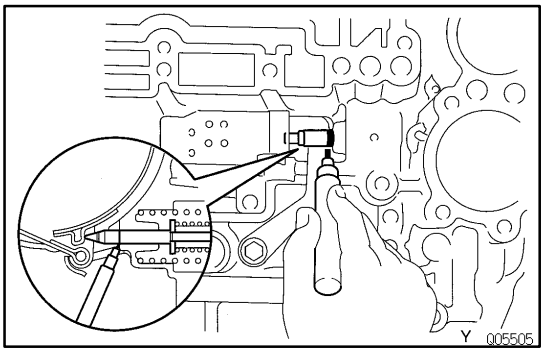
Make sure that the input shaft rotates smoothly.

28. INSTALL SECOND COAST BRAKE PISTON

(a) Coat the new O-rings with ATF and install it to the cover.
(b) Install the outer spring with the piston.
(c) Place the cover into the bore.

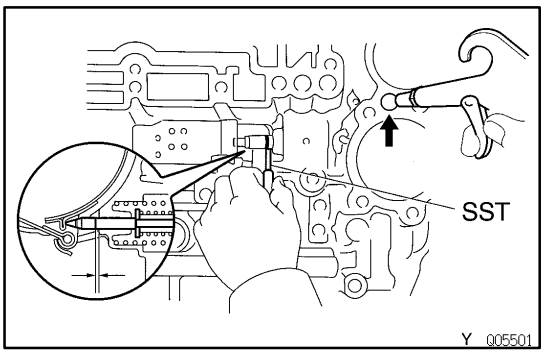


(d) Using SST, install the snap ring while pressing the cover.
SST 09350-32014 (09351-32050)
(e) Check that the front end of the piston rod contacts the center of the second brake band depression.

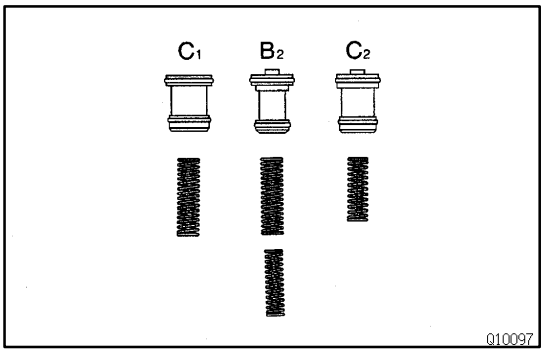


29. CHECK SECOND COAST BRAKE PISTON STROKE

(a) Apply a small amount of paint to the piston rod at the point it meets the case.



(b) Using SST, measure the piston stroke while applying and releasing compressed air (392-785 kPa, 4-8 kgf/cm^2, 57-1 14 psi).
SST 09240-00020
Piston stroke:
2.0-3.5 mm (0.079-0.138 in.)
If the stroke is more than specified, replace the piston rod with a longer one.
Piston rod length:
95.2 mm (3.748 in.)
96.3 mm (3.791 in.)
If the still more than standard value, replace the brake band with a new one.

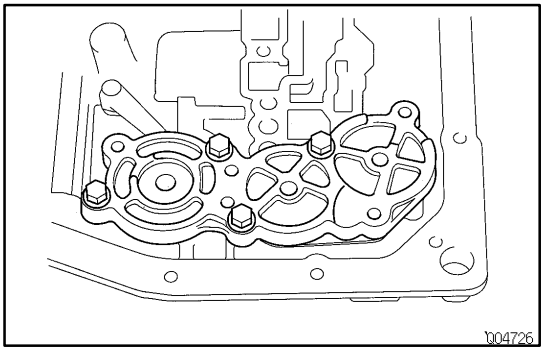


HYDRAULIC CONTROL UNIT INSTALLATION AX0U3-02

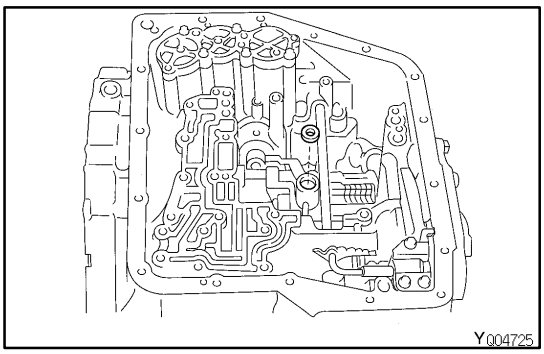
1. INSTALL ACCUMULATOR PISTONS AND SPRINGS

(a) Install the new O-rings to the pistons.
(b) Install the springs and pistons into the bores.
Spring dimensions
mm (in.)

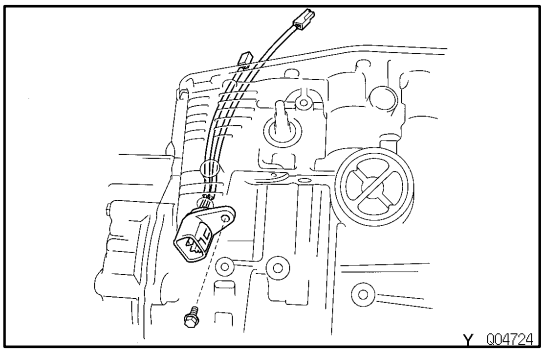
Spring	Color	Free length
C_2	Yellow/Purple	51.8 (2.039)
B_2	None	88.2 (3.473)
B_2	None	70.3 (2.767)
C_1	None	73.6 (2.898)



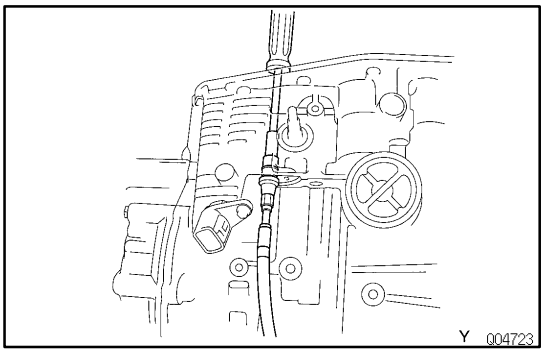
(c) Place the cover with a new gasket and gradually tighten the bolts a little at a time in sequence.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



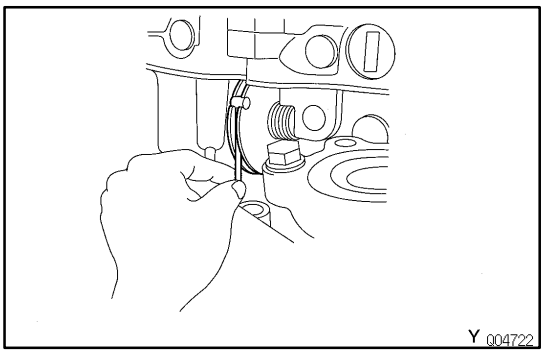
2. PLACE NEW SECOND BRAKE APPLY GASKET



3. INSTALL SOLENOID WIRE



4. INSTALL THROTTLE CABLE

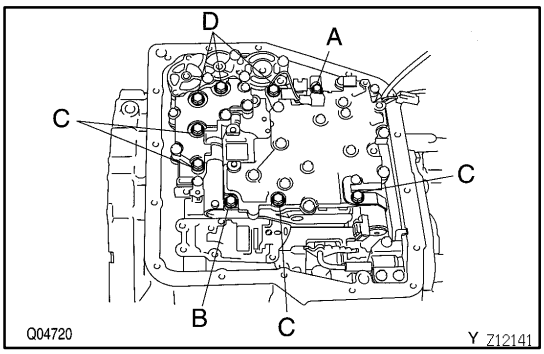


5. INSTALL VALVE BODY TO TRANSAXLE CASE

(a) While holding the cam down with your hand, slip the cable end into the slot.

(b) Lower the valve body into place.

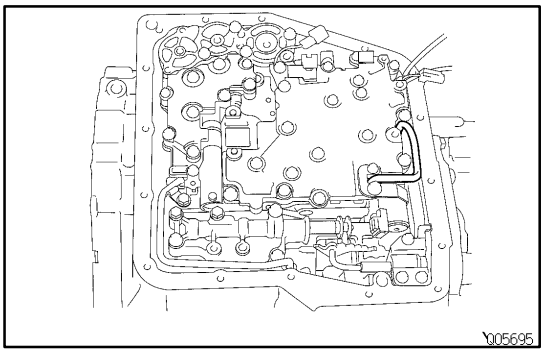
NOTICE: Do not entangle the solenoid wire.



(c) Install and tighten the 9 bolts.
HINT:
★ Each bolt length is indicated below.
★ Hand tighten the 9 bolts first, then torque with a torque wrench.

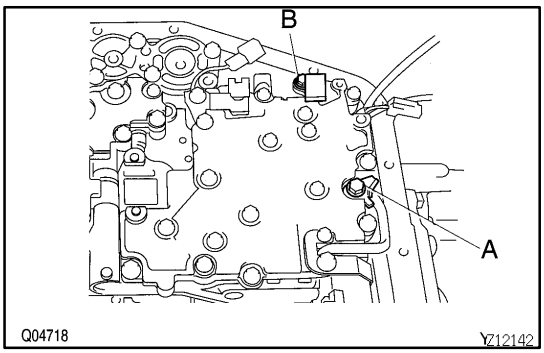
Bolt length:
Bolt A: 30 mm (1.181 in.)
Bolt B: 43 mm (1.693 in.)
Bolt C: 48 mm (1.890 in.)
Bolt D: 52 mm (2.047 in.)

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



6. INSTALL B_3 APPLY PIPE

NOTICE: Be careful not to bend or damage the pipe.

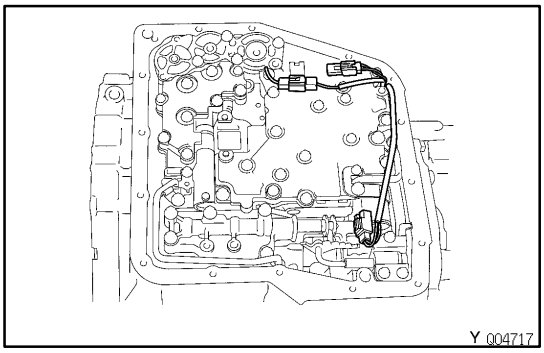


7. INSTALL CONNECTOR CLAMP AND PIPE RETAINER

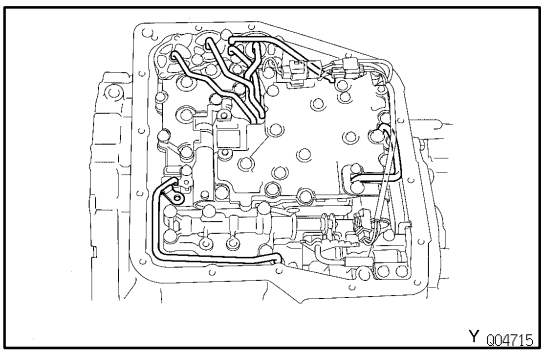
HINT: Each bolt length is indicated below.

Bolt length:
Bolt A: 48 mm (1.890 in.)
Bolt B: 39 mm (1.535 in.)

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



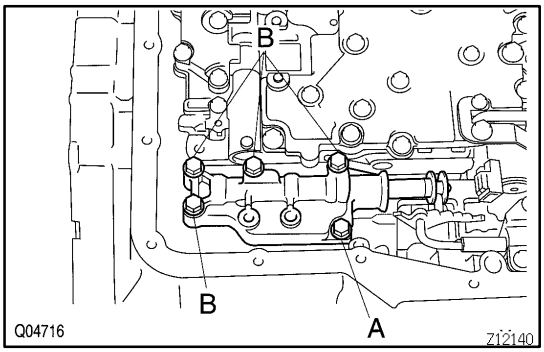
8. CONNECT SOLENOID CONNECTORS

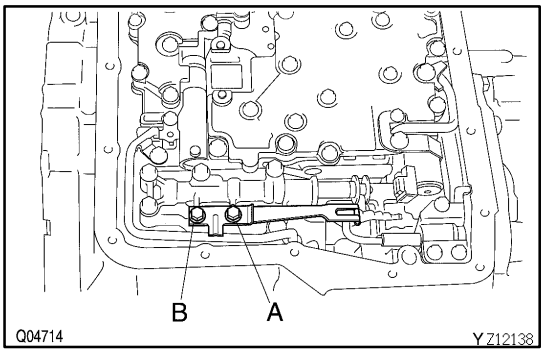


9. INSTALL OIL PIPES

Using a plastic hammer, install the pipes into the positions.

NOTICE: Be careful not to bend or damage the pipes.





10. INSTALL MANUAL VALVE BODY AND DETENT SPRING

HINT: Each bolt length is indicated below.

Bolt length:

Bolt A: 22 mm (0.866 in.)

Bolt B: 37 mm (1.457 in.)

(a) Align the manual valve with the pin on the manual shaft lever.

(b) Lower the manual valve body into place.

(c) Hand tighten the 5 bolts first. Then, tighten them with a torque wrench.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

(d) Place the detent springs on the manual valve body and hand tighten the 2 bolts first.

Then, tighten them with a torque wrench.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

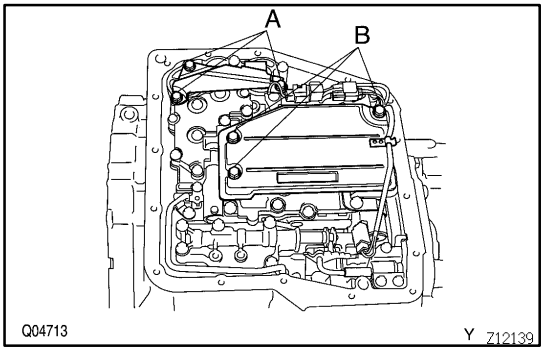
HINT: Each bolt length is indicated below.

Bolt length:

Bolt A: 14 mm (0.551 in.)

Bolt B: 37 mm (1.457 in.)

(e) Check that the manual valve lever is touching the center of the detent spring tip roller.



11. INSTALL PIPE BRACKET AND OIL STRAINER

Each bolt length is indicated below.

Bolt length:

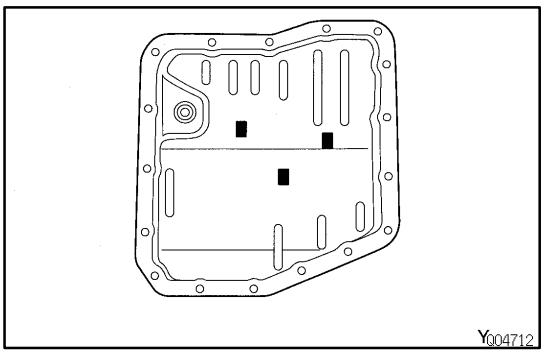
Bolt A: 22 mm (0.866 in.)

Bolt B: 53 mm (2.087 in.)

Torque:

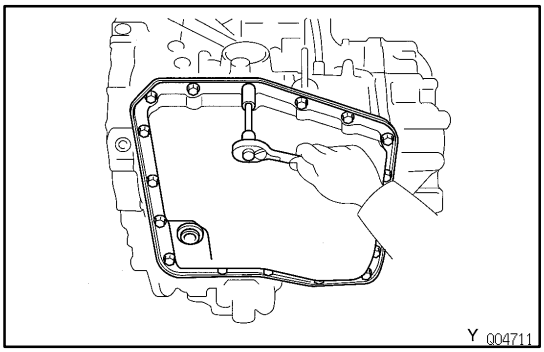
Pipe bracket: 10 N·m (100 kgf·cm, 7 ft·lbf)

Oil strainer: 11 N·m (110 kgf·cm, 8 ft·lbf)



12. INSTALL MAGNETS IN PLACE

NOTICE: Make sure that the magnets do not interfere with the oil pipes.

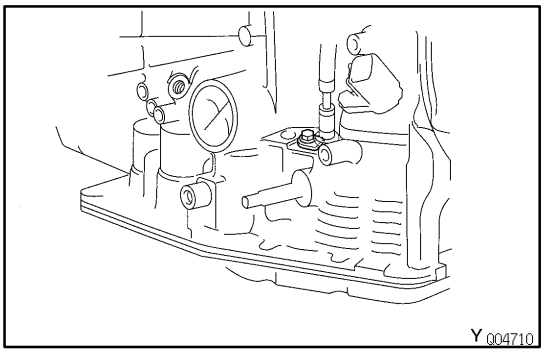


13. INSTALL OIL PAN WITH NEW GASKET

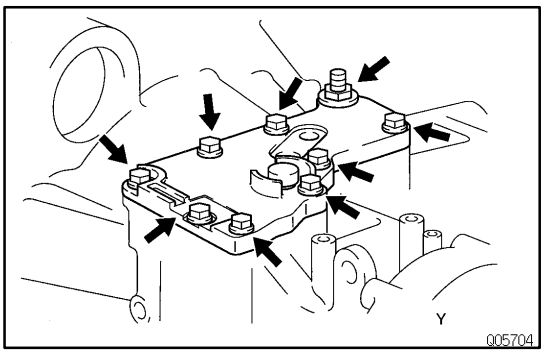
(a) Install a new gasket and oil pan.

(b) Install and torque the 17 bolts.

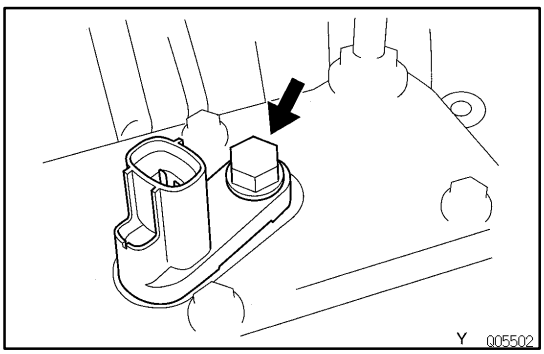
Torque: 4.9 N·m (50 kgf·cm, 43 in.·lbf)



14. INSTALL THROTTLE CABLE RETAINING PLATE



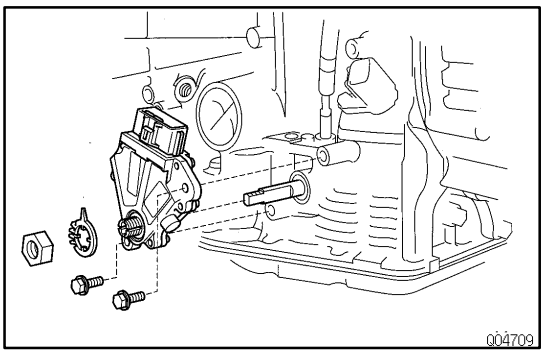
15. INSTALL TRANSAXLE UPPER COVER



16. INSTALL T/M REVOLUTION SENSOR

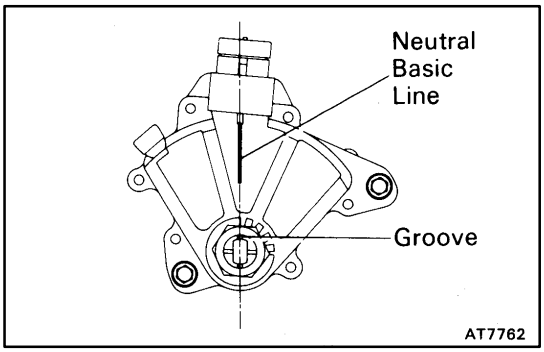
(a) Install a new O-ring to the T/M revolution sensor.

(b) Install the T/M revolution sensor with the bolt.

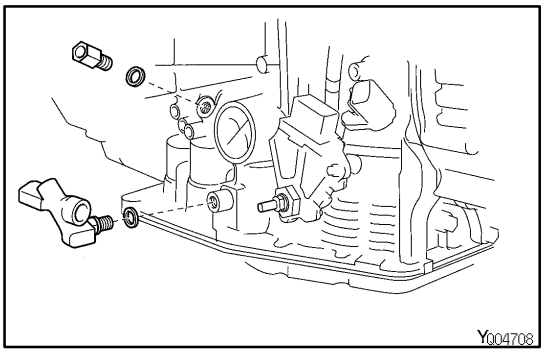


17. INSTALL PARK/NEUTRAL POSITION SWITCH

(a) Install the park/neutral position switch to the manual valve shaft.
(b) Place the new locking plate and tighten the nut.
(c) Stake the nut with locking plate.
(d) Install the 2 bolts.

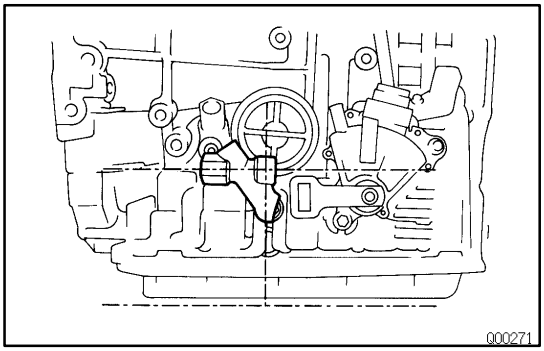


(e) Adjust the park/neutral position switch.
HINT: Align the groove and neutral basic line.
(f) Tighten the 2 bolts.

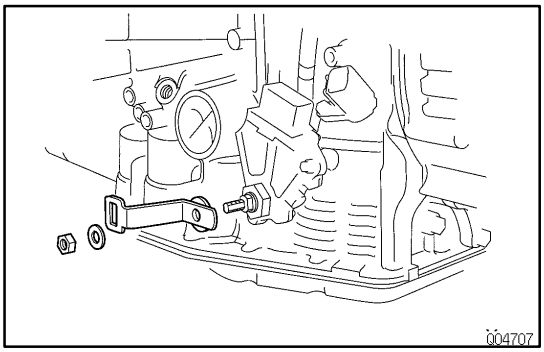


18. INSTALL UNION AND ELBOW

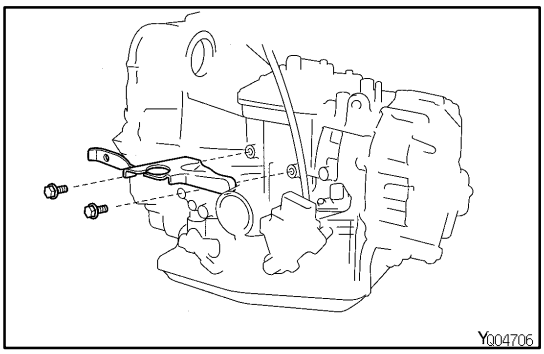
(a) Install the new O-rings to the union and elbow.
(b) Install the union elbow to the transaxle case.
Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)



HINT: Install the elbow, as shown in the illustration.



19. INSTALL MANUAL SHAFT LEVER



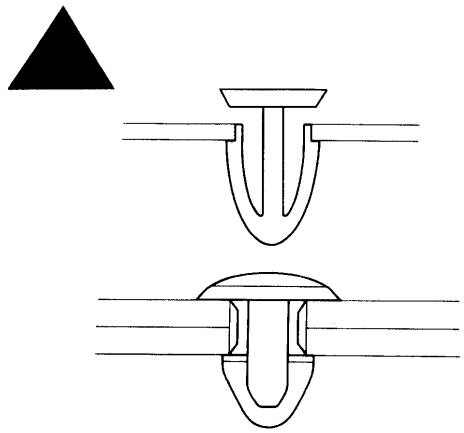
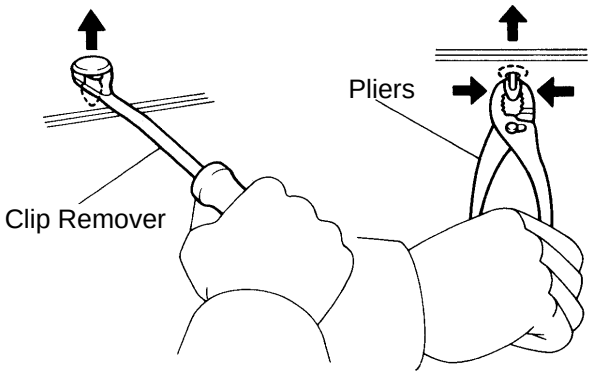
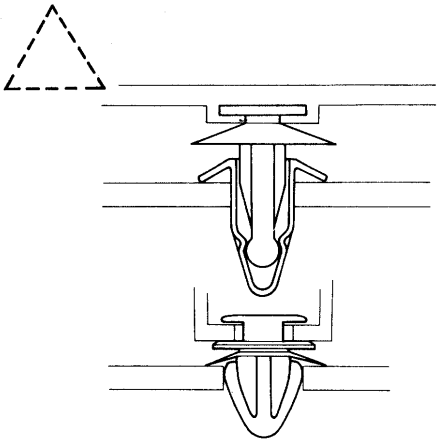
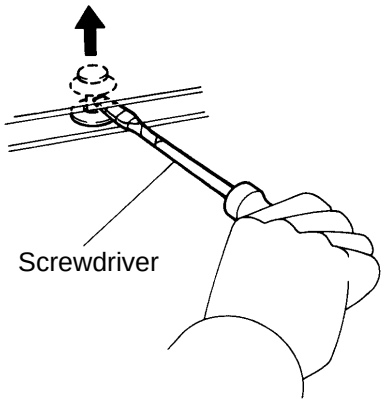
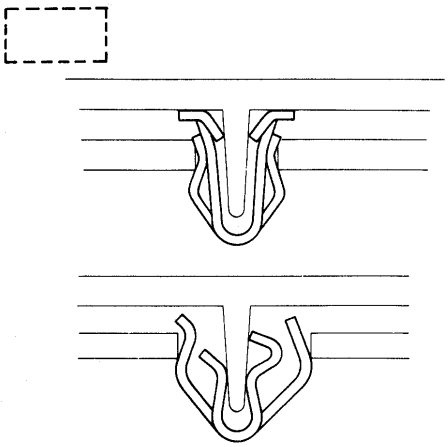
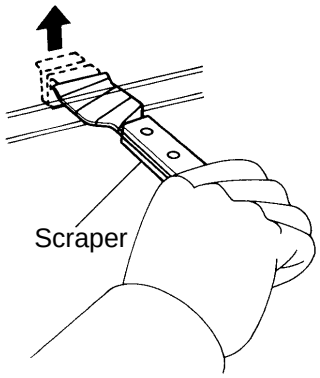
20. INSTALL SHIFT CONTROL CABLE BRACKET

CLIP

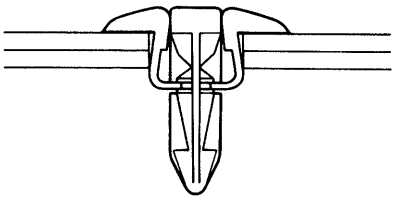
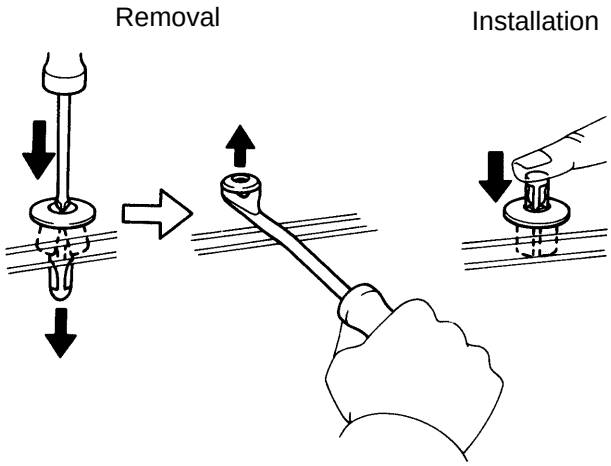
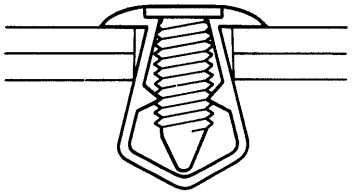
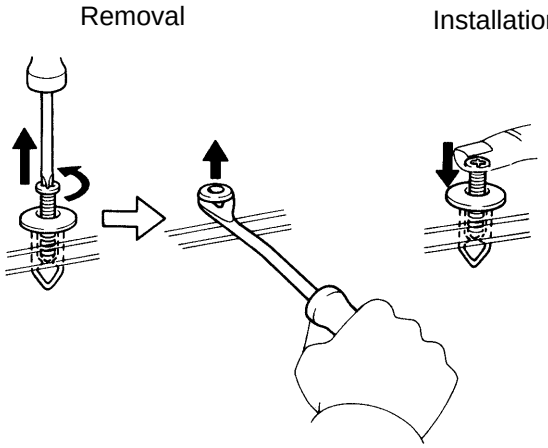
BO094–02

REPLACEMENT

The removal and installation methods of typical clips used in body parts are shown in the table below.
HINT:
If the clip is damaged during the operation, always replace it with a new clip.

Shape (Example)	Removal/Installation
	
	
	

V00005

Shape (Example)	Removal/Installation
	
	

V00012

SRS AIRBAG

BO094–02

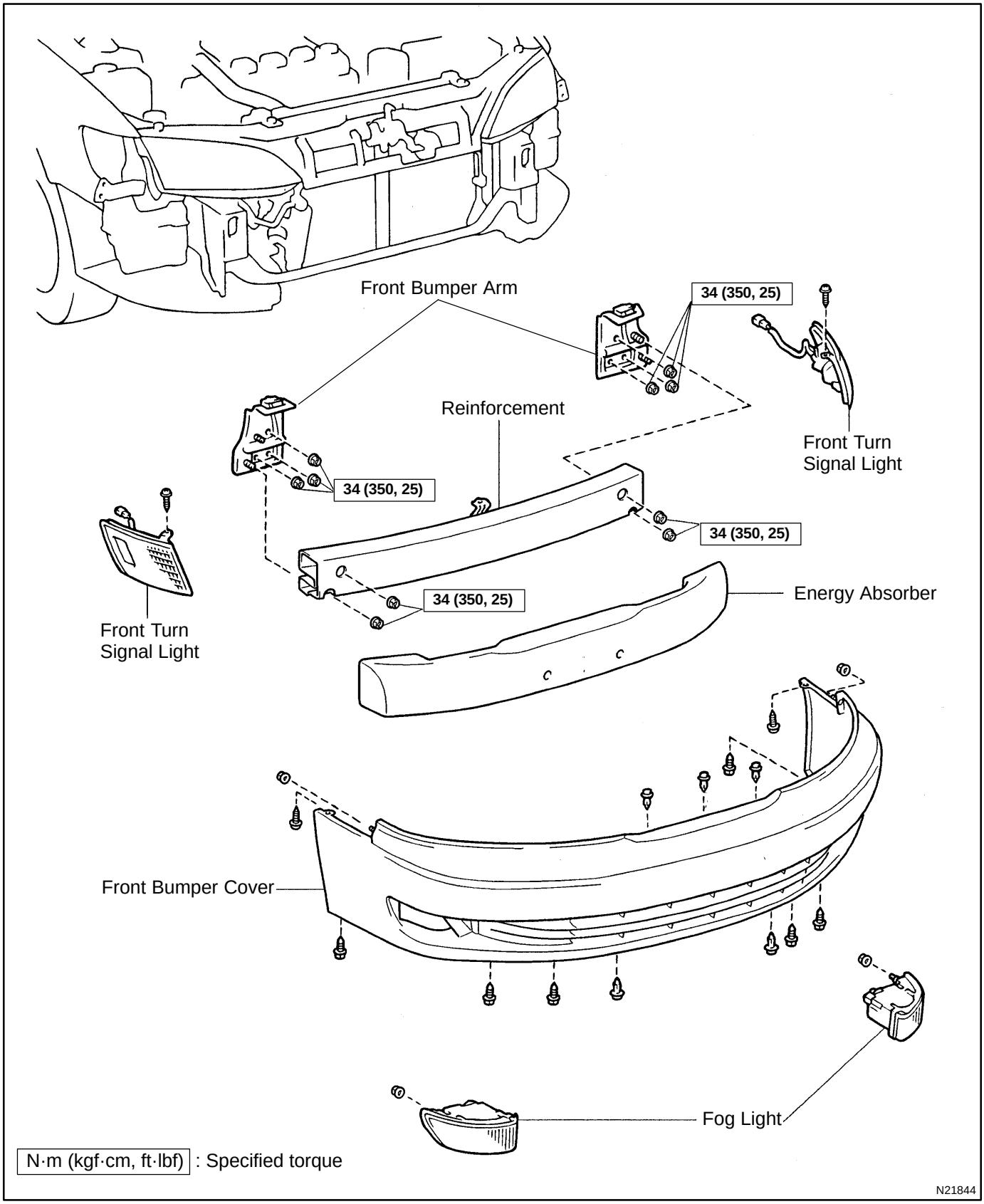
PRECAUTION

The LEXUS ES300 is equipped with an SRS (Supplemental Restraint System) such as the driver airbag ¿and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

FRONT BUMPER

BO095–05

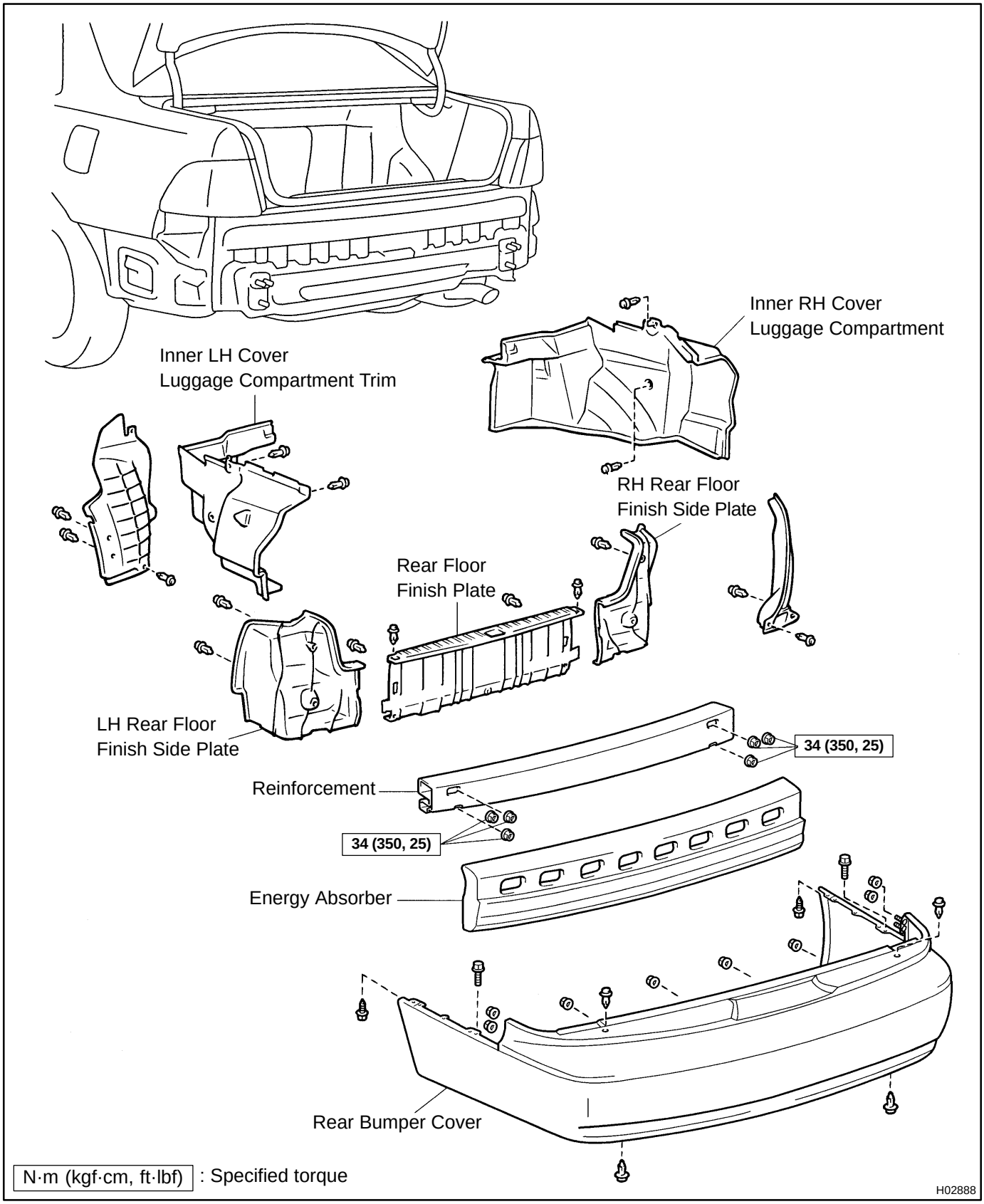
COMPONENTS



REAR BUMPER

BO096–01

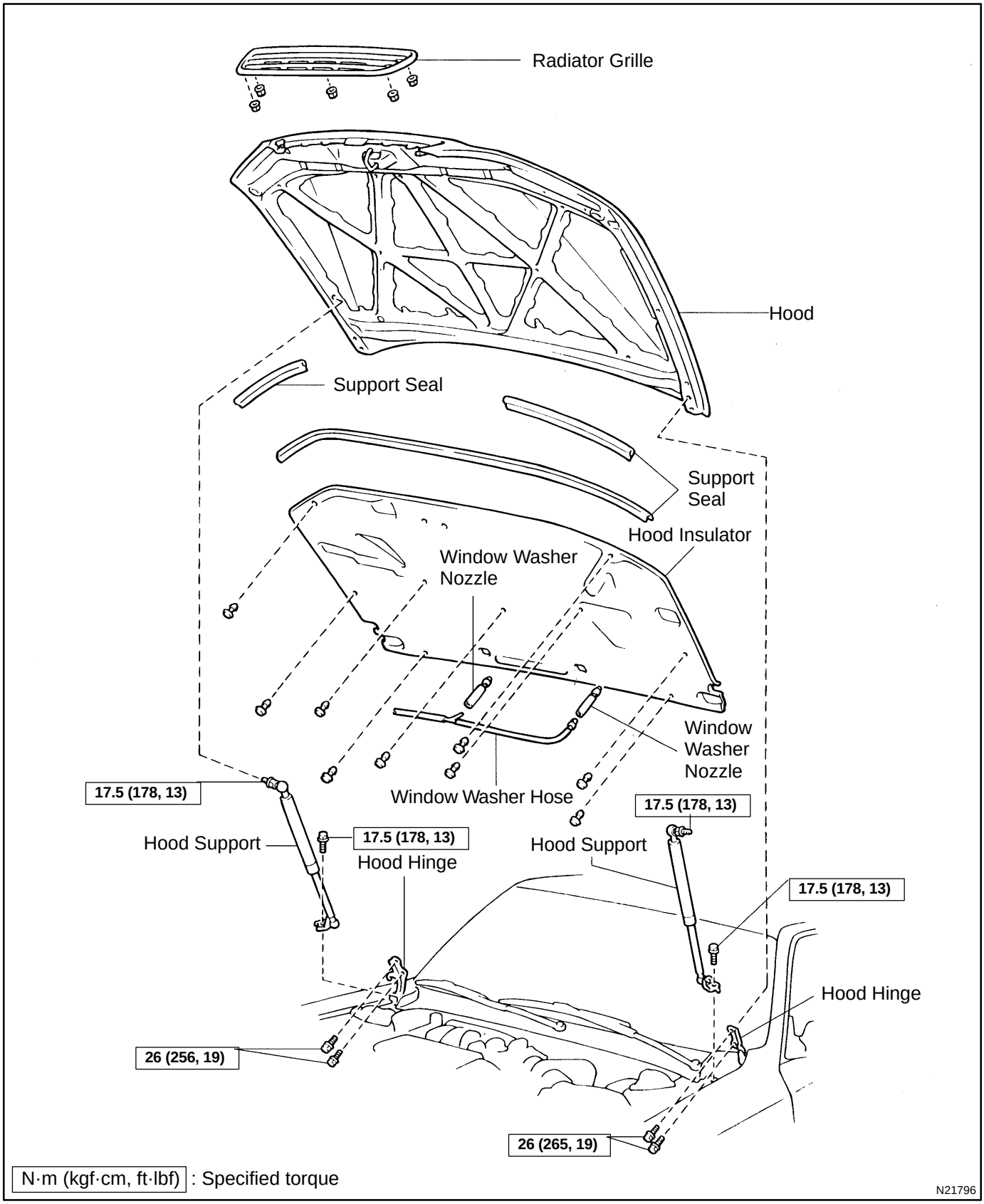
COMPONENTS



HOOD

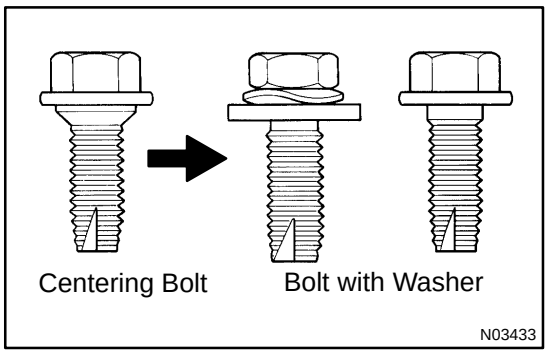
COMPONENTS

BO097–03



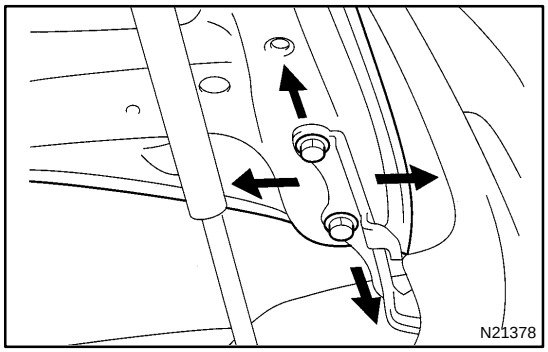
BO098–01

ADJUSTMENT



HINT:

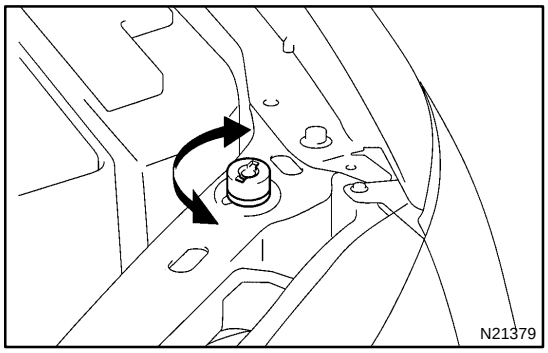
Since the centering bolt is used as the hood hinge and hood lock set bolt, the hood and hood lock cannot be adjusted with it on. Substitute the bolt with the washer for the centering bolt.



1. ADJUST HOOD IN FORWARD/REARWARD AND LEFT/RIGHT DIRECTIONS

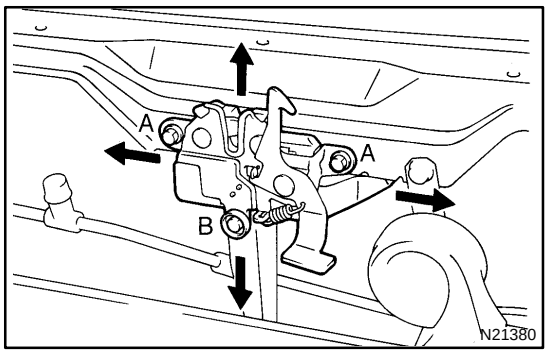
Adjust the hood by loosening the hood side hinge bolts.

Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)



2. ADJUST FRONT EDGE OF HOOD IN VERTICAL DIRECTION

Adjust the hood by turning the cushions.



3. ADJUST HOOD LOCK

Adjust the hood lock by loosening bolts.

Torque:

A bolt: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

B bolt: 11 N·m (112 kgf·cm, 8 ft·lbf)

HOOD SUPPORT

BO099–01

REPLACEMENT

1. REMOVE SUPPORT FROM HOOD

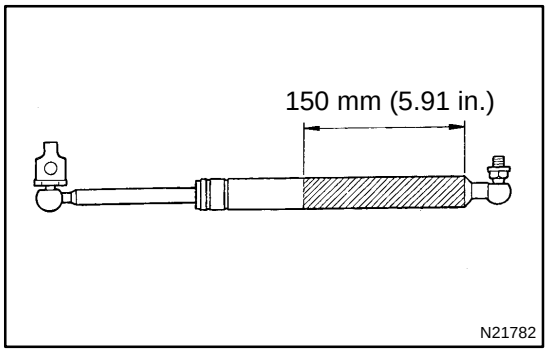
Remove the bolt and support from the hood.

HINT:

While supporting the hood with by hand, remove the hood.

2. REMOVE SUPPORT FROM BODY

Remove the bolt and support.



3. IF NECESSARY, REPLACE HOOD SUPPORT

NOTICE:

Handling the hood support

- **Do not disassemble the support because the cylinder is filled with pressurized gas.**
- **If the support is to be replaced, drill a 2.0 – 3.0 mm (0.079 – 0.118 in.) hole in the area shown in the illustration to completely release the high–pressure gas before disposing of it.**
- **When drilling, chips may fly out so work carefully.**
- **The gas is colorless, odorless and non–toxic.**
- **When working, handle the support carefully. Never score or scratch the exposed part of the piston rod, and allow any paint or oil to get on it.**
- **Do not turn the piston rod and cylinder with the support fully extended.**

4. INSTALL HOOD SUPPORT

Install the hood support.

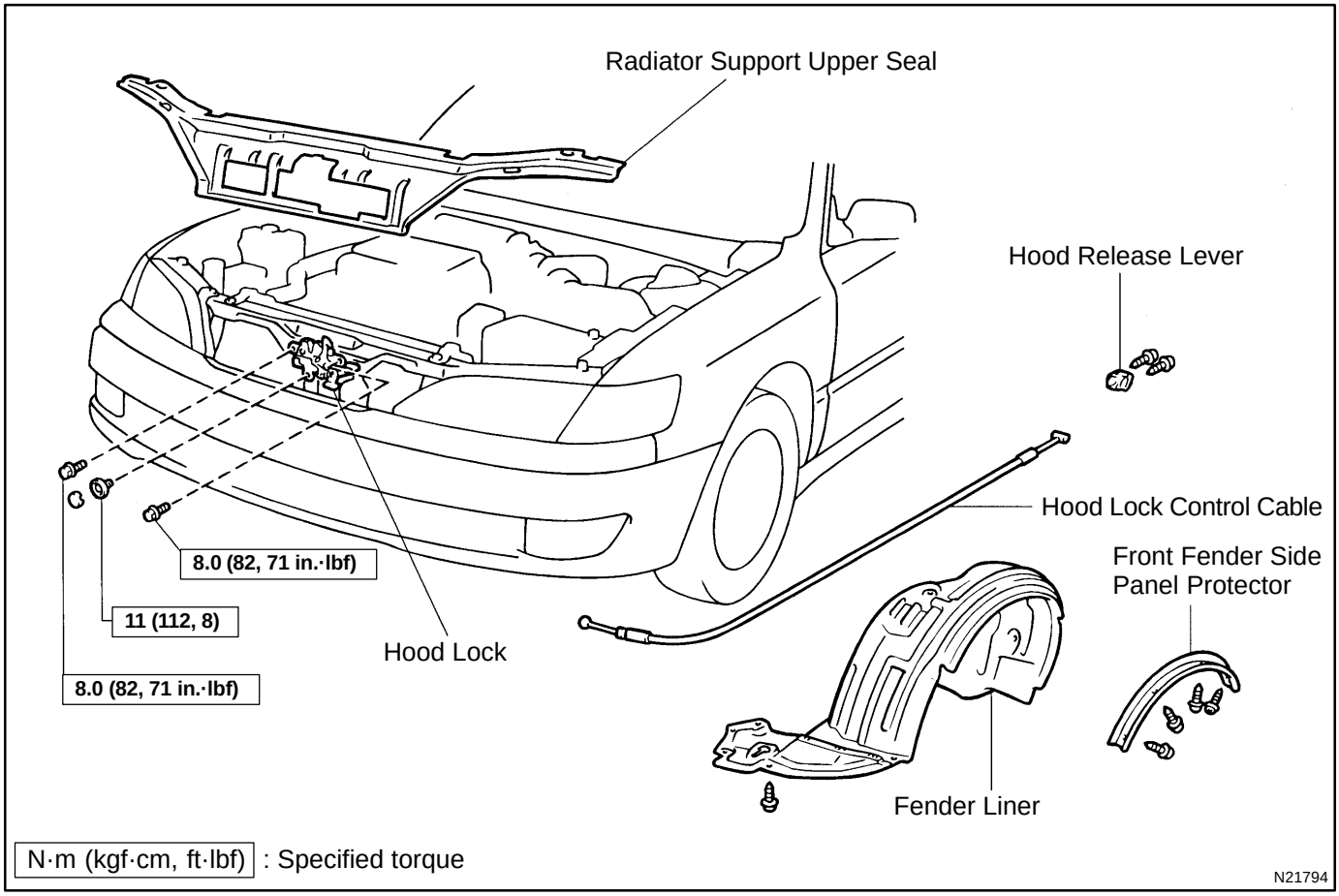
Torque: 17.5 N·m (178 kgf·cm, 13 ft·lbf)

HOOD LOCK CONTROL

HOOD LOCK CONTROL

COMPONENTS

BO09A–03

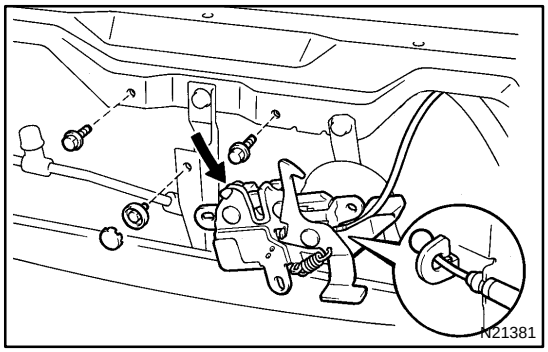


BO09B–01

REMOVAL

1. REMOVE THESE PARTS:

(a) LH front fender side panel protector
(b) LH fender liner
(c) Hood release lever
(d) Radiator support upper seal



2. REMOVE HOOD LOCK

(a) Using a screwdriver, pry out the cap.

HINT:

Tape the screwdriver tip before use.

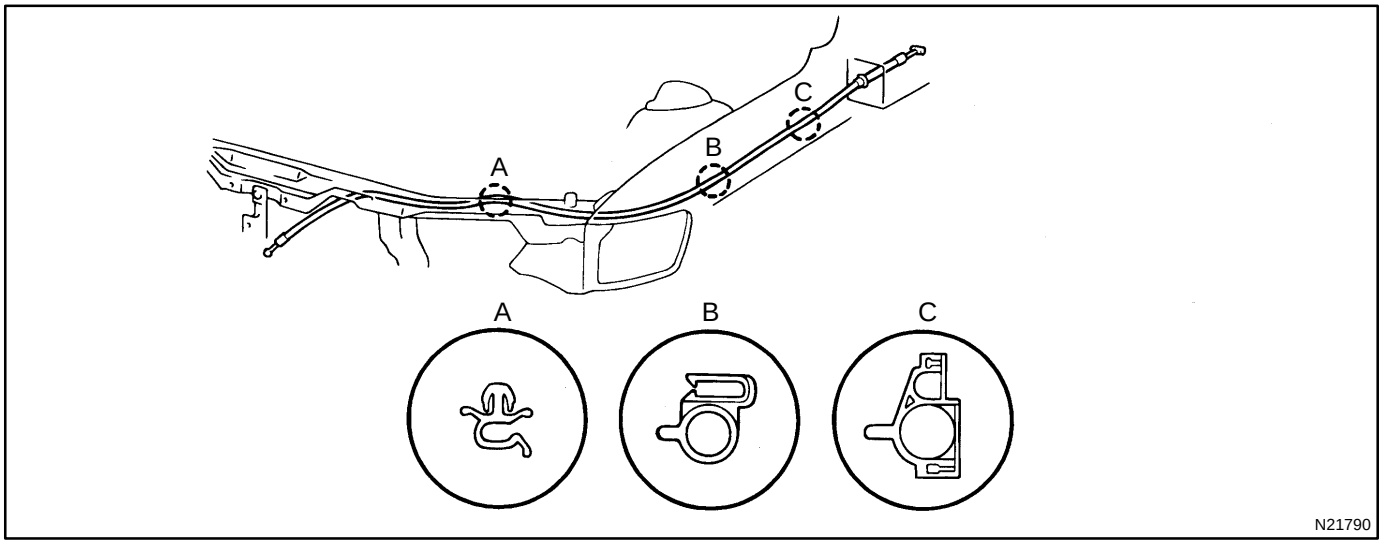
(b) Remove the 3 bolts and hood lock.
(c) Disconnect the link from the lock.

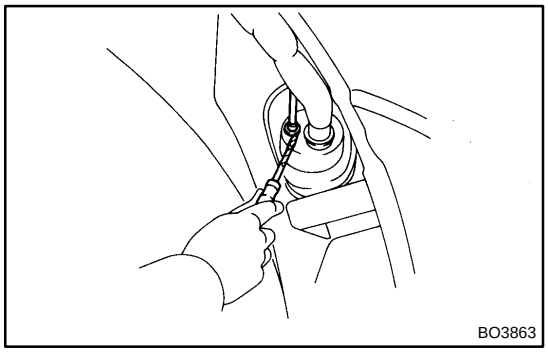
3. REMOVE HOOD LOCK CONTROL CABLE

(a) Using a screwdriver, disconnect the cable from the clamps.

HINT:

Tape the screwdriver tip before use.

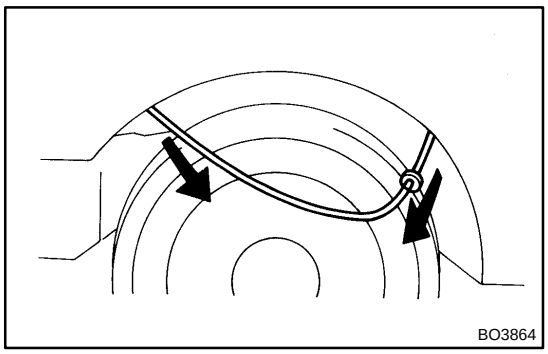




(b) Using a screwdriver, pry out the cable stopper from the grommet.

HINT:

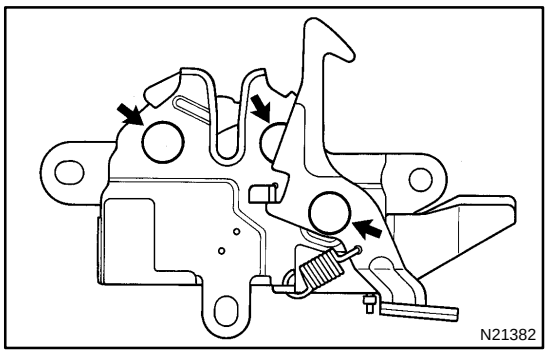
- Tape the screwdriver tip before use.
- Do not damage the grommet with the screwdriver.



(c) Pull off the cable from the front wheel housing to remove it.

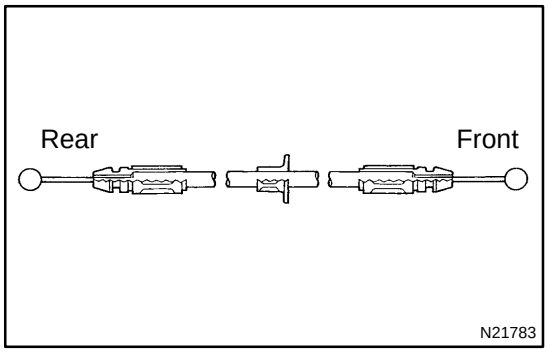
BO09C–03

INSTALLATION



1. BEFORE INSTALLING PARTS, COAT LOCK WITH MP GREASE

Apply MP grease to the sliding surface of the lock.



2. INSTALL HOOD LOCK CONTROL CABLE

(a) Push the rear side cable through the grommet.

(b) Using a screwdriver, push the cable stopper into the grommet.

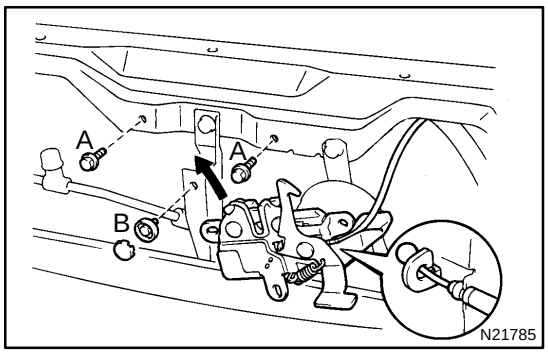
HINT:

- Tape the screwdriver tip before use.
- Do not damage the grommet with the screwdriver.

(c) Pass the front side cable through the upper radiator support.

(d) Install the cable with clamps.

3. INSTALL HOOD RELEASE LEVER



4. CHECK HOOD LOCK CONTROL FOR PROPER OPERATION

After checking for proper operation, tighten the 3 bolts to install the lock.

Torque:
A bolt: 8.0 N·m (82 kgf·cm, 71 in.·lbf)
B bolt: 11 N·m (112 kgf·cm, 8 ft·lbf)

5. INSTALL THESE PARTS:

(a) Radiator support upper seal

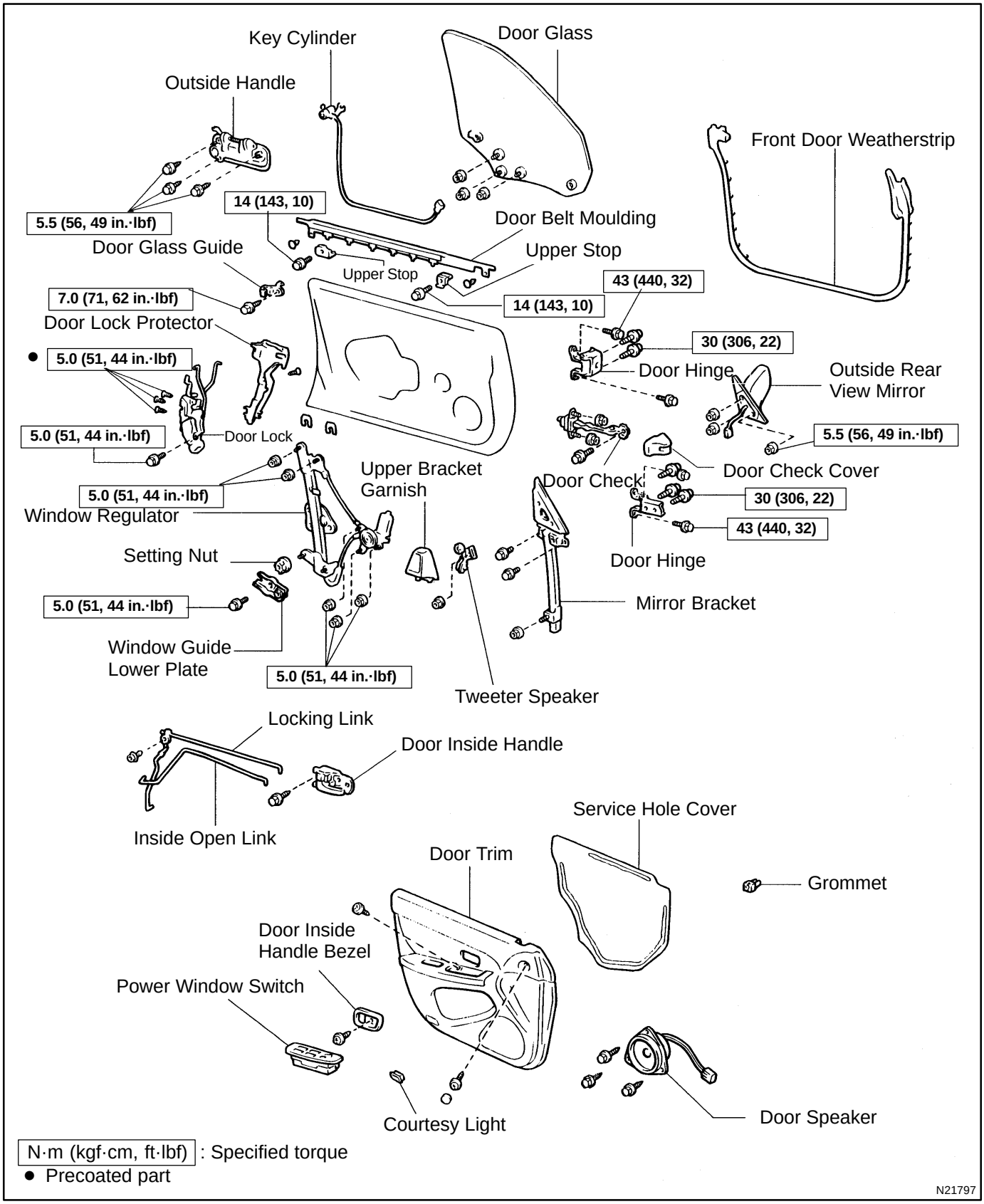
(b) LH fender liner

(c) LH front fender side panel protector

FRONT DOOR

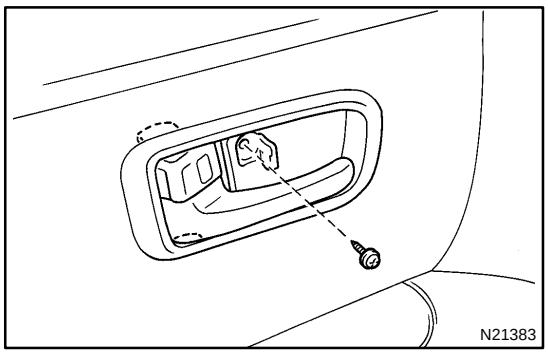
COMPONENTS

BO09D–03



BO09E–01

DISASSEMBLY



1. REMOVE DOOR INSIDE HANDLE BEZEL

(a) Open the cap, then remove the screw.

(b) Using a screwdriver, remove the inside handle bezel.

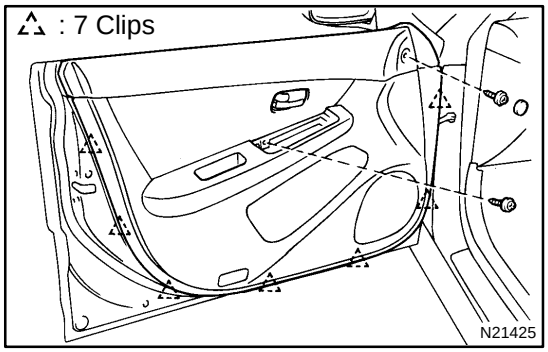
HINT:

Tape the screwdriver tip before use.

2. REMOVE THESE PARTS:

(a) Upper bracket garnish

(b) Power window switch



3. REMOVE DOOR TRIM

(a) Using a screwdriver, remove the screw cap.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 screws.

(c) Insert a screwdriver between the door panel and door trim to pry the trim out.

HINT:

Tape the screwdriver tip before use.

(d) Pull the trim upward to remove it, then disconnect the courtesy light connector.

(e) Remove the courtesy light from the door trim.

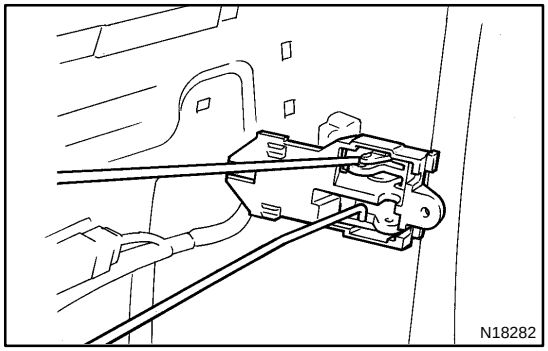
4. REMOVE THESE PARTS:

(a) Tweeter speaker

(b) Outside rear view mirror

Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(c) Front door weatherstrip



5. REMOVE DOOR INSIDE HANDLE

(a) Remove the screw.

(b) Disconnect the 2 control links from the inside handle as shown in the illustration.

6. REMOVE SERVICE HOLE COVER

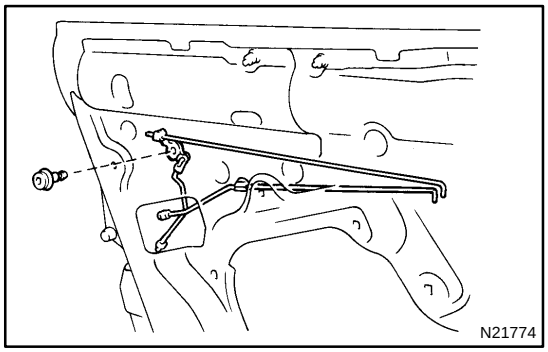
Remove the grommet, then remove the service hole cover.

HINT:

At the time of assembly, please refer to the following item.

Bring out the links through the service hole cover.

7. REMOVE SPEAKER

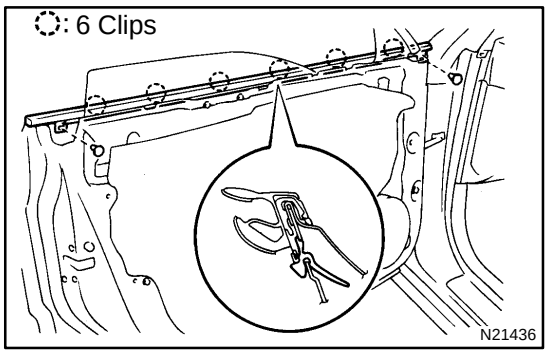


8. DISCONNECT INSIDE OPEN LINK AND LOCKING LINK

(a) Using a clip remover, remove the clip.

(b) Disconnect the 2 links from the door lock, then remove the 2 links.

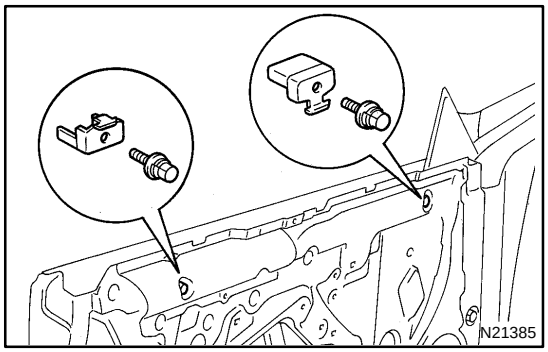
9. REMOVE FRONT DOOR WEATHERSTRIP



10. REMOVE DOOR BELT MOULDING

(a) Remove the 2 clips from the front and rear edge of the moulding shown in the illustration.

(b) Pry out the clips from the edge of moulding and remove the moulding.



11. REMOVE UPPER STOP

Remove the 2 bolts and 2 upper stops as shown in the illustration.

Torque: 14 N·m (143 kgf·cm, 10 ft·lbf)

12. REMOVE DOOR GLASS

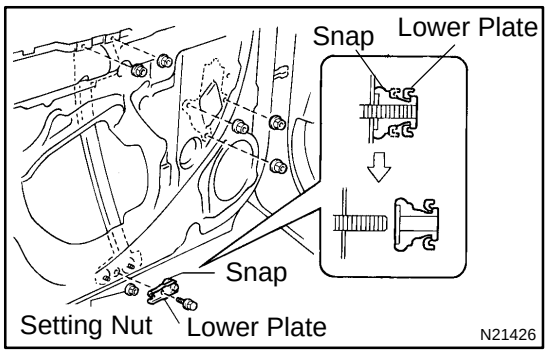
(a) Remove the 3 nuts.

(b) Pull the door glass out of the panel carefully.

HINT:

At the time of assembly, please refer to the following item.

Insert a shop rag inside the panel to prevent scratching the glass.



13. REMOVE WINDOW REGULATOR

(a) Disconnect the connector.

(b) Remove the bolt of lower plate.

Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

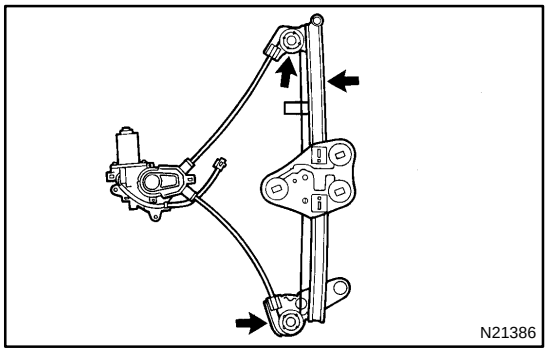
(c) Unlock the snap by pulling the lower plate.

(d) Remove the snap and lower plate from the stud bolt of lower bracket.

(e) Remove the setting nut from the lower bracket.

(f) Remove the 5 nuts and window regulator.

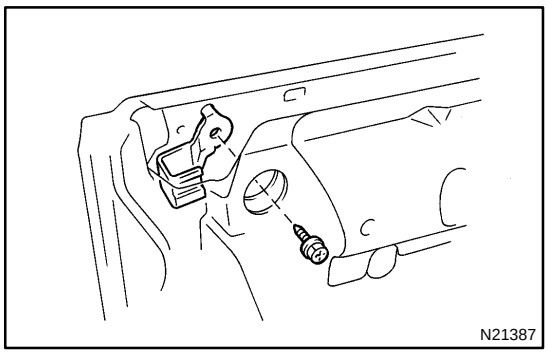
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)



HINT:

At the time of assembly, please refer to the following item.

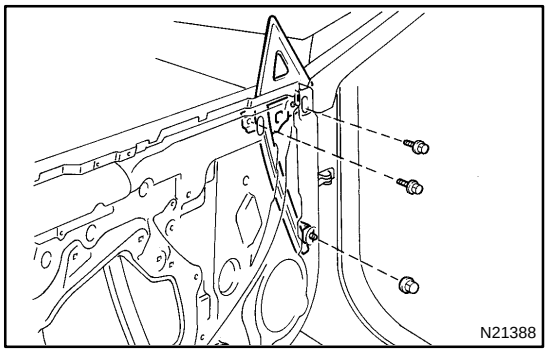
Apply MP grease to the glass guide and rollers of window regulator.



14. REMOVE DOOR GLASS GUIDE

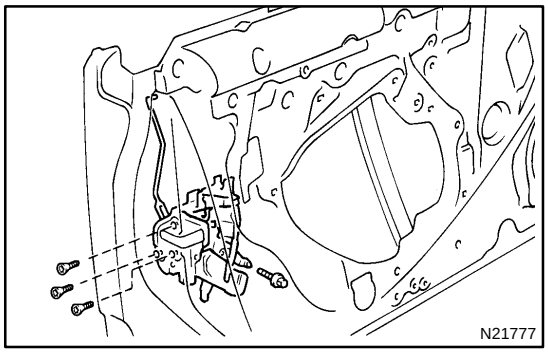
Remove the bolt and guide.

Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)



15. REMOVE MIRROR BRACKET

Remove the 2 bolts, nut and bracket.



16. REMOVE DOOR LOCK

(a) Disconnect the 2 links from the outside handle and key cylinder.

(b) Disconnect the connector.

(c) Remove the bolt.

Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

(d) Remove the 3 screws and door lock.

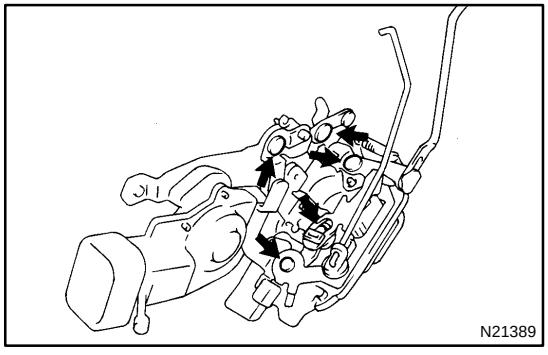
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

HINT:

At the time of assembly, please refer to the following item.

Apply adhesive to the 3 screws.

Part No.08833–00070, THREE BOND 1324 or equivalent.



HINT:

At the time of assembly, please refer to the following item.

Apply MP grease to the sliding and rotating parts of the door lock.

17. REMOVE OUTSIDE HANDLE

(a) Disconnect the connector.

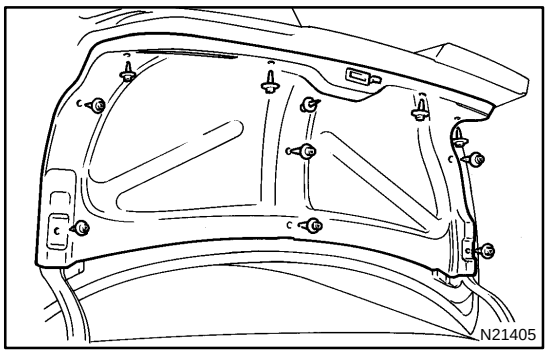
(b) Remove the 2 bolts and handle.

Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

(c) Remove the key cylinder from the handle.

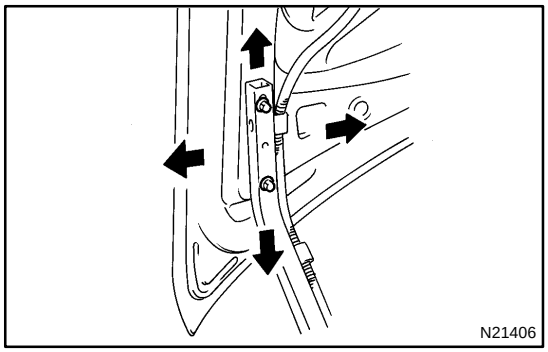
BO09U–01

ADJUSTMENT



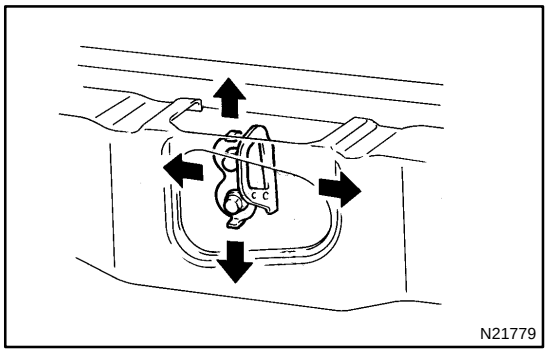
1. ADJUST LUGGAGE COMPARTMENT DOOR

(a) Remove the 11 clips and luggage compartment door trim.



(b) For forward/rearward and horizontal adjustment loosen the bolts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

(c) For vertical adjustment of the front end of the door, increase or decrease the number of washers between the hinge and the door.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



2. ADJUST DOOR LOCK STRIKER

(a) Remove the LH and RH rear floor finish side plates.

(b) Remove the rear floor finish plate.

(c) Loosen the 2 lock striker set bolts.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(d) Using a hammer and a brass bar, tap the striker to adjust it.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–36).

BO09W–01

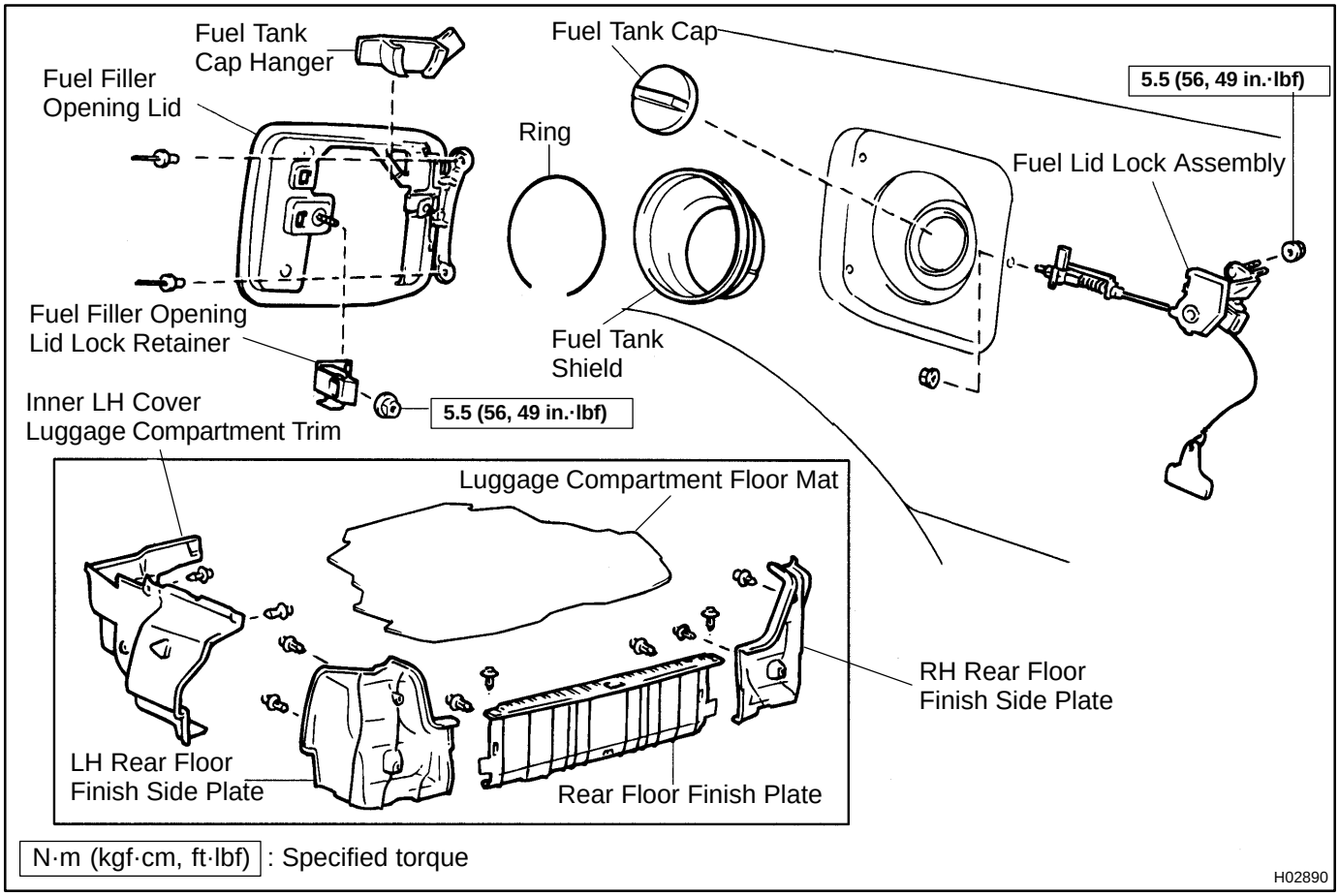
INSTALLATION

Installation is in the reverse order of removal (See page BO–34).

FUEL LID

COMPONENTS

BO09X–03

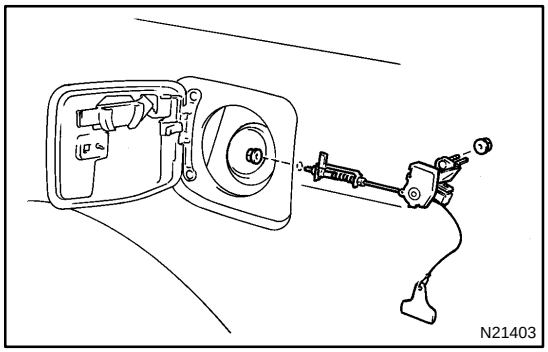


BO09Y–03

REMOVAL

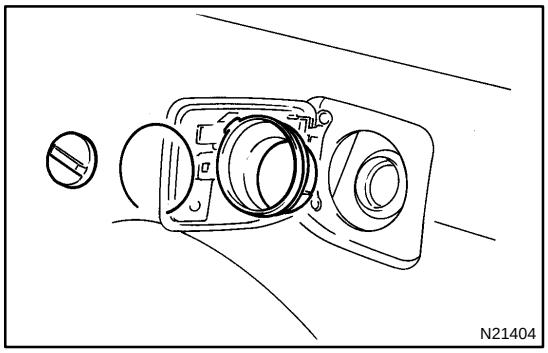
1. REMOVE THESE PART:

(a) Luggage compartment floor mat
(b) Rear floor finish plate
(c) LH rear floor finish side plate
(d) Inner LH cover luggage compartment trim



2. REMOVE FUEL LID LOCK ASSEMBLY

(a) Remove the nut from the fuel lid side.
(b) Remove the nut and lock assembly, then disconnect the connector.



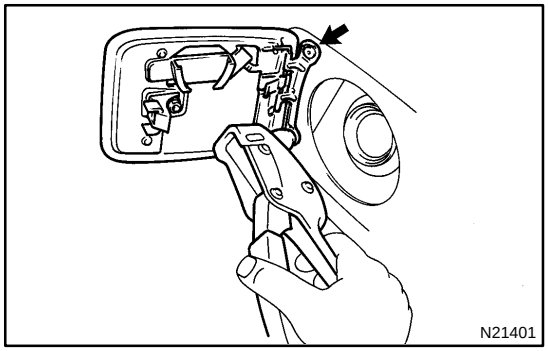
3. REMOVE FUEL INLET PIPE SHIELD

(a) Remove the ring.
(b) Remove the fuel tank cap and shield.

CAUTION:

- **Always keep the tank cap closed when it is not required to be open.**
- **Keep all fire away during the operation.**

(c) Install the cap quickly.



4. REMOVE FUEL FILLER OPENING LID

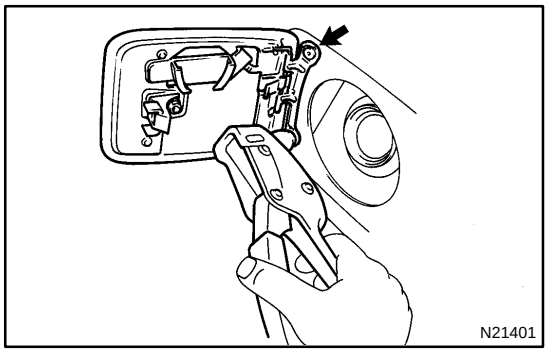
(a) Using a drill, drill out the rivet heads.
(b) Remove the fuel filler opening lid.
(c) Remove the fuel tank cap hanger and lock retainer from the opening lid.

BO09Z–01

INSTALLATION

1. INSTALL THESE PARTS:

(a) Fuel inlet pipe shield
(b) Fuel tank cap
(c) Ring
(d) Fuel lid lock assembly
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)



2. INSTALL FUEL FILLER OPENING LID

(a) Install the fuel tank cap hanger to the opening lid.
(b) Install the nut and fuel filler opening lid lock retainer to the opening lid.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)
(c) Using a riveter, install the 2 rivets to the fuel filler opening lid.

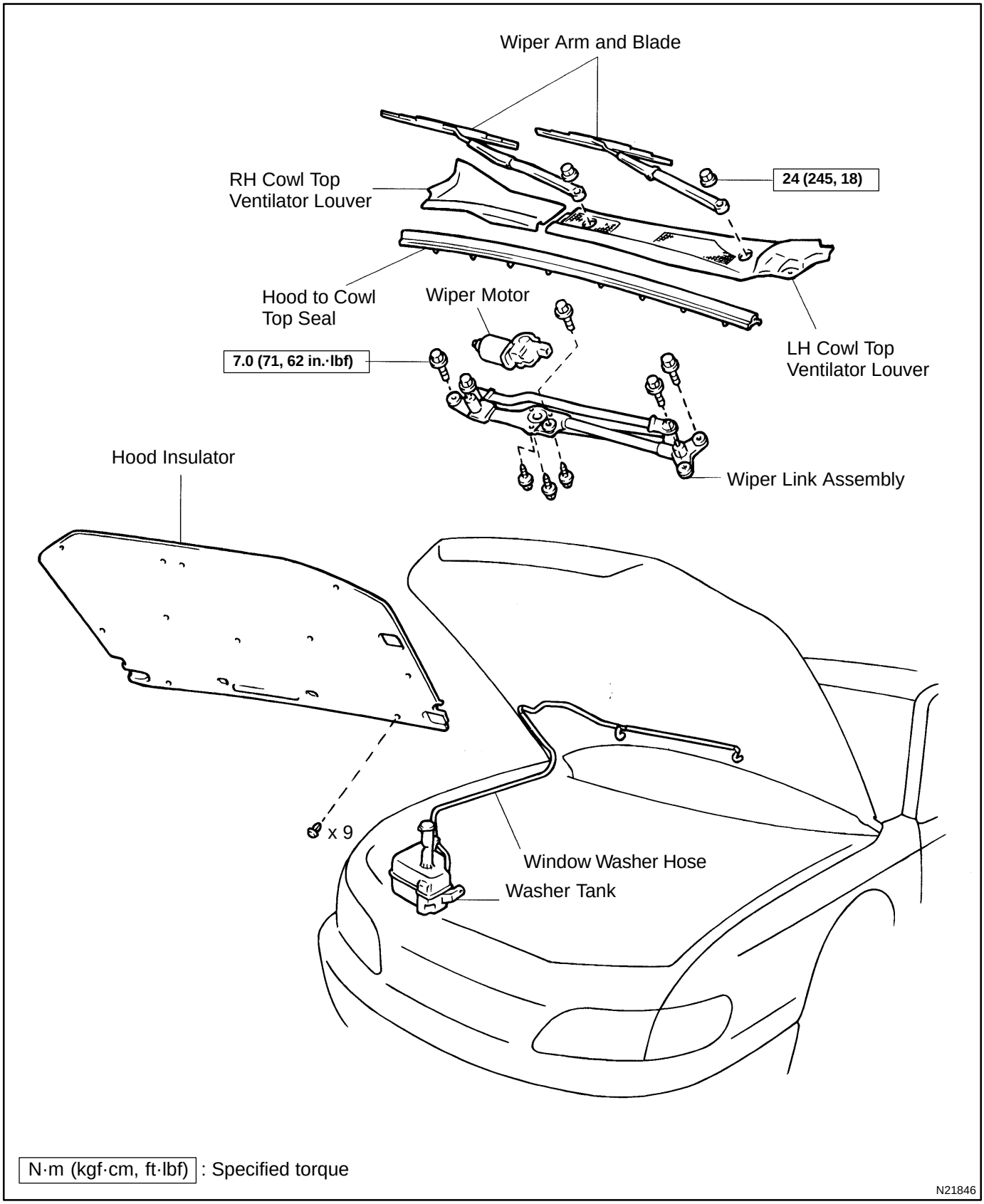
3. INSTALL THESE PARTS:

(a) Inner LH cover luggage compartment trim
(b) Rear floor finish side plates
(c) Rear floor finish plate
(d) Luggage compartment floor mat

FRONT WIPER AND WASHER

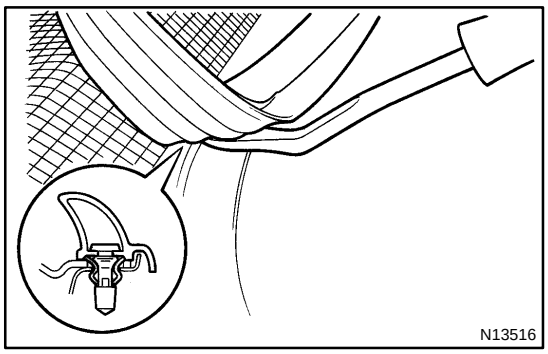
BO0A0–03

COMPONENTS



BO0A1–01

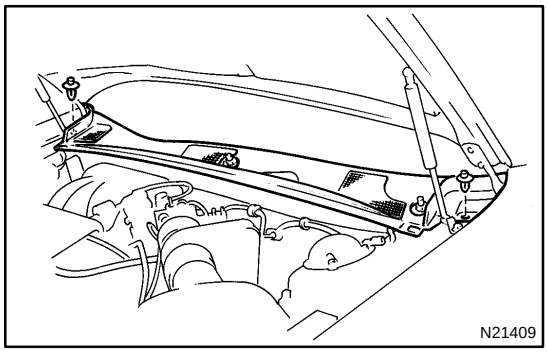
REMOVAL



1. REMOVE WIPER ARM AND BLADE ASSEMBLY

2. REMOVE COWL TOP VENTILATOR LOUVER

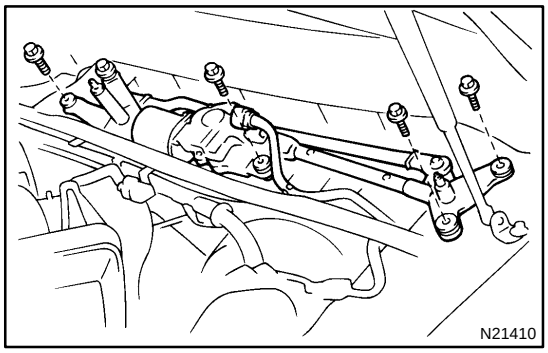
(a) Remove the hood to cowl top seal.



(b) Remove the 2 clips and cowl top ventilator louver.

HINT:

Raise the front side of the cowl top ventilator louver up and remove the cowl top ventilator louver.



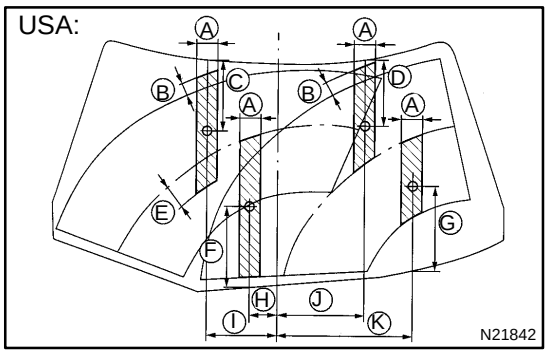
3. REMOVE WIPER MOTOR AND LINK ASSEMBLY

(a) Remove the 4 bolts.

(b) Disconnect the connector, then unfasten the bolt.

(c) Raise the front side of the wiper motor and link assembly up and remove the wiper motor and link assembly.

BO0A2–03



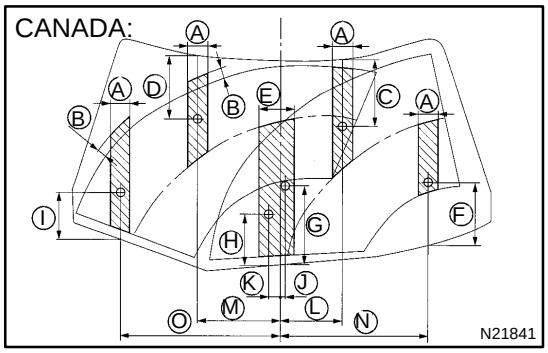
INSPECTION

INSPECT WASHER NOZZLE

(a) While operating the washer, check that the points where the washer fluid hits the windshield and the upsurge area are within the range indicated by the hatched line.

USA:

A: Approx. 150 mm (5.91 in.)
B: Approx. 50 mm (1.99 in.)
C: Approx. 251 mm (9.88 in.)
D: Approx. 243 mm (9.57 in.)
E: Approx. 100 mm (3.94 in.)
F: Approx. 297 mm (11.69 in.)
G: Approx. 306 mm (12.05 in.)
H: Approx. 90 mm (3.54 in.)
I: Approx. 230 mm (9.06 in.)
J: Approx. 280 mm (11.02 in.)
K: Approx. 440 mm (17.32 in.)

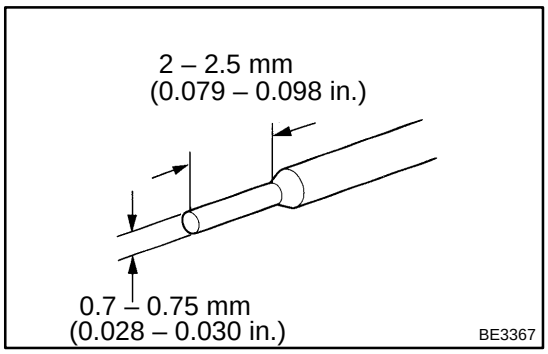


CANADA:

A: Approx. 150 mm (5.91 in.)
B: Approx. 50 mm (1.99 in.)
C: Approx. 262 mm (10.31 in.)
D: Approx. 260 mm (10.24 in.)
E: Approx. 210 mm (8.27 in.)
F: Approx. 239 mm (9.41 in.)
G: Approx. 310 mm (12.20 in.)
H: Approx. 196 mm (7.72 in.)
I: Approx. 194 mm (7.64 in.)
J: Approx. 22 mm (0.87 in.)
K: Approx. 40 mm (1.57 in.)
L: Approx. 230 mm (9.06 in.)
M: Approx. 283 mm (11.14 in.)
N: Approx. 521 mm (20.51 in.)
O: Approx. 548 mm (21.57 in.)

(b) Check that the lower point where the washer fluid hits the windshield is within the range of the wiping pattern (the area of the glass which is wiped by the wiper blades).

BO0A3–01



ADJUSTMENT

ADJUST WASHER NOZZLE

Using a tool like the one shown in the illustration, change the direction of the nozzle hole to adjust the point where washer fluid strikes the windshield.

BO0A4–01

INSTALLATION

1. INSTALL WIPER MOTOR AND LINK ASSEMBLY

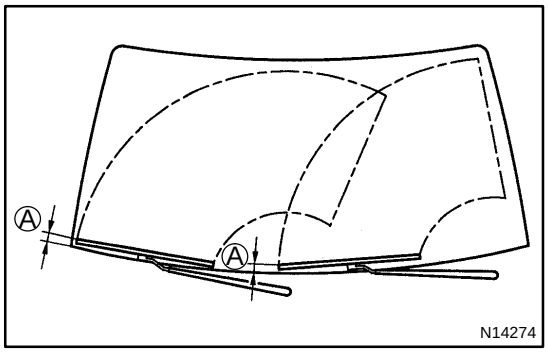
(a) Install the wiper motor and link assembly.

(b) Connect the connector.

(c) Install and torque the 5 bolts.

Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

2. INSTALL COWL TOP VENTILATOR LOUVER



3. INSTALL WIPER ARM AND BLADE ASSEMBLY

(a) Install the wiper arms and blades, and operate the wipers once and turn the wiper switch OFF.

(b) Adjust the wiper arms to the positions shown in the illustration.

A: Approx. 25 mm (0.98 in.)

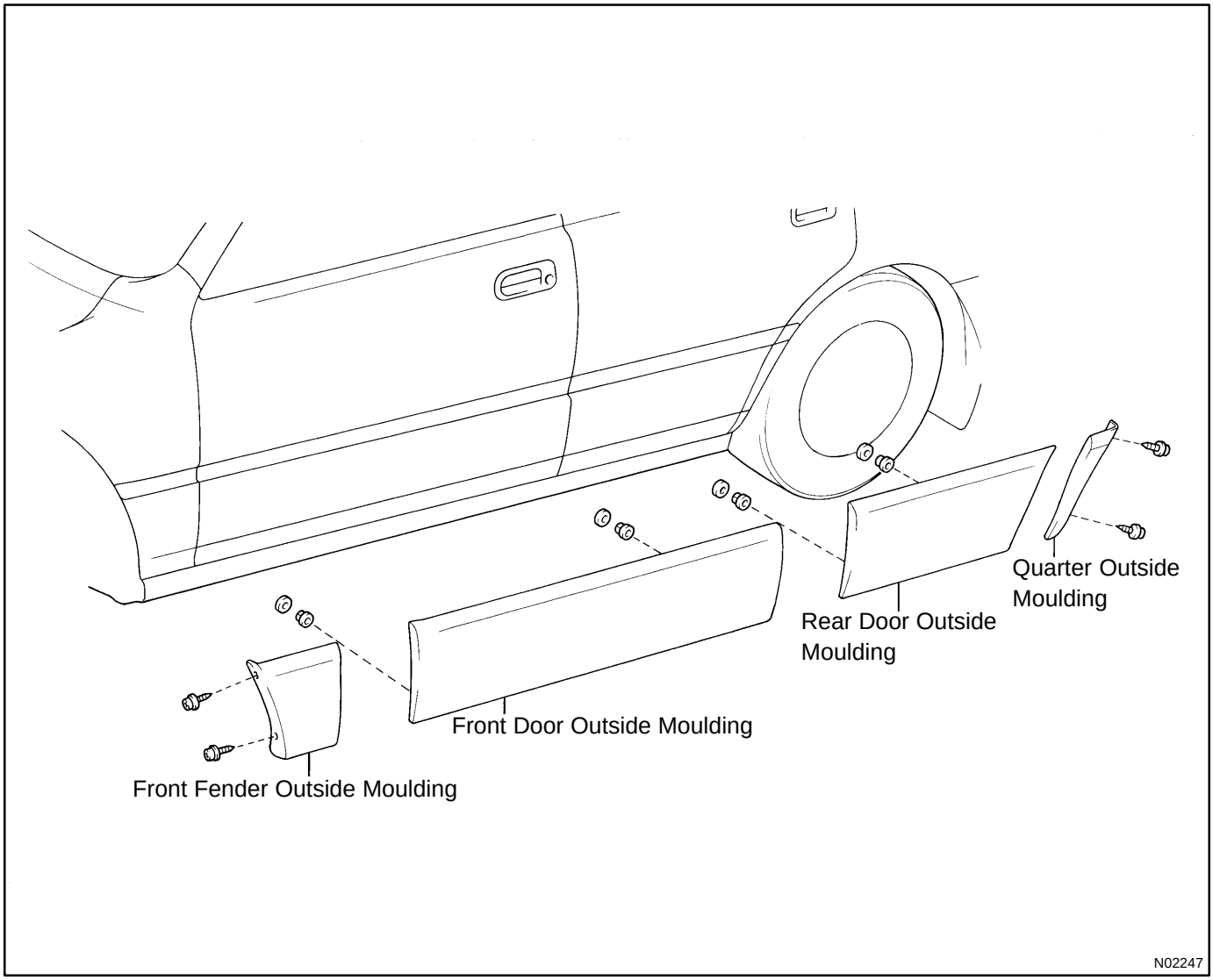
(c) Torque the nuts.

Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

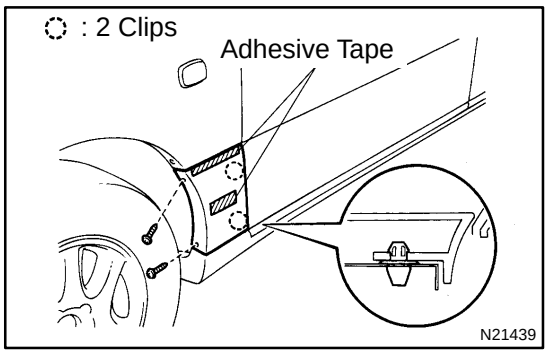
BODY OUTSIDE MOULDING

COMPONENTS

BO0A5–01



BO0A6–01



REMOVAL

1. REMOVE FRONT FENDER MOULDING

(a) Remove the 2 screws.

(b) Using a heat light, heat the moulding to 40 – 60 ˚C (104 – 140 ˚F).

NOTICE:

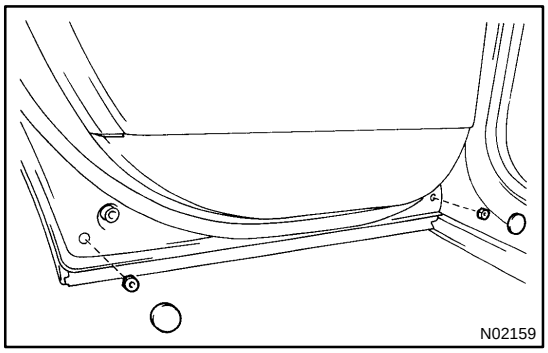
Do not heat the moulding excessively.

(c) Cut the adhesive tape with a knife.

NOTICE:

- **If reusing the moulding, take care not damage the moulding.**
- **Do not damage the body.**

(d) Remove the moulding.



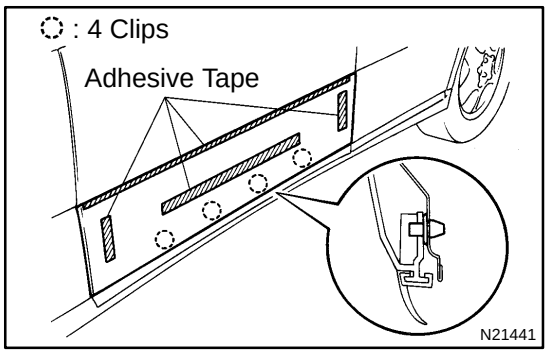
2. REMOVE FRONT DOOR OUTSIDE MOULDING

(a) Remove the 2 hole plugs and 2 nuts.

(b) Using a heat light, heat the moulding to 40 – 60 ˚C (104 – 140 ˚F).

NOTICE:

Do not heat the moulding excessively.

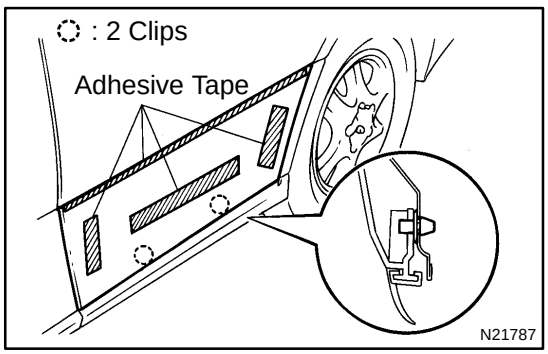


(c) Cut the adhesive tape with a knife.

NOTICE:

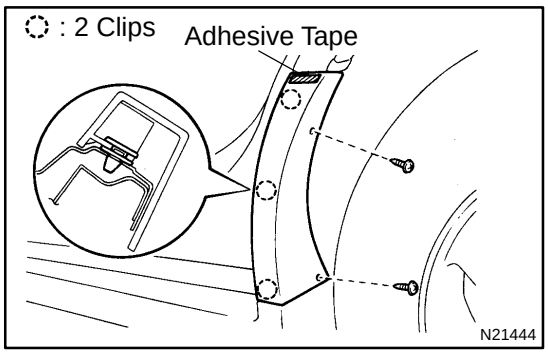
- **If reusing the moulding, take care not to damage the moulding.**
- **Do not damage the body.**

(d) Remove the moulding.



3. REMOVE REAR DOOR OUTSIDE MOULDING

Remove the rear door outside moulding in the same way as the front fender moulding.



4. REMOVE QUARTER OUTSIDE MOULDING

(a) Remove the 2 screws.

(b) Using a heat light, heat the moulding to 40 – 60 ˚C (104 – 140 ˚F).

NOTICE:

Do not heat the moulding excessively.

(c) Cut the adhesive tape with a knife.

NOTICE:

- **If reusing the moulding, take care not to damage the moulding.**
- **Do not damage the body.**

(d) Remove the moulding.

BO0A7–01

INSTALLATION

1. CLEAN BODY MOUNTING SURFACE

(a) Using a heat light, heat the body mounting surface to 40 – 60 ˚C (104 – 140 ˚F).

(b) Remove adhesive tape from the body.

(c) Wipe off stains with a cleaner.

2. CLEAN MOULDING

If reusing the moulding

(a) Using a heat light, heat the moulding to 20 – 40 ˚C (68 – 86 ˚F).

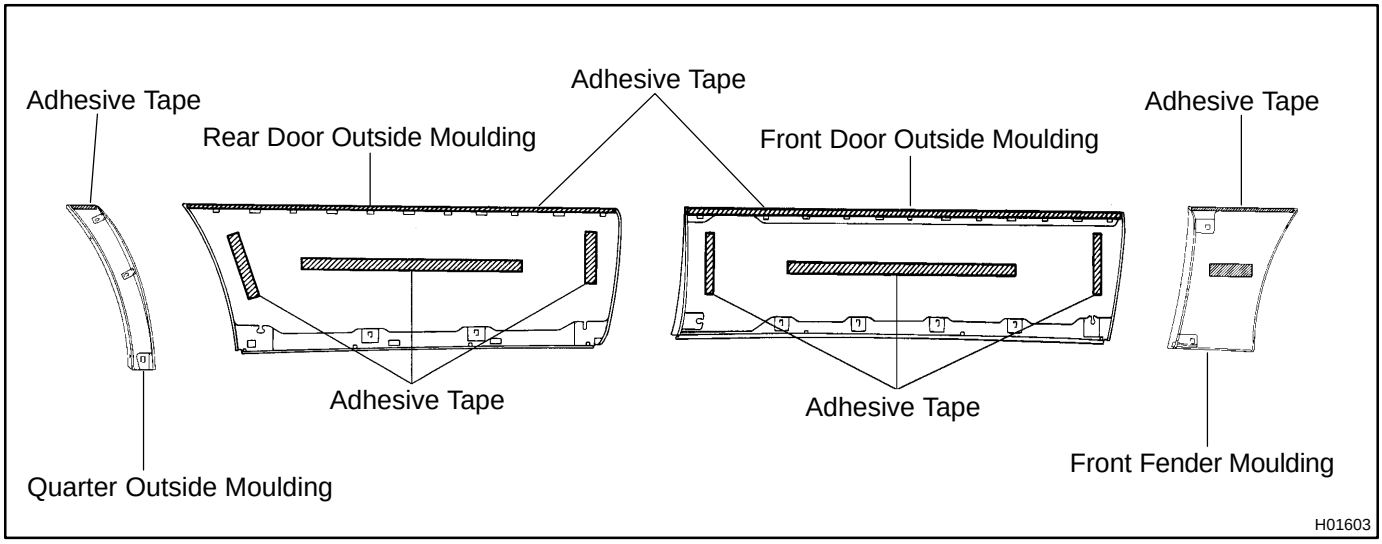
NOTICE:

Do not heat the moulding excessively.

(b) Remove the adhesive tape from the moulding.

(c) Wipe off stains with a cleaner.

(d) Apply new adhesive tape to the moulding as shown in the illustration.



3. INSTALL MOULDING

(a) Using a heat light, heat the body and moulding.
Body: 40 – 60 ˚C (104 – 140 ˚F)
Moulding: 20 – 30 ˚C (68 – 86 ˚F)

NOTICE:

Do not heat the moulding excessively.

(b) Remove the moulding release sheet from the face of moulding.

NOTICE:

When the moulding release sheet is removed, make sure that no dirt or dust can get onto the uncoated area.

(c) Align the bosses with their corresponding holes in the body, and press firmly on the moulding.

NOTICE:

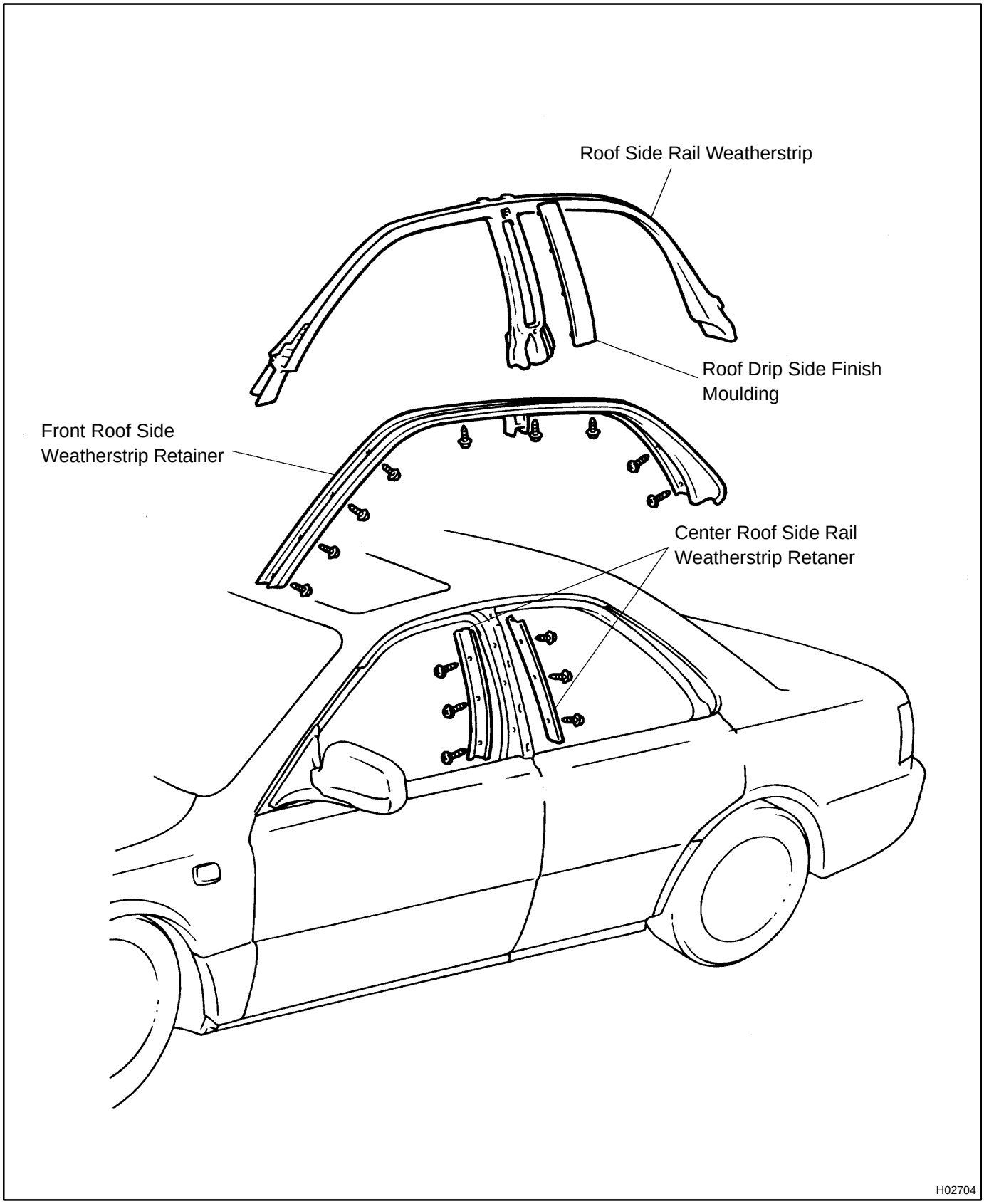
Do not apply excessive force onto the moulding, but apply steady pressure with your thumbs.

(d) Install the moulding.

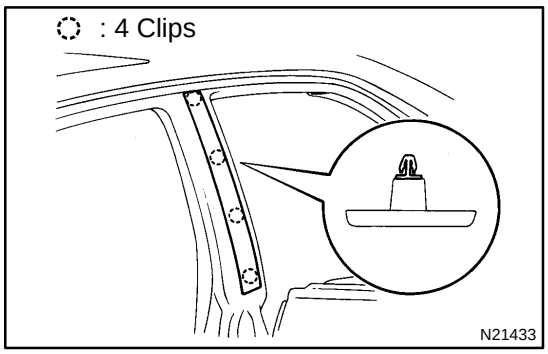
ROOF DRIP SIDE FINISH MOULDING

BO0A8–01

COMPONENTS



BO0A9–01



REMOVAL

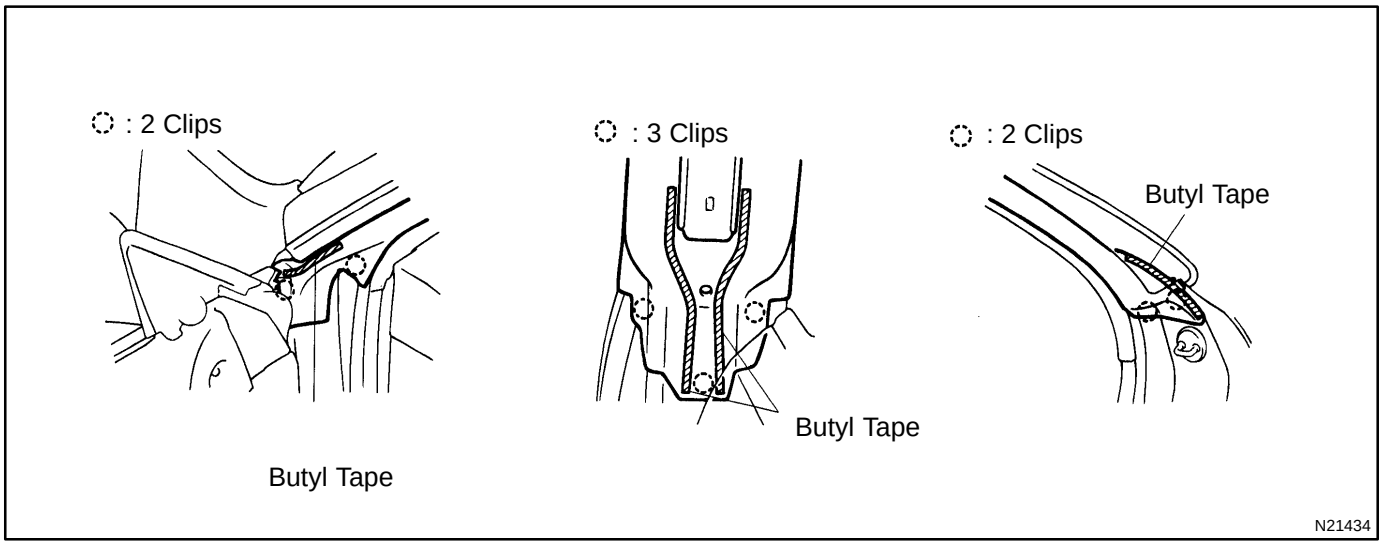
1. REMOVE ROOF DRIP SIDE FINISH MOULDING

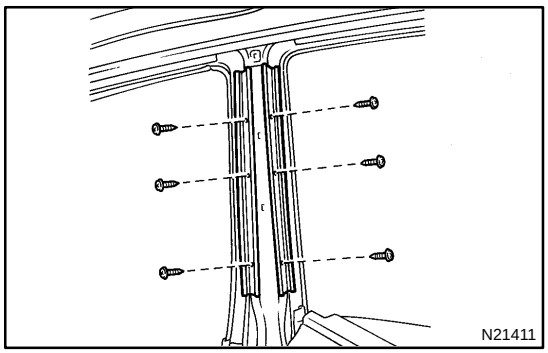
Remove the moulding.

2. REMOVE ROOF SIDE RAIL WEATHERSTRIP

(a) Using a clip remover, remove the 7 clips.

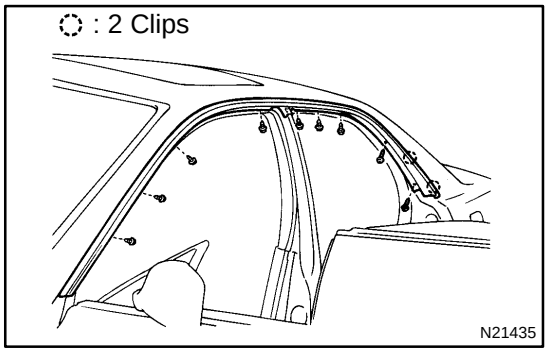
(b) Pull off the weatherstrip.





3. REMOVE CENTER ROOF SIDE RAIL WEATHERSTRIP RETAINER

Remove the 6 screws and retainers.



4. REMOVE FRONT ROOF SIDE WEATHERSTRIP RETAINER

Remove the 9 screws and retainers.

BO0AA–01

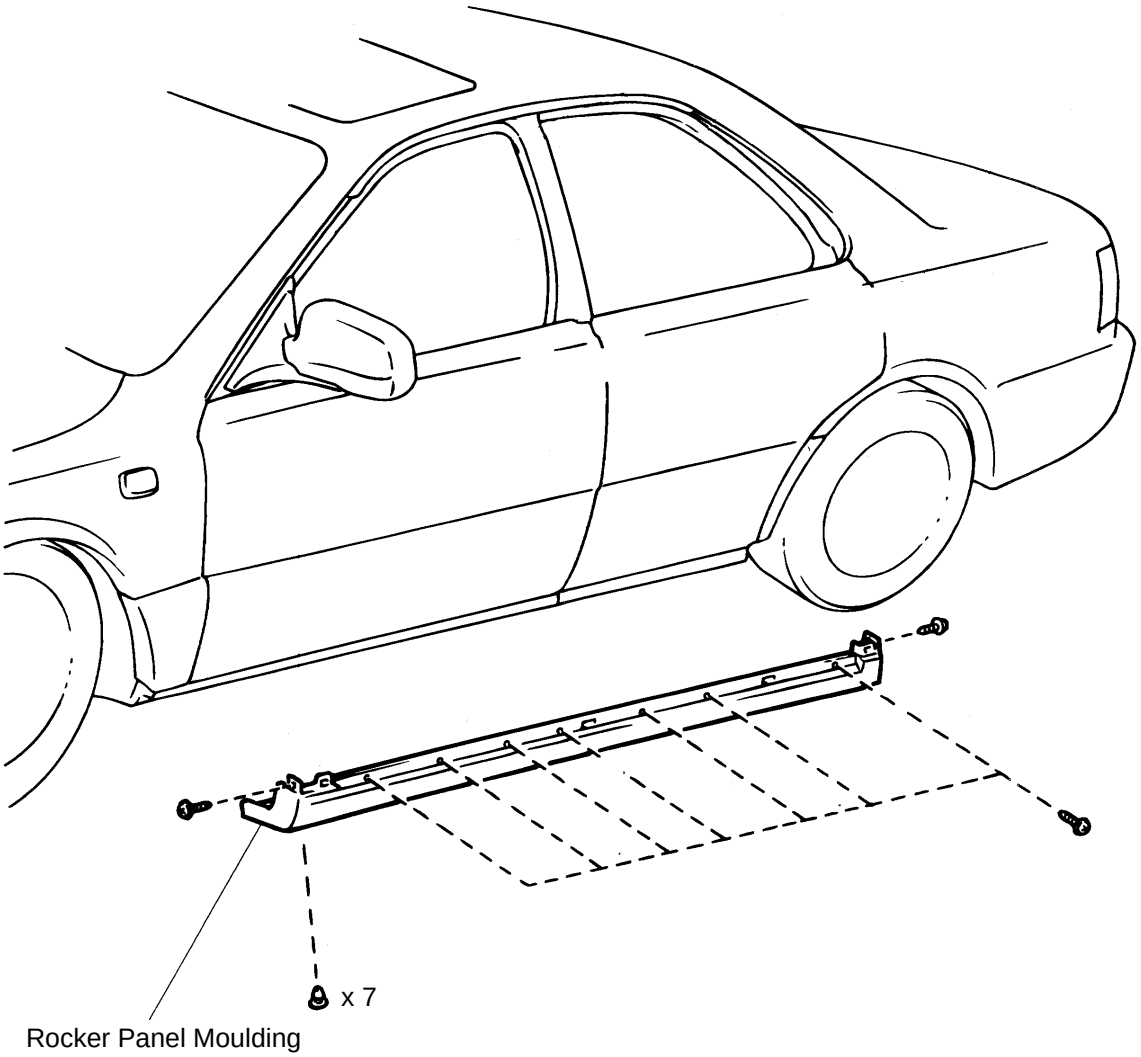
INSTALLATION

Installation is in the reverse order of removal (See page BO–54).

ROCKER PANEL MOULDING

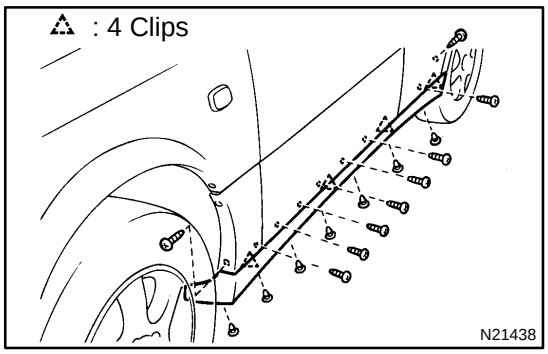
BO0AB–01

COMPONENTS



H02705

BO0AC–01



REMOVAL

REMOVE ROCKER PANEL MOULDING

(a) Remove the 9 screws and 7 clips.

(b) Using a screwdriver, remove the rocker panel moulding.

HINT:

Tape the screwdriver tip before use.

BO0AD–01

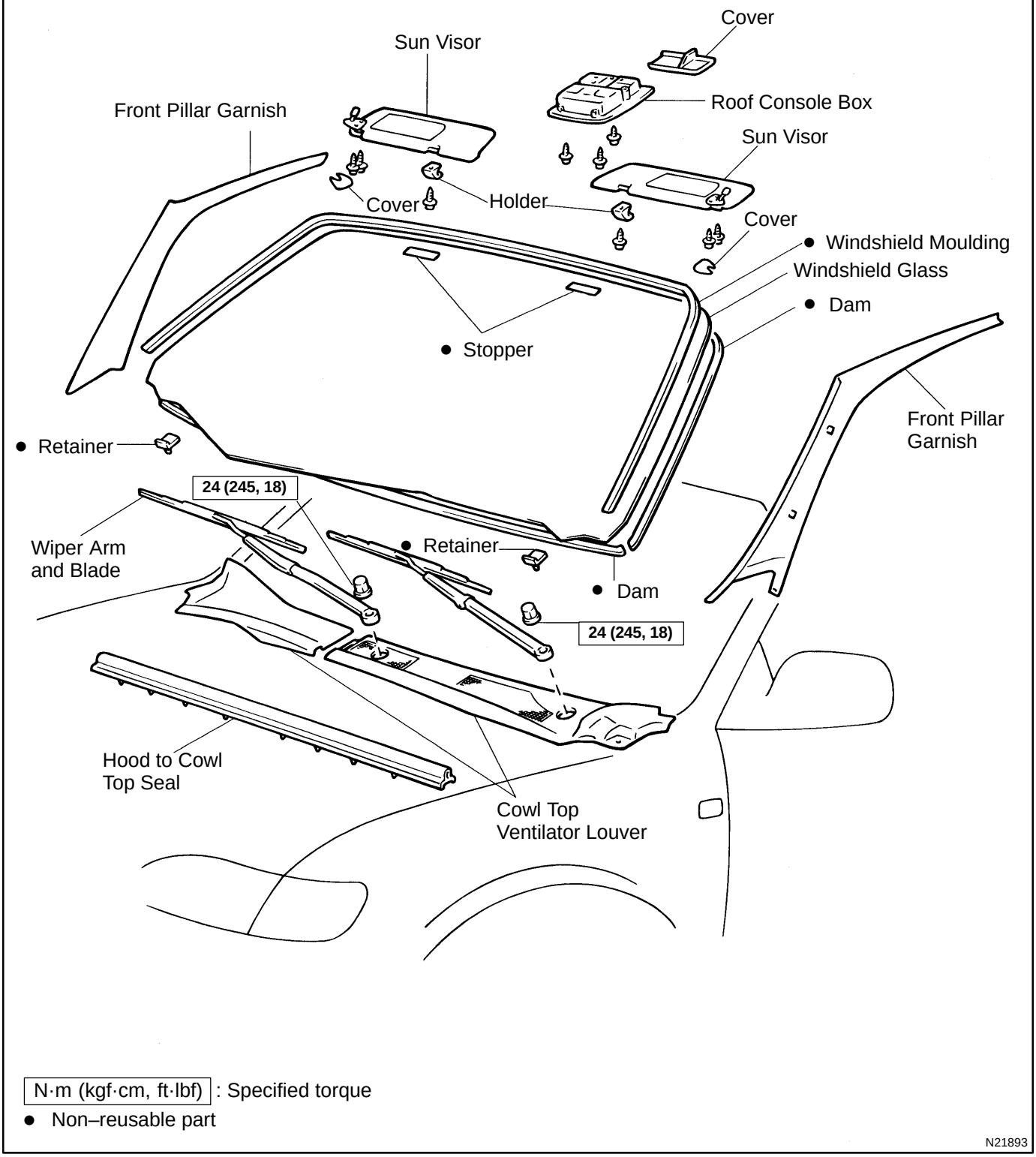
INSTALLATION

Installation is in the reverse order of removal (See page BO–57).

WINDSHIELD

COMPONENTS

BO0AE–05



N·m (kgf·cm, ft·lbf) : Specified torque

● Non–reusable part

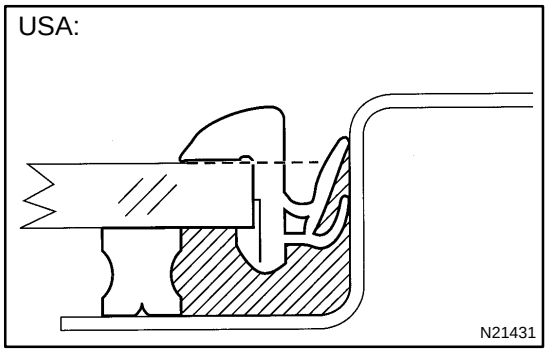
N21893

BO0AF–02

REMOVAL

1. REMOVE THESE PARTS:

(a) Sun visors and holders
(b) Front pillar garnishes
(c) Wiper arm and blades
(d) Hood to cowl top seal
(e) Cowl top ventilator louver
(f) Roof console box
(g) Front side of roof headlining

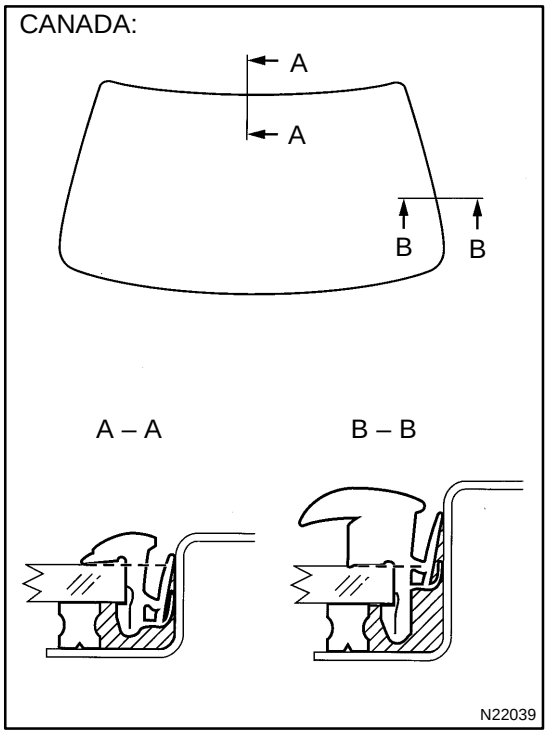


2. USA:
REMOVE WINDSHIELD MOULDING

Using a knife, cut off the moulding shown in the illustration.

NOTICE:

Do do not damage the body with the knife.

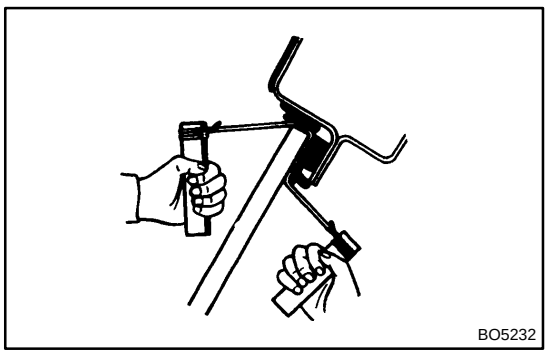


3. CANADA:
REMOVE WINDSHIELD MOULDING

Using a knife, cut off the moulding shown in the illustration.

NOTICE:

Do not damage the body with the knife.

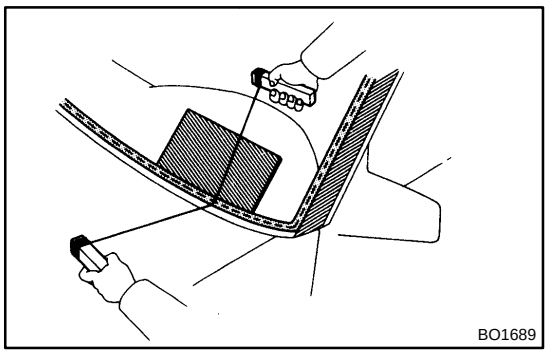


4. REMOVE WINDSHIELD GLASS

(a) Push piano wire through between the body and glass from the interior.
(b) Tie both wire ends to a wooden block or a similar object.

HINT:

Apply adhesive tape to the outer surface to keep the surface from being scratched.



NOTICE:

When separating the glass, take care not to damage the paint and interior and exterior ornaments. To prevent scratching the safety pad when removing the windshield, place a plastic sheet between the piano wire and safety pad.

(c) Cut the adhesive by pulling the piano wire around it.

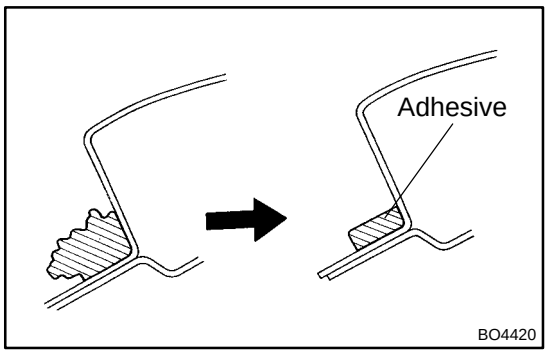
(d) Remove the glass.

NOTICE:

Leave as much of the adhesive on the body as possible when cutting off the glass.

BO0AG–02

INSTALLATION



1. CLEAN AND SHAPE CONTACT SURFACE OF BODY

(a) Using a knife, cut away any rough areas on the body.

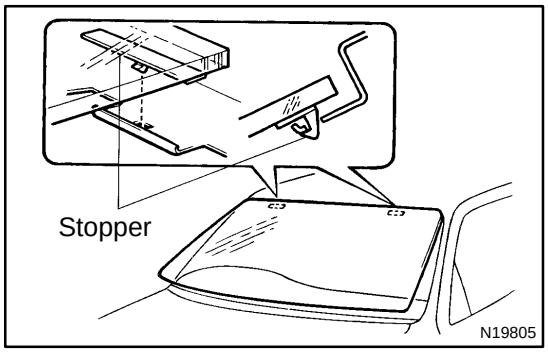
HINT:

Leave as much of the adhesive on the body as possible.

(b) Clean the cutting surface of the adhesive with a piece of shop rag saturated in a cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.



2. REPLACE STOPPER

(a) Remove the damaged stopper.

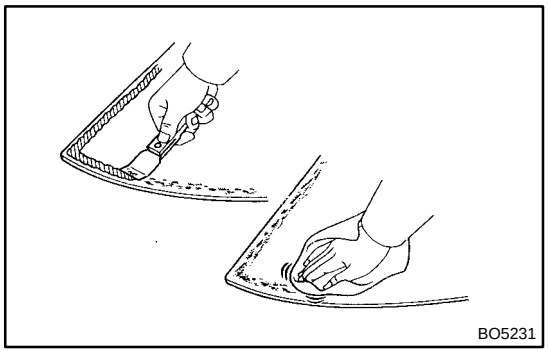
(b) Cut off the old adhesive around the stopper installation area.

NOTICE:

Be careful not to damage the glass.

(c) Clean the installation area.

(d) Install a new stopper onto the glass.



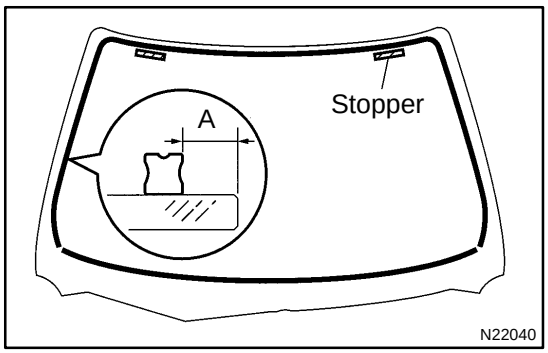
3. CLEAN REMOVED GLASS

(a) Using a scraper, remove the adhesive sticking to the glass.

(b) Clean the glass with a cleaner.

NOTICE:

Do not touch the glass after cleaning it.



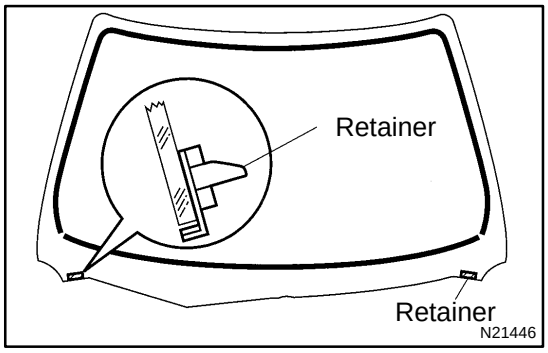
4. INSTALL DAM

Install the dam with double – stick tape as shown in the illustration.

NOTICE:

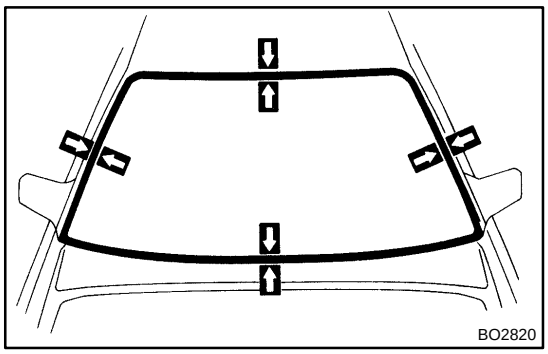
Do not touch the glass face after cleaning it.

A: 7.0 mm (0.276 in.)



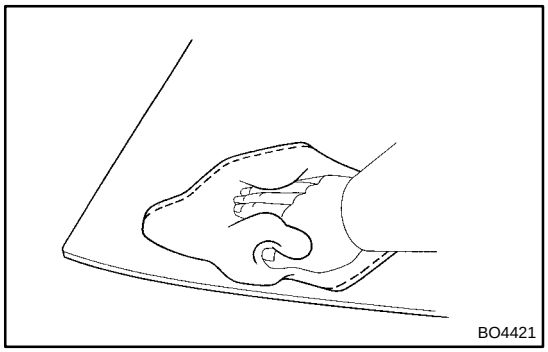
5. INSTALL RETAINER

Install the retainers as shown in the illustration.



6. POSITION GLASS

(a) Place glass in the correct position.
(b) Check that all contacting parts of the glass rim are perfectly even.
(c) Place reference marks between the glass and body.
(d) Remove the glass.

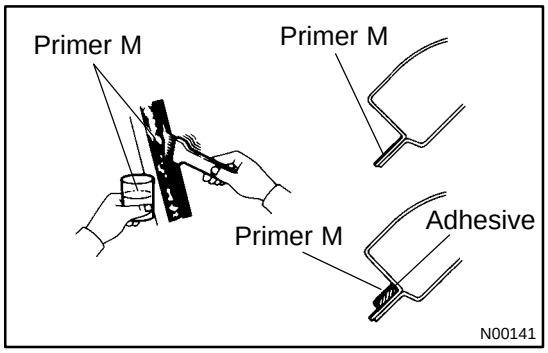


7. CLEAN CONTACT SURFACE OF GLASS

Using a cleaner, clean the contact surface which is black–colored area around the entire glass rim.

NOTICE:

Do not touch the glass face after cleaning it.

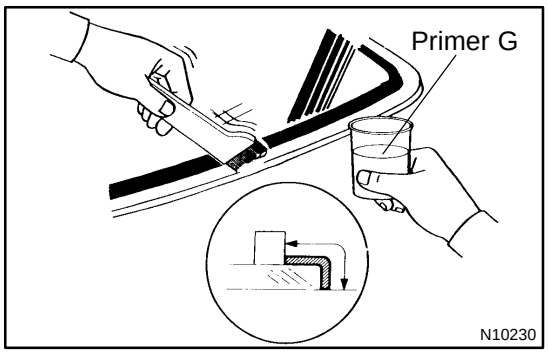


8. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat the contact surface on the body with Primer M.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not coat Primer M to the adhesive..**
- **Do not keep any of the opened Primer M for later use.**



9. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or a sponge, coat the edge of the glass and the contact surface with Primer G.
(b) Before the primer dries, wipe it off with a clean shop rag.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not keep any of the opened Primer G for later use.**

10. APPLY ADHESIVE

(a) Cut off the tip of the cartridge nozzle.

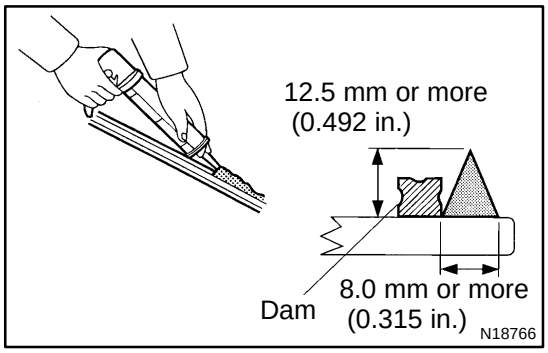
Part No.08850–00801 or equivalent

HINT:

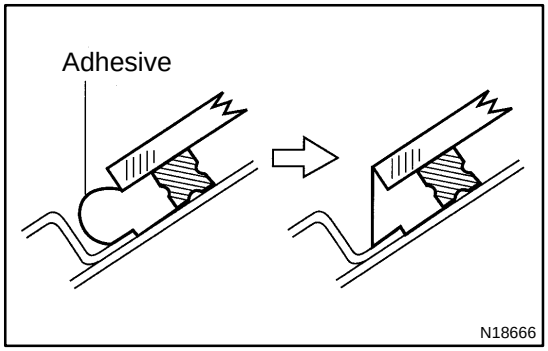
After cutting off the tip, use all adhesive within the time described in the chart below.

Temperature	Tackfree time
35 ˚C (95 ˚F)	15 minute
20 ˚C (68 ˚F)	100 minute
5 ˚C (41 ˚F)	8 hour

(b) Load the cartridge into the sealer gun.



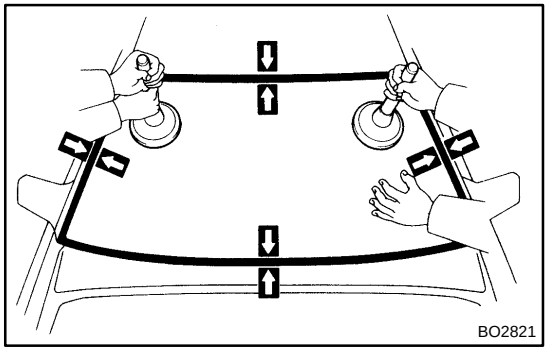
(c) Coat the glass with adhesive as shown.



11. INSTALL GLASS

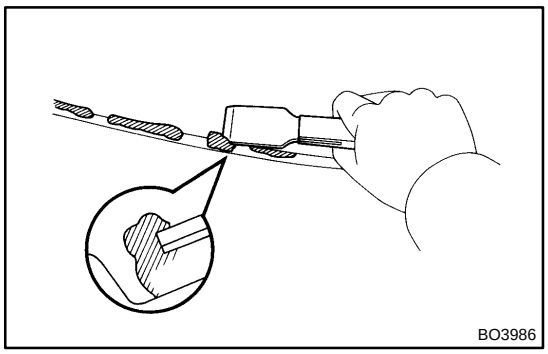
HINT:

Confirm that the dam is attached to the body panel as shown in the illustration.



(a) Position the glass so that the reference marks are lined up, and press in gently along the rim.

(b) Using a spatula, apply adhesive on the glass rim.



(c) Use a scraper to remove any excessive or protruding adhesive.

(d) Hold the glass in place securely with a protective tape or equivalent until the adhesive hardened.

NOTICE:

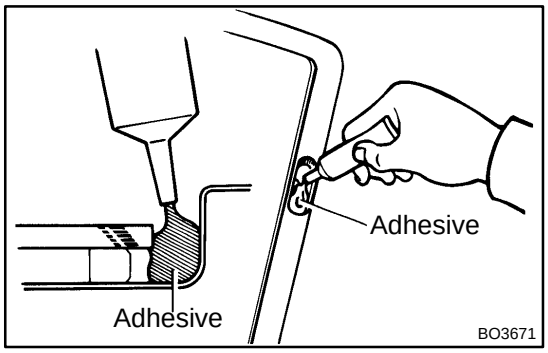
Take care not to drive the vehicle during the time described in the chart below.

Temperature	Minimum time prior to drive the vehicle
35 ˚C (95 ˚F)	1.5 hour
20 ˚C (68 ˚F)	5 hour
5 ˚C (41 ˚F)	24 hour

12. INSPECT FOR LEAKS AND REPAIR

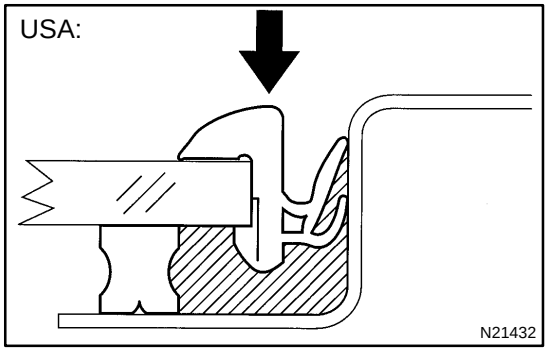
(a) Do a leak test after the hardening time has elapsed.

(b) Seal any leak with sealant.
Part No. 08833–00030 or equivalent



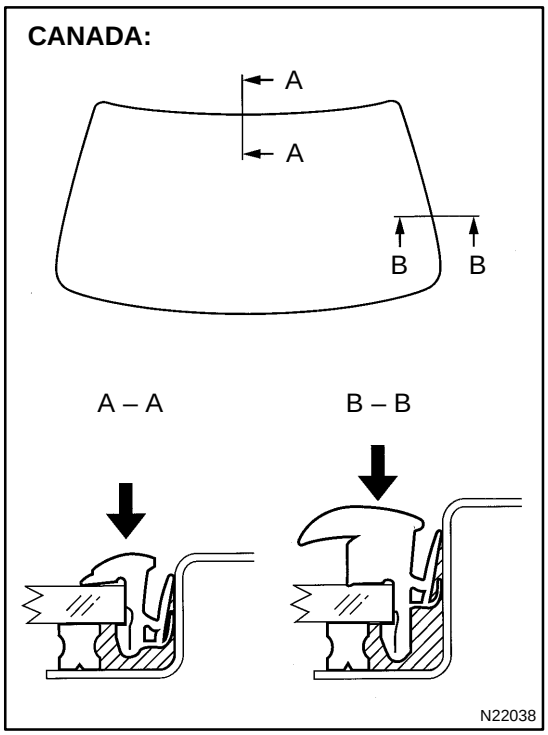
13. APPLY ADHESIVE AT MOULDING INSTALLATION AREA

Coat the glass with adhesive at the moulding installation area.
Part No. 08833–00030 or equivalent



14. USA:
INSTALL WINDSHIELD MOULDING

Place the moulding onto the body and tap it by hand.



15. CANADA:
INSTALL WINDSHIELD MOULDING

Place the moulding onto the body and tap it by hand.

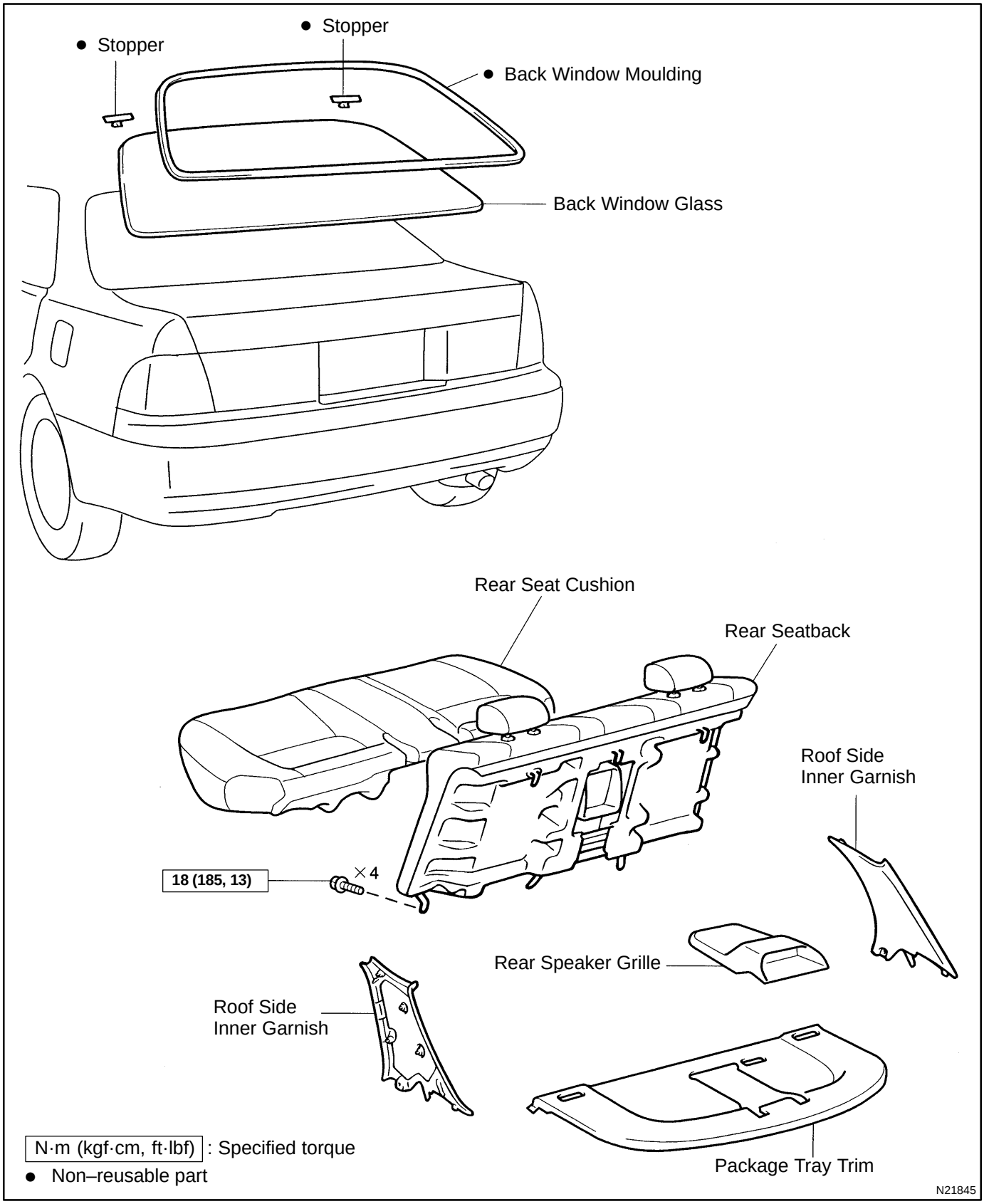
16. INSTALL THESE PARTS:

(a) Front side of roof headlining
(b) Roof console box
(c) Cowl top ventilator louver
(d) Hood to cowl top seal
(e) Wiper arm and blades
Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)
(f) Front pillar garnishes
(g) Sun visors and holders

BACK WINDOW GLASS

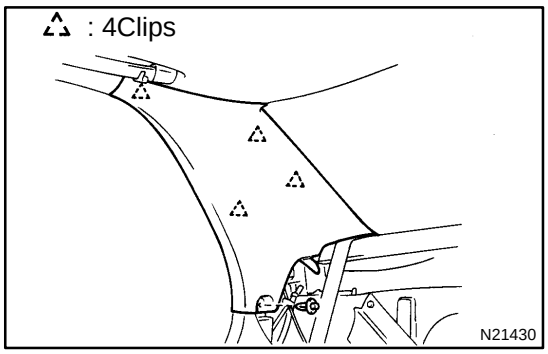
BO0AH–04

COMPONENTS



BO0AI–04

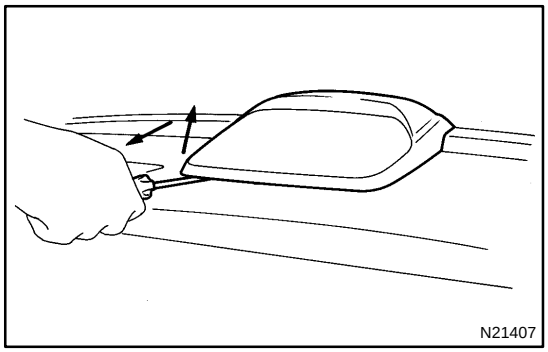
REMOVAL



1. REMOVE REAR SEAT CUSHION AND SEATBACK (See page BO–105)

2. REMOVE ROOF SIDE INNER GARNISH

Remove the clip and garnish.



3. REMOVE REAR SPEAKER GRILLE

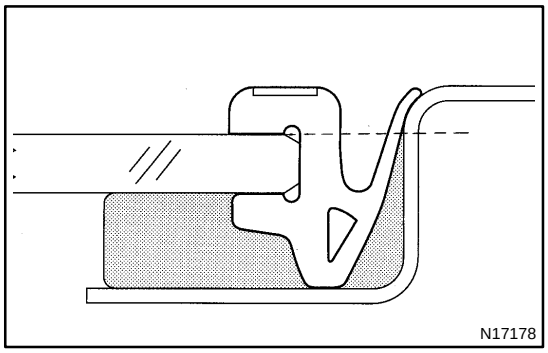
(a) Using a screwdriver, remove the rear speaker grille as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

(b) Disconnect the connector.

4. REMOVE PACKAGE TRAY TRIM



5. REMOVE BACK WINDOW MOULDING

Using a knife, cut off the moulding as shown in the illustration.

NOTICE:

Do not damage the body with the knife.

6. REMOVE BACK WINDOW GLASS

Remove the glass in the same way as windshield.

(See page BO–60)

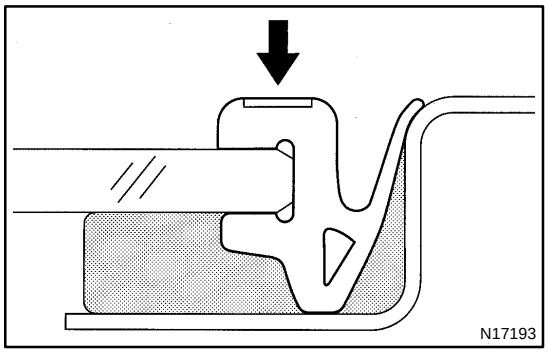
BO0AJ–04

INSTALLATION

HINT:

Refer to the installation of windshield and install the back window glass by following operations. (See page BO–62)

1. **CLEAN AND SHAPE CONTACT SURFACE OF BODY**
2. **REPLACE STOPPER**
3. **CLEAN REMOVED GLASS**
4. **POSITION GLASS**
5. **CLEAN CONTACT SURFACE OF GLASS**
6. **COAT CONTACT SURFACE OF BODY WITH PRIMER ”M”**
7. **COAT CONTACT SURFACE OF GLASS WITH PRIMER ”G”**
8. **APPLY ADHESIVE**
9. **INSTALL GLASS**
10. **INSPECT FOR LEAKS AND REPAIR**
11. **APPLY ADHESIVE AT MOULDING INSTALLATION AREA**

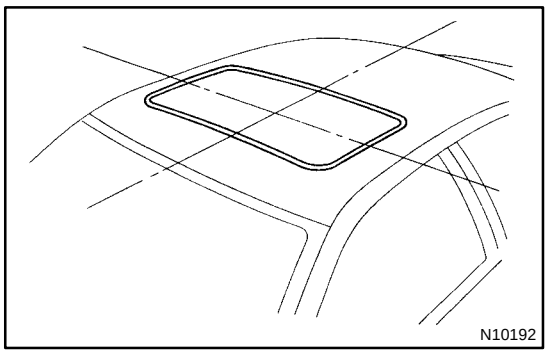


12. **INSTALL BACK WINDOW MOULDING**

Place the moulding onto the body and tap it by hand.

13. **INSTALL THESE PARTS:**

(a) Package tray trim
(b) Rear speaker grille
(c) Roof side inner garnish
(d) Rear seat cushion and seatback



SLIDING ROOF

BO0AK–01

ON–VEHICLE INSPECTION

INSPECT SLIDING ROOF GLASS ALIGNMENT

(a) Start the engine and check the operation time of the sliding roof.
Operation time:
Approx. 6 secs.

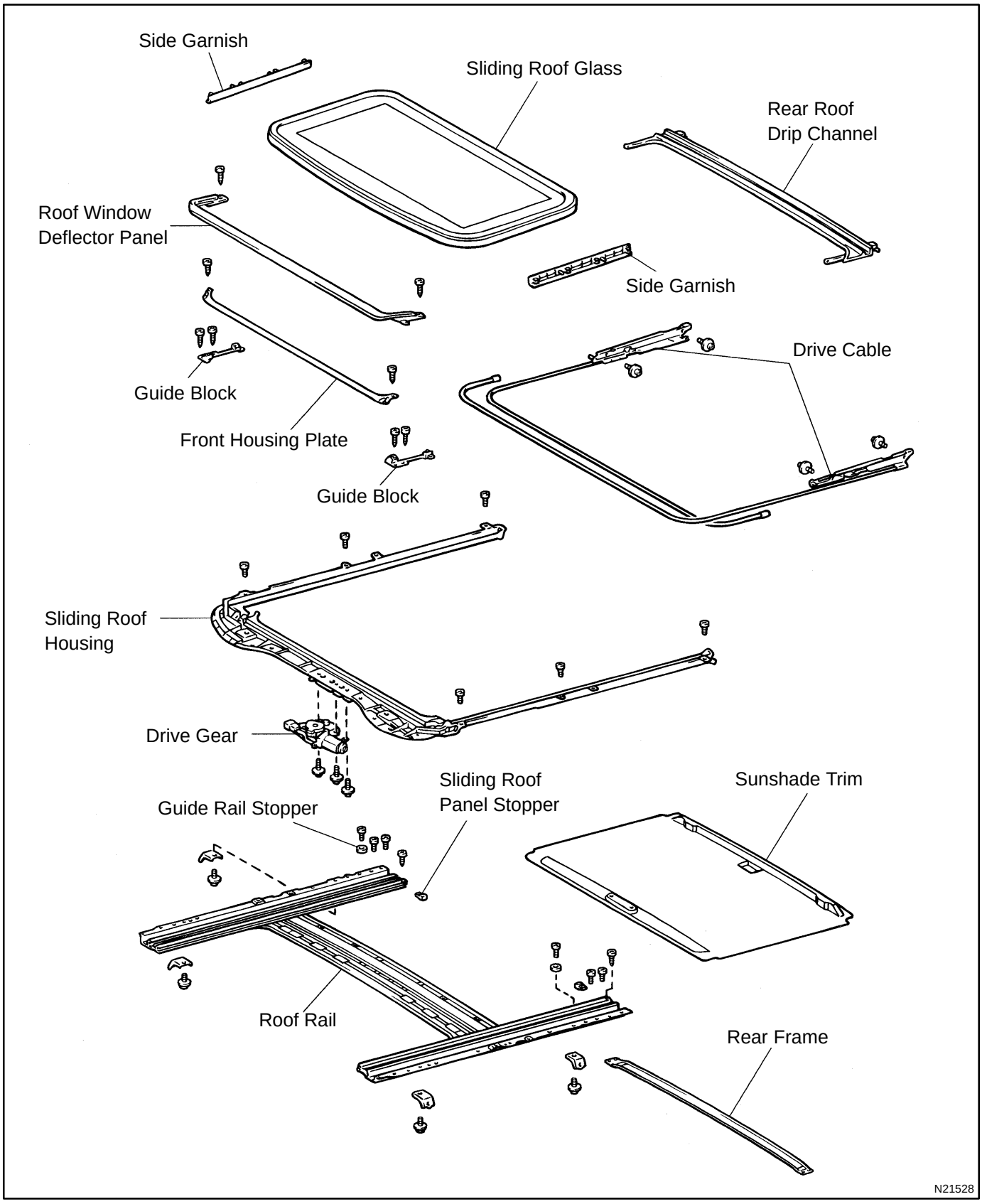
(b) Check for abnormal noise or binding during operation.

(c) With the sliding roof fully closed, check for water leakage.

(d) Check for a difference in level between the sliding roof weatherstrip and roof panel.
Except rear end:
0 ± 1.5 mm (0 ± 0.059 in.)
Rear end:
0 + 1.5 mm (0 + 0.059 in.)
0 – 1.0 mm (0 – 0.039 in.)

BO0AL–01

COMPONENTS



BO0AM–03

REMOVAL

1. REMOVE ROOF HEADLINING
(See page BO–93)

2. REMOVE SIDE GARNISH

Using a screwdriver, remove the garnishes.

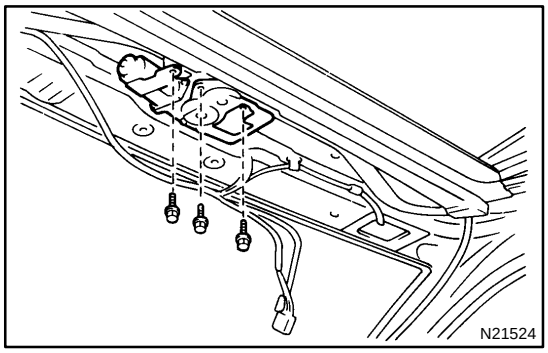
HINT:

Tape the screwdriver tip before use.

3. REMOVE SLIDING ROOF GLASS ASSEMBLY

(a) Using a torx wrench, remove the 4 screws.

(b) Pull the glass upward to remove it.



4. REMOVE DRIVE GEAR

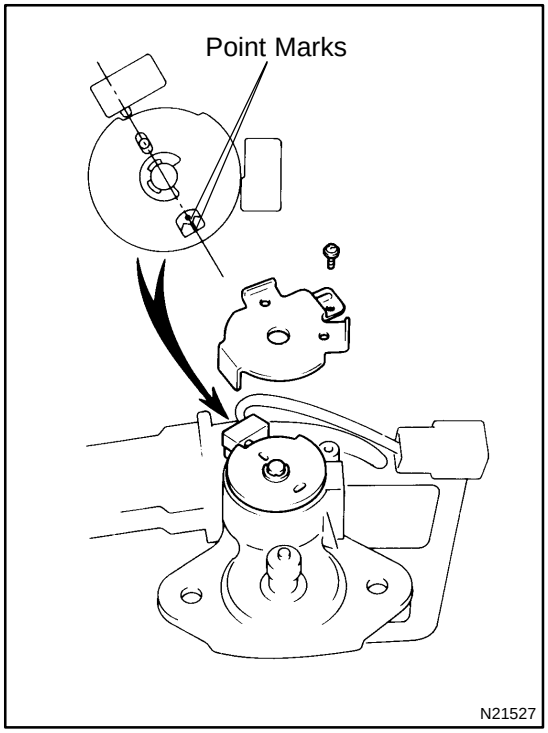
NOTICE:

Remove the drive gear with the sliding roof full closed.

(a) Disconnect the connector.

(b) Remove the 3 bolts and drive gear.

(c) Remove the screw and cam plate cover.



(d) Turn the drive gear to align the point marks as shown in the illustration.

(e) Install the cam plate cover and screw.

NOTICE:

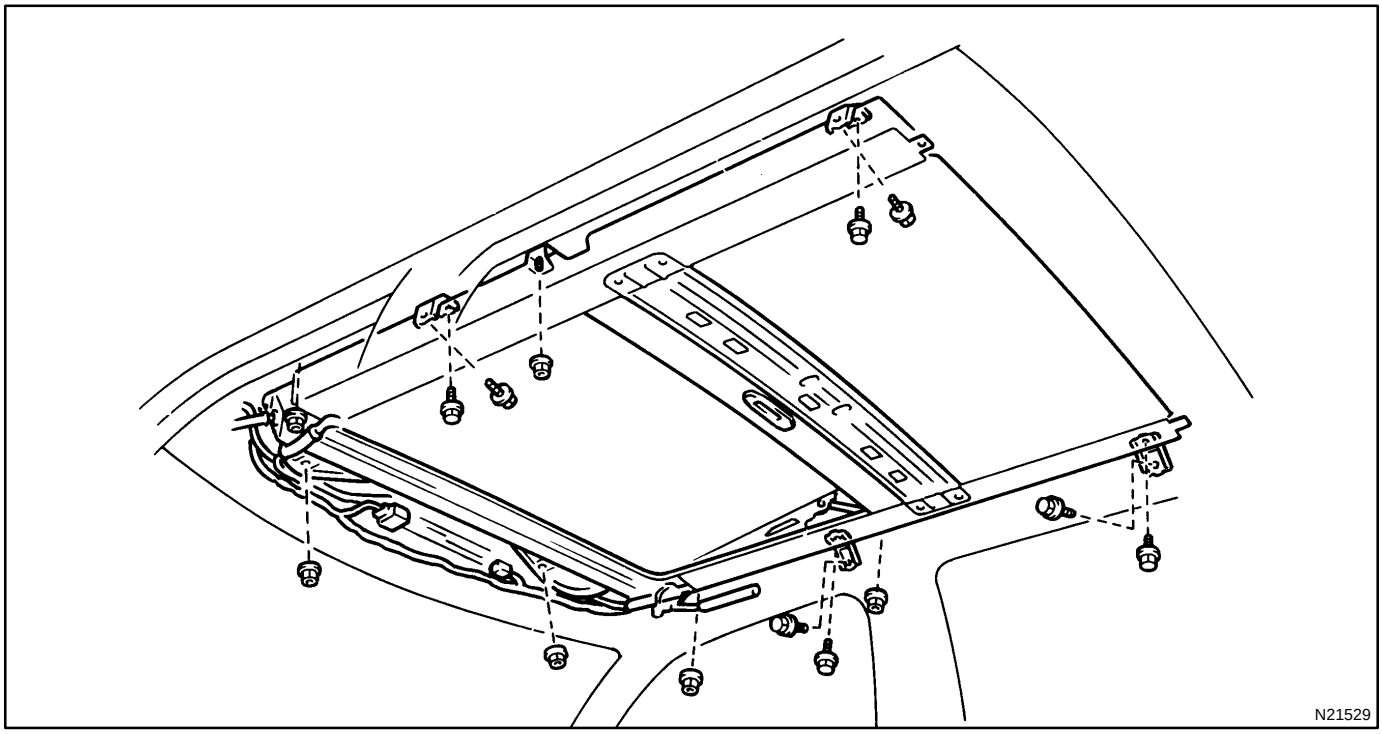
At the time of installation, please refer to the following item. If the sliding roof position and drive gear full close position not matched, the sliding roof does not operate normally.

5. REMOVE SLIDING ROOF HOUSING

(a) Disconnect the 4 drain hoses from the housing.

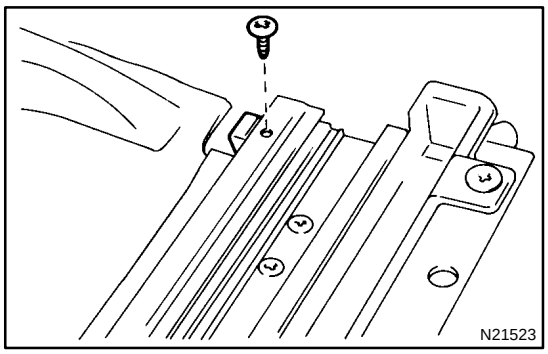
(b) Remove the 8 bolts and 4 brackets.

(c) Remove the 6 nuts, then remove the housing as shown in the illustration below.



BO0AN–01

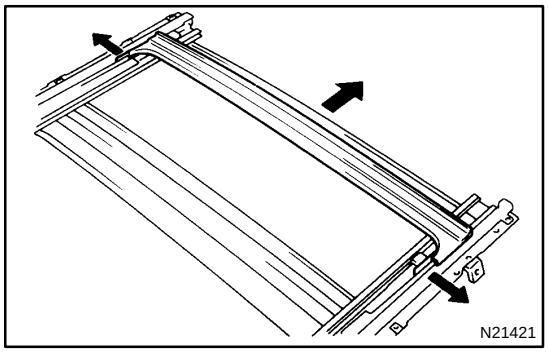
DISASSEMBLY



1. REMOVE SLIDING ROOF PANEL STOPPER

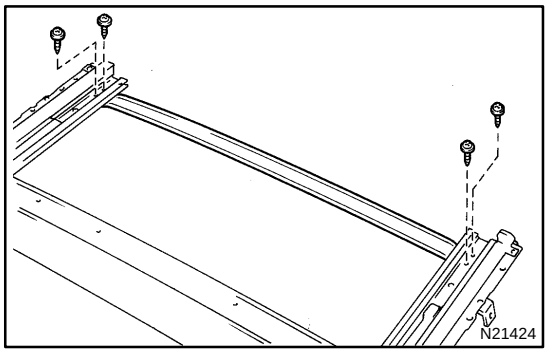
Remove the 2 screws and 2 stoppers.

2. REMOVE SUNSHADE TRIM



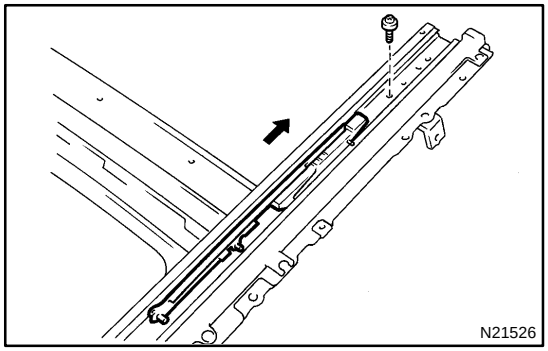
3. REMOVE REAR ROOF DRIP CHANNEL

Remove the rear roof drip channel as shown in the illustration.



4. REMOVE REAR FRAME

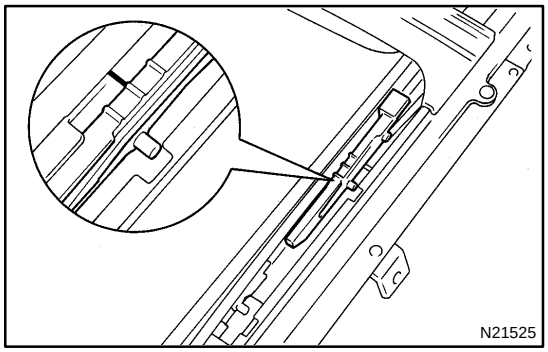
Remove the 4 screws and rear frame.



5. REMOVE DRIVE CABLE

(a) Remove the screw and guide rail stopper.

(b) Slide the drive cable rearward, then remove it.

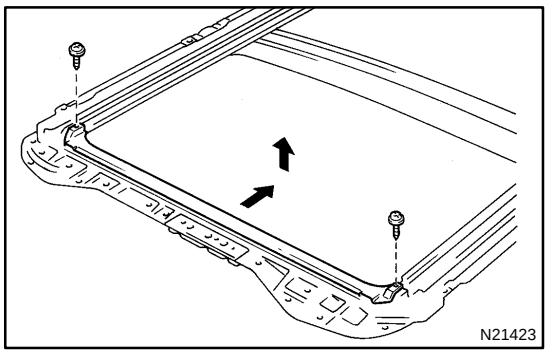


HINT:

At the time of assembly, please refer to the following items.

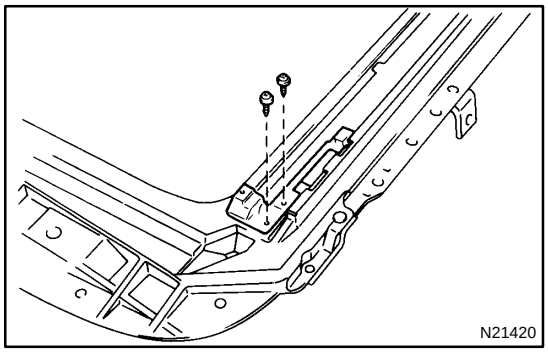
- Adjust the drive cable to a closed and tilted down position.
- Slide the cable forward or backward to align the 2 marks as shown.
- Slide the cable to the forefront with your hand.

6. REMOVE ROOF WINDOW DEFLECTOR PANEL



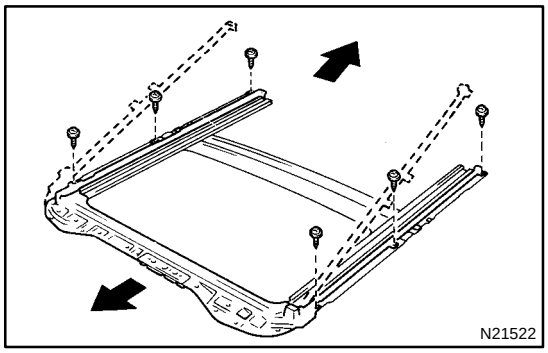
7. REMOVE FRONT HOUSING PLATE

Remove the 2 screws and plate.



8. REMOVE GUIDE BLOCK

Remove the 2 screws and guide block.

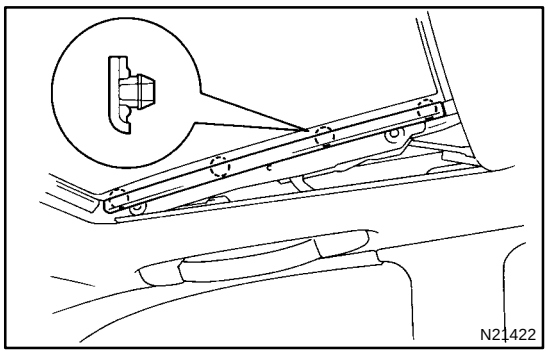


9. REMOVE SLIDING ROOF HOUSING

Remove the 6 screws and sliding roof housing.

BO0AO–01

ADJUSTMENT

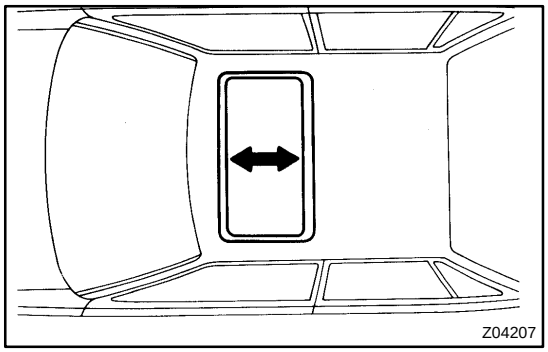


1. REMOVE SIDE GARNISH

Before making adjustments, using a screwdriver, remove the side garnishes.

HINT:

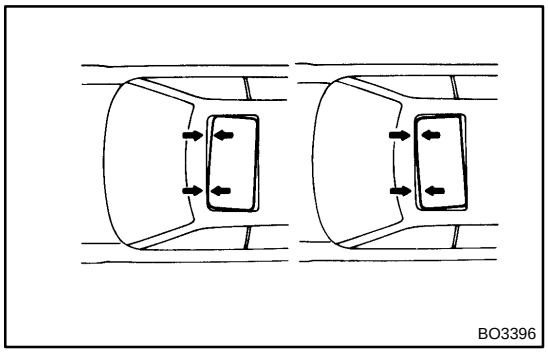
- Tape the screwdriver tip before use.
- After adjustment, reinstall the side garnishes.



2. ADJUST SLIDING ROOF GLASS FORWARD OR REARWARD

(a) Using a torx wrench, loosening the sliding roof glass installation screws.

(b) Adjust the sliding roof glass forward or rearward.

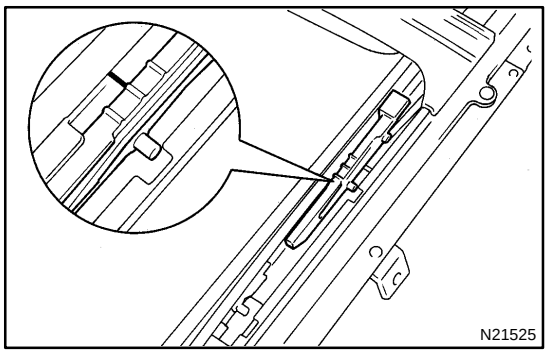


3. ADJUST SLIDING ROOF GLASS IN CLEARANCE (Difference in left and right clearance)

(a) When the front or rear alignment is not correct, remove the drive gear and sliding roof glass, then adjust the drive cable.

NOTICE:

Remove the drive gear with the sliding roof full closed.



(b) Adjust by sliding the cable forward or rearward to align the 2 marks as shown.

(c) Install the drive gear and sliding roof glass.

BO0AP–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–74).

BO0AQ–01

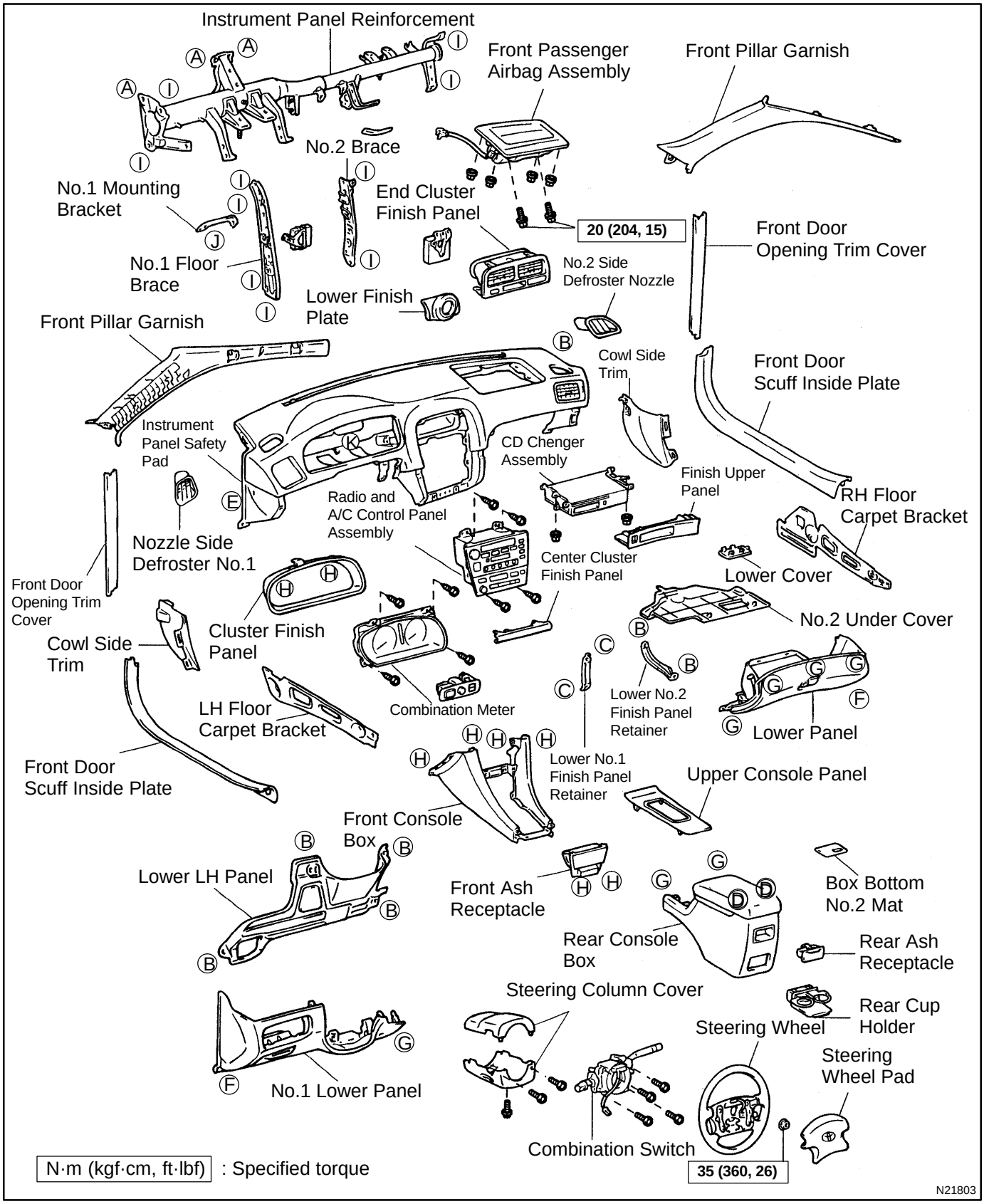
INSTALLATION

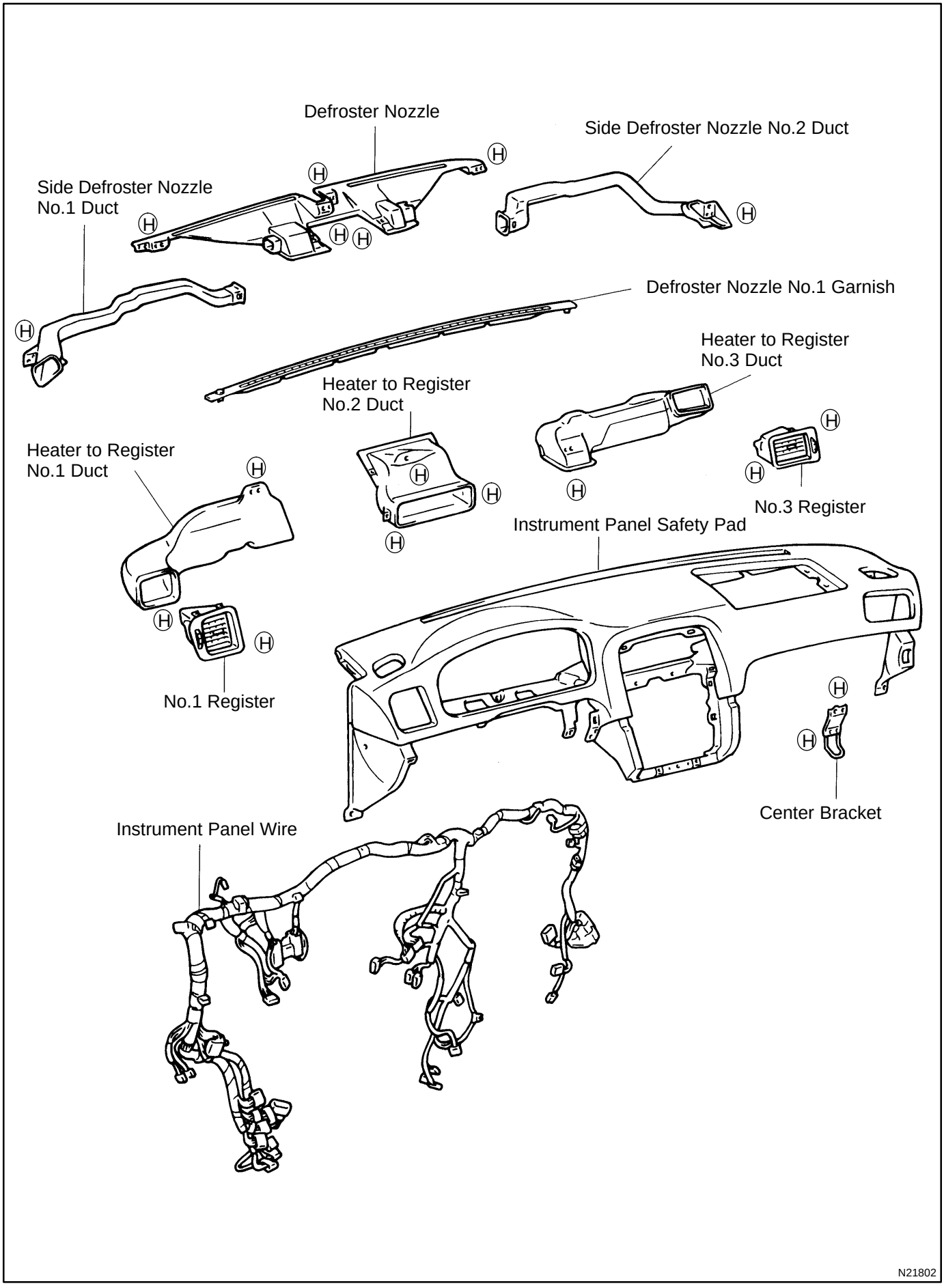
Installation is in the reverse order of removal (See page BO–72).

INSTRUMENT PANEL

COMPONENTS

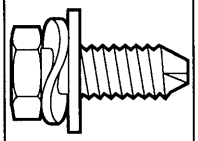
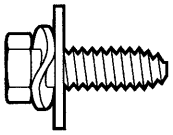
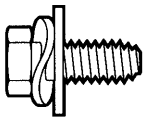
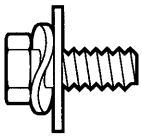
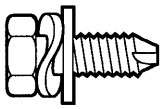
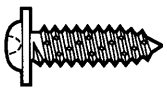
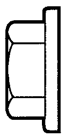
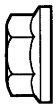
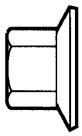
BO0AR–03




Defroster Nozzle
Side Defroster Nozzle No.2 Duct
Side Defroster Nozzle No.1 Duct
Defroster Nozzle No.1 Garnish
Heater to Register No.3 Duct
Heater to Register No.2 Duct
Heater to Register No.1 Duct
No.3 Register
Instrument Panel Safety Pad
No.1 Register
Center Bracket
Instrument Panel Wire
N21802

HINT:
Screw shapes and sizes are indicated in the table below. The codes (A – K) correspond to those indicated on the previous pages.

mm (in.)

	Shape	Size		Shape	Size		Shape	Size
Ⓐ		ø = 8 (0.31) L = 22 (0.87)	Ⓑ		ø = 6 (0.24) L = 20 (0.79)	Ⓒ		ø = 6 (0.24) L = 16 (0.63)
Ⓓ		ø = 6 (0.24) L = 16 (0.63)	Ⓔ		ø = 6 (0.24) L = 20 (0.79)	Ⓕ		ø = 6 (0.24) L = 18 (0.71)
Ⓖ		ø = 5.22 (0.2055) L = 20 (0.79)	Ⓗ		ø = 5.22 (0.2055) L = 16 (0.63)	Ⓘ		ø = 8 (0.31)
Ⓙ		ø = 6 (0.24)	Ⓚ		ø = 6 (0.24)			

V08545

BO0AS–03

REMOVAL

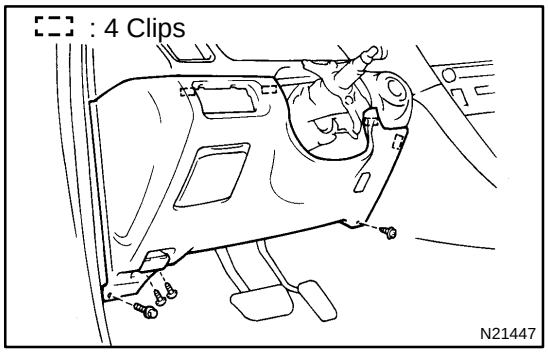
1. REMOVE THESE PARTS:

(a) Front pillar garnishes
(b) Front door scuff inside plates
(c) Front door opening trim covers
(d) Cowl side trims

2. REMOVE STEERING WHEEL
(See page SR–9)

3. REMOVE THESE PARTS:

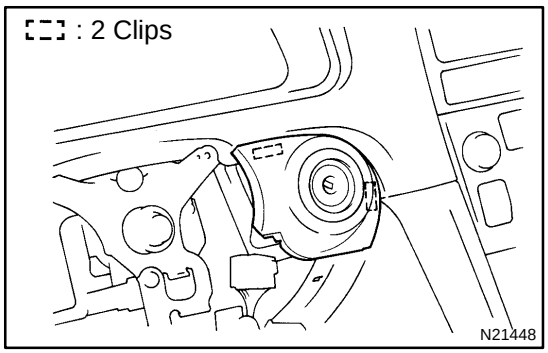
(a) Steering column cover
(b) Combination switch



4. REMOVE NO.1 LOWER PANEL

(a) Remove the 2 screws and hood release lever.
(b) Remove the bolt, screw and No.1 lower panel, then disconnect the connectors.

5. REMOVE LOWER LH PANEL

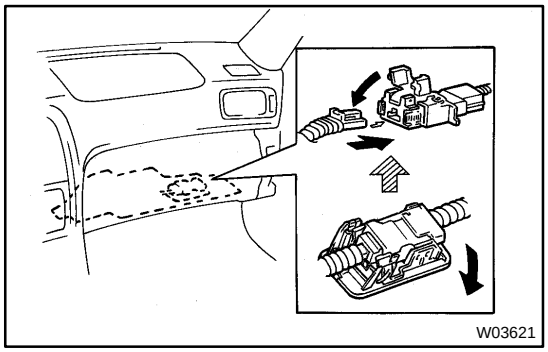


6. REMOVE LOWER FINISH PANEL

Using a screwdriver, remove the lower finish panel.

7. REMOVE THESE PARTS:

(a) Cluster finish panel
(b) Combination meter



8. REMOVE NO.2 UNDER COVER

(a) Using a screwdriver, remove the lower cover.

HINT:

Tape the screwdriver tip before use.

(b) Pull up the connector.
(c) Disconnect the passenger airbag connector.

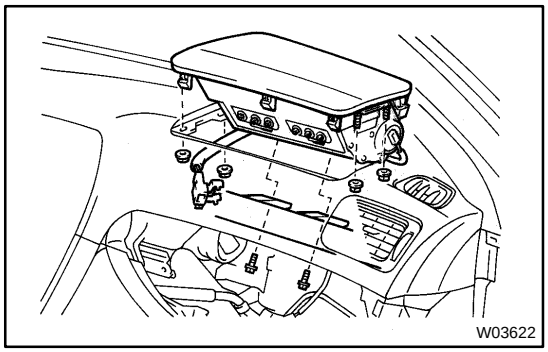
NOTICE:

When disconnecting the passenger airbag connector take care not to damage the airbag wire harness.

(d) Remove the No.2 under cover.

9. REMOVE THESE PARTS:

(a) Lower panel
(b) Finish upper panel
(c) CD changer assembly
(d) Lower No.1 finish panel retainer

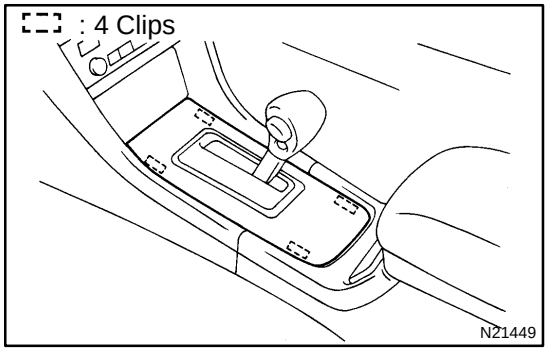


10. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY (See page RS–21)

(a) Remove the 2 bolts from the instrument panel reinforcement.
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)
(b) Remove the 4 nuts and front passenger airbag assembly.

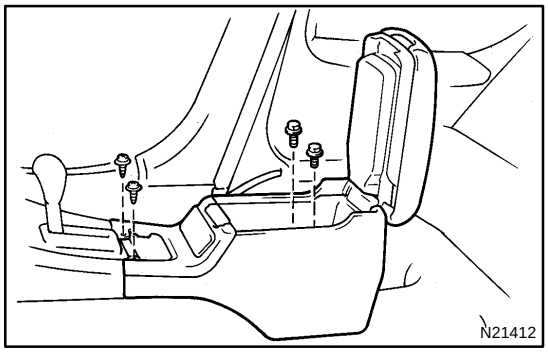
CAUTION:
Do not store the front passenger airbag assembly with the airbag deployment direction facing down. Never disassemble the front passenger airbag assembly.

NOTICE:
At the time of installation, please refer to the following item. Make sure that the front passenger airbag assembly is installed to the specified torque. When installing the instrument panel, take care that the airbag wire harness does not interfere with other parts and is not pinched between other parts.



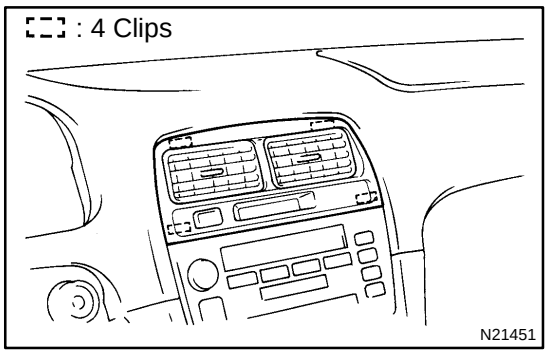
11. REMOVE UPPER CONSOLE PANEL

Using a screwdriver, remove the upper console panel.
HINT:
Tape the screwdriver tip before use.



12. REMOVE REAR CONSOLE BOX

(a) Remove the box bottom No.2 mat.
(b) Remove the 2 bolts, 2 screws and rear console box, then disconnect the connector.
(c) Remove the rear cup holder and rear ash receptacle.

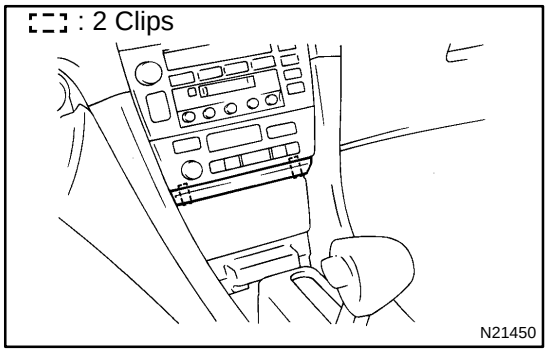


13. REMOVE END CLUSTER FINISH PANEL

Using a screwdriver, remove the panel.

HINT:

Tape the screwdriver tip before use.



14. REMOVE CENTER CLUSTER FINISH PANEL

Using a screwdriver, remove the panel, then disconnect the connectors.

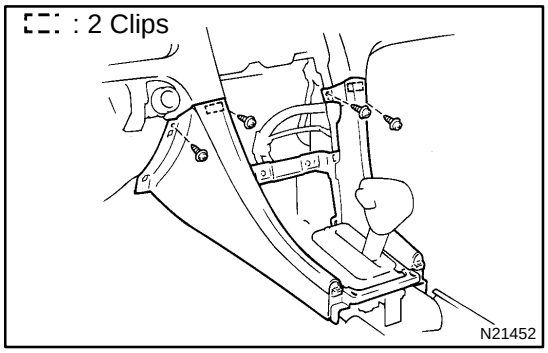
HINT:

Tape the screwdriver tip before use.

15. REMOVE THESE PARTS:

(a) Radio and A/C control panel assembly

(b) Front ash receptacle



16. REMOVE FRONT CONSOLE BOX

Remove the 4 screws and front console box.

17. REMOVE THESE PARTS:

(a) LH and RH floor carpet brackets

(b) Lower No.2 finish panel retainer

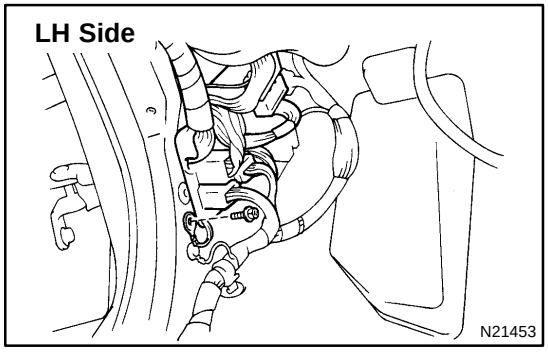
(c) Nozzle side defroster No.1

18. REMOVE INSTRUMENT PANEL SAFETY PAD

(a) Using a screwdriver, remove the No.2 side defroster nozzle.

HINT:

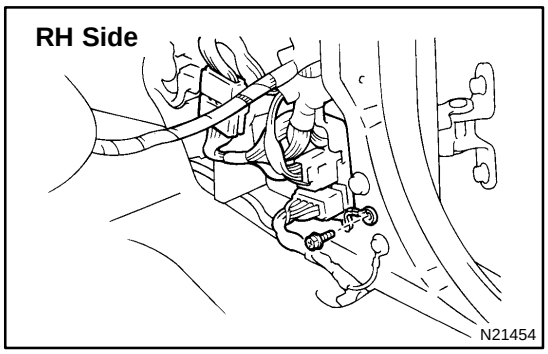
Tape the screwdriver tip before use.



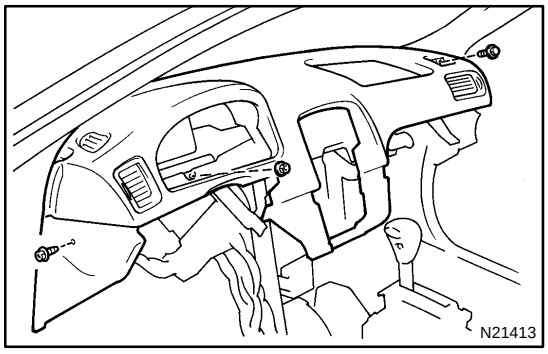
(b) Disconnect the connectors.

(c) Remove the bolt.

(d) Remove the connector holder.



(e) Disconnect the connectors.
(f) Remove the bolt.
(g) Remove the connector holder.



(h) Remove the bolt, nut, screw and safety pad.

19. REMOVE INSTRUMENT PANEL REINFORCEMENT

(a) Remove the nut and No.1 finish panel mounting bracket.
(b) Remove the 4 nuts and No.1 floor brace.
(c) Remove the 2 nuts and No.2 brace.
(d) Remove the bolt, 2 nuts and junction block.
(e) Remove the 3 bolts, 4 nuts and reinforcement.

BO0AT–01

DISASSEMBLY

1. REMOVE THESE PARTS:

(a) Defroster nozzle No.1 garnish
(b) Side defroster nozzle No.1 duct
(c) Side defroster nozzle No.2 duct
(d) Defroster nozzle
(e) Heater to register No.1 duct
(f) Heater to register No.3 duct
(g) Heater to register No.2 duct
(h) No.1 register
(i) No.3 register
(j) Center bracket

2. REMOVE INSTRUMENT PANEL WIRE

Remove the screws, clips and wire.

BO0AU–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–86).

BO0AV–01

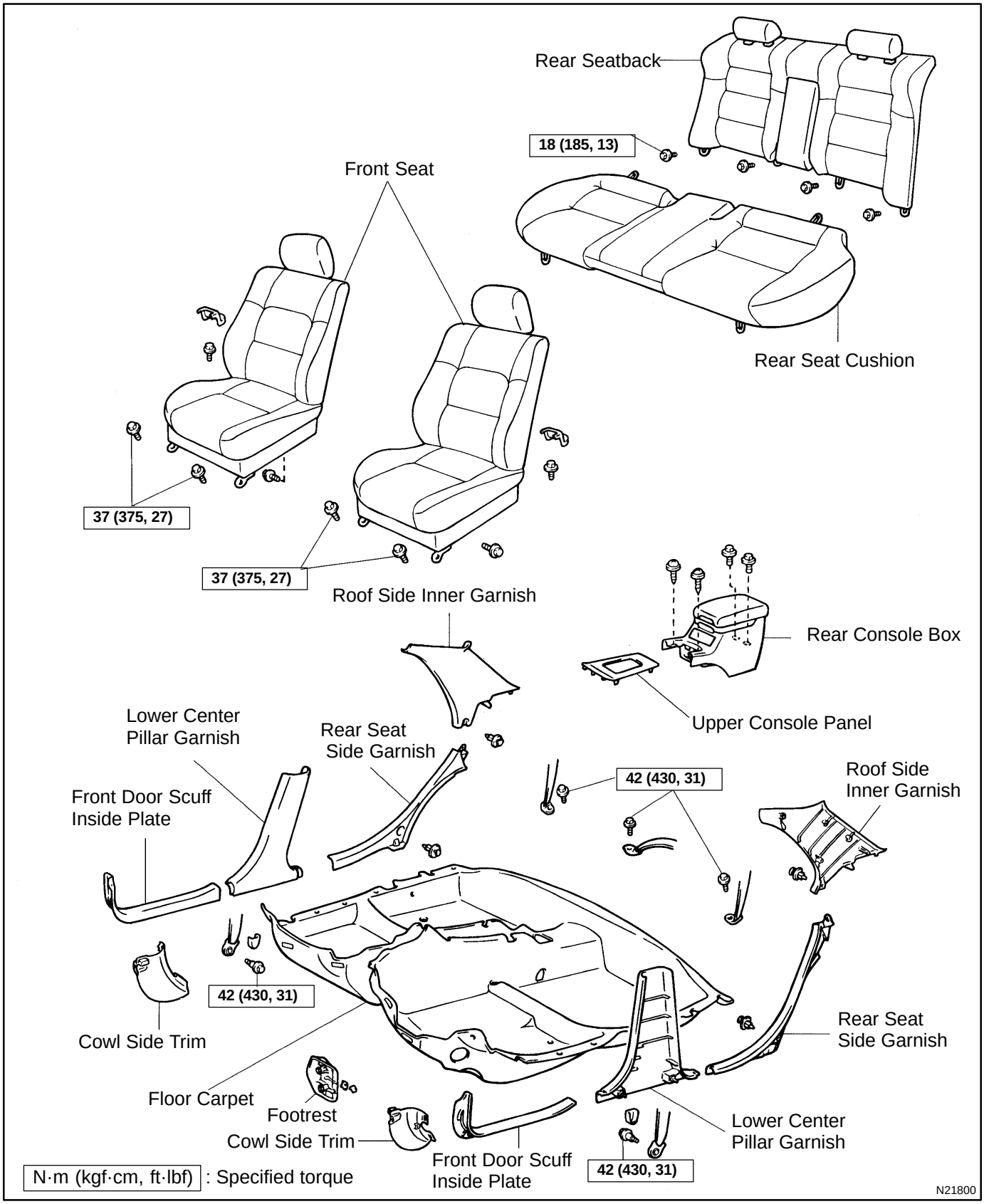
INSTALLATION

Installation is in the reverse order of removal (See page BO–82).

FLOOR CARPET

COMPONENTS

BO0AW–03

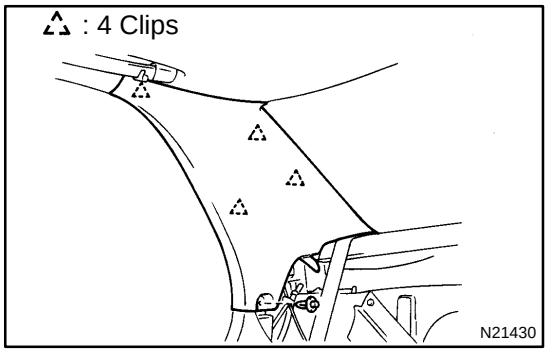


BO0AX–01

REMOVAL

1. REMOVE THESE PARTS:

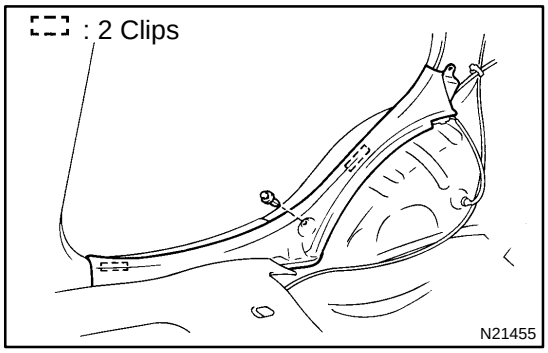
(a) Front seat
(b) Rear seat cushion
(c) Rear seat belt lower side bolts
(d) Rear seatback
(e) Front door scuff inside plate
(f) Cowl side trim
(g) Front seat belt floor anchor bolt



2. REMOVE ROOF SIDE INNER GARNISH

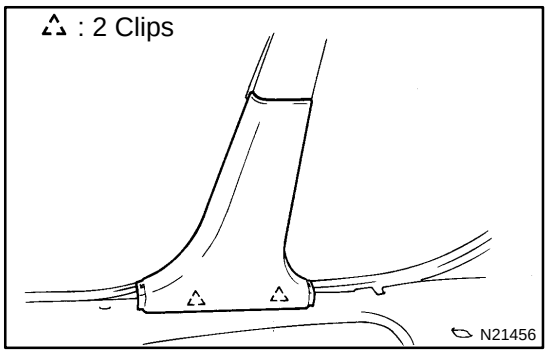
(a) Remove the clip.
(b) Using a screwdriver, pry loose and remove the garnish.

HINT:
Tape the screwdriver tip before use.



3. REMOVE REAR SEAT SIDE GARNISH

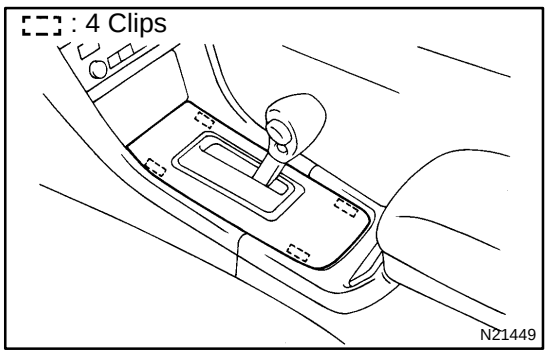
(a) Remove the clip.
(b) Pry loose and remove the garnish.



4. REMOVE LOWER CENTER PILLAR GARNISH

Using a screwdriver, pry off the garnish.

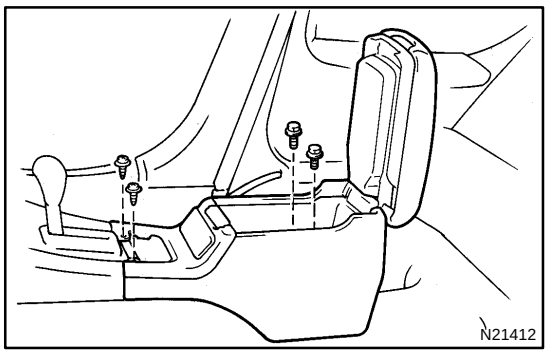
HINT:
Tape the screwdriver tip before use.



5. REMOVE UPPER CONSOLE PANEL

Using a screwdriver, remove the upper console panel.

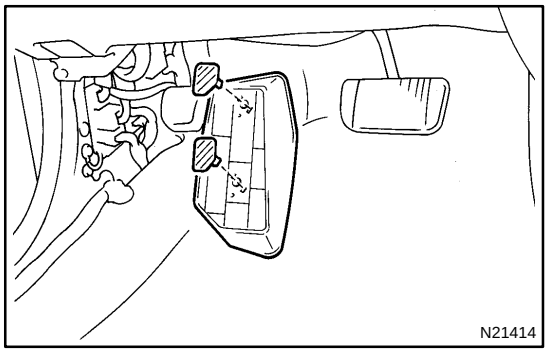
HINT:
Tape the screwdriver tip before use.



6. REMOVE REAR CONSOLE BOX

(a) Remove the box bottom No.2 mat.

(b) Remove the 2 bolts, 2 screws and rear console box.



7. REMOVE FOOTREST

(a) Using a screwdriver, remove the 2 covers.

HINT:

Tape the screwdriver tip before use.

(b) Unfasten 2 screws and remove the footrest.

8. REMOVE FLOOR CARPET

Slide the carpet backward and remove it.

BO0AY–01

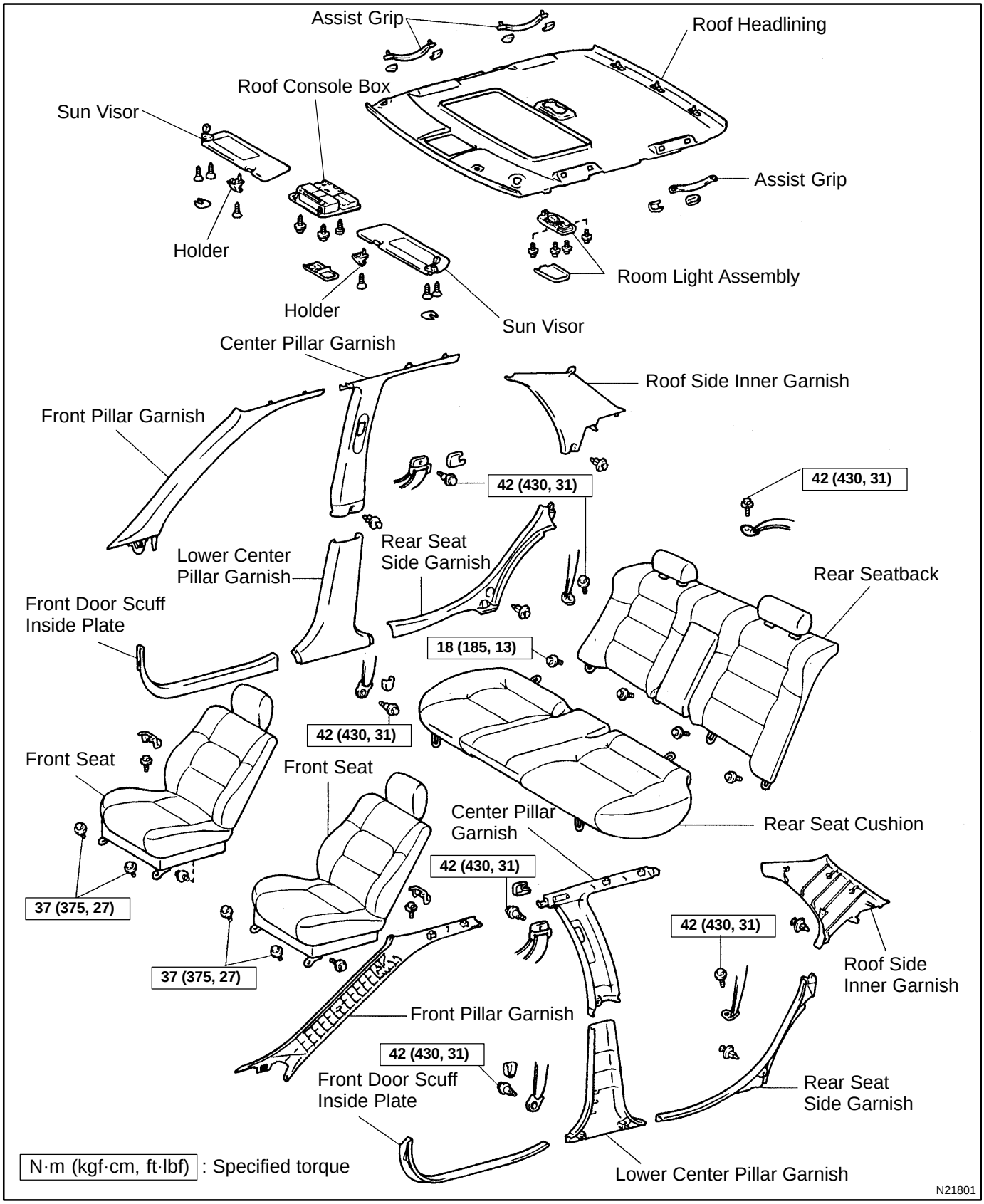
INSTALLATION

Installation is in the reverse order of removal (See page BO–90).

ROOF HEADLINING

BO0AZ–04

COMPONENTS

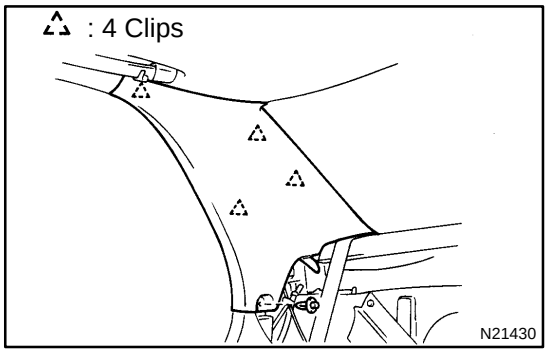


BO0B0–01

REMOVAL

1. REMOVE THESE PARTS:

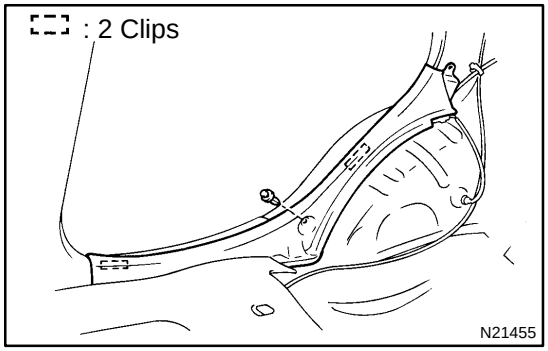
(a) Front seat
(b) Rear seat cushion
(c) Rear seat belt lower side bolts
(d) Rear seatback
(e) Front door scuff inside plate
(f) Front seat belt shoulder anchor bolts
(g) Sun visors and holders
(h) Assist grips



2. REMOVE ROOF SIDE INNER GARNISH

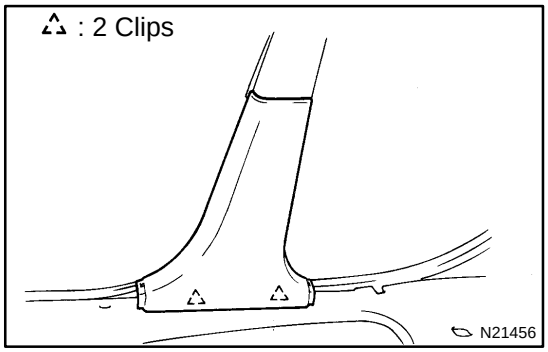
(a) Remove the clip.
(b) Using a screwdriver, pry loose and remove the garnish.

HINT:
Tape the screwdriver tip before use.



3. REMOVE REAR SEAT SIDE GARNISH

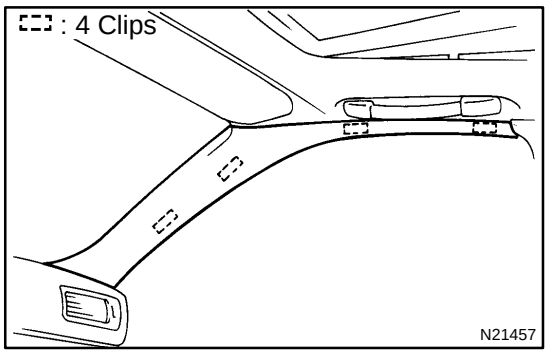
(a) Remove the clip.
(b) Pry loose and remove the garnish.



4. REMOVE LOWER CENTER PILLAR GARNISH

Using a screwdriver, pry off the garnish.

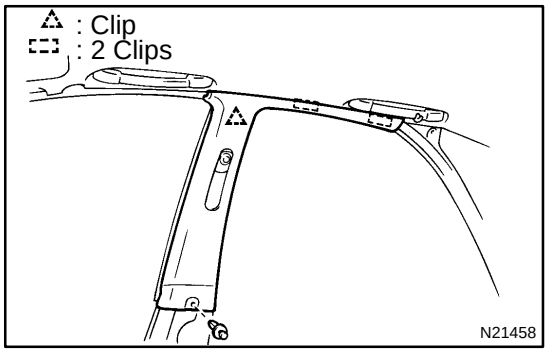
HINT:
Tape the screwdriver tip before use.



5. REMOVE FRONT PILLAR GARNISH

(a) Pry out clips by your hand.

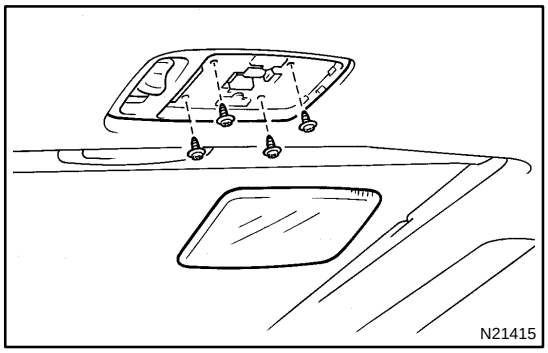
(b) Pull the garnish upward to remove it.



6. REMOVE CENTER PILLAR GARNISH

(a) Remove the clip.

(b) Pry off the garnish.



7. REMOVE ROOM LIGHT

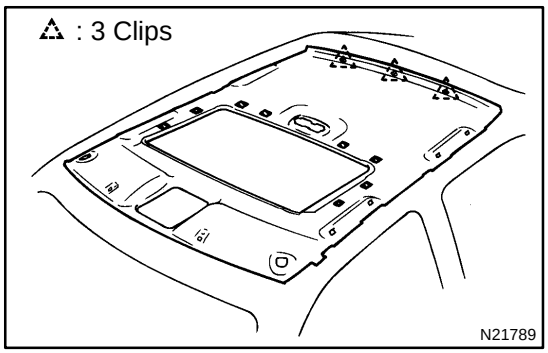
(a) Using a screwdriver, remove the room light lens.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 4 screws, then disconnect the connector.

8. REMOVE ROOF CONSOLE BOX



9. REMOVE ROOF HEADLINING

(a) Disconnect the 3 clips from the roof panel rear end.

(b) Remove the headlining.

(c) Bring out the headlining.

BO0B1–01

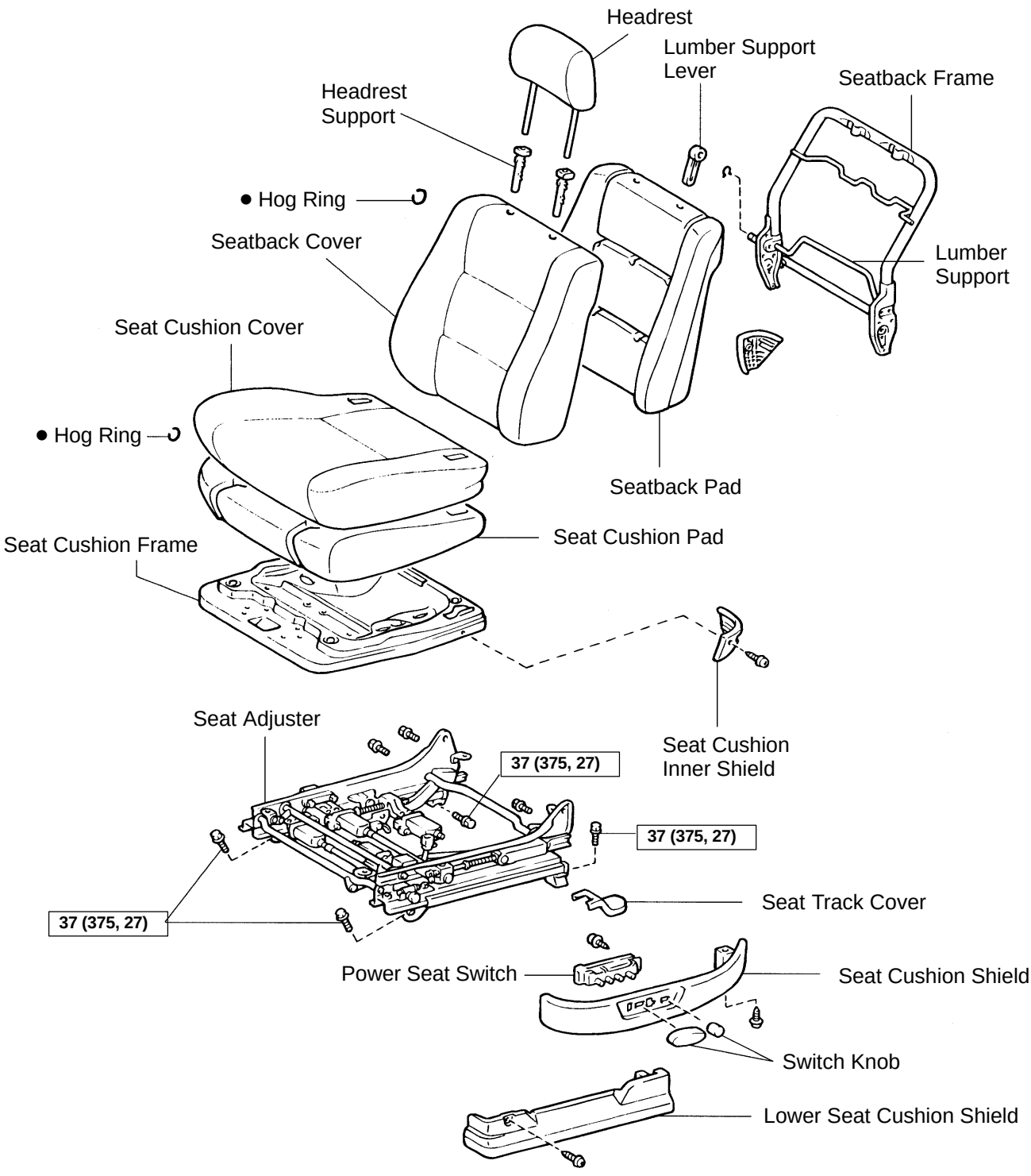
INSTALLATION

Installation is in the reverse order of removal (See page BO–94).

FRONT SEAT

COMPONENTS

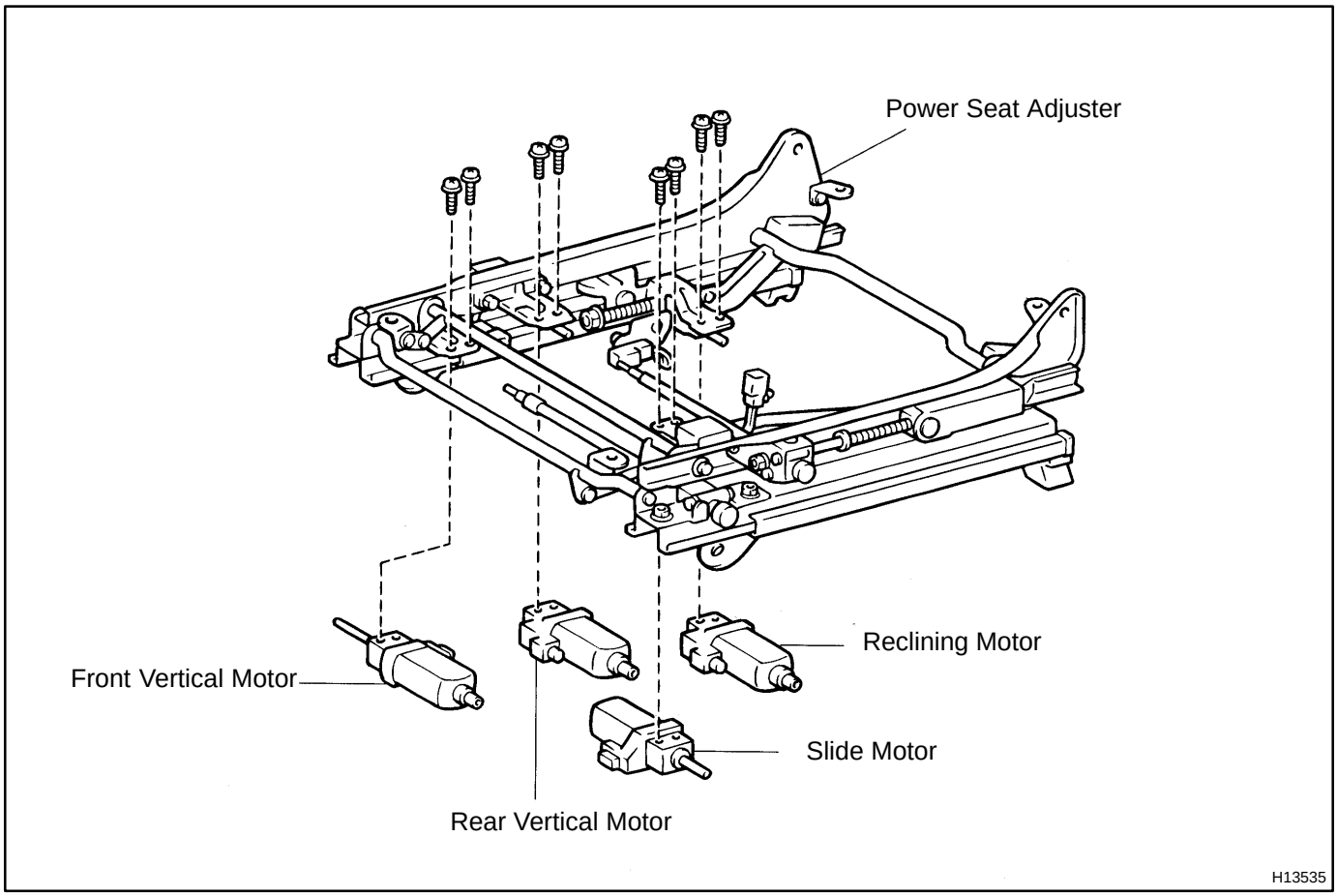
BO3E9–01



N·m (kgf·cm, ft·lbf) : Specified torque

● Non–reusable part

H13534


Power Seat Adjuster
Reclining Motor
Front Vertical Motor
Slide Motor
Rear Vertical Motor
H13535

BO0B3–01

REMOVAL

REMOVE FRONT SEAT

(a) Using a screwdriver, remove the seat track covers.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 4 bolts.

(c) Disconnect the connector.

(d) Remove the front seat.

NOTICE:

Be careful not to damage the body.

BO3EC–01

DISASSEMBLY

1. REMOVE THESE PARTS:

(a) Headrest
(b) Switch knobs
(c) Seat cushion shield
(d) Seat cushion inner shield

2. REMOVE SEATBACK ASSEMBLY

3. REMOVE SEATBACK COVER

(a) Remove the headrest supports.
(b) Remove the hog rings and seatback frame from seatback cover with pad.
(c) Remove the hog rings and seatback cover from seatback pad.

4. REMOVE LUMBER SUPPORT LEVER

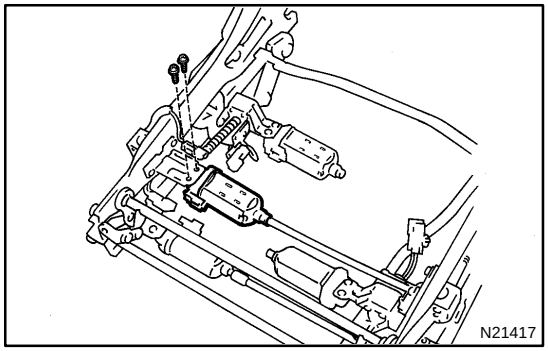
5. REMOVE SEAT CUSHION ASSEMBLY

Remove the 4 bolts and seat cushion assembly.

6. REMOVE SEAT CUSHION COVER

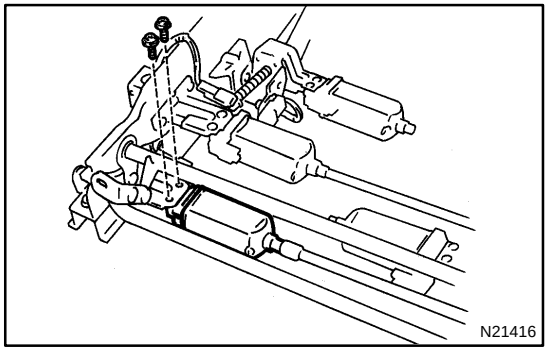
(a) Remove the hog rings, hook and seat cushion frame from seat cushion cover with pad.
(b) Remove the hog rings and seat cushion cover from the seat cushion pad.

7. REMOVE LOWER SEAT CUSHION SHIELD



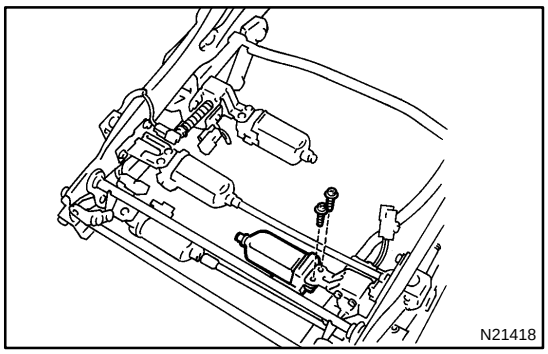
8. REMOVE REAR VERTICAL MOTOR

Remove the 2 screws and front vertical motor.



9. REMOVE FRONT VERTICAL MOTOR

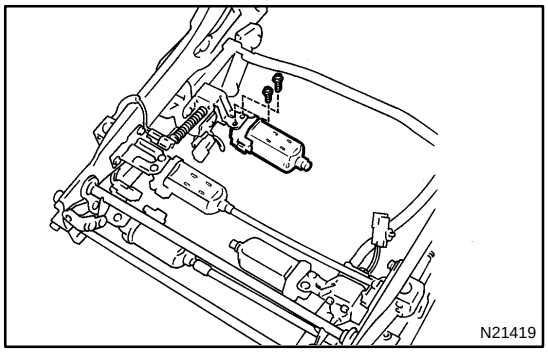
Remove the 2 screws and rear vertical motor.



10. REMOVE SLIDE MOTOR

(a) Remove the 2 screws.

(b) Disconnect the No.1 drive cable, then remove the slide motor.



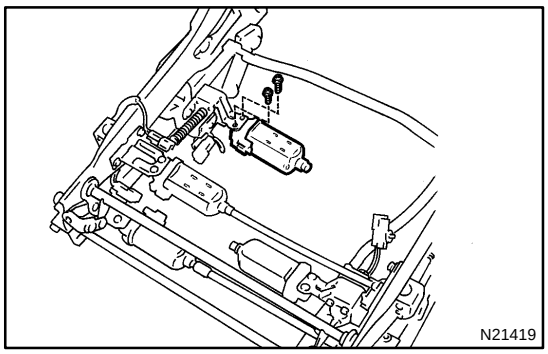
11. REMOVE RECLINING MOTOR

(a) Remove the 2 screws.

(b) Disconnect the No.2 drive cable, then remove the reclining motor.

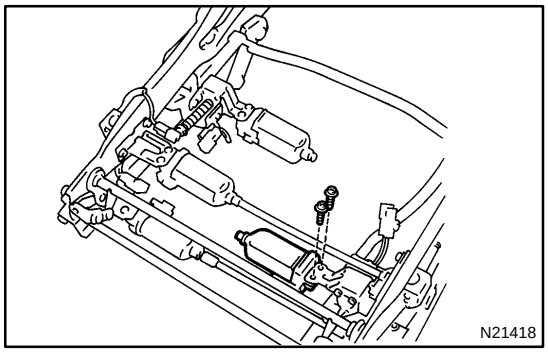
BO3EE–01

REASSEMBLY



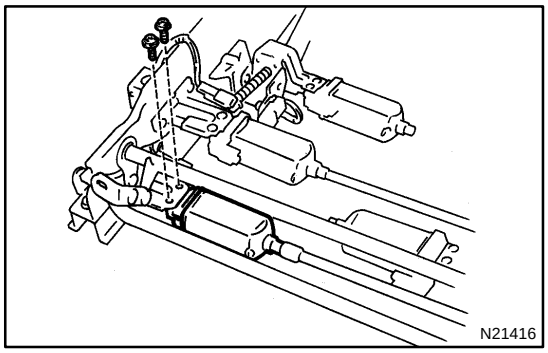
1. INSTALL RECLINING MOTOR

Connect the No.2 drive cable, then install the reclining motor with 2 screws.



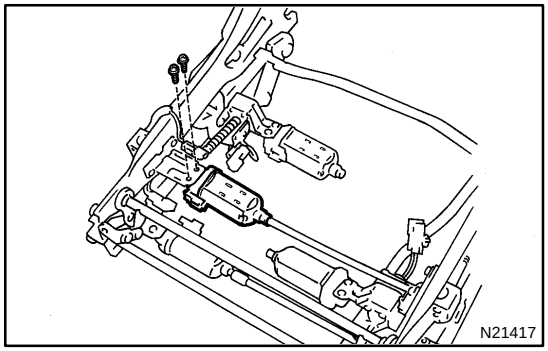
2. INSTALL SLIDE MOTOR

Connect the No.1 drive cable, then install the slide motor with 2 screws.



3. INSTALL FRONT VERTICAL MOTOR

Install the rear vertical motor with 2 screws.



4. INSTALL REAR VERTICAL MOTOR

Install the front vertical motor with 2 screws.

5. INSTALL LOWER SEAT CUSHION SHIELD

6. INSTALL SEAT CUSHION COVER

(a) Install the seat cushion cover with new hog rings to seat cushion pad.

(b) Install the seat cushion cover with pad to the seat cushion frame with new hog rings.

HINT:

Install the hog rings to prevent wrinkles as least as possible.

7. INSTALL SEAT CUSHION ASSEMBLY

Install the seat cushion assembly with 4 bolts.

8. INSTALL SEATBACK COVER

(a) Install the seatback cover with new hog rings to the seatback pad.

HINT:

Install the hog rings to prevent wrinkles as least as possible.

(b) Install the seatback cover with pad to the seatback frame with new hog rings.

HINT:

Install the hog rings to prevent wrinkles as least as possible.

(c) Install the headrest supports.

9. INSTALL SEATBACK ASSEMBLY

10. INSTALL THESE PARTS:

(a) Seat cushion inner shield

(b) Seat cushion shield

(c) Switch knobs

(d) Headrest

BO0B6–01

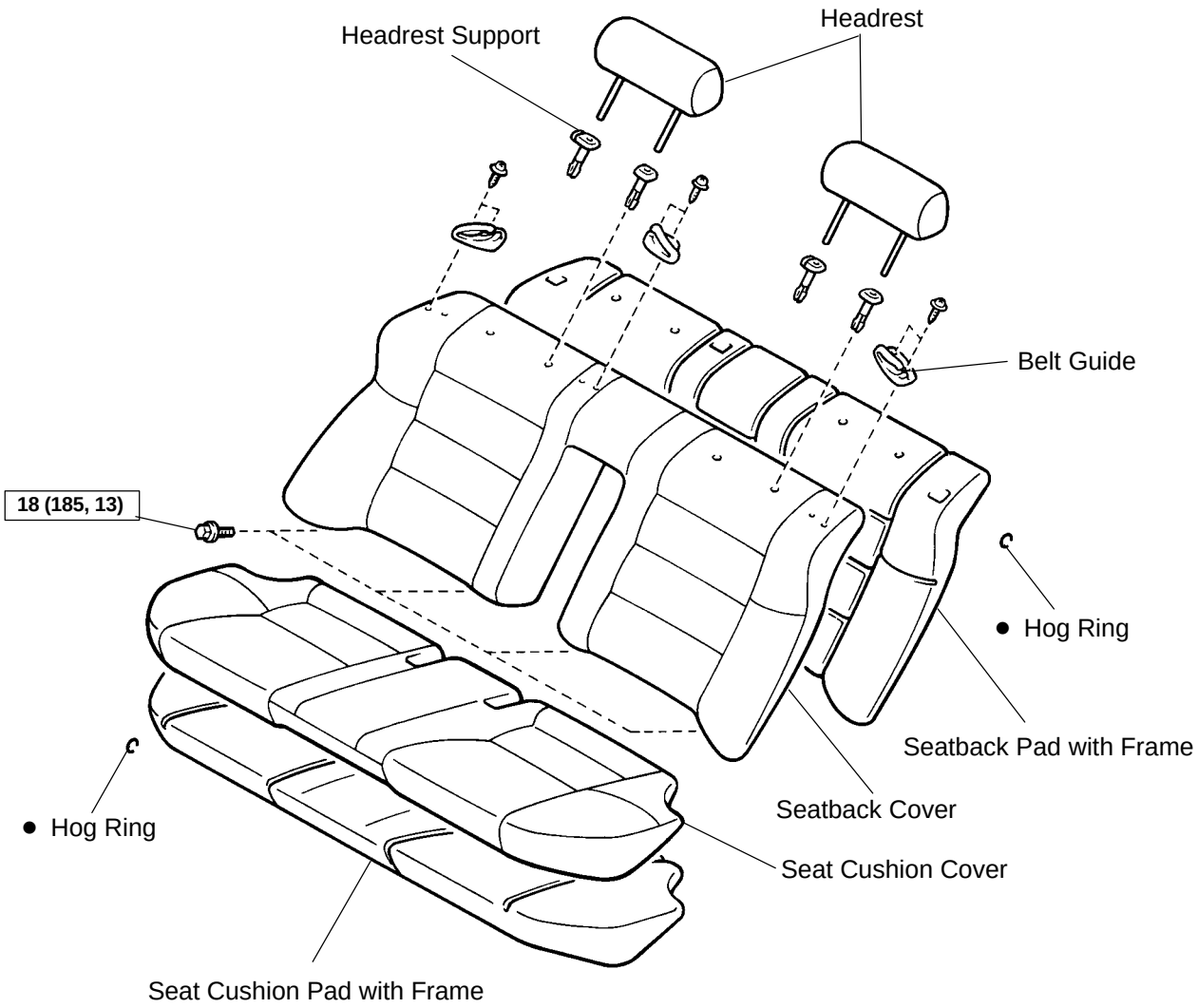
INSTALLATION

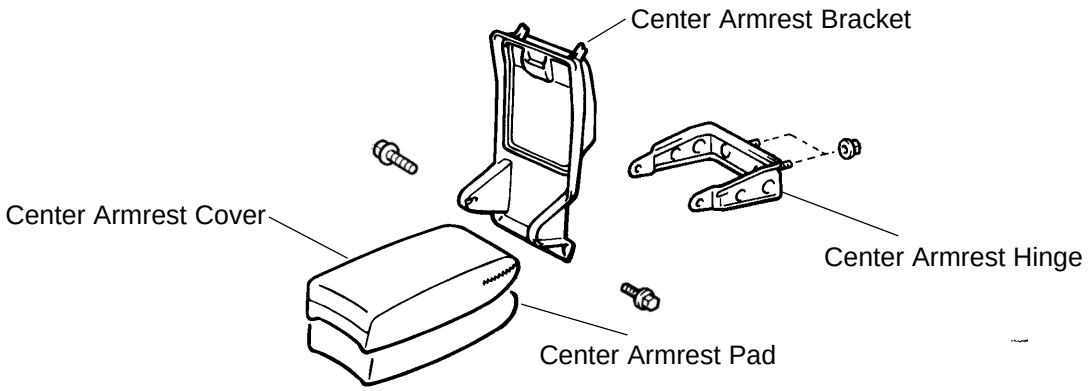
Installation is in the reverse order of removal (See page BO–99).

REAR SEAT

COMPONENTS

BO0B7–05



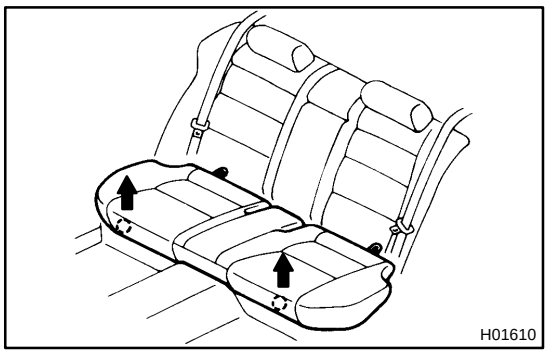


N·m (kgf·cm, ft·lbf) : Specified torque
● Non–reusable part

H01613

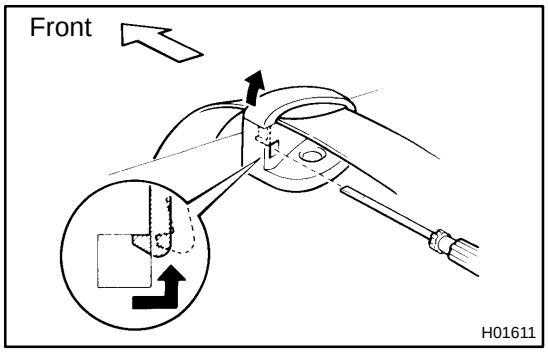
BO0B8–01

REMOVAL



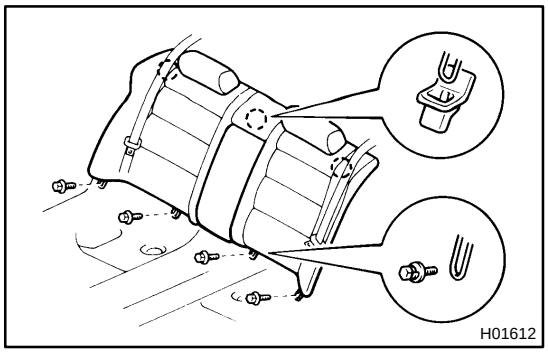
1. REMOVE SEAT CUSHION ASSEMBLY

Remove the seat cushion assembly as shown in the illustration.



2. REMOVE SEATBACK ASSEMBLY

(a) Using a screwdriver, remove the rear seat belt from the belt guide as shown in the illustration.



(b) Remove the 4 bolts, then raise the seatback assembly upward to remove the seatback assembly.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

BO0B9–01

DISASSEMBLY

1. REMOVE BELT GUIDE

Remove the 6 screws and 3 belt guides.

2. REMOVE SEATBACK COVER

(a) Remove the 2 headrests.

(b) Remove the 4 headrest supports.

(c) Remove the hog rings and seatback cover from the seatback pad.

3. REMOVE SEAT CUSHION COVER

Remove the hog rings and seat cushion cover from the seat cushion pad.

BO0BA–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–107).

BO0BB–01

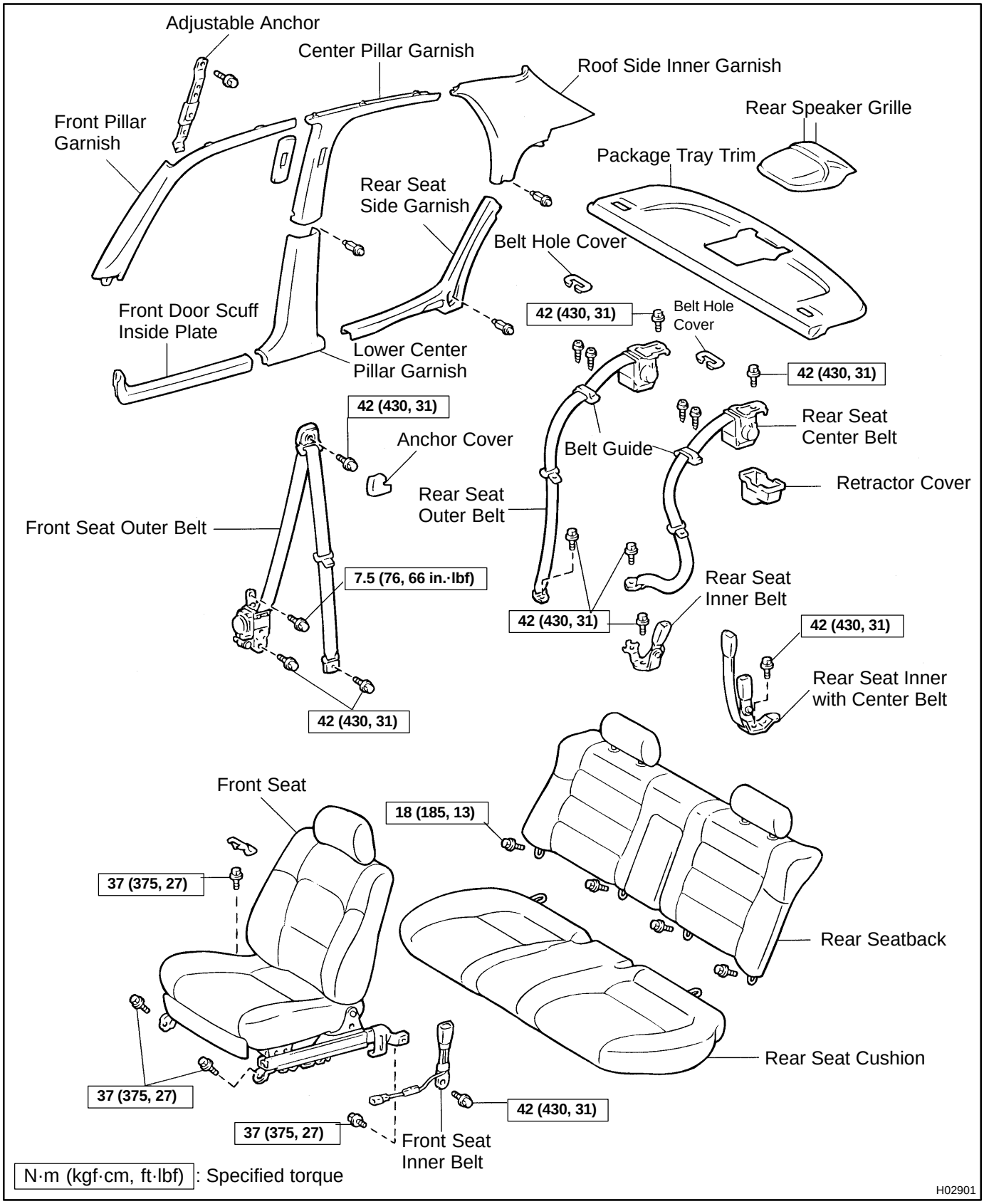
INSTALLATION

Installation is in the reverse order of removal (See page BO–106).

SEAT BELT

COMPONENTS

BO0BC–04



BO0BD–04

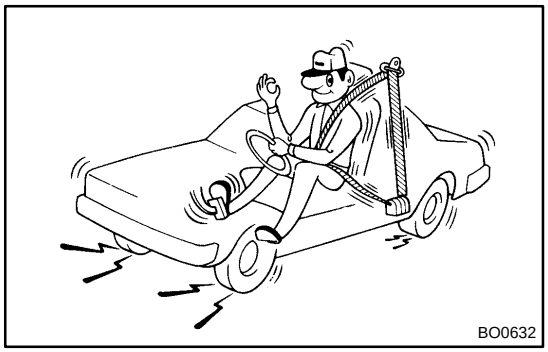
INSPECTION

CAUTION:

Replace the seat belt assembly (outer belt, inner belt, bolts, nuts or sill–bar) if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.

1. RUNNING TEST (IN SAFE AREA)

(a) Fasten the front seat belts.


BO0632

(b) Drive the car at 10 mph (16 km/h) and slam on the brakes. Check that the belt locks and cannot be extended at this time.

HINT:

Conduct this test in a safe area. If the belt does not lock, remove the belt mechanism assembly and conduct the following static check. Also, whenever installing a new belt assembly, verify the proper operation before installation.

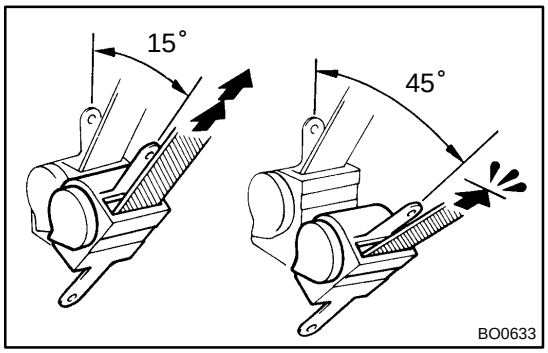
2. Driver's seat belt (ELR):

STATIC TEST

(a) Make sure that the belt locks when pulled out quickly.

(b) Remove the locking retractor assembly.

(c) Tilt the retractor slowly.



BO0633

(d) Make sure that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out over 45 degrees of tilt.

If a problem is found, replace the assembly.

3. Except driver's seat belt (ALR/ELR):

STATIC TEST

(a) Make sure that the belt locks when pulled out quickly.

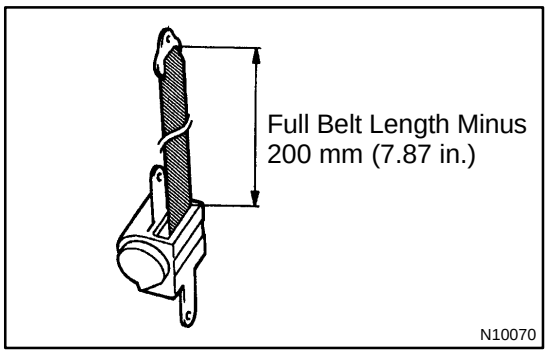
(b) Remove the locking retractor assembly.

(c) Pull out the whole belt and measure the length of the whole belt.

Then retract the belt slightly and pull it out again

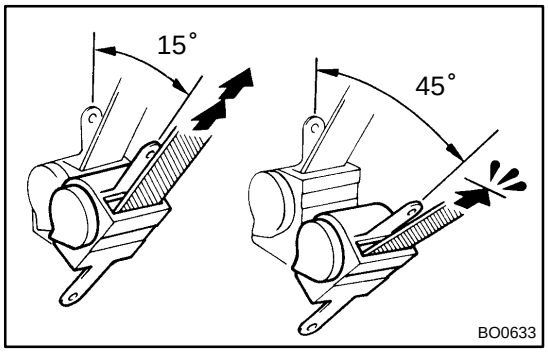
(d) Make sure that the belt cannot be extended further.

If a problem is found, replace the assembly.



(e) Retract the whole belt, then pull out the belt until 200 mm (7.87 in.) of belt remains retracted.

(f) Tilt the retractor slowly.



(g) Make sure that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out at over 45 degrees of tilt.

If a problem is found, replace the assembly.

SEAT BELT PRETENSIONER

BO3EM–01

REMOVAL

CAUTION:

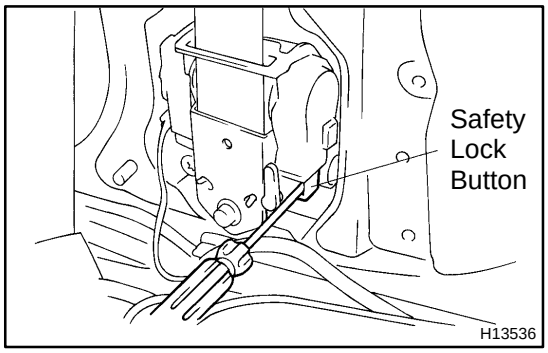
When removing the seat belt pretensioner, always place it on a flat, stable surface.

NOTICE:

- **If the seat belt pretensioner has been dropped or damaged, replace it with a new one.**
- **Never install a seat belt pretensioner which has been used in another vehicle. When replacing a seat belt pretensioner, always install a new one.**

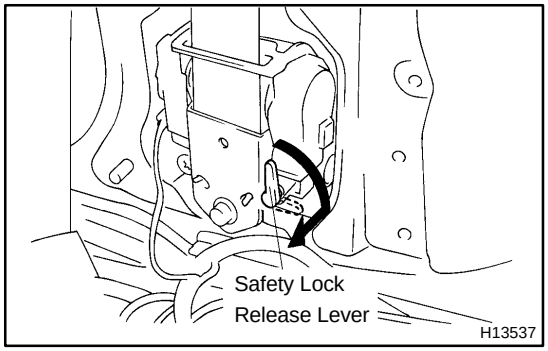
1. REMOVE THESE PARTS:

(a) Front door scuff inside plate
(b) Roof side inner garnish
(c) Rear seat side garnish
(d) Power center pillar garnish

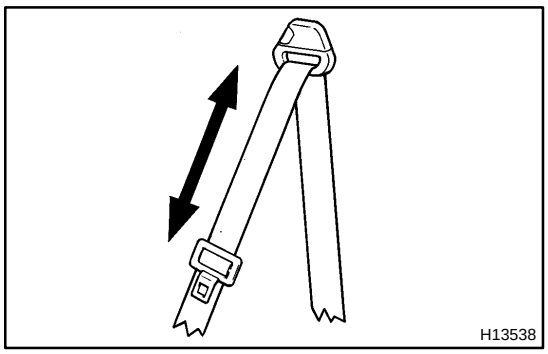


2. REMOVE FRONT SEAT OUTER BELT

(a) Look the sensor by pushing in the safety lock button with a screwdriver.



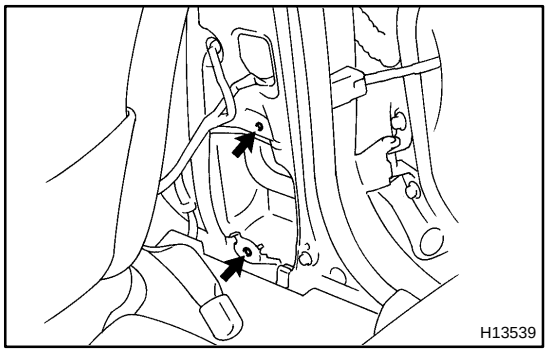
(b) Turn the safety lock release lever as shown in the illustration.
(c) Remove the 4 bolts and front seat outer belt.



INSPECTION

1. INSPECT SEAT BELT PRETENSIONER ACTIVATION

Replace the seat belt if the seat belt cannot be drawn out or does not retract.



2. INSPECT SEAT BELT PRETENSIONER MOUNT BO3EN–01

Remove the seat belt pretensioner and check for deformation of the mount. If you find any deformation, repair the mount.

BO3EP–01

DISPOSAL

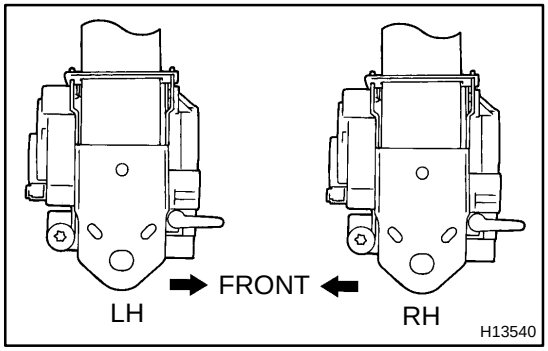
HINT:

When scrapping vehicles equipped with a pretensioner or disposing of a front seat outer belt (with seat belt pretensioner), always first activate the seat belt pretensioner in accordance with the procedure described below. If any abnormality occurs with the seat belt pretensioner operation, contact the SERVICE DEPT. of the DISTRIBUTOR.

CAUTION:

- **Never dispose of a front seat outer belt (with seat belt pretensioner) which has inactivated pretensioner.**
- **Then seat belt pretensioner produces a sizeable exploding sound when it activates, so perform the operation outdoors where it will not create a nuisance to nearby residents.**
- **Activate the seat belt pretensioner in a safe place outdoors, on a flat concrete area.**
- **After unlocking the sensor, take care not to jolt or drop the seat belt pretensioner.**
- **Use gloves and safety glasses when handling a activated seat belt pretensioner.**
- **Always stand at least 5 m (16 ft) away from the seat belt pretensioner when activating it.**
- **Then activated seat belt pretensioner is very hot, so wait 30 minutes for it cool down. Do not splash water on it at all.**
- **Put the seat belt pretensioner in a vinyl bag, seal the bag and dispose of it.**
- **Seat belt pretensioners should always be activated before disposal.**

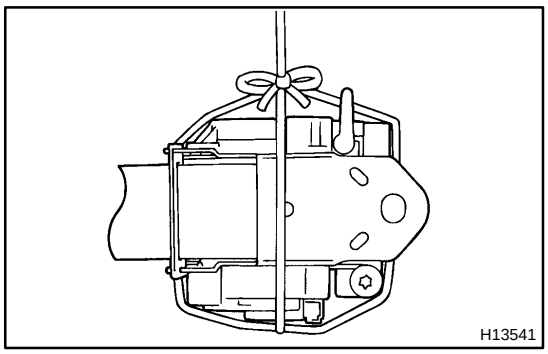
1. REMOVE FRONT SEAT OUTER BELT
(See page BO–113)



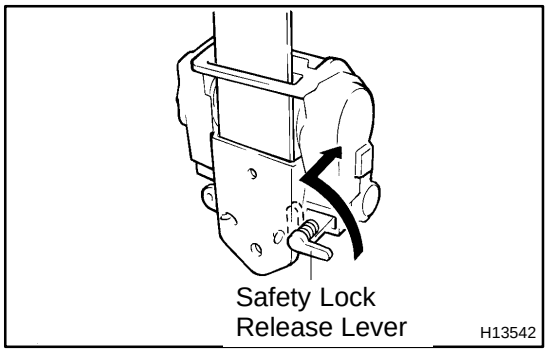
2. PREPARATION FOR ACTIVATING SEAT BELT PRETENSIONER

(a) Cut the belt off near the seat belt retractor.

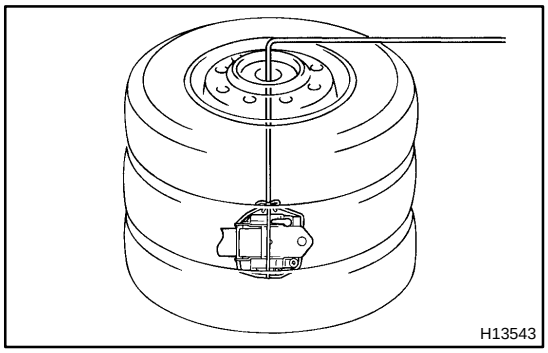
(b) Check that which side of the seat of the seat belt pretensioner is the vehicle front side.



(c) As shown in the illustration, tie the seat belt pretensioner so that the vehicle front side of the pretensioner is facing downward and that the pretensioner is horizontal.



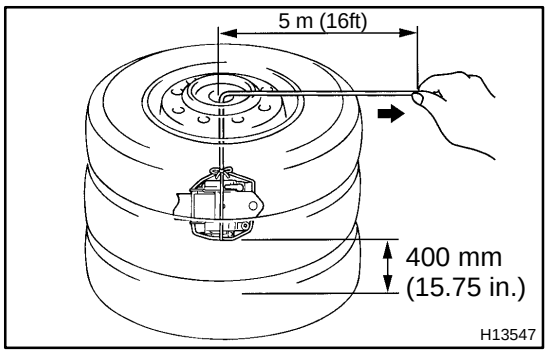
(d) Unlock the sensor by operating in he safety lock release lever as shown in the illustration.



(e) Pile 2 tires and 1 tire with wheel around the seat belt pretensioner. Pass the cord the through the wheel of the top tire.

CAUTION:

So not apply any shock to the seat belt pretensioner.

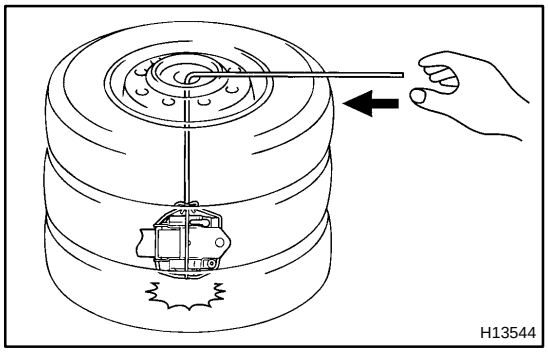


3. ACTIVE SEAT BELT PRETENSIONER

(a) Stand at least 5 m (16 ft) away from the seat belt pretensioner and pull the pretensioner 400 mm (15.75 in.) off the ground.

CAUTION:

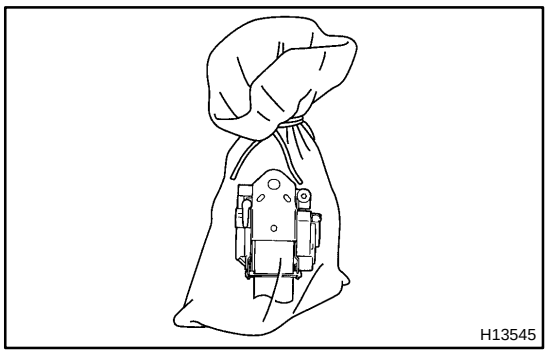
- **Before pulling the seat belt pretensioner up, check that the area around the tires is safe.**
- **Before activating the seat belt pretensioner, always warm anyone near by in a loud voice.**



(b) Release the cord and drop the seat belt pretensioner.

CAUTION:

The activated seat pelt pretensioner is very hot, so wait 30 minutes for it to cool down. Do not splash water on it at all. If the sensor lock is not fully released or if the seat belt pretensioner is not suspended horizontally, the seat belt pretensioner may not activate. If this occurs, avoid any shocks to the pretensioner, lock the sensor and do the activation precess again from the start.



4. DISPOSAL OF SEAT BELT PRETENSIONER

Put the seat belt pretensioner in a vinyl bag, seal the bag and dispose of it.

CAUTION:

- **Use gloves and safety glasses when handling a deployed seat belt pretensioner.**
- **Always wash your hands after completing disposal of the seat belt pretensioner.**

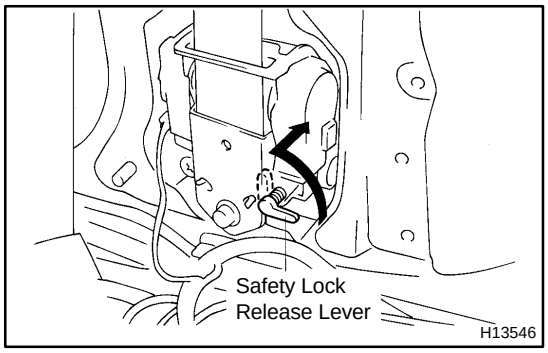
BO0BH–05

INSTALLATION

1. INSTALL FRONT SEAT OUTER BELT

(a) Install the front seat outer belt retractor
Torque:
Upper bolt: 7.5 N·m (76 kgf·cm, 66 in.·lbf)
Lower bolt: 42 N·m (430 kgf·cm, 31 ft·lbf)

(b) Install the front seat outer belt shoulder anchor and floor anchor bolts.
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)



(c) Unlock the sensor by operating in the safety lock release lever as shown in the illustration.

2. INSTALL THESE PARTS:

(a) Lower center pillar garnish
(b) Rear seat side garnish
(c) Roof side inner garnish
(d) Front door scuff inside plate

BODY ELECTRICAL SYSTEM

BE04P–01

PRECAUTION

HINT:

Take care to observe the following precautions when performing inspections or removal and replacement of body electrical related parts.

1. HEADLIGHT SYSTEM

Halogen bulbs have pressurized gas inside and require special handling. They can burst if scratched or dropped. Hold a bulb only by its plastic or metal case. Don't touch the glass part of a bulb with bare hands.

2. SRS (SUPPLEMENTAL RESTRAINT SYSTEM)

The LEXUS ES300 is equipped with an SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

3. AUDIO SYSTEM

- If the negative (–) terminal cable is disconnected from the battery, the preset AM, FM 1 and FM 2 stations stored in memory are erased, so make sure to note the stations and reset them after the negative (–) terminal cable is reconnected to the battery.
- If the negative (–) terminal cable is disconnected from the battery, the "ANTI–THEFT SYSTEM" will operate when the cable is reconnected, but the radio, tape player and CD player will not operate. Be sure to input the correct ID number so that the radio, tape player and CD player can be operated again.

4. MOBILE COMMUNICATION SYSTEM

If the vehicle is equipped with a mobile communication system, refer to precautions in the IN section.

BE04Q–09

PROBLEM SYMPTOMS TABLE

1. POWER OUTLET

Symptom	Suspect Area	See page
Electric power source cannot be taken out of the power outlet.	1. Battery 2. POWER OUTLET Fuse (Instrument Panel J/B) 3. Wire Harness	– – –

2. HEADLIGHT AND TAILLIGHT SYSTEM (USA):

Symptom	Suspect Area	See page
Headlight does not light. (Taillight is normal)	1. HEAD (LH, RH) Fuse (E/G Room J/B) 2. Headlight Control Relay (E/G Room J/B) 3. Headlight Bulbs 4. Wire Harness	– – – –
Headlight does not light. (Taillight does not light up)	1. Integration Relay (Instrument Panel J/B) 2. Light Control Switch 3. Wire Harness	BE–20 BE–27 –
Only one side light does not light.	1. HEAD (LH, RH) Fuse (E/G Room J/B) 2. Headlight Bulbs 3. Wire Harness	– – –
”Lo–Beam” does not light.	1. Light Control Switch 2. Headlight Dimmer Switch 3. Headlight Bulbs 4. Wire Harness	BE–27 BE–27 – –
”Hi–Beam” does not light.	1. Light Control Switch 2. Headlight Dimmer Switch 3. Headlight Bulbs 4. Wire Harness	BE–27 BE–27 – –
”Flash” does not light.	1. Headlight Dimmer Switch 2. Wire Harness	BE–27 –
”Auto Turn–off system” does not operate.	1. Integration Relay (Instrument Panel J/B) 2. GAUGE Fuse (Instrument Panel J/B) 3. Ignition Switch 4. Door Courtesy Switch (Driver’s) 5. Wire Harness 6. DOME Fuse (E/G Room J/B)	BE–20 – BE–20 BE–46 – –
Taillight does not light. (Headlight does not light)	1. Light Control Switch 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness	BE–27 BE–20 –
Taillight does not light. (Headlight is normal)	1. TAIL Fuse (Instrument Panel J/B) 2. Taillight Control Relay (Instrument Panel J/B) 3. Wire Harness	– BE–27 –
Only one side light does not light.	1. Bulb 2. Wire Harness	– –
Rear Combination light does not light.	1. Wire Harness 2. Light Failure Sensor 3. Bulb	– BE–92 –
”Light Auto Turn–off system” does not operate.	1. Integration Relay 2. Wire Harness 3. DOME Fuse (E/G Room J/B) 4. Door Courtesy Switch (Driver’s)	BE–20 – – BE–46

3. HEADLIGHT AND TAILLIGHT SYSTEM (CANADA):

Symptom	Suspect Area	See page
Headlight does not light. (Taillight is normal)	1. Wire Harness	–
Headlight does not light. (Taillight does not light up)	1. Wire Harness	–
Only one side light does not light.	1. Headlight Bulb 2. Wire Harness	– –
”Lo–Beam” does not light.	1. Headlight Control Relay (E/G Room J/B) 2. Light Control Switch 3. Integration Relay (Instrument Panel J/B) 4. Wire Harness 5. HEAD LO (LH, RH) Fuse (E/G Room R/B No.2) 6. Headlight Bulb	BE–27 BE–27 BE–20 – – –
”Hi–Beam” does not light.	1. DRL No.2 Fuse (E/G Room R/B No.2) 2. Daytime Running Light Relay No.2 (E/G Room R/B No.2) 3. Daytime Running Light Relay 4. Daytime Running Light Relay No.3 (E/G Room R/B No.2) 5. Daytime Running Light Relay No.4 (E/G Room R/B No.2) 6. DOME Fuse (E/G Room J/B) 7. Headlight Dimmer Switch 8. Wire Harness 9. HEAD HI (LH, RH) Fuse (E/G Room J/B) 10. Headlight Bulb	– – BE–27 BE–27 – BE–27 – BE–27 – BE–27 – – –
”Flash” does not light.	1. DRL No.2 Fuse (E/G Room R/B No.2) 2. Daytime Running Light Relay No.2 (E/G Room R/B No.2) 3. Daytime Running Light Relay 4. Daytime Running Light Relay No.3 (E/G Room R/B No.2) 5. Daytime Running Light Relay No.4 (E/G Room R/B No.2) 6. DOME Fuse (E/G Room J/B) 7. Headlight Dimmer Switch 8. Wire Harness 9. HEAD HI (LH, RH) Fuse (E/G Room J/B) 10. Headlight Bulb	– – BE–27 BE–27 – BE–27 – BE–27 – BE–27 – – –
”Auto Turn–off System” dose not operate.	1. Integration Relay (Instrument Panel J/B) 2. GAUGE Fuse (Instrument Panel J/B) 3. Ignition Switch 4. Door Courtesy Switch (Driver’s) 5. Wire Harness 6. DOME Fuse (E/G Room J/B)	BE–27 – BE–27 BE–46 – –
Headlight does not light with engine running and light control SW OFF.	1. GAUGE Fuse (Instrument Panel J/B) 2. DOME Fuse (E/G Room J/B) 3. Other Parts* 4. Daytime Running Light Relay 5. Daytime Running Light Relay No.3 (E/G Room R/B No.2) 6. Wire Harness 7. HEAD HI (LH, RH) Fuse (E/G Room J/B) 8. Headlight Bulb	– – – BE–27 – BE–27 – – –

Taillight does not light. (Headlight does not light)	1. Light Control Switch 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness	BE–27 BE–27 –
Taillight does not light. (Headlight is normal)	1. TAIL Fuse (Instrument Panel J/B) 2. Taillight Control Relay (Instrument Panel J/B) 3. Wire Harness	– BE–27 –
Only one side light does not light.	1. Bulb 2. Wire Harness	– –
Rear Combination light does not light.	1. Wire Harness 2. Light Failure Sensor 3. Bulb	– BE–92 –
”Light Auto Turn–off system” does not operate.	1. Integration Relay 2. Wire Harness 3. DOME Fuse (E/G Room J/B) 4. Door Courtesy Switch (Driver’s)	BE–27 – – BE–46

*: Parking Brake Switch and Terminal L of Generator

4. FOG LIGHT SYSTEM

Symptom	Suspect Area	See page
Fog light does not light with light control SW HEAD. (Headlight is normal)	1. FOG Fuse (Instrument Panel J/B) 2. Fog Light Relay 3. Fog Light Switch 4. Wire Harness	– BE–36 BE–36 –
Fog light does not light with light control SW HEAD. (Headlight does not light)	1. Other Parts*1 2. Wire Harness	– –
Only one light does not light.	1. Bulb 2. Wire Harness	– –

*1: Inspect Headlight System.

5. TURN SIGNAL AND HAZARD WARNING SYSTEM

Symptom	Suspect Area	See page
”Hazard” and ”Turn” do not light up.	1. Hazard Warning Switch 2. Turn Signal Flasher 3. Wire Harness	 BE–40 –
The flashing frequency is abnormal.	1. Bulb 2. Turn Signal Switch 3. Wire Harness	– BE–40 –
Hazard warning light does not light up. (Turn signal is normal)	1. HAZARD Fuse (E/G Room J/B) 2. Wire Harness	– –
Either of hazard warning lights does not light up .	1. Hazard Warning Switch 2. Wire Harness	BE–40 –
*1 Turn signal does not light up.	1. Ignition Switch 2. Turn Signal Switch 3. Wire Harness	BE–20 BE–40 –
*2 Turn signal does not light up.	1. TURN Fuse (Instrument Panel J/B) 2. Turn Signal Switch 3. Wire Harness	– BE–40 –
Turn signal does not light up in one direction.	1. Turn Signal Switch 2. Wire Harness	BE–40 –
Only one bulb does not light up.	1. Bulb 2. Wire Harness	– –

*1: Combination Meter, Wiper and Washer do not operate.

*2: Combination Meter, Wiper and Washer are normal.

6. ILLUMINATION LIGHT SYSTEM

Symptom	Suspect Area	See page
Illumination lights do not light up. (Taillight is normal)	1. PANEL Fuse (Instrument Panel J/B) 2. Wire Harness	– –
Illumination lights do not light up. (Taillight does not light)	1. Taillight Control Relay (Instrument Panel J/B) 2. Other parts* 3. Wire Harness	BE–27 – –
Illumination light with adjustable brightness do not light up.	1. Rheostat Light Control Volume 2. Wire Harness	BE–43 –
Only one light does not light up.	1. Bulb 2. Wire Harness	– –
Brightness does not chang when rheostat volume is trutned. (ALL)	1. Rheostat Light Control Volume 2. Wire Harness	BE–43 –
Brightness does not chang when rheostat volume is trutned. (Only Combination Meter)	1. Combination Meter Assembly 2. Wire Harness	BE–58 –
Glove box does not light up.	1. Glove Box Light Switch 2. Bulb 3. Wire Harness	BE–43 – –

*: Inspect Taillight System.

7. INTERIOR LIGHT SYSTEM

Symptom	Suspect Area	See page
Only one interior light does not light up.	1. Bulb 2. Wire Harness	– –
Interior lights do not light up (ALL).	1. DOME Fuse (E/G Room J/B) 2. Wire Harness	– –
”Illuminated Entry System” does not operate.	1. Integration Relay (Instrument Panel J/B) 2. Door Courtesy Switch 3. Wire Harness	– BE–46 –
Interior light does not light up.	1. Bulb 2. Interior Light Switch 3. Wire Harness	– BE–46 –
Front personal light does not light up.	1. Bulb 2. Personal Light Switch 3. Wire Harness	– BE–46 –
Vanity light does not light up.	1. Bulb 2. Vanity Light 3. Wire Harness	– BE–46 –
Luggage compartment light does not light up.	1. Bulb 2. Luggage Compartment Door Courtesy Switch 3. Wire Harness	– BE–46 –
Courtesy light does not light up.	1. Bulb 2. Door Courtesy Switch 3. Wire Harness	– BE–46 –

8. STOP LIGHT SYSTEM

Symptom	Suspect Area	See page
Stop light does not light up.	1. STOP Fuse (Instrument Panel J/B) 2. Stop Light Switch 3. Light Failure Sensor 4. Wire Harness	– BE–51 BE–51 –
Stop light always lights up.	1. Stop Light Switch 2. Wire Harness	BE–51 –

Only one light always lights up.	1. Wire Harness	–
Only one light does not light.	1. Bulb 2. Wire Harness	– –

9. WIPER AND WASHER SYSTEM

Symptom	Suspect Area	See page
Wiper and washers do not operate.	1. WIPER Fuse (Instrument Panel J/B) 2. Wiper Switch 3. Wire Harness	– BE–54 –
Wipers do not operate in LO or HI.	1. Wiper Switch 2. Wiper Motor 3. Wire Harness	BE–54 BE–54 –
Wipers do not operate in INT.	1. Wiper Switch 2. Wiper Motor 3. Wire Harness	BE–54 BE–54 –
Washer motor does not operate.	1. Washer Switch 2. Washer Motor 3.Wire Harness	BE–54 BE–54 –
Wiper do not operate when washer switch is ON.	1. Washer Motor 2. Wire Harness	BE–54 –
Washer fluid does not operate.	1. Washer Hose and Nozzle	–
●At wiper switch HI position, the wiper blade is in contact with the body. ●When the wiper switch is OFF, the wiper blade does not retract or the retract position is wrong.	1. Wiper Switch* 2. Wire Harness	BE–54 – – – –

*: Inspect wiper arm and blade set position.

10. DEFOGGER SYSTEM

Symptom	Suspect Area	See page
All defogger systems do not operate.	1. DEFOG Fuse (Instrument Panel J/B) 2. HEATER Fuse (Instrument Panel J/B) 3. Defogger Relay (Instrument Panel J/B) 4. Defogger Switch 5. Wire Harness	– – BE–106 BE–106 –
Rear window defogger does not operate.	1. Defogger Wire 2. Choke Coil 3. Wire Harness	– – –
Mirror defogger does not operate.	1. MIRROR–HEATER Fuse (Instrument Panel J/B) 2. Mirror Defogger 3. Wire Harness	– BE–106 –

11. POWER WINDOW CONTROL SYSTEM

Symptom	Suspect Area	See page
*1 Power window does not operate.	1. Integration Relay (Instrument Panel J/B) 2. Wire Harness	BE–20 –
*2 Power window does not operate.	1. POWER Fuse (Instrument Panel J/B) 2. Integration Relay (Instrument Panel J/B) 3. Power Main Relay (Instrument Panel J/B) 4. Power Window Master Switch 5. Wire Harness	– BE–20 BE–110 BE–110 –
*2 ”One Touch Power Window System” does not operate.	1. Power Window Master Switch	BE–110

Only one window glass does not move.	1. Power Window Master Switch 2. Power Window Switch 3. Power Window Motor 4. Wire Harness	BE–110 BE–110 BE–110 –
”Window Lock System” does not operate.	1. Power Window Master Switch	BE–110
”Window Lock Illumination” does not lightup.	1. Power Window Master Switch	BE–110
Key–off power window does not operate.	1. GAUGE Fuse (Instrument Panel J/B) 2. Integration Relay (Instrument Panel J/B) 3. Ignition Switch 4. Door Courtesy Switch 5. Wire Harness	– BE–20 BE–20 BE–46 –

*1: Door Lock does not operate.
*2: Door Lock is normal.

12. POWER DOOR LOCK CONTROL SYSTEM

Symptom	Suspect Area	See page
”Door lock system” does not operate at all.	1. ECU–IG Fuse (Instrument Panel J/B) 3. DOOR Fuse (Instrument Panel J/B) 4. Integration Relay (Instrument Panel J/B) 5. Wire Harness	– – BE–20 –
Door lock system does not operate by manual switch.	1. Power Window Master Switch 2. Door Lock Control Switch 3. Integration Relay (Instrument Panel J/B) 4. Wire Harness	BE–110 BE–119 BE–20 –
Door lock system does not operate by door key.	1. Door Key Lock and Unlock Switch 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness 4. Door Lock Link Disconnected	BE–119 BE–20 – –
Fault in 2–Operation unlock function of Driver’s side door key lock and unlock switch.	1. Door Key Lock and Unlock Switch 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness	BE–119 BE–20 –
Fault in key confine prevention operate.	1. Integration Relay (Instrument Panel J/B) 2. Key Unlock Warning Switch 3. Door Courtesy Switch 4. Wire Harness	BE–20 BE–20 BE–46 –
Only one door lock does not operation.	1. Door Lock Motor 2. Wire Harness	BE–119 –

13. SLIDING ROOF SYSTEM

Symptom	Suspect Area	See page
*1 Sliding roof system does not operate.	1. Power Main Relay (Instrument Panel J/B) 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness	BE–110 BE–20 –
*2 Sliding roof system does not operate.	1. POWER Fuse (Instrument Panel J/B) 2. Integration Relay (Instrument Panel J/B) 3. Sliding Roof Switch 4. Sliding Roof Control Relay 5. Sliding Roof Motor 6. Wire Harness	– BE–20 BE–125 BE–125 BE–125 –

Sliding roof system operates abnormally.	1. Sliding Roof Control Relay 2. Limit Switch 3. Sliding Roof Switch	BE–125 BE–125 BE–125
Sliding roof system stops operation half way.	1. Sliding Roof Control Relay 2. Limit Switch 3. Sliding Roof Switch 4. Sliding Roof Motor (Stones or foreign material trapped in motor assembly)	BE–125 BE–125 BE–125 BE–125 –

*1: Door Lock does not operate.
*2: Door Lock is normal.

14. POWER SEAT CONTROL SYSTEM

Symptom	Suspect Area	See page
Power seat does not operate. (Power door lock system does not operate)	1. Wire Harness 2. POWER Fuse (Instrument Panel J/B)	– –
Power seat does not operate. (Power door lock system is normal)	1. Wire Harness 2. Power Seat Switch (D,P)	– BE–129
Driver's seat does not operate.	1. Power seat Switch (D) 2. Wire Harness	BE–129 –
Passenger's seat does not operate.	1. Power Seat Switch (P) 2. Wire Harness	BE–129 –
"Slide operation" does not operate.	1. Power Seat Switch (D,P) 2. Wire Harness 3. Slide Motor (D,P)	BE–129 – BE–129
"Front vertical operation" does not operate.	1. Power Seat Switch (D,P) 2. Wire Harness 3. Front Vertical Motor (D,P)	BE–129 – BE–129
"Rear Vertical operation" does not operate.	1. Power Seat Switch (D,P) 2. Wire Harness 3. Rear Vertical Motor (D,P)	BE–129 – BE–129
"Reclining operation" does not operate.	1. Power Seat Switch (D,P) 2. Wire Harness 3. Reclining Motor (D,P)	BE–129 – BE–129

(D): Driver's Seat
(P): Passenger's Seat

15. POWER MIRROR CONTROL SYSTEM

Symptom	Suspect Area	See page
Mirror does not operate.	1. CIG Fuse (Instrument Panel J/B) 2. Mirror Switch 3. Mirror Motor 4. Wire Harness	– BE–134 BE–134 –
Mirror operates abnormally.	1. Mirror Switch 2. Mirror Motor 3. Wire Harness	BE–134 BE–134 –

16. SEAT HEATER SYSTEM

Symptom	Suspect Area	See page
Seat heaters do not operate. (Driver's and Passenger's)	1. SEAT–HEATER Fuse (Instrument Panel J/B) 2. Wire Harness	– –
Driver's seat heater does not operate.	1. Seat Heater Switch (Driver's) 2. Seat Heater (Driver's) 3. Wire Harness	BE–137 BE–137 –

Passenger's seat heater does not operate.	1. Seat Heater Switch (Passenger's) 2. Seat Heater (Passenger's) 3. Wire Harness	BE–137 BE–137 –
Seat heater temperature is too high.	1. Seat Heater	BE–137

17. FUEL LID OPENER SYSTEM

Symptom	Suspect Area	See page
Fuel lid opener system does not operate.	1. DOOR Fuse (Instrument Panel J/B) 2. Fuel Lid Opener Switch 3. Fuel Lid Opener Solenoid 4. Wire Harness	– BE–140 BE–140 –

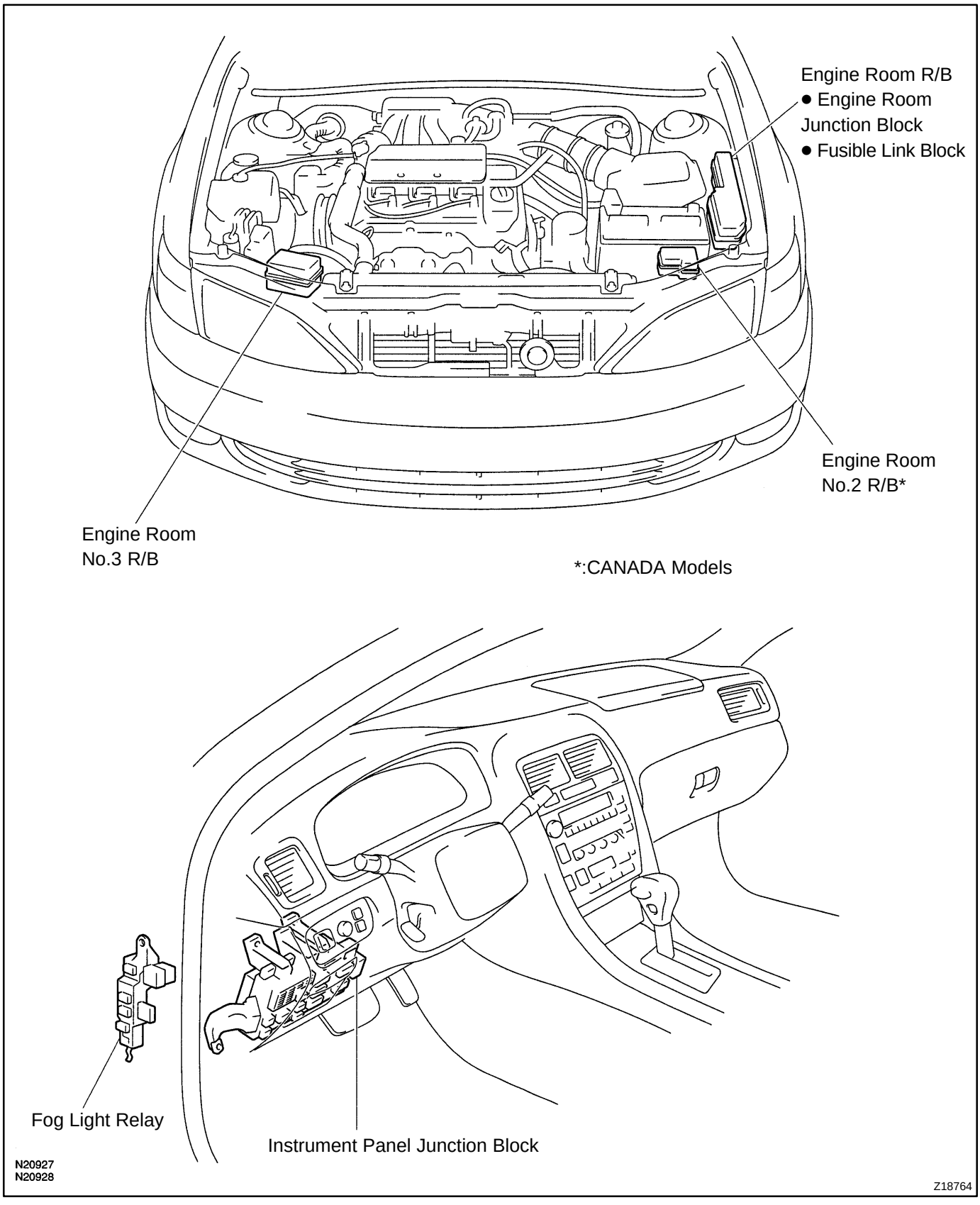
18. HORN SYSTEM

Symptom	Suspect Area	See page
Horn system does not operate.	1. HORN Fuse (E/G Room J/B) 2. Horn Relay (E/G Room J/B) 3. Horn Switch 4. Horn 5. Wire Harness	– BE–172 BE–172 BE–172 –
Horn blows all the time.	1. Horn Relay (E/G Room J/B) 2. Horn Switch 3. Wire Harness	BE–172 BE–172 –
One horn operates but the other horn does not operate.	1. Horn 2. Wire Harness	BE–172 –
Horns operate abnormally.	1. Horn Relay (E/G Room J/B) 2. Horn 3. Wire Harness	BE–172 BE–172 –

POWER SOURCE

LOCATION

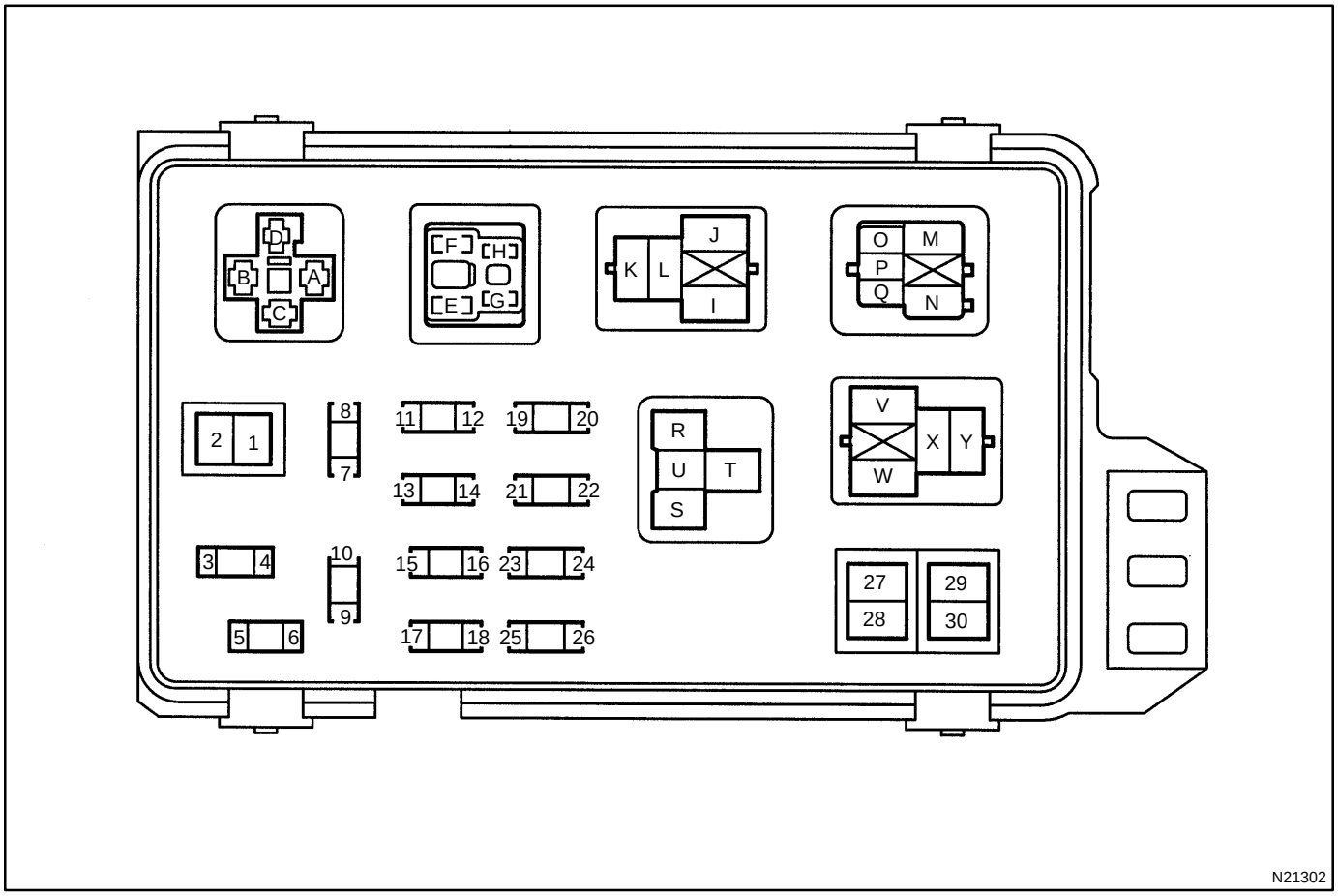
BE04R–01



BE04S–01

INSPECTION

1. INSPECT ENGINE ROOM JUNCTION BLOCK CIRCUIT



(a) Remove the fuse from the junction block and inspect the connector on junction block side.

Fuse	Tester connection	Condition	Specified condition
MAIN	1 – Ground	Constant	Battery positive voltage
DOME	4 – Ground	Constant	Battery positive voltage
ECU–B	6 – Ground	Constant	Battery positive voltage
RADIO No.1	7 – Ground	Ignition switch turned to ACC or ON	Battery positive voltage
SHORT PIN	9 – Ground	Constant	Battery positive voltage
HAZARD	11 – Ground	Constant	Battery positive voltage
AM2	13 – Ground	Constant	Battery positive voltage
TEL	15 – Ground	Constant	Battery positive voltage
HEAD (LH)	17 – Ground	Constant	Battery positive voltage
ALT–S	19 – Ground	Constant	Battery positive voltage
HEAD (RH)	21 – Ground	Constant	Battery positive voltage
EFI	23 – Ground	Constant	Battery positive voltage
HORN	25 – Ground	Constant	Battery positive voltage
RDI	28 – Ground	Constant	Battery positive voltage
CDS	30 – Ground	Constant	Battery positive voltage

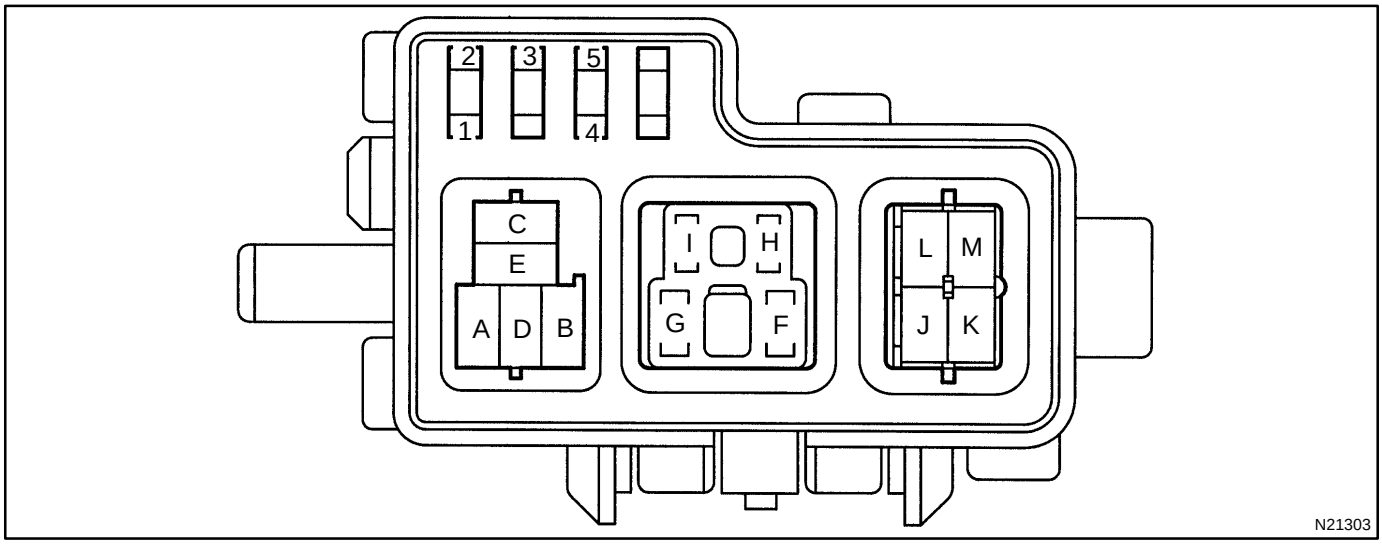
If the circuit is not as specified, inspect the circuits connected to other parts.

(b) Remove the relay from the junction block and inspect the connector on junction block side.

Relay	Tester connection	Condition	Specified condition
ST	C – Ground	Constant	Battery positive voltage
HEAD	E – Ground	Constant	Battery positive voltage
HEAD	H – Ground	Constant	Battery positive voltage
EFI	J – Ground	Constant	Continuity
ENGINE MAIN	M – Ground	Constant	Battery positive voltage
ENGINE MAIN	Q – Ground	Ignition switch turned to ON	Battery positive voltage
FAN No.1	U – Ground	Constant	Battery positive voltage
HORN	V – Ground	Constant	Battery positive voltage
HORN	Y – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

2. CANADA Models Only:
INSPECT ENGINE ROOM No.2 RELAY BLOCK CIRCUIT



(a) Remove the fuse from the relay block and inspect the connector on relay block side.

Fuse	Tester connection	Condition	Specified condition
H – LP RH (LO)	2 – Ground	Constant	Battery positive voltage
H – LP LH (LO)	3 – Ground	Constant	Battery positive voltage
DRL No.2	5 – Ground	Constant	Battery positive voltage

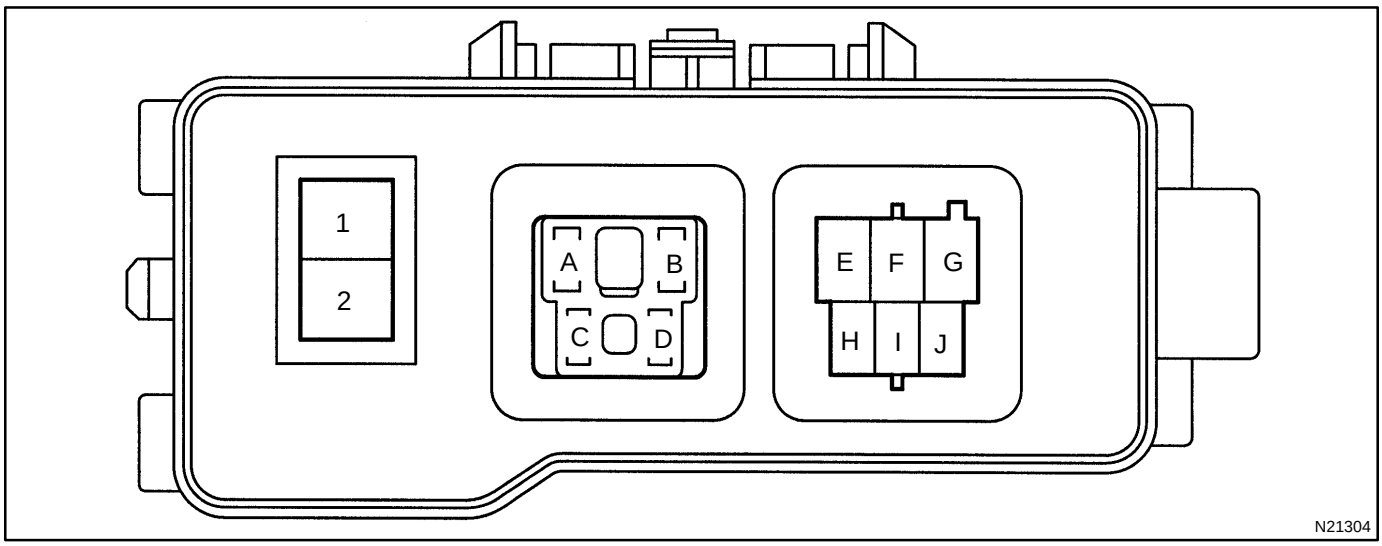
If the circuit is not as specified, inspect the circuits connected to other parts.

(b) Remove the relay from the relay block and inspect the connector on relay block side.

Relay	Tester connection	Condition	Specified condition
DRL No.3	D – Ground	Constant	Continuity
DRL No.3	A – Ground	Constant	Battery positive voltage
DRL No.3	E – Ground	Constant	Battery positive voltage
DRL No.4	H – Ground	Constant	Battery positive voltage
DRL No.4	I – Ground	Constant	Battery positive voltage
DIM	J – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

3. INSPECT ENGINE ROOM No.3 RELAY BLOCK CIRCUIT



(a) Remove the fuse from the relay block and inspect the connector on relay block side.

Fuse	Tester connection	Condition	Specified condition
ABS	2 – Ground	Constant	Battery positive voltage

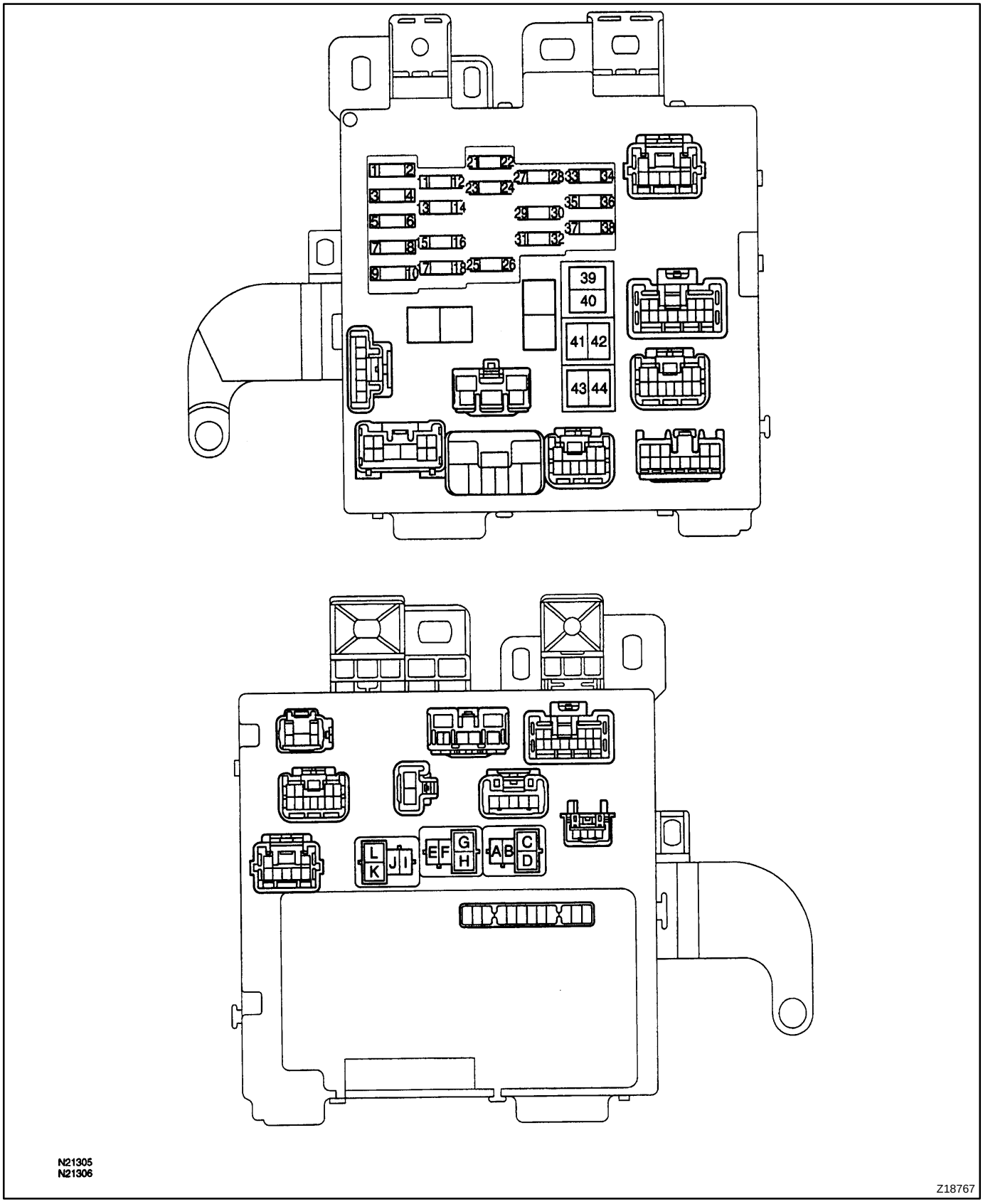
If the circuit is not as specified, inspect the circuits connected to other parts.

(b) Remove the relay from the relay block and inspect the connector on relay block side.

Relay	Tester connection	Condition	Specified condition
ABS SOL	F – Ground	Constant	Continuity
ABS SOL	E – Ground	Constant	Battery positive voltage
ABS MTR	G – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

4. INSPECT INSTRUMENT PANEL JUNCTION BLOCK CIRCUIT



(a) Remove the fuse from the instrument panel junction block and inspect the connector on instrument panel junction block side.

Fuse	Tester connection	Condition	Specified condition
S – HTR	2 – Ground	Ignition switch turned to ON	Battery positive voltage
HEATER	3 – Ground	Ignition switch turned to ON	Battery positive voltage
GAUGE	6 – Ground	Ignition switch turned to ON	Battery positive voltage
WIPER	7 – Ground	Ignition switch turned to ON	Battery positive voltage
M – HTR	10 – Ground	Ignition switch turned to ON	Battery positive voltage
ECU – IG	11 – Ground	Ignition switch turned to ON	Battery positive voltage
IGN	14 – Ground	Ignition switch turned to ON	Battery positive voltage
STOP	16 – Ground	Constant	Battery positive voltage
TAIL	18 – Ground	Light control switch turned to TAIL or HEAD and Engine running	Battery positive voltage
PWR	22 – Ground	Ignition switch turned to ON	Battery positive voltage
OBD – 2	24 – Ground	Constant	Battery positive voltage
FOG	26 – Ground	Constant	Battery positive voltage
ST	28 – Ground	Constant	Battery positive voltage
DOOR	29 – Ground	Constant	Battery positive voltage
PANEL	31 – Ground	Constant	Battery positive voltage
TURN	33 – Ground	Ignition switch turned to ON	Battery positive voltage
RAD/2	35 – Ground	Ignition switch turned to ACC or ON	Battery positive voltage
CIG	38 – Ground	Ignition switch turned to ACC or ON	Battery positive voltage
DEF	39 – Ground	Constant	Battery positive voltage
POWER	41 – Ground	Constant	Battery positive voltage
AM1	44 – Ground	Constant	Battery positive voltage

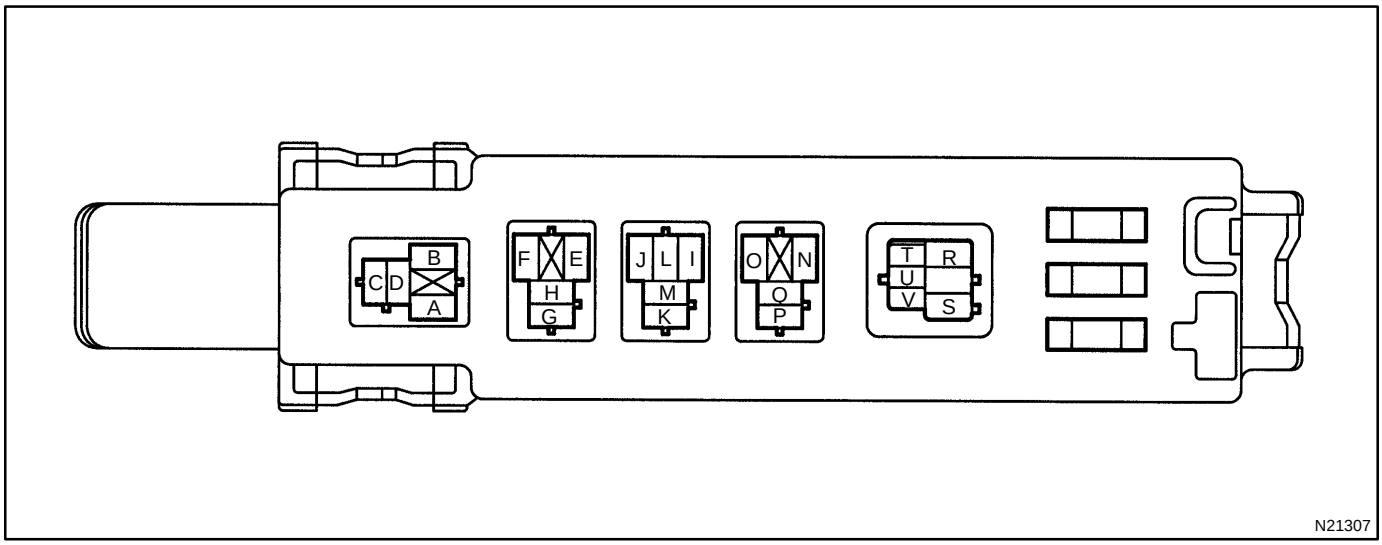
If the circuit is not as specified, inspect the circuits connected to other parts.

(b) Remove the relay from the junction block and inspect inspect the connector on junction block side.

Relay	Tester connection	Condition	Specified condition
Taillight	B – Ground	Constant	Battery positive voltage
Taillight	D – Ground	Constant	Battery positive voltage
Defogger	F – Ground	Constant	Battery positive voltage
Defogger	G – Ground	Defogger switch ON	Battery positive voltage
Power Main	J – Ground	Constant	Battery positive voltage
Power Main	K – Ground	Constant	Continuity

If the circuit is not as specified, inspect the circuits connected to other parts.

5. INSPECT INSIDE ENGINE ROOM JUNCTION BLOCK CIRCUIT

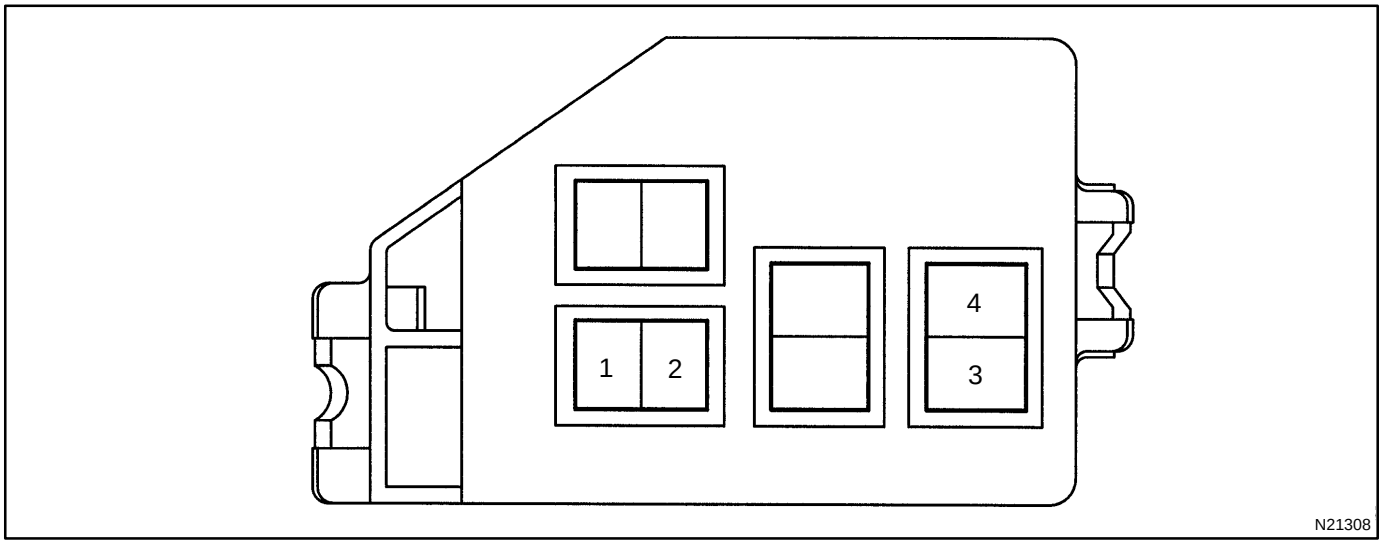


Remove the relay from the relay block and inspect the connector on relay block side.

Relay	Tester connection	Condition	Specified condition
MG/CLT	C – Ground	Constant	Continuity
MG/CLT	D – Ground	Ignition switch turned to ON	Battery positive voltage
C/OPN	G – Ground	Constant	Continuity
FAN No.2	L – Ground	Constant	Continuity
FAN No.2	J – Ground	Ignition switch turned to ON	Battery positive voltage
FAN No.2	K – Ground	Constant	Battery positive voltage
FAN No.3	P – Ground	Constant	Battery positive voltage
HEATER	U – Ground	Constant	Continuity
HEATER	R – Ground	Ignition switch turned to ON	Battery positive voltage
HEATER	V – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

6. INSPECT FUSIBLE LINK BLOCK CIRCUIT



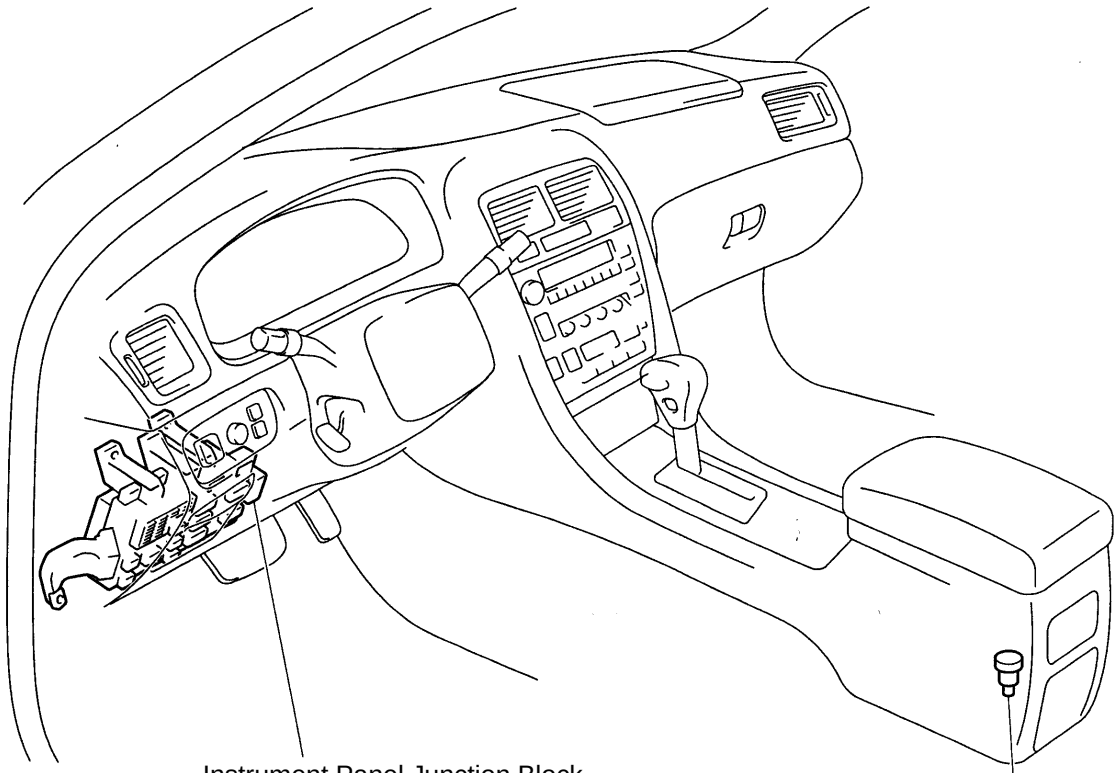
Remove the fuse from the junction block and inspect the connector on junction block side.

Fuse	Tester connection	Condition	Specified condition
HTR	1 – Ground	Ignition switch turned to ON	Battery positive voltage
ALT	4 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

POWER OUTLET
LOCATION

BE04T–01

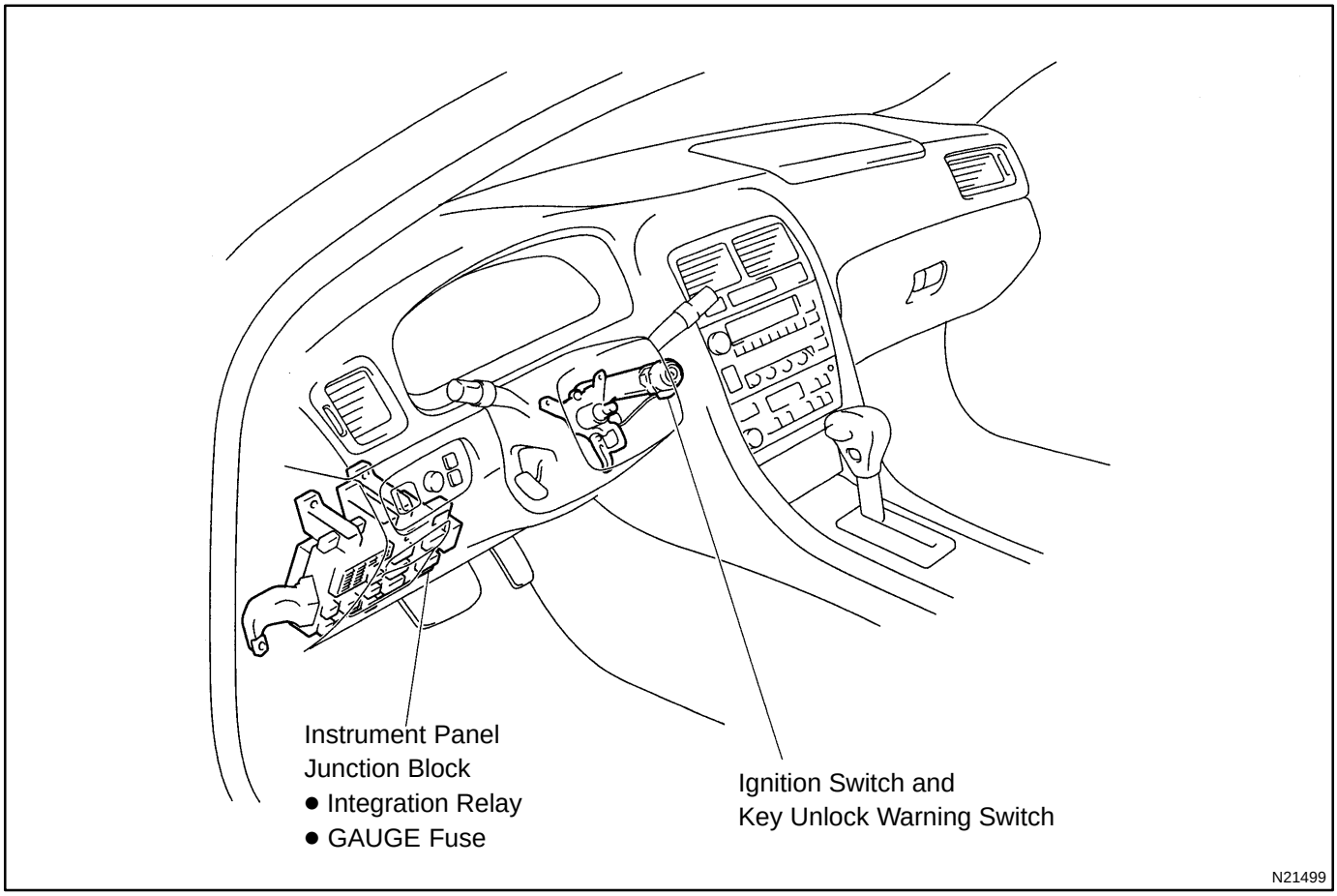


N21557

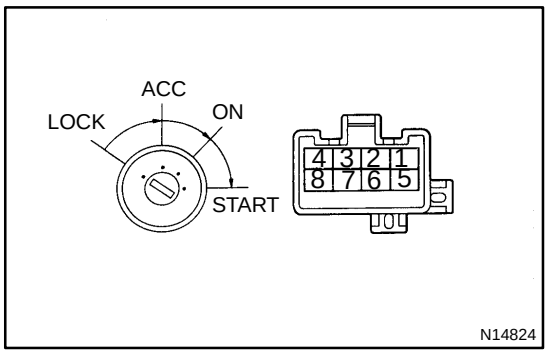
IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH

BE04U–01

LOCATION



BE04V–01

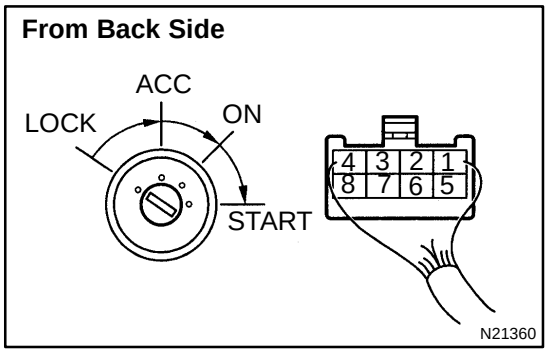


INSPECTION

1. INSPECT IGNITION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	–	No continuity
ACC	2 – 3	Continuity
ON	2 – 3 – 4 6 – 7	Continuity
START	1 – 2 – 4 6 – 7 – 8	Continuity

If continuity is not as specified, replace the switch.

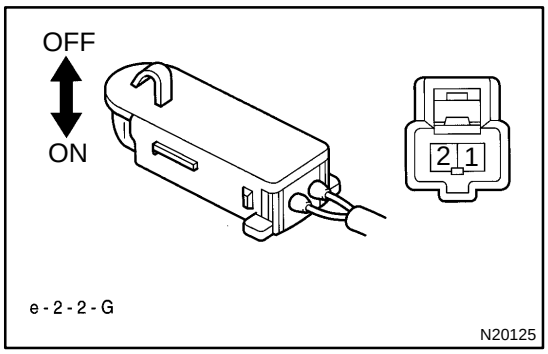


2. INSPECT IGNITION SWITCH CIRCUIT

Connect the switch connector and inspect the connector on the wire harness side from the back side.

Tester connection	Condition	Specified condition
1– Ground	Ignition switch START	Battery positive voltage
2 – Ground	Constant	Battery positive voltage
3 – Ground	Ignition switch ACC or ON	Battery positive voltage
4 – Ground	Ignition switch ON	Battery positive voltage
6 – Ground	Ignition switch ON	Battery positive voltage
7 – Ground	Constant	Battery positive voltage
8– Ground	Ignition switch START	Battery positive voltage

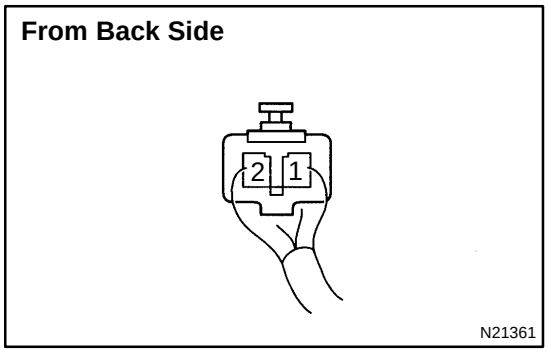
If circuit is not as specified, inspect the switch and circuits connected to other parts.



3. INSPECT KEY UNLOCK WARNING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Key removed)	–	No continuity
ON (Key set)	1 – 2	Continuity

If continuity is not as specified, replace the switch.

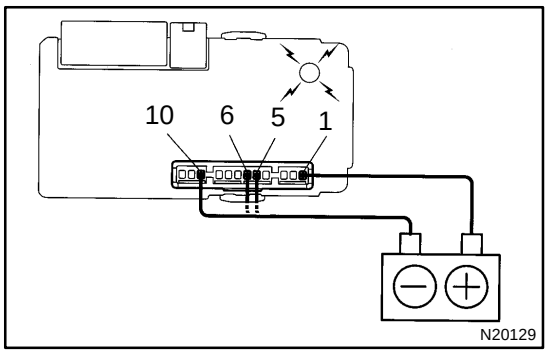


4. INSPECT KEY UNLOCK WARNING SWITCH CIRCUIT

Connect the switch connector and inspect the connector on the wire harness side from the back side.

Tester connection	Condition	Specified condition
2– Ground	Ignition key removed	No continuity
2– Ground	Ignition key set	Continuity
1– Ground	Constant	Continuity

If circuit is not as specified, inspect the switch and circuits connected to other parts.

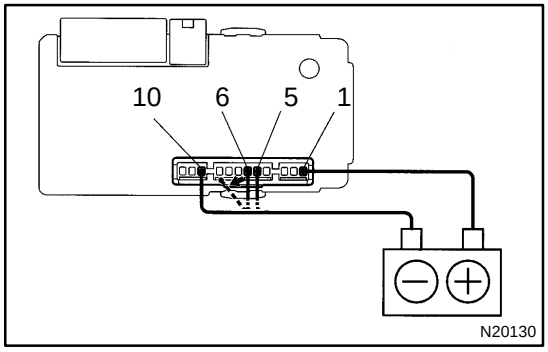


5. Key Unlock Warning System: INSPECT INTEGRATION RELAY OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1.

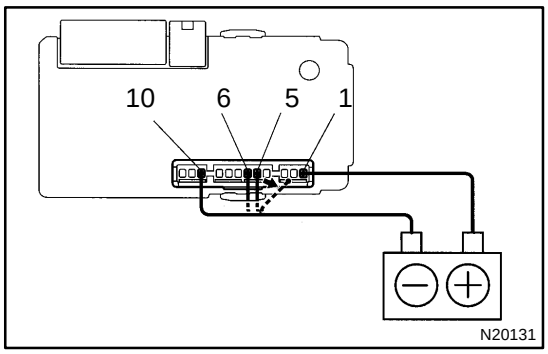
(b) Connect the negative (–) lead from the battery to terminals 5, 6 and 10.

(c) Check the buzzer sounds.



(d) Disconnect the negative (–) lead from the battery to terminal 6.

(e) Check that the buzzer stops sounding.

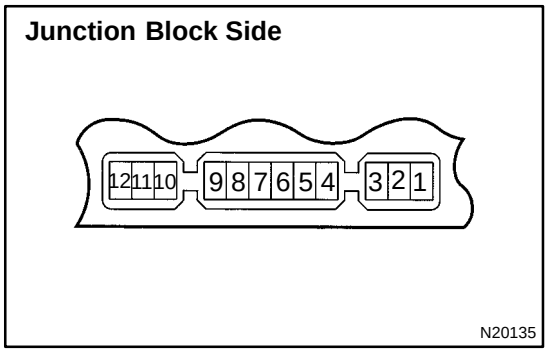


(f) Connect the negative (–) lead from the battery to terminal 6.

(g) Disconnect the negative (–) lead from the battery to terminal 5.

(h) Check that the buzzer stops sounding.

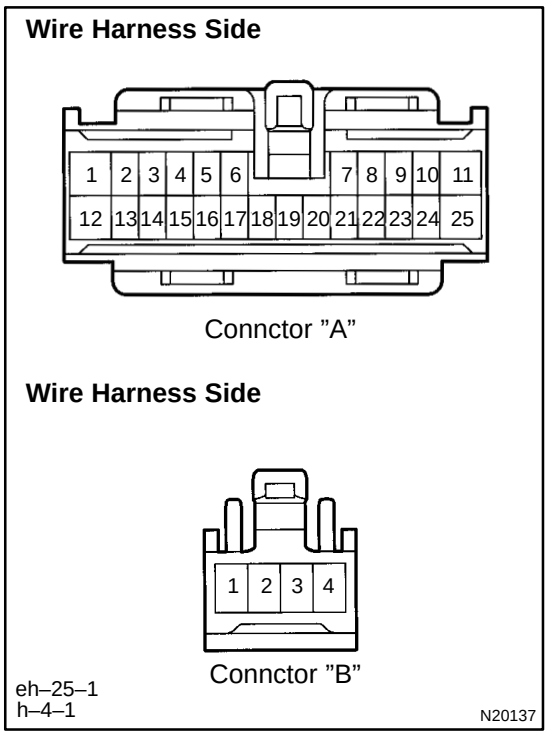
If operation is not as specified, replace the relay.



6. INSPECT INTEGRATION RELAY CIRCUIT

(a) Remove the relay from the junction block No.1 and inspect the connector on the junction block side.

Tester connection	Condition	Specified condition
2 – Ground	All door courtesy switches OFF (Door closed)	No continuity
2 – Ground	One of the door courtesy switches ON (Door opened)	Continuity
4 – Ground	Door courtesy switches except that of the driver's door OFF (Door closed)	No continuity
4 – Ground	One of the door courtesy switches except that of the driver's door ON (Door opened)	Continuity
3 – Ground	Door outside handle switch OFF	No continuity
3 – Ground	Door outside handle switch ON	Continuity
5 – Ground	Key unlock warning switch OFF	No continuity
5 – Ground	Key unlock warning switch ON	Continuity
6 – Ground	Driver's door courtesy switch OFF (Door closed)	No continuity
6 – Ground	Driver's door courtesy switch ON (Door opened)	Continuity
8 – Ground	Buckle switch OFF (Seat belt unfastened)	No continuity
8 – Ground	Buckle switch ON (Seat belt fastened)	Continuity
10 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage
7 – Ground 9 – Ground	Ignition switch LOCK or ACC	No voltage
7 – Ground 9 – Ground	Ignition switch ON	Battery positive voltage
11 – Ground	Ignition switch LOCK	No voltage
11 – Ground	Ignition switch ACC or ON	Battery positive voltage



(b) Disconnect the connector from the integration relay and inspect the connectors on the wire harness side.

Tester connection	Condition	Specified condition
A3 – Ground	Constant	Continuity
A5 – Ground	Driver’s door unlock detection switch OFF (Door closed)	No continuity
A5 – Ground	Driver’s door unlock detection switch ON (Door opened)	Continuity
A6 – Ground	Passenger’s door courtesy switch OFF (Door closed)	No continuity
A6 – Ground	Passenger’s door courtesy switch ON (Door opened)	Continuity
A7 – Ground	Passenger’s door unlock detection switch OFF (Door closed)	No continuity
A7 – Ground	Passenger’s door unlock detection switch ON (Door opened)	Continuity
A9 – Ground	Rear door unlock detection switch OFF (Door closed)	No continuity
A9 – Ground	Rear door unlock detection switch ON (Door opened)	Continuity
A11 – A12 A12 – A25	Constant	Continuity
A16 – Ground	Door lock manual switch OFF or UNLOCK	No continuity
A16 – Ground	Door lock manual switch LOCK	Continuity
A17 – Ground	Door lock manual switch OFF or LOCK	No continuity
A17 – Ground	Door lock manual switch UNLOCK	Continuity
A18 – Ground	Driver’s and passenger’s door key lock and unlock switch OFF or UNLOCK	No continuity
A18 – Ground	Driver’s or passenger’s door key lock and unlock switch LOCK	Continuity

Tester connection	Condition	Specified condition
A19 – Ground	Driver's door key lock and unlock switch OFF or LOCK	No continuity
A19 – Ground	Driver's door key lock and unlock switch UNLOCK	Continuity
A20 – Ground	Passenger's door key lock and unlock switch OFF or LOCK	No continuity
A20 – Ground	Passenger's door key lock and unlock switch UNLOCK	Continuity
A1 – Ground	Constant	Battery positive voltage
B1 – Ground	Light control switch OFF	No voltage
B1 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
B4 – Ground	Light control switch OFF or TAIL	No voltage
B4 – Ground	Light control switch HEAD	Battery positive voltage
B2 – Ground B3 – Ground	Constant	Battery positive voltage

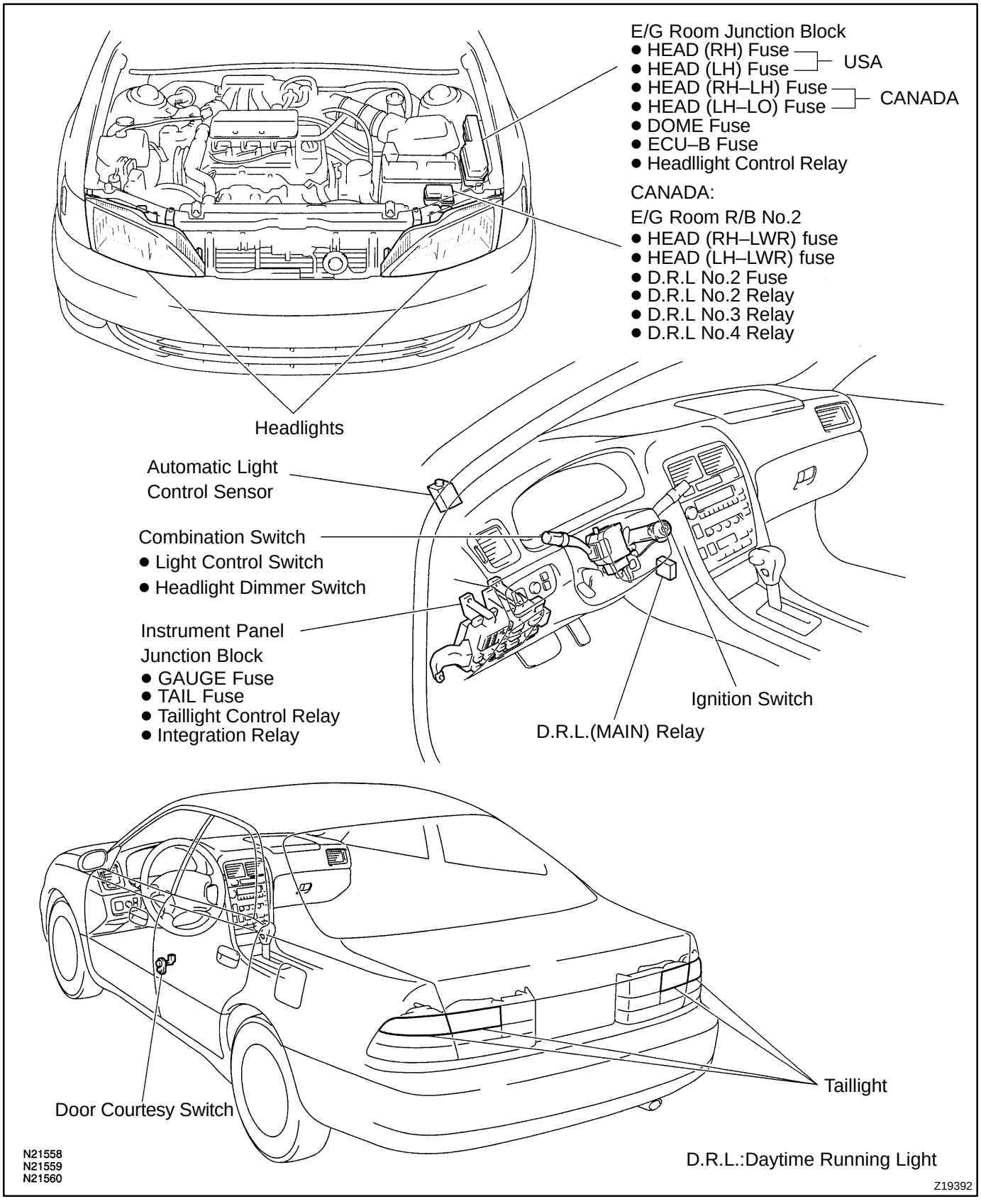
If the circuit is as specified, try replacing the relay with a new one.

If the circuit is not as specified, inspect the circuits connected to other parts.

HEADLIGHT AND TAILLIGHT SYSTEM

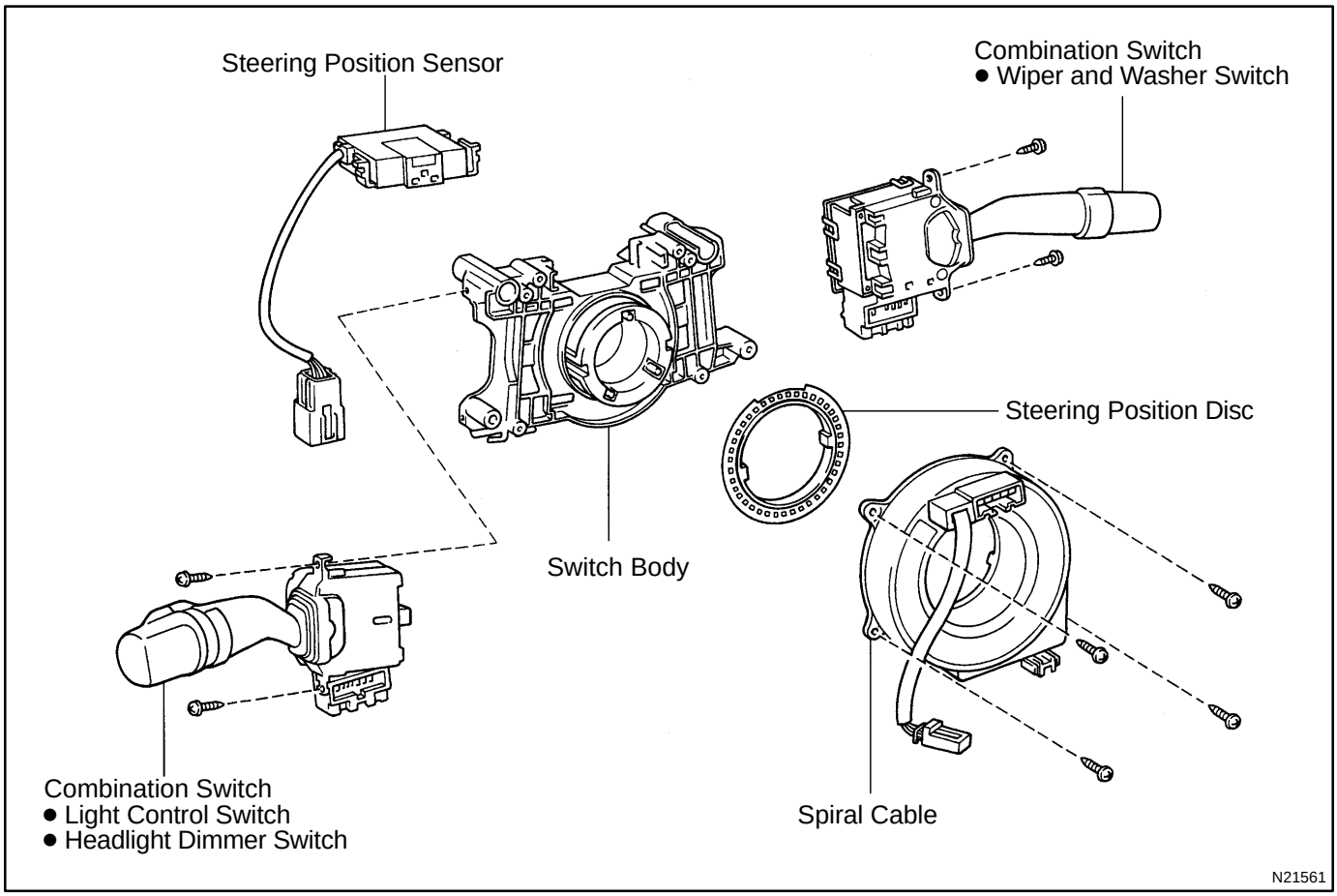
BE04W–01

LOCATION



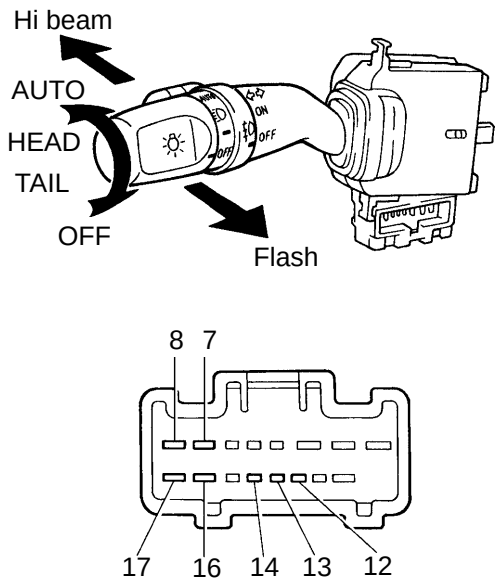
BE04X–01

COMPONENTS



BE04Y–02

INSPECTION



1. INSPECT LIGHT CONTROL SWITCH CONTINUITY

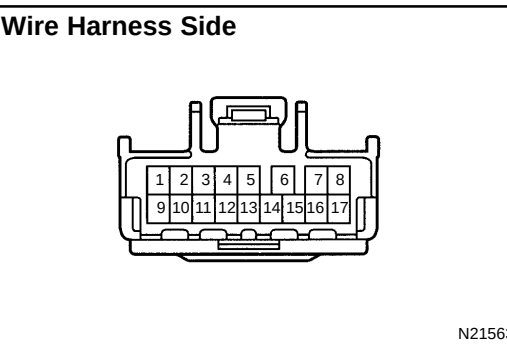
Switch position	Tester connection	Specified condition
OFF	–	No continuity
TAIL	14 – 16	Continuity
HEAD	13 – 14 – 16	Continuity
AUTO	12 – 16	Continuity

If continuity is not as specified, replace the switch.

2. INSPECT HEADLIGHT DIMMER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Low beam	16 – 17	Continuity
High beam	7 – 16	Continuity
Flash	7 – 8 – 16	Continuity

If continuity is not as specified, replace the switch.



3. INSPECT COMBINATION SWITCH CIRCUIT

Connect the wire harness side connector to the combination switch and inspect wire harness side connector from the back side.

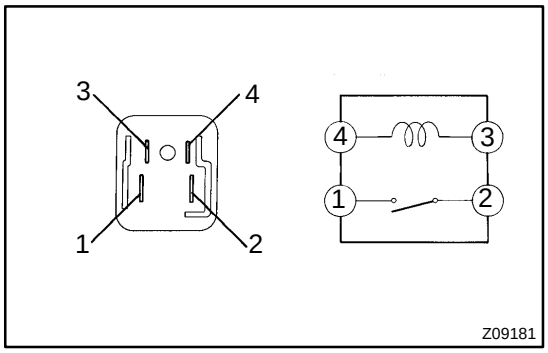
Light Control Switch:

Tester connection	Condition	Specified condition
16 – Ground	Constant	Continuity
12 – Ground	Light control switch OFF, TAIL or HEAD	No voltage
12 – Ground	Light control switch AUTO	Battery positive voltage
13 – Ground	Light control switch OFF or TAIL	No voltage
13 – Ground	Light control switch HEAD	Battery positive voltage
14 – Ground	Light control switch OFF	No voltage
14 – Ground	Light control switch TAIL or HEAD	Battery positive voltage

Headlight Dimmer Switch:

Tester connection	Condition	Specified condition
7 – Ground	Headlight dimmer switch Low Beam	No voltage
7 – Ground	Headlight dimmer switch High Beam or Flash	Battery positive voltage
8 – Ground	Headlight dimmer switch Low Beam or High Beam	No voltage
8 – Ground	Headlight dimmer switch Flash	Battery positive voltage
17– Ground	Headlight dimmer switch High Beam or Flash	No voltage
17– Ground	Headlight dimmer switch Low Beam	Battery positive voltage

If the circuit is not as specified, inspect the circuit connected to other parts.

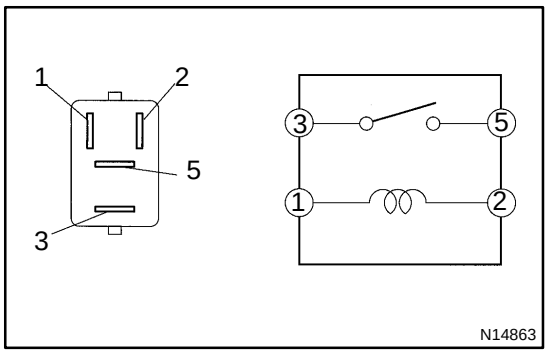


4. INSPECT HEADLIGHT CONTROL RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	3 – 4	Continuity
Apply B+ between terminals 3 and 4.	1 – 2	Continuity

If continuity is not as specified, replace the relay.

5. INSPECT HEADLIGHT CONTROL RELAY CIRCUIT (See page BE–11)

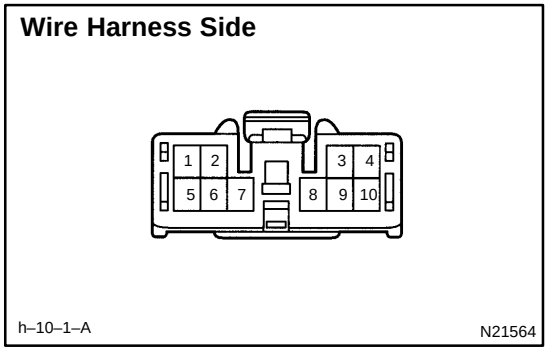


6. INSPECT TAILLIGHT CONTROL RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

7. INSPECT TAILLIGHT CONTROL RELAY CIRCUIT (See page BE–27)

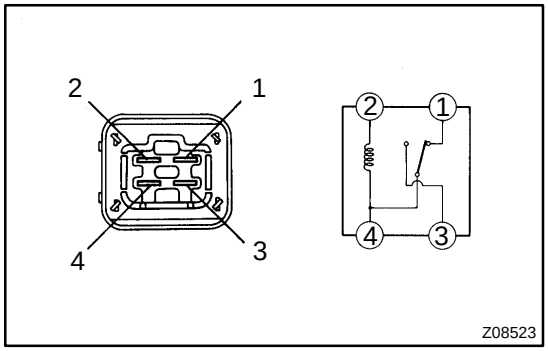


8. INSPECT DAYTIME RUNNING LIGHT RELAY CIRCUIT

Disconnect the connector from the relay and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Light control switch position OFF or TAIL	No continuity
2 – Ground	Light control switch position HEAD	Continuity
4 – Ground	Parking brake switch position OFF (Parking brake lever released)	No continuity
4 – Ground	Parking brake switch position ON (Parking brake lever pulled up)	Continuity
6 – Ground	Constant	Continuity
8 – Ground	Headlight dimmer switch position Low beam	No continuity
8 – Ground	Headlight dimmer switch position High beam or Flash	Continuity
10 – Ground	Brake fluid level warning switch position OFF	No continuity
10 – Ground	Brake fluid level warning switch position ON	Continuity
1 – Ground	Ignition switch position LOCK or ACC	No voltage
1 – Ground	Ignition switch position ON or START	Battery positive voltage
5 – Ground	Engine Stop	No voltage
5 – Ground	Engine Running	Battery positive voltage
7 – Ground	Constant	Battery positive voltage
9 – Ground	Constant	Battery positive voltage

If circuit is as specified, try replacing the relay with a new one.
If circuit is not as specified, inspect the circuits connected to other parts.

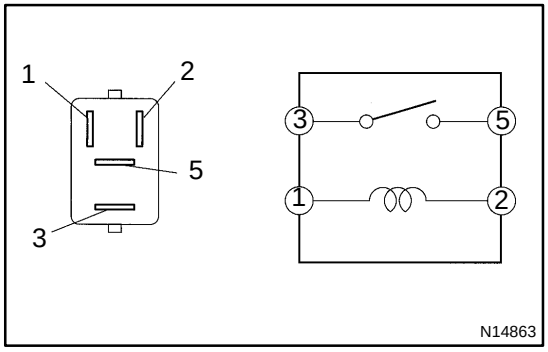


9. INSPECT HEADLIGHT DIMMER RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 4, 2 – 4	Continuity
Apply B+ between terminals 2 and 4.	3 – 4	Continuity

If continuity is not as specified, replace the relay.

10. INSPECT HEADLIGHT DIMMER RELAY CIRCUIT (See page BE–11)

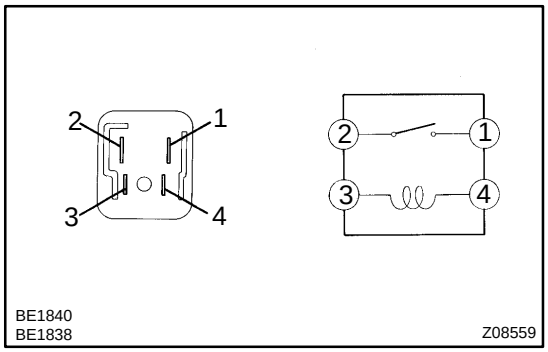


11. INSPECT DAYTIME RUNNING LIGHT NO.3 RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

12. INSPECT DAYTIME RUNNING LIGHT NO.3 RELAY CIRCUIT
(See page BE–11)



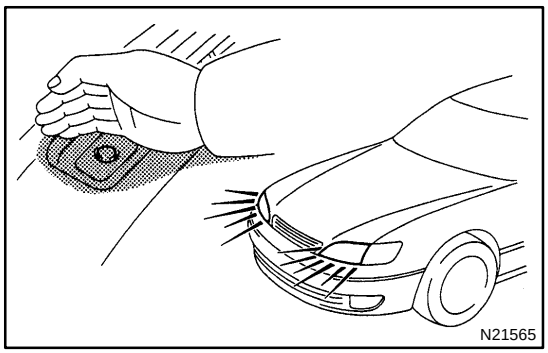
13. INSPECT DAYTIME RUNNING LIGHT NO.4 RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	3 – 4	Continuity
Apply B+ between terminals 3 and 4.	1 – 2	Continuity

If continuity is not as specified, replace the relay.

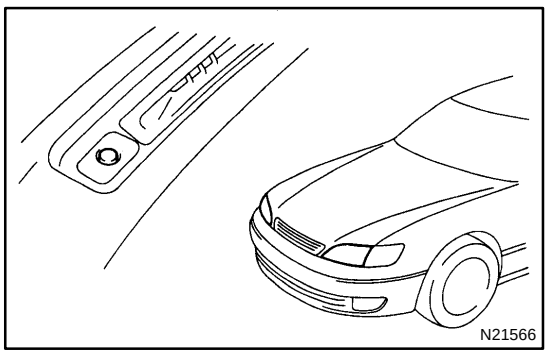
14. INSPECT DAYTIME RUNNING LIGHT NO.4 RELAY CIRCUIT
(See page BE–11)

15. INSPECT LIGHT AUTO TURN OFF SYSTEM
(See Integration relay circuit on page BE–20)



16. Auto ON:
INSPECT AUTOMATIC LIGHT CONTROL

(a) Turn the ignition switch ON.
(b) Turn the light control switch to AUTO.
(c) Gradually cover the top of the sensor.
(d) Verify that the accessory lights and the headlights turn ON.



17. Auto OFF:
INSPECT AUTOMATIC LIGHT CONTROL

(a) Gradually expose the sensor.
(b) Verify that the headlights and the accessory lights turn OFF.

18. INSPECT LIGHT–OFF CONDITION

(a) Turn the ignition switch ON.

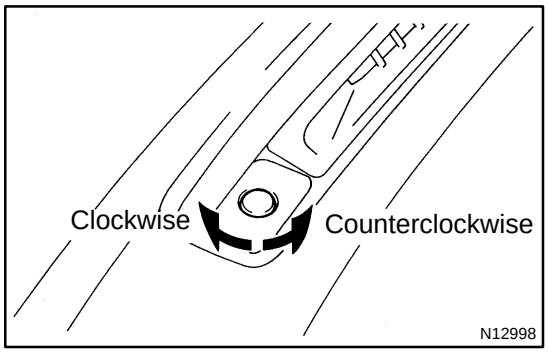
(b) Gradually cover the top of the sensor.
Lights auto ON:

(c) Verify that the lights will go out when light control switch position is OFF or the area surrounding the sensor gets bright or open the driver's door while the ignition switch is OFF.

19. INSPECT LIGHTS–ON CONDITION

(a) Open the driver's door while the ignition switch is OFF.

(b) Turn the light control switch to AUTO leaving the door open and cover the top of the sensor, and verify that the lights go on when the ignition switch is turned ON.

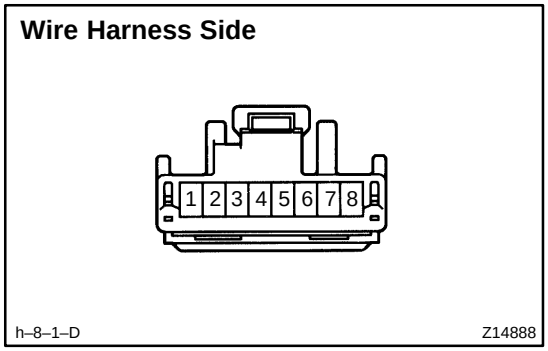


20. ADJUST AUTOMATIC LIGHT CONTROL SENSOR

(a) Adjustment of the light control is performed by turning the sensitivity knob on the sensor.

(b) This will determine at what light condition the automatic control will take place.

- If response is too quick, turn the knob counterclockwise.
- If response is too slow, turn the knob clockwise.



**21. Connector disconnected:
INSPECT SENSOR CIRCUIT**

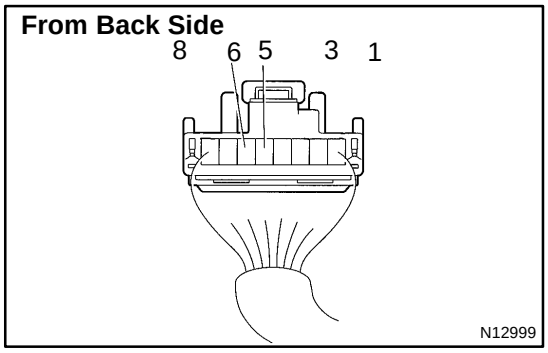
Disconnect the connector from the sensor and inspect the connector on the wire harness side, as shown in the chart.

Tester connection	Condition	Specified condition
3 – Ground	Door courtesy switch OFF	No continuity
3 – Ground	Door courtesy switch ON	Continuity
5 – Ground	Light control switch OFF, TAIL or AUTO	No continuity
5 – Ground	Light control switch HEAD	Continuity
6 – Ground	Light control switch OFF, TAIL or HEAD	No continuity
6 – Ground	Light control switch AUTO	Continuity
7 – Ground	Light Control Switch OFF or AUTO	No continuity
7 – Ground	Light Control Switch TAIL or HEAD	Continuity

Tester connection	Condition	Specified condition
1 – Ground	Ignition switch position LOCK or ACC	No voltage
1 – Ground	Ignition switch position ON	Battery positive voltage
2 – Ground	Constant	Battery positive voltage

If circuit is as specified, perform the inspection on the following page.

If the circuit is not as specified, inspect the circuit connected to other parts.



22. Connector connected:
INSPECT SENSOR CIRCUIT

Connect the wire harness side connector to the sensor and inspect wire harness side connector from the back side.

HINT:

- Ignition switch ON.
- Light control switch AUTO.
- Vehicle's surroundings are bright.

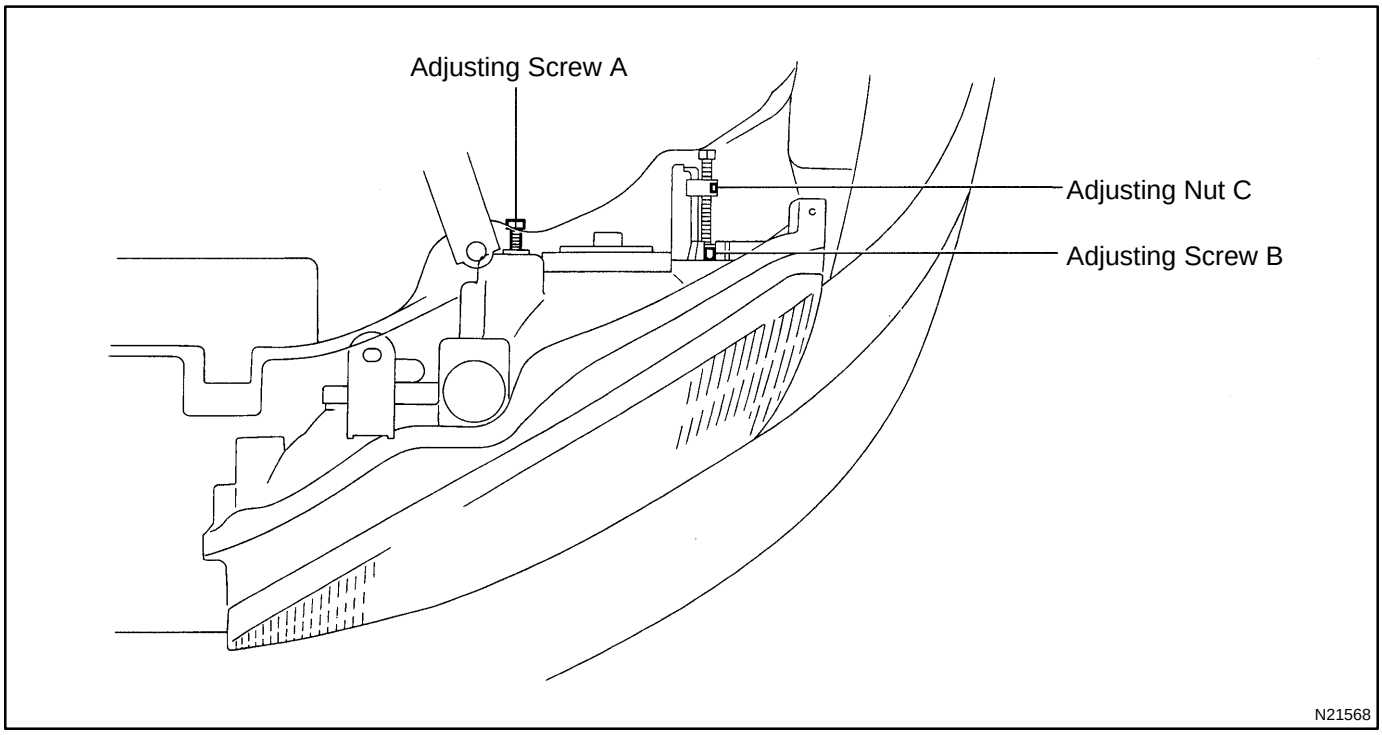
Tester connection	Condition	Specified condition
1 – Ground	Ignition switch position ON	10 V or more
1 – Ground	Ignition switch position OFF	1 V or less
3 – Ground	Door courtesy switch ON	1 V or less
3 – Ground	Door courtesy switch OFF	9 V or more
5 – Ground	Vehicle's surroundings are dark	1.8 V or less
5 – Ground	Dimmer switch position Flash	0.3 V or less
6 – Ground	Vehicle's surroundings are dark	1.5 V or less
8 – Ground	Vehicle is under the direct sun light. (Sensor is not covered)	3.7 V or more
8 – Ground	Vehicle's surroundings are dim. (Sensor is covered and taillights are ON)	1.32 ~ 2.32 V
8 – Ground	Vehicle's surroundings are dark. (Sensor is covered and headlights are ON)	0.42 V

If circuit is as specified, try replacing the sensor with a new one.

If the circuit is not as specified, inspect the circuit connected to other parts.

BE04Z–02

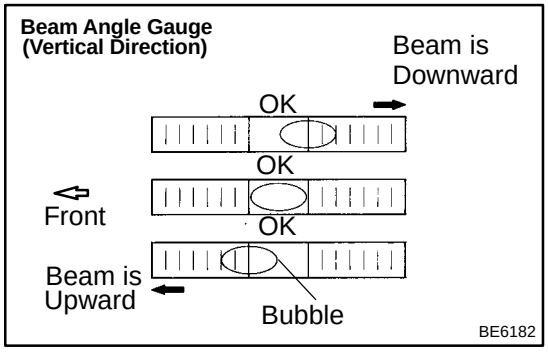
ADJUSTMENT



1. ADJUSTING HEADLIGHT AIM ONLY

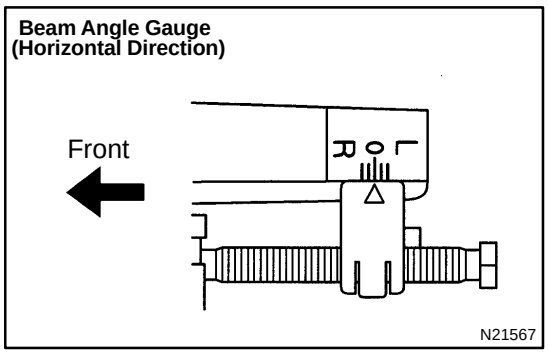
(a) Put the vehicle in below conditions.

- Make sure the body around the headlight is not deformed.
- Park the vehicle on a level spot.
- The driver gets into the driver's seat and puts the vehicle in a state ready for driving (with a full tank).
- Bounce the vehicle several times.



(b) Adjust the headlight in vertical direction.

If the bubble is outside the acceptable range of the beam angle gauge, adjust it using adjusting screw A.



(c) Adjust the headlight in horizontal direction.

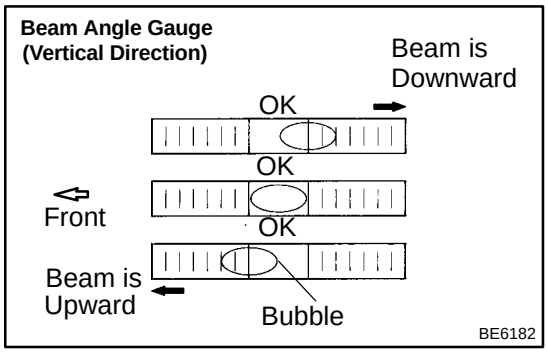
If the ”0” moves away from the mark beyond the acceptable range, adjust the ”0” back to the mark using adjusting screw B.

2. REPLACING HEADLIGHT

(a) Replace the headlight.

(b) Put the vehicle in below conditions.

- Make sure the body around the headlight is not deformed.
- Park the vehicle on a level spot.
- The driver gets into the driver’s seat and puts the vehicle in a state ready for driving (with a full tank).
- Bounce the vehicle several times.



(c) Adjust the headlight in vertical direction.

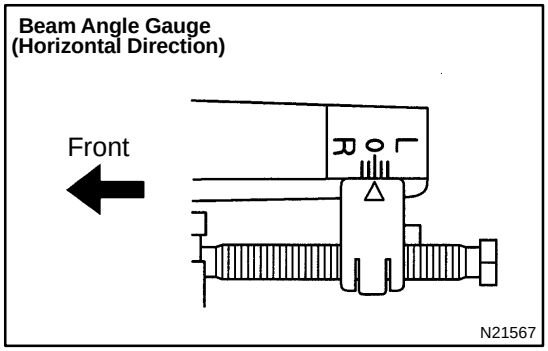
(1) Using adjusting screw A, adjust the headlight aim to within the specifications.

(2) Make sure that the gauge bubble is within the acceptable range.

HINT:

If the gauge bubble is outside the acceptable range, check that the vehecle is parked on a level place.

Readjust the headlight aim after parking the vehicle on a level place.



(d) Adjust the headlight in horizontal direction.

(1) Using adjusting screw B, adjust the headlight aim to within the specifications.

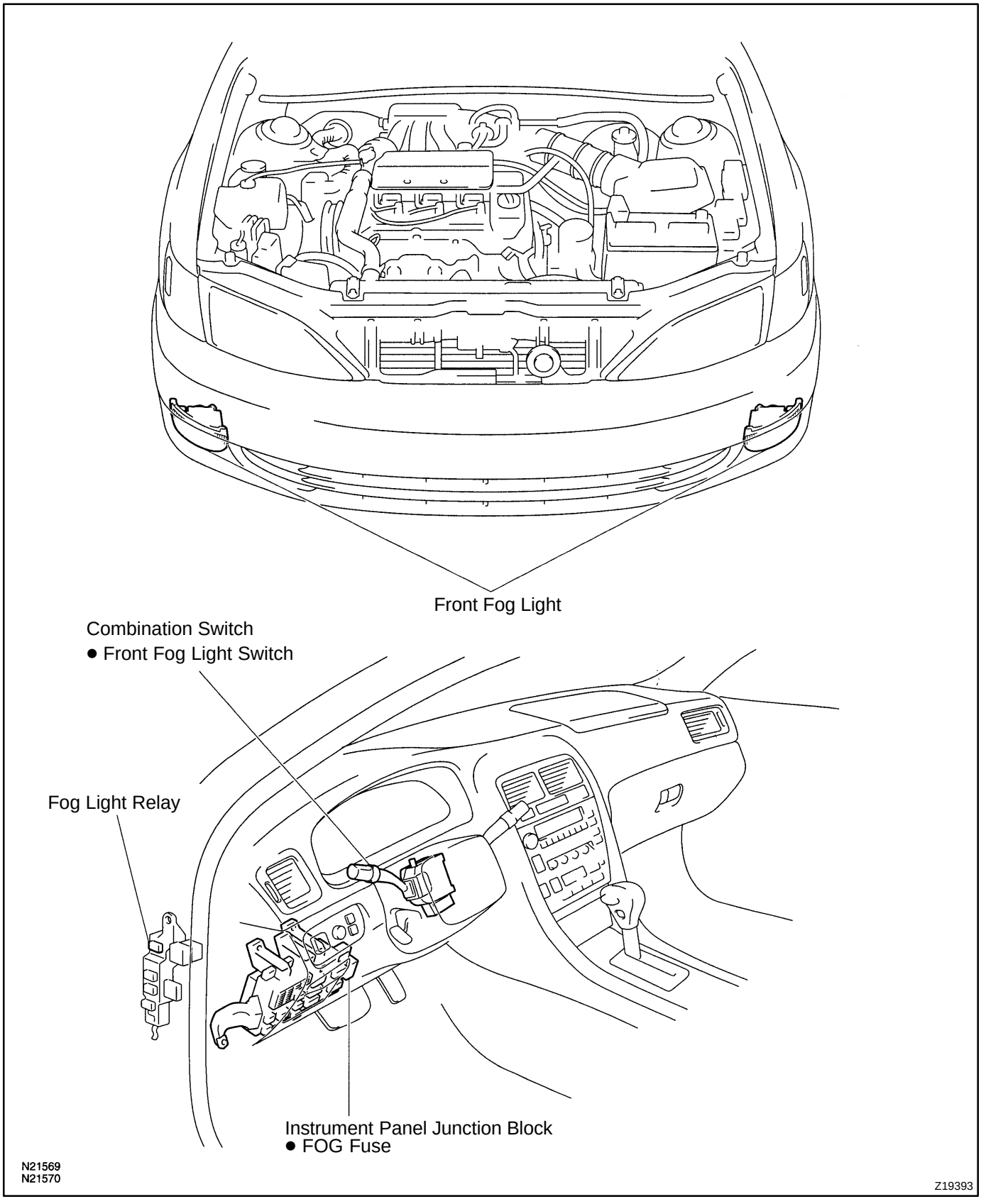
(2) Using adjusting nut C, adjust the ”0” back to the mark.

3. ADJUST SPIRAL CABLE

(See page SR–16)

FOG LIGHT SYSTEM
LOCATION

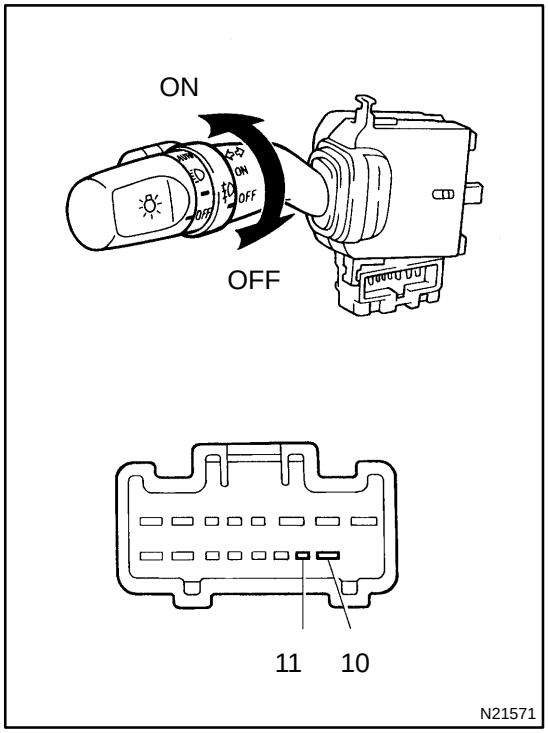
BE050–01



BE051–01

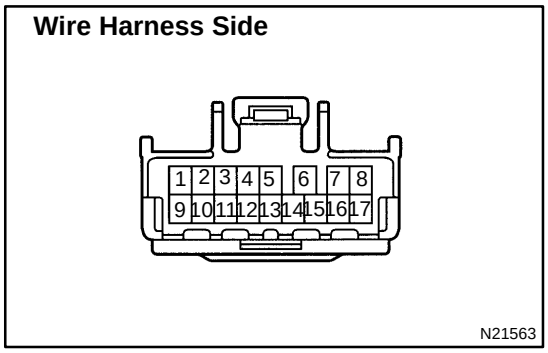
INSPECTION

1. INSPECT FOG LIGHT SWITCH CONTINUITY



Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	10 – 11	Continuity

If continuity is not as specified, replace the switch.

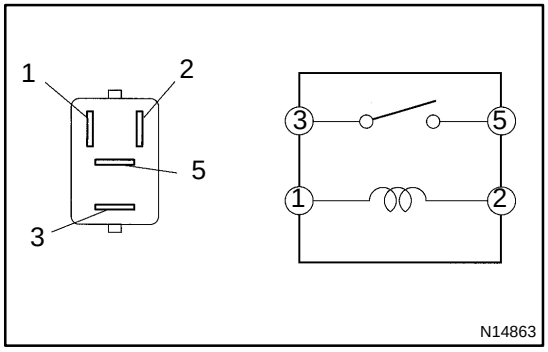


2. INSPECT COMBINATION SWITCH CIRCUIT

Connect the wire harness side connector to the combination switch and inspect wire harness side connector from the back side.

Tester connection	Condition	Specified condition
10– Ground	Headlight dimmer switch High Beam or Flash	No continuity
10– Ground	Headlight dimmer switch Low Beam	Continuity
11 – Ground	Light control switch OFF or TAIL	No voltage
11 – Ground	Light control switch HEAD	Battery positive voltage

If the circuit is not as specified, inspect the circuit connected to other parts.



3. INSPECT FOG LIGHT RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

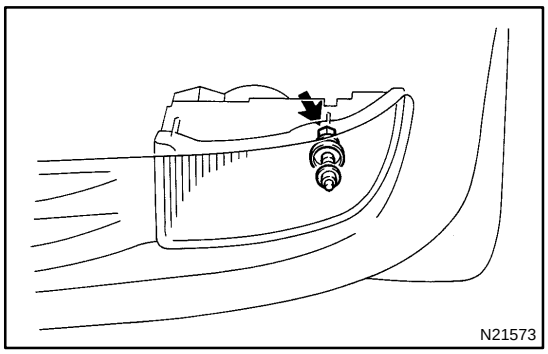
4. INSPECT FOG LIGHT RELAY CIRCUIT

Remove the relay from the driver's side relay block and inspect the connector on relay block side.

Tester connection	Condition	Specified condition
3 – Ground	Constant	Continuity
1 – Ground	Light control switch HEAD	Battery positive voltage
5 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuit connected to other parts.

BE052–01



ADJUSTMENT

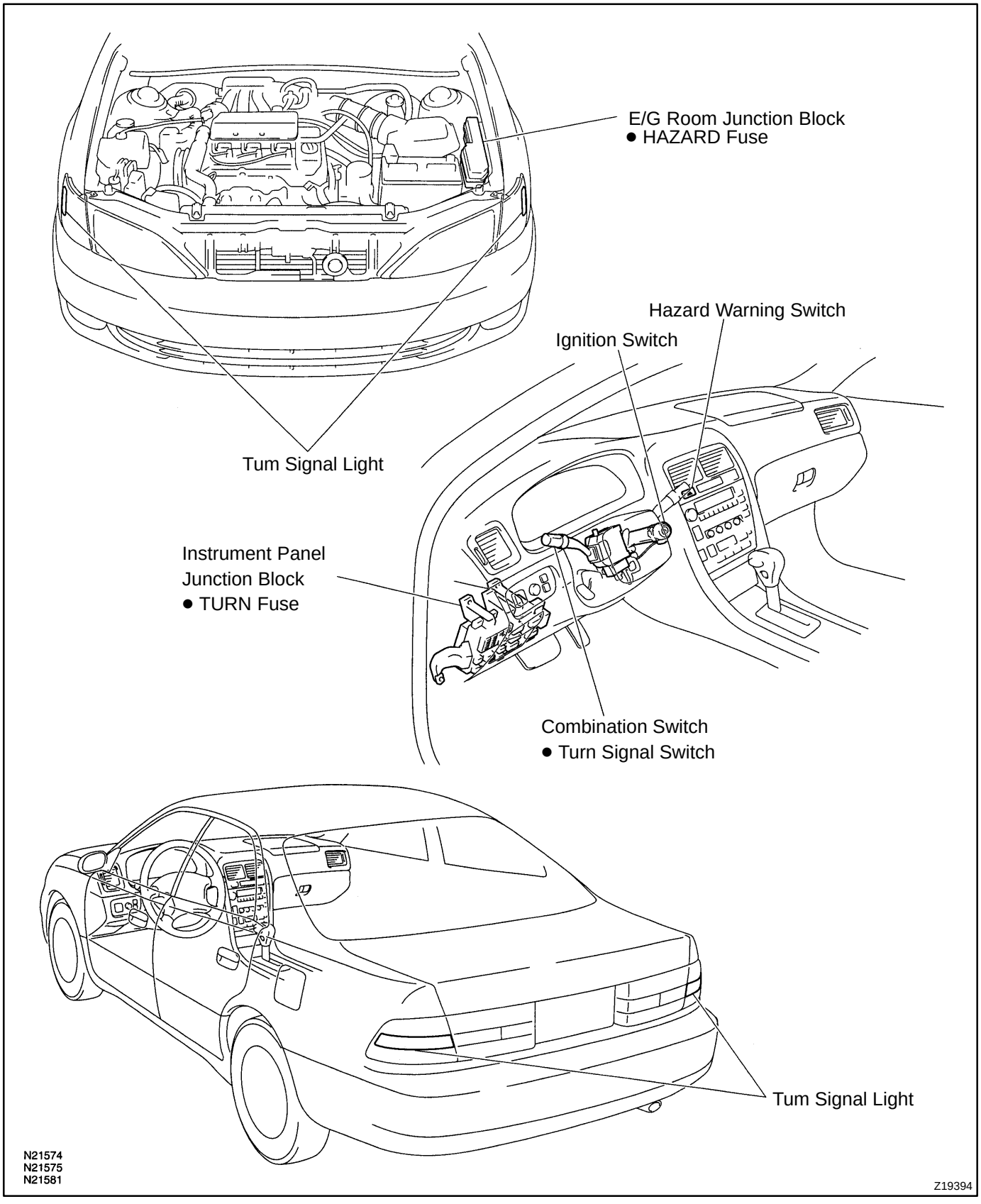
ADJUST FOG LIGHT AIM

A–bolt: Vertical Direction

TURN SIGNAL AND HAZARD WARNING SYSTEM

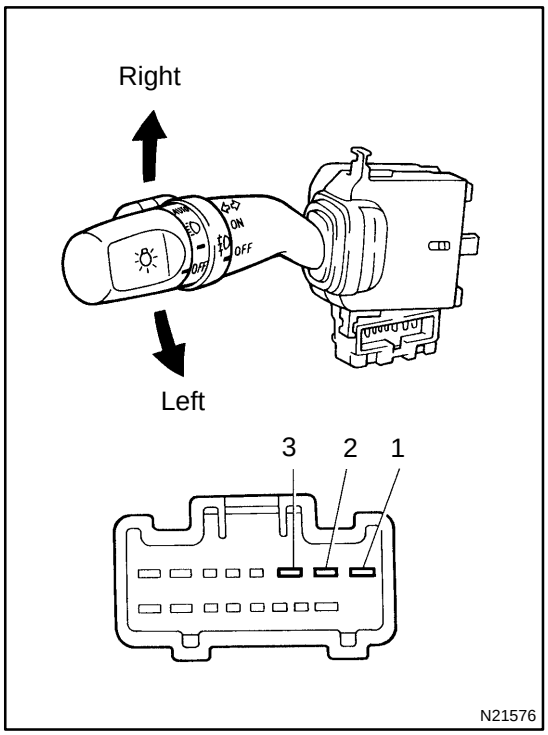
BE053–01

LOCATION



BE054–01

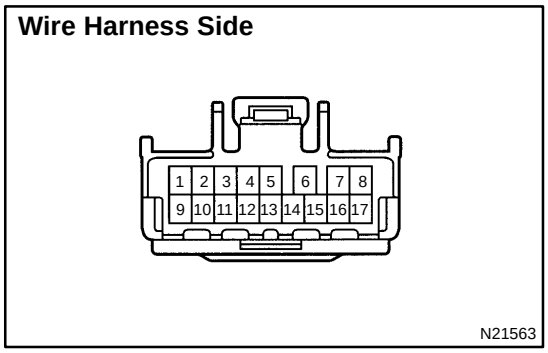
INSPECTION



1. INSPECT TURN SIGNAL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Left turn	1 – 2	Continuity
Neutral	–	No continuity
Right turn	2 – 3	Continuity

If continuity is not as specified, replace the switch.



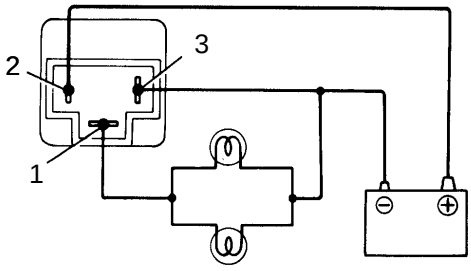
2. INSPECT COMBINATION SWITCH CIRCUIT

Connect the wire harness side connector to the combination switch and inspect wire harness side connector from the back side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	*Continuity
3 – Ground	Constant	*Continuity
2 – Ground	Ignition switch ON and turn signal switch position Neutral	No voltage
2 – Ground	Hazard warning switch ON	Battery positive voltage
2 – Ground	Ignition switch ON and turn signal switch position Left or Right	Battery positive voltage

*There is resistance because this circuit is grounded through the bulb.

If the circuit is not as specified, inspect the circuit connected to other parts.



Turn Signal Light Bulbs(21W)

BE1843

3. INSPECT TURN SIGNAL FLASHER OPERATION

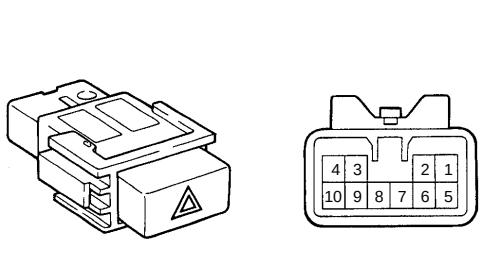
(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3.

(b) Connect the 2 turn signal light bulbs in parallel to each other to terminals 1 and 3, check that the bulbs flash.

HINT:

The turn signal lights should flash 60 to 120 times per minute. If one of the front or rear turn signal lights has an open circuit, the number of flashes will be more than 140 per minute.

If operation is not as specified, replace the flasher.



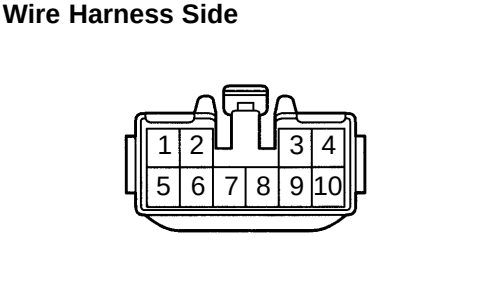
e–10–2

N21578

4. INSPECT HAZARD WARNING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch OFF	5 – 7	Continuity
Switch ON	1 – 2 – 3 – 4 5 – 6	Continuity
Illumination circuit	8 – 9	Continuity

If continuity is not as specified, replace the switch.



e–10–1

N21579

5. INSPECT HAZARD WARNING SWITCH CIRCUIT

Disconnect the switch connector and inspect the connection on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	*2Continuity
2 – Ground	Constant	*2Continuity
*19 – Ground	Constant	Continuity
6 – Ground	Constant	Battery positive voltage
7 – Ground	Ignition switch position LOCK or ACC	No voltage
7 – Ground	Ignition switch position ON	Battery positive voltage
*18 – Ground	Light control switch position OFF	No voltage
*18 – Ground	Light control switch position TAIL or HEAD	Battery positive voltage

*1: Illumination

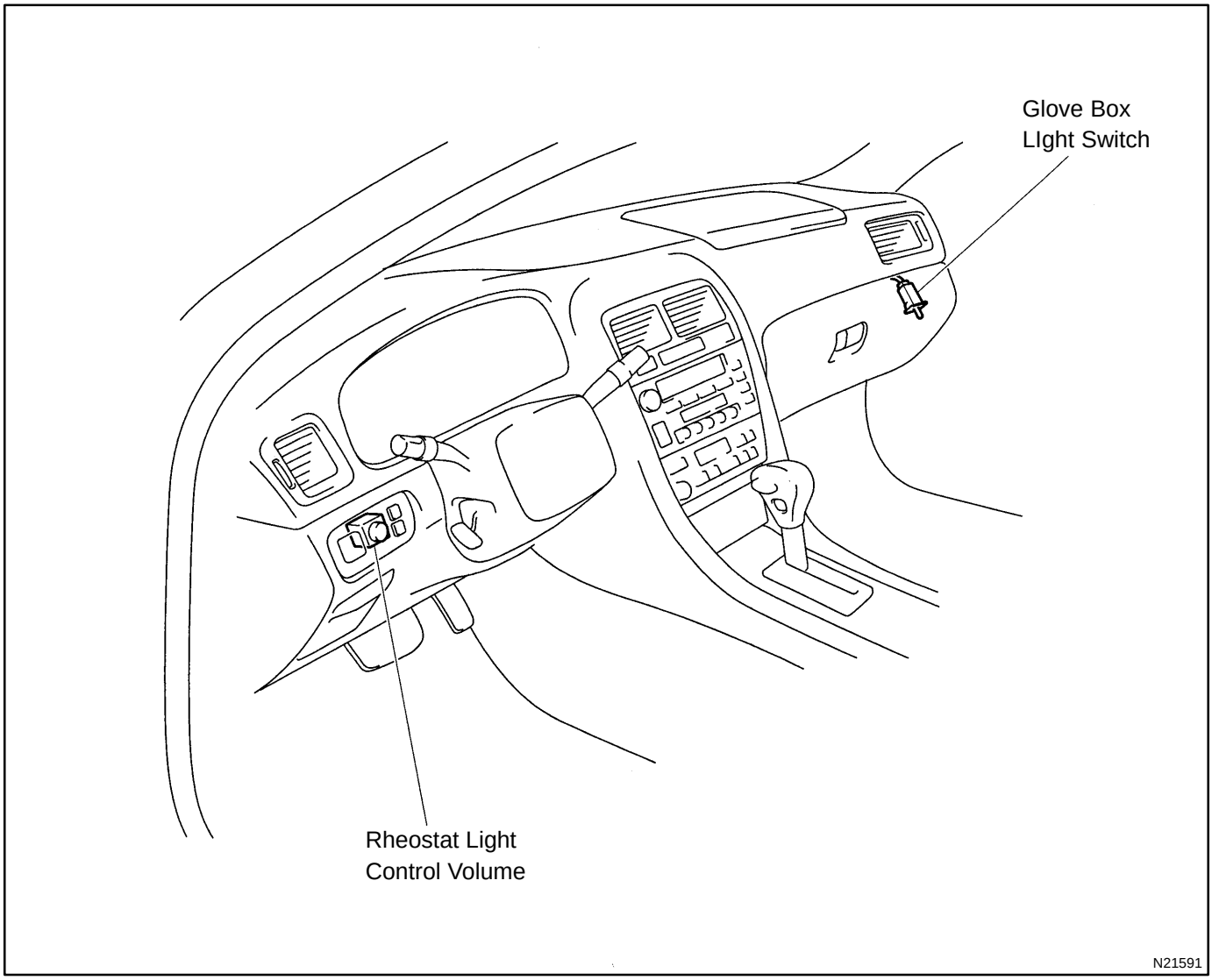
*2: There is resistance because this circuit is grounded through the bulb.

If the circuit is not as specified, inspect the circuits connected to other parts.

ILLUMINATION LIGHT SYSTEM

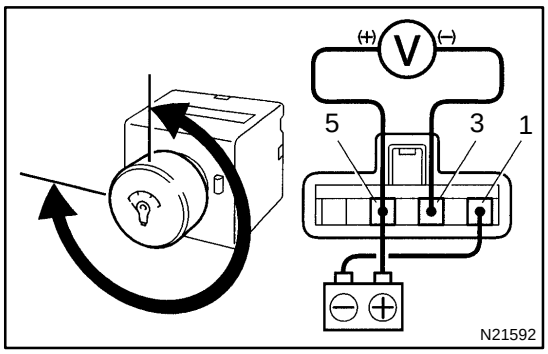
LOCATION

BE055–01



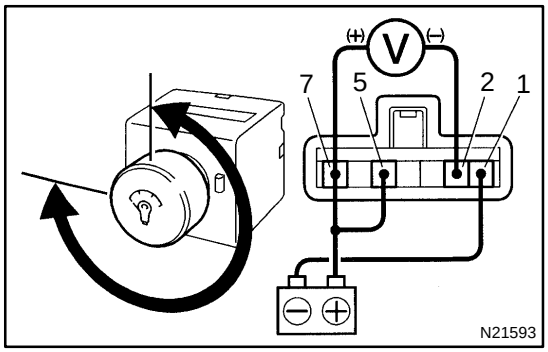
BE056–01

INSPECTION



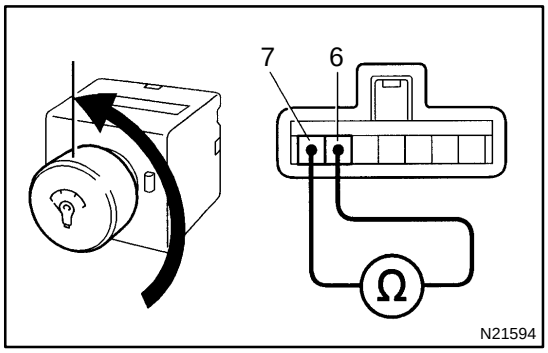
1. Combination Meter Adjustment:
INSPECT RHEOSTAT LIGHT CONTROL VOLUME

(a) Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 1.
(b) Connect the positive (+) lead from the voltmeter to terminal 5 and negative (–) lead to terminal 3.
(c) Turn the rheostat knob and check that the voltage changes.



2. Illumination Adjustment:
INSPECT RHEOSTAT LIGHT CONTROL VOLUME

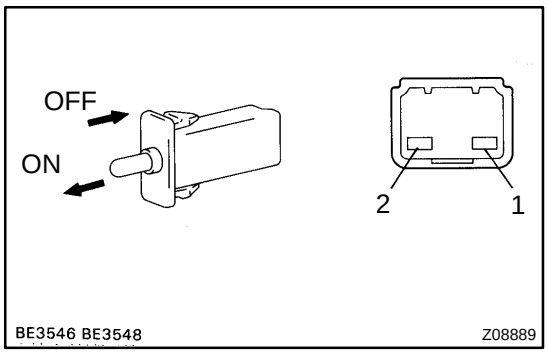
(a) Connect the positive (+) lead from the battery to terminal 5 and 7 and negative (–) lead to terminal 1.
(b) Connect the positive (+) lead from the voltmeter to terminal 7 and negative (–) lead to terminal 2.
(c) Turn the rheostat knob and check that the voltage changes.



3. Tail Cancel:
INSPECT RHEOSTAT LIGHT CONTROL VOLUME

(a) Connect the ohmmeter to terminals 6 and 7.
(b) Turn the rheostat knob fully clockwise and check that current flow stops.

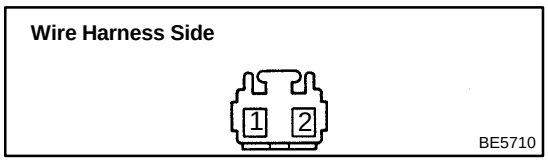
If switch is not as specified, replace the volume.



4. INSPECT GLOVE BOX LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Closed)	–	No continuity
ON (Opened)	1 – 2	Continuity

If continuity is not as specified, replace the relay.



5. INSPECT GLOVE BOX LIGHT SWITCH CIRCUIT

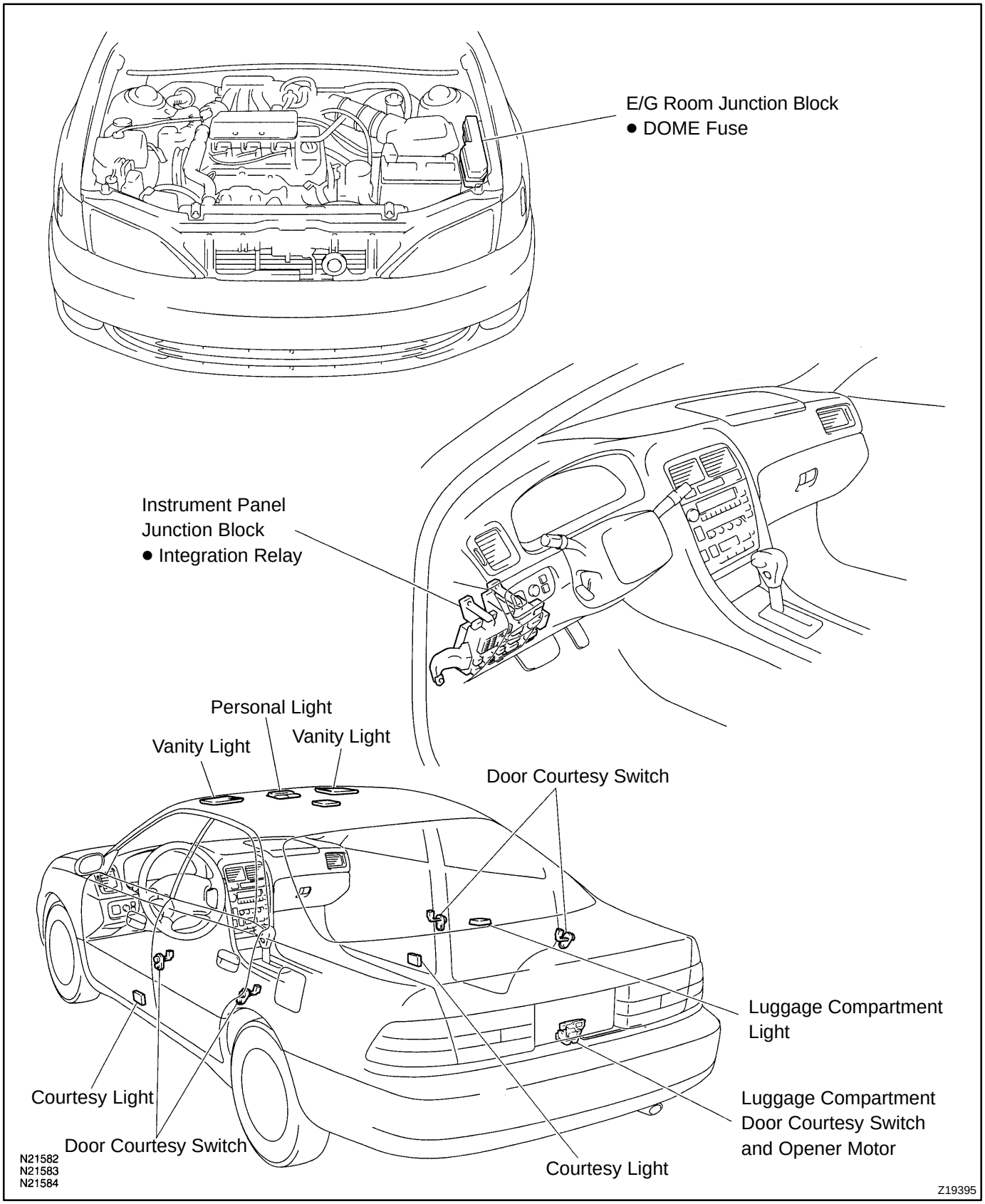
Disconnect the connector fromt the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Light control switch position OFF	No voltage
1 – Ground	Light control switch position TAIL or HEAD	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

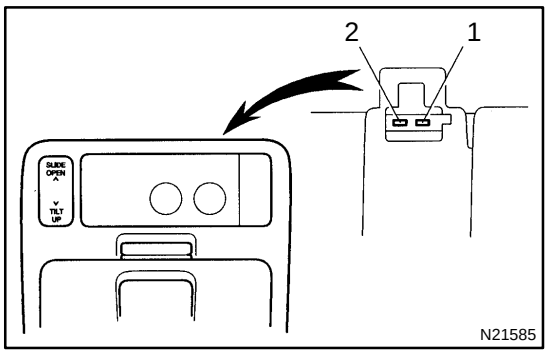
INTERIOR LIGHT SYSTEM
LOCATION

BE057–01



BE058–03

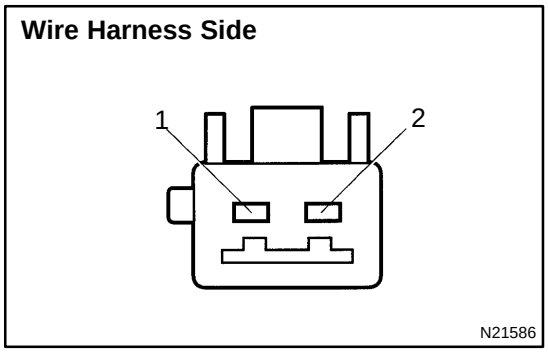
INSPECTION



1. INSPECT PERSONAL LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	1 – 2	Continuity

If continuity is not as specified, replace the light assembly or bulb.

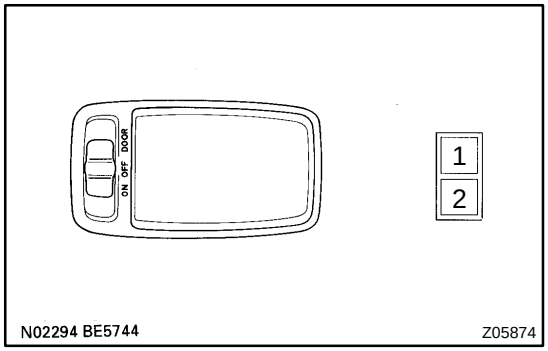


2. INSPECT PERSONAL LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage

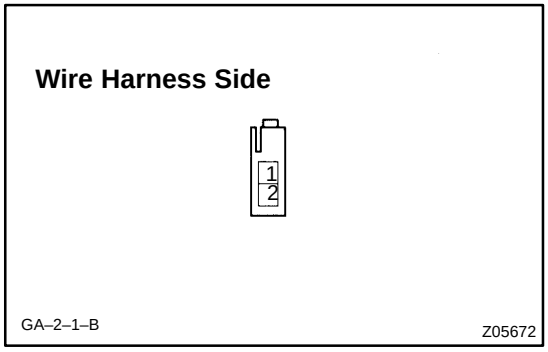
If the circuit is as specified, inspect power source or wire harness.



3. INSPECT INTERIOR LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
DOOR	2 – Switch body	Continuity
OFF	–	No continuity
ON	1 – 2	Continuity

If continuity is not as specified, replace the light assembly or bulb.

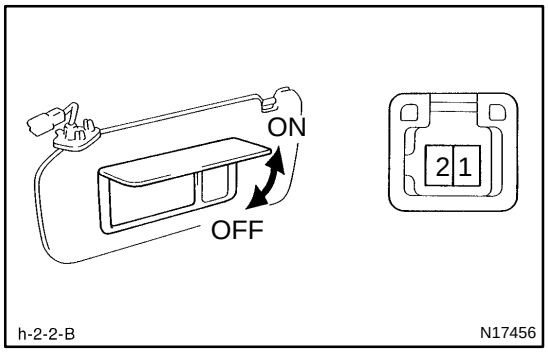


4. INSPECT INTERIOR LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Battery positive voltage

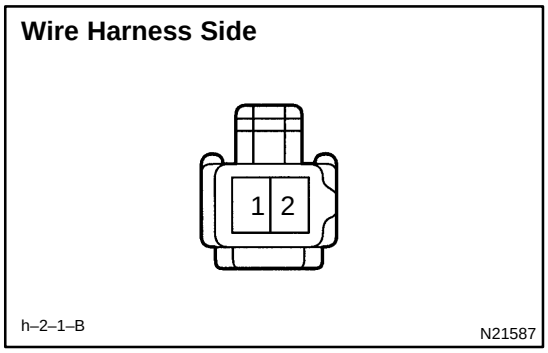
If the circuit is not as specified, inspect power source or wire harness.



5. INSPECT VANITY LIGHT CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Closed)	–	No continuity
ON (Opened)	1 – 2	Continuity

If continuity is not as specified, replace the bulb or vanity light.

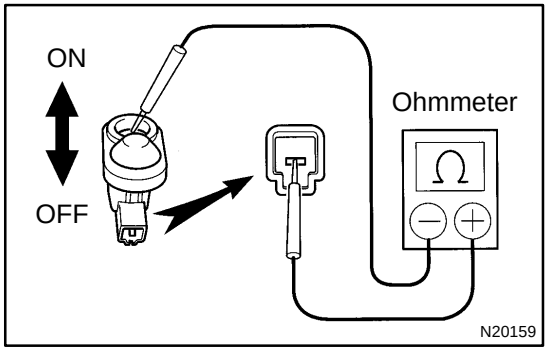


6. INSPECT VANITY LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect power source or wire harness.

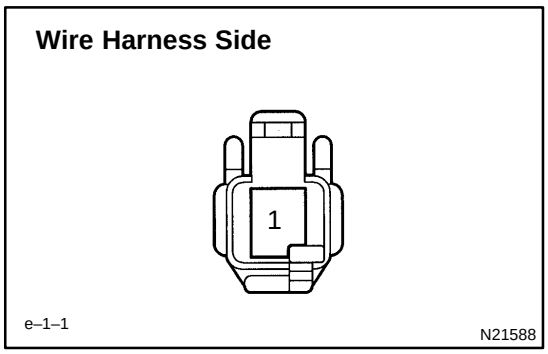


7. INSPECT DOOR COURTESY SWITCH CONTINUITY

(a) Check that continuity exists between terminals and the switch body with the switch ON (switch pin released: opened door).

(b) Check that no continuity exists between terminals and the switch body with the switch OFF (switch pin pushed in: closed doors).

If operation is not as specified, replace the switch.

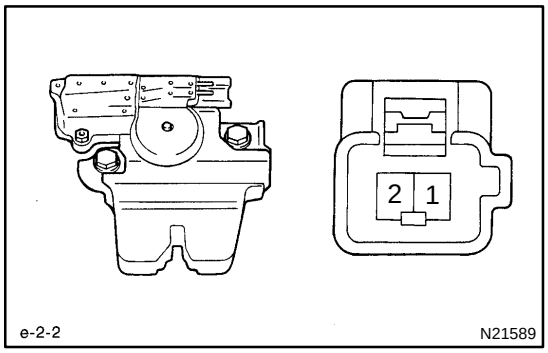


8. INSPECT DOOR COURTESY SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Battery positive voltage

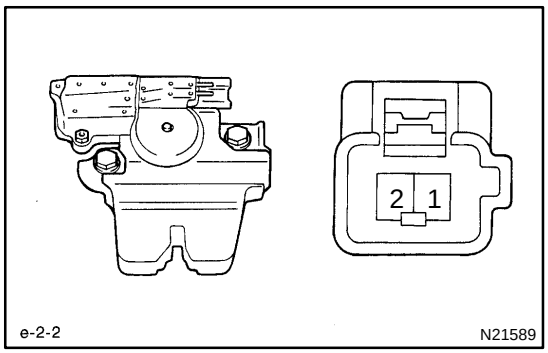
If the circuit is not as specified, inspect power source or wire harness.



9. INSPECT LUGGAGE COMPARTMENT DOOR COURTESY SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch OFF	–	No continuity
Switch ON	2 – Body Ground	Continuity

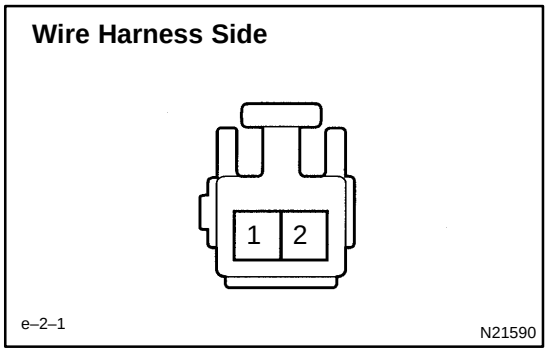
If continuity is not as specified, replace the switch and motor.



10. INSPECT LUGGAGE COMPARTMENT DOOR OPENER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to body ground, check that the motor operates.

If operation is not as specified, replace the switch and motor.



11. INSPECT LUGGAGE COMPARTMENT DOOR COURTESY SWITCH AND OPENER MOTOR CIRCUIT

Disconnect the connector from the switch and opener motor, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Luggage compartment door opener switch OFF	No voltage
1 – Ground	Luggage compartment door opener switch ON	Battery positive voltage
2 – Ground	Constant	Battery positive voltage

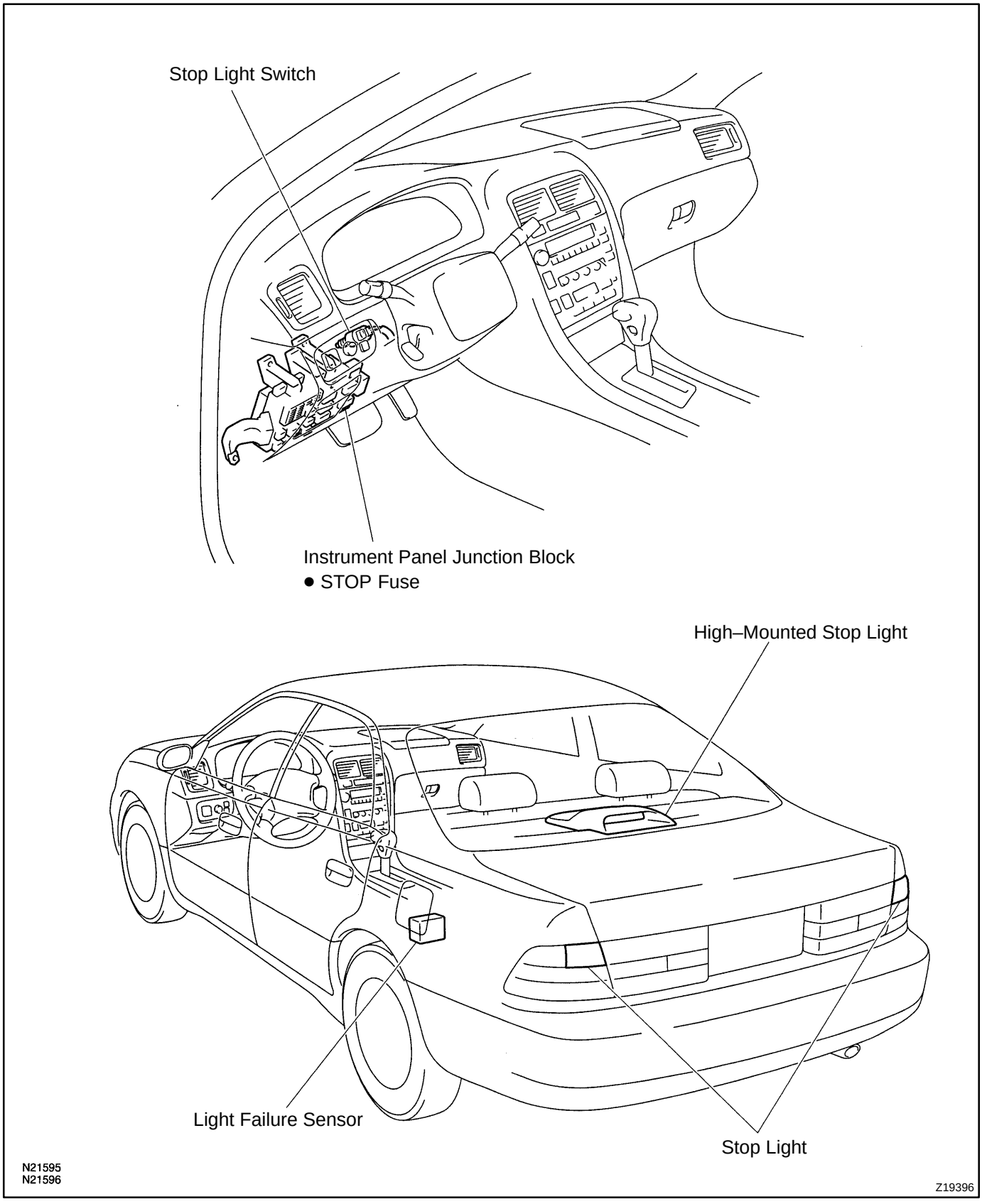
If the circuit is not as specified, inspect power source or wire harness.

12. INSPECT ILLUMINATED ENTRY SYSTEM
(See integration relay circuit on page BE–20)

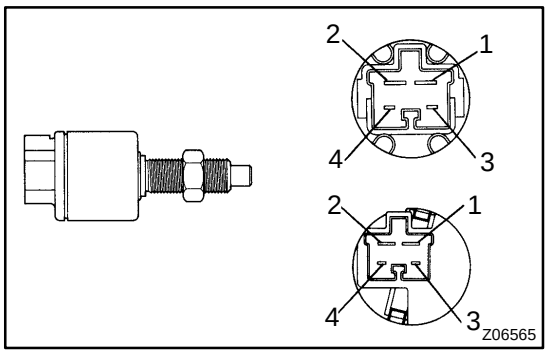
STOP LIGHT SYSTEM

LOCATION

BE059–01



BE05A–01

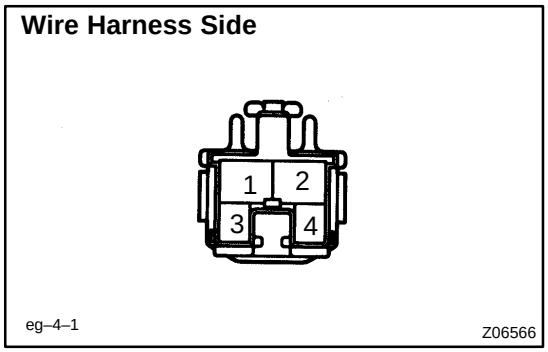


INSPECTION

1. INSPECT STOP LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch pin free	1 – 2	Continuity
Switch pin pushed in	3 – 4	Continuity

If continuity is not as specified, replace the switch.

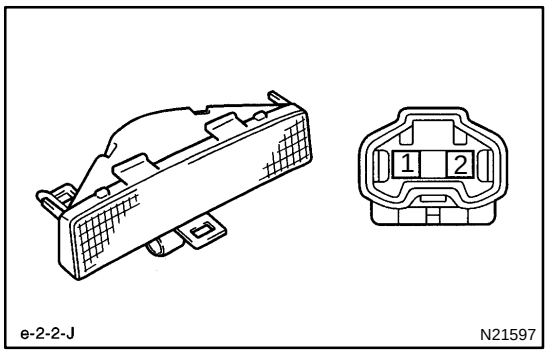


2. INSPECT STOP LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Battery positive voltage

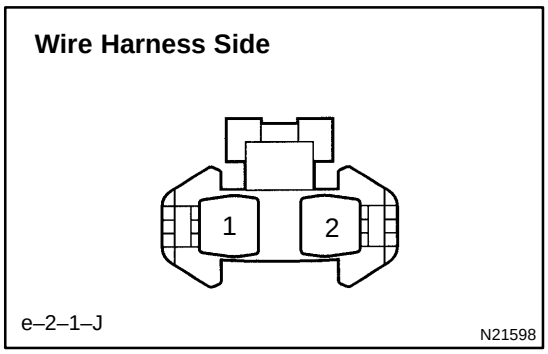
If circuit is not as specified, inspect the power source or wire harness.



3. INSPECT HIGH–MOUNTED STOP LIGHT ASSEMBLY CONTINUITY

Using the ohmmeter, check that continuity exists between terminals.

If continuity is not as specified, replace the bulb or light assembly.

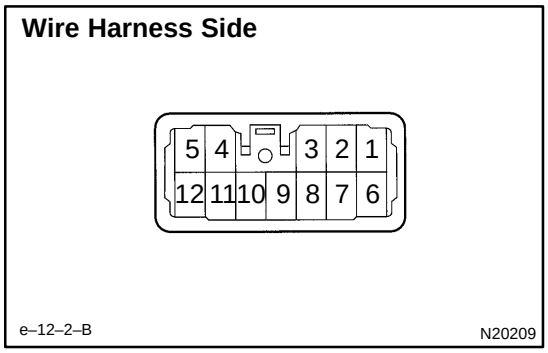


4. INSPECT HIGH–MOUNTED STOP LIGHT ASSEMBLY CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the power source or wire harness.



5. INSPECT LIGHT FAILURE SENSOR CIRCUIT

Disconnect the connector from the sensor and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity*
2 – Ground	Constant	Continuity*
9 – Ground	Constant	Continuity*
11 – Ground	Constant	Continuity
3 – Ground	Light control switch OFF	No voltage
3 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
4 – Ground	Ignition switch LOCK or ACC	No voltage
4 – Ground	Ignition switch ON	Battery positive voltage
7 – Ground	Stop light switch OFF	No voltage
7 – Ground	Stop light switch ON	Battery positive voltage
8 – Ground	Ignition switch LOCK or ACC	No voltage
8 – Ground	Ignition switch ON	Battery positive voltage

*: There is resistance because this circuit is grounded through the bulb.

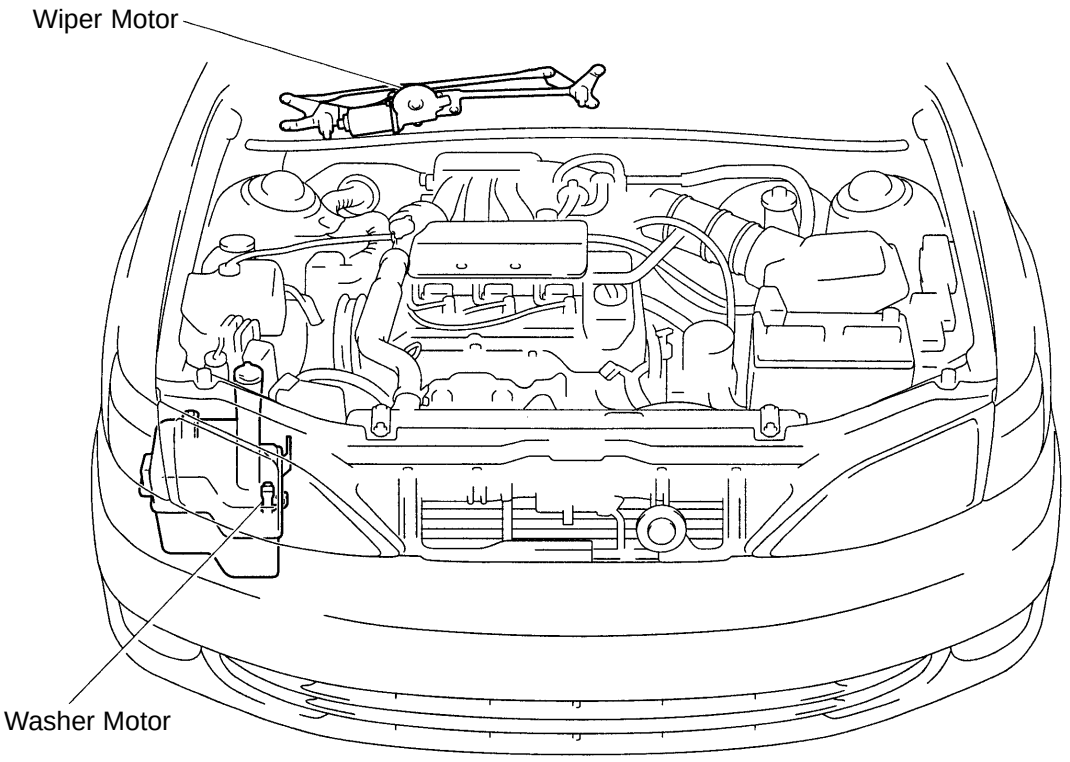
If the circuit is as specified, replace the sensor.

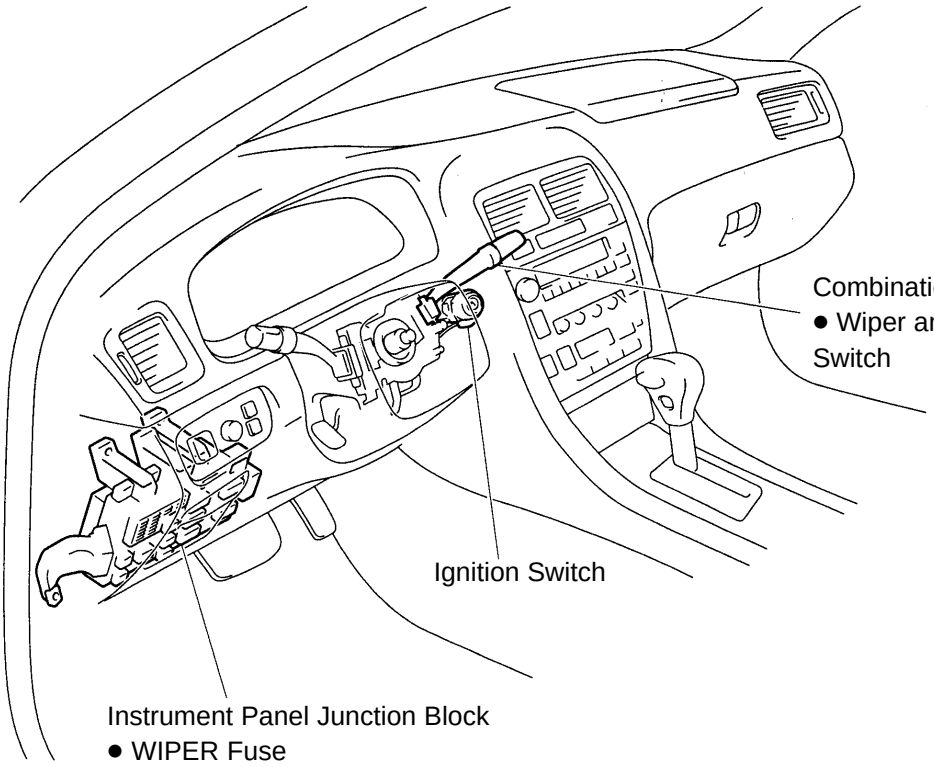
If the circuit is not as specified, inspect the circuits connected to other parts.

WIPER AND WASHER SYSTEM

LOCATION

BE05B–01





N21500
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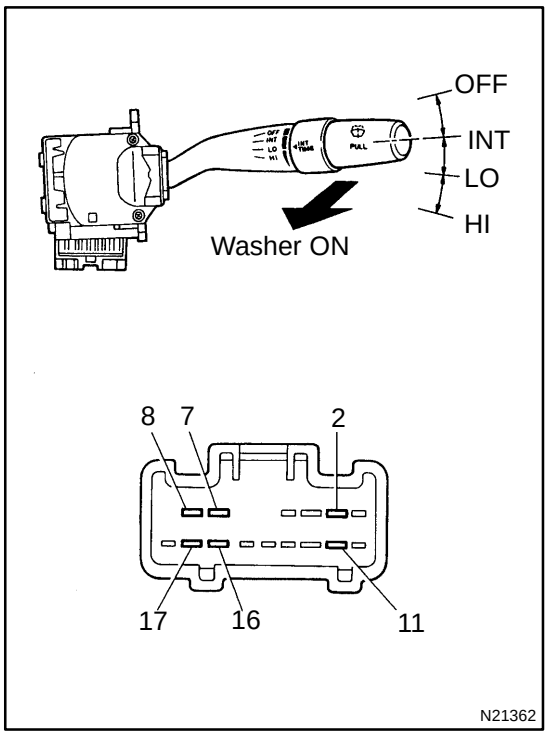
BE05C–03

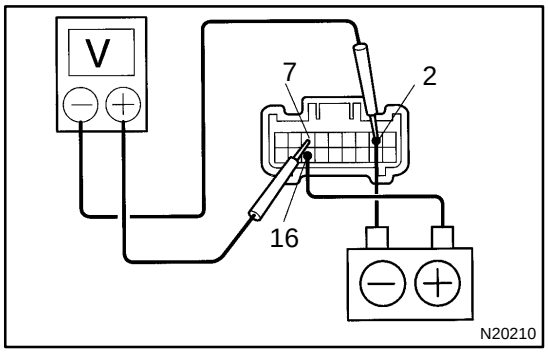
INSPECTION



1. INSPECT FRONT WIPER AND WASHER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	7 – 16	Continuity
INT	7 – 16	Continuity
LO	7 – 17	Continuity
HI	8 – 17	Continuity
Washer ON	2 – 11	Continuity

If continuity is not as specified, replace the switch.



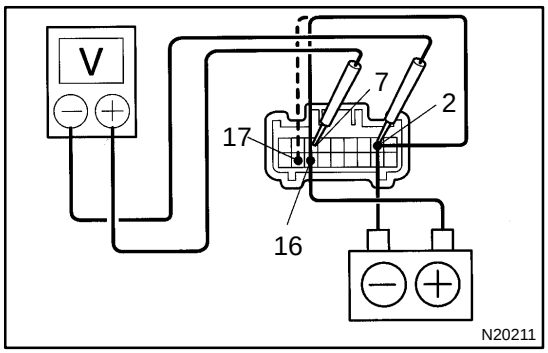
2. INSPECT INTERMITTENT OPERATION

(a) Turn the wiper switch to INT position.

(b) Turn the intermittent time control switch to FAST position.

(c) Connect the positive (+) lead from the battery to terminal 16 and the negative (–) lead to terminal 2.

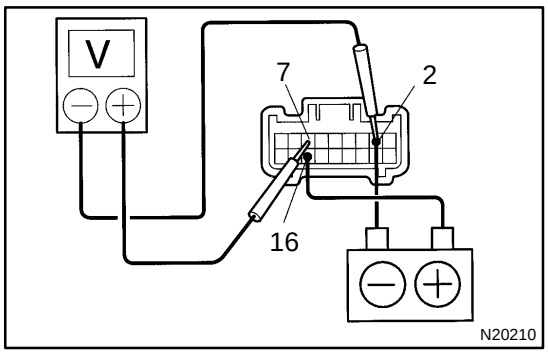
(d) Connect the positive (+) lead from the voltmeter to terminal 7 and the negative (–) lead to terminal 2, check that the meter needle indicates battery positive voltage.



(e) After connecting terminal 16 to terminal 17, connect it to terminal 2, check the voltage rises from 0 volt to battery positive voltage within the time, as shown in the table.

INT time control switch position	Voltage
FAST	Approx. 2 sec. → Battery positive voltage / 0 V
SLOW	10.7 ± 5 sec. → Battery positive voltage / 0 V
Non variable type	3.3 ± 1 sec. → Battery positive voltage / 0 V

If operation is not as specified, replace the wiper and washer switch.

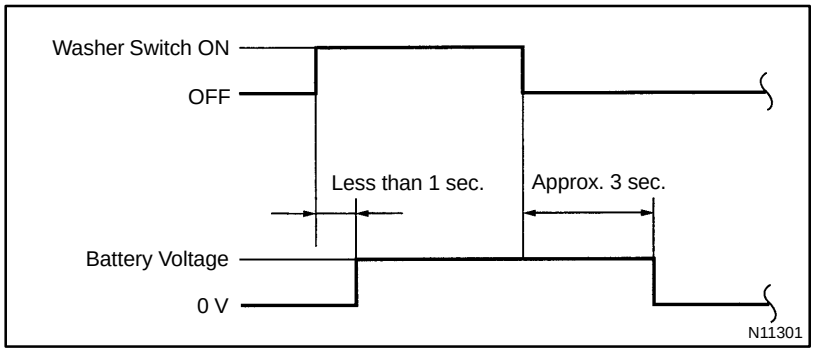


3. INSPECT WASHER LINKED OPERATION

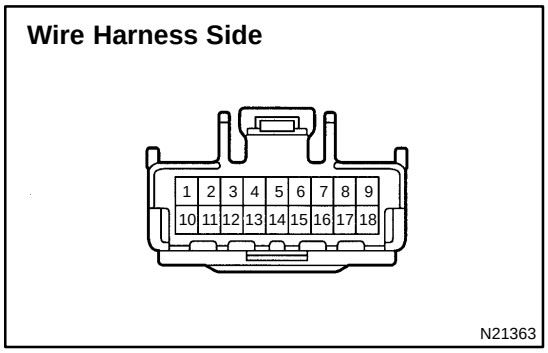
(a) Connect the positive (+) lead from the battery to terminal 16 and the negative (–) lead to terminal 2.

(b) Connect the positive (+) lead from the voltmeter to terminal 7 and the negative (–) lead to terminal 2.

(c) Push in the washer switch, and check that the voltage changes as shown in the table below.



If operation is not as specified, replace the wiper and washer switch.

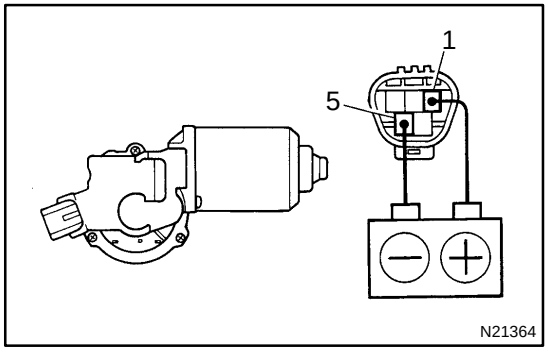


4. INSPECT WIPER SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
11 – Ground	Ignition switch LOCK or ACC	No voltage
11 – Ground	Ignition switch ON	Battery positive voltage

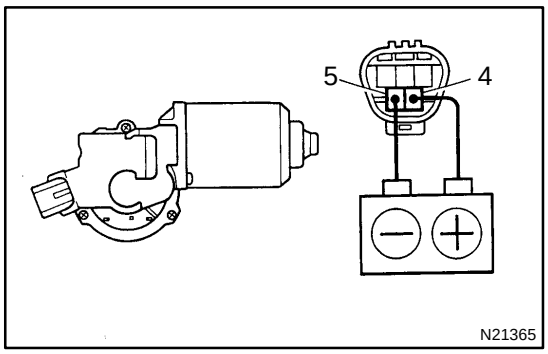
If circuit is not as specified, inspect the circuits connected to other parts.



5. Low Speed: INSPECT FRONT WIPER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 5, check that the motor operates at low speed.

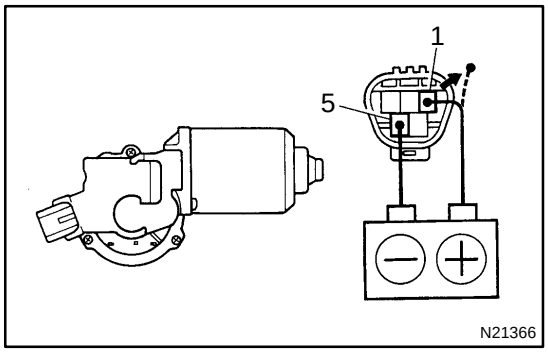
If operation is not as specified, replace the motor.



6. High Speed:
INSPECT FRONT WIPER MOTOR OPERATION

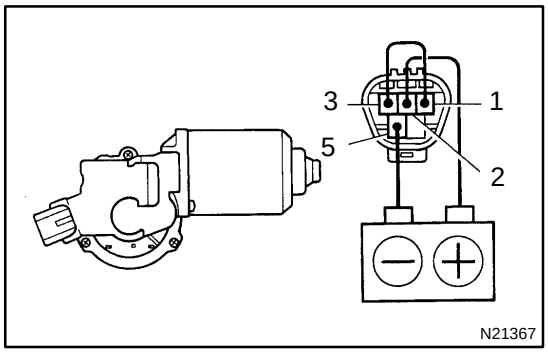
Connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to terminal 5, check that the motor operates at high speed.

If operation is not as specified, replace the motor.



7. Stopping at Stop Position:
INSPECT FRONT WIPER MOTOR OPERATION

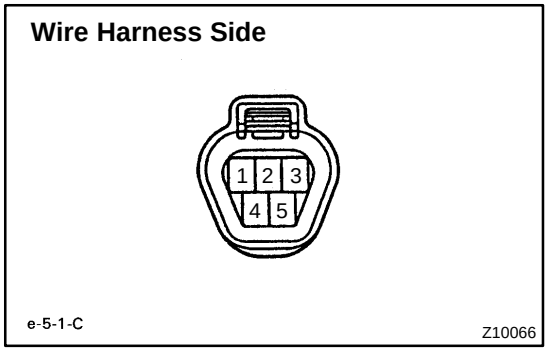
(a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting positive (+) lead from terminal 1.



(b) Connect terminals 1 and 3.

(c) Connect the positive (+) lead from the battery to terminal 2 and negative (–) lead to terminal 5, check that the motor stops running at the stop position after the motor operates again.

If operation is not as specified, replace the motor.

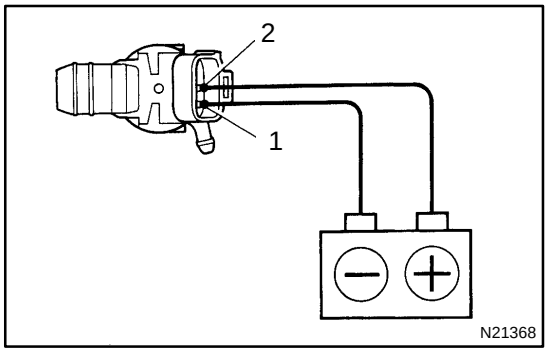


8. INSPECT WIPER MOTOR CIRCUIT

Disconnect the connector from the motor and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
5 – Ground	Constant	Continuity
1 – Ground	* Wiper switch OFF or INT, HIGH	No voltage
1 – Ground	* Wiper switch LOW	Battery positive voltage
2 – Ground	Ignition switch LOCK or ACC	No voltage
2 – Ground	Ignition switch ON	Battery positive voltage
4 – Ground	* Wiper switch OFF or INT, LOW	No voltage
4 – Ground	* Wiper switch HIGH	Battery positive voltage

*: Turn ignition switch ON
If circuit is not as specified, inspect the circuits connected to other parts.



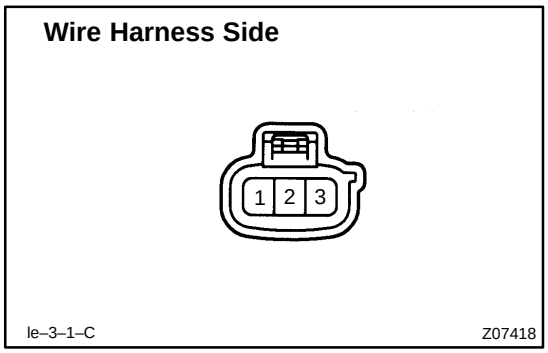
9. INSPECT WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the motor operates.

NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



10. INSPECT WASHER MOTOR CIRCUIT

Disconnect the connector from the washer motor and inspect the connector on harness side.

Tester connection	Condition	Specified condition
1 – Ground	Washer switch OFF (released)	No continuity
1 – Ground	Washer switch ON (pushed in)	Continuity
2 – Ground	Ignition switch LOCK or ACC	No voltage
2 – Ground	Ignition switch ON	Battery positive voltage

If circuit is not as specified, inspect wire harness, power source or wiper switch.

COMBINATION METER

BE05D–03

TROUBLESHOOTING

PRECAUTIONS

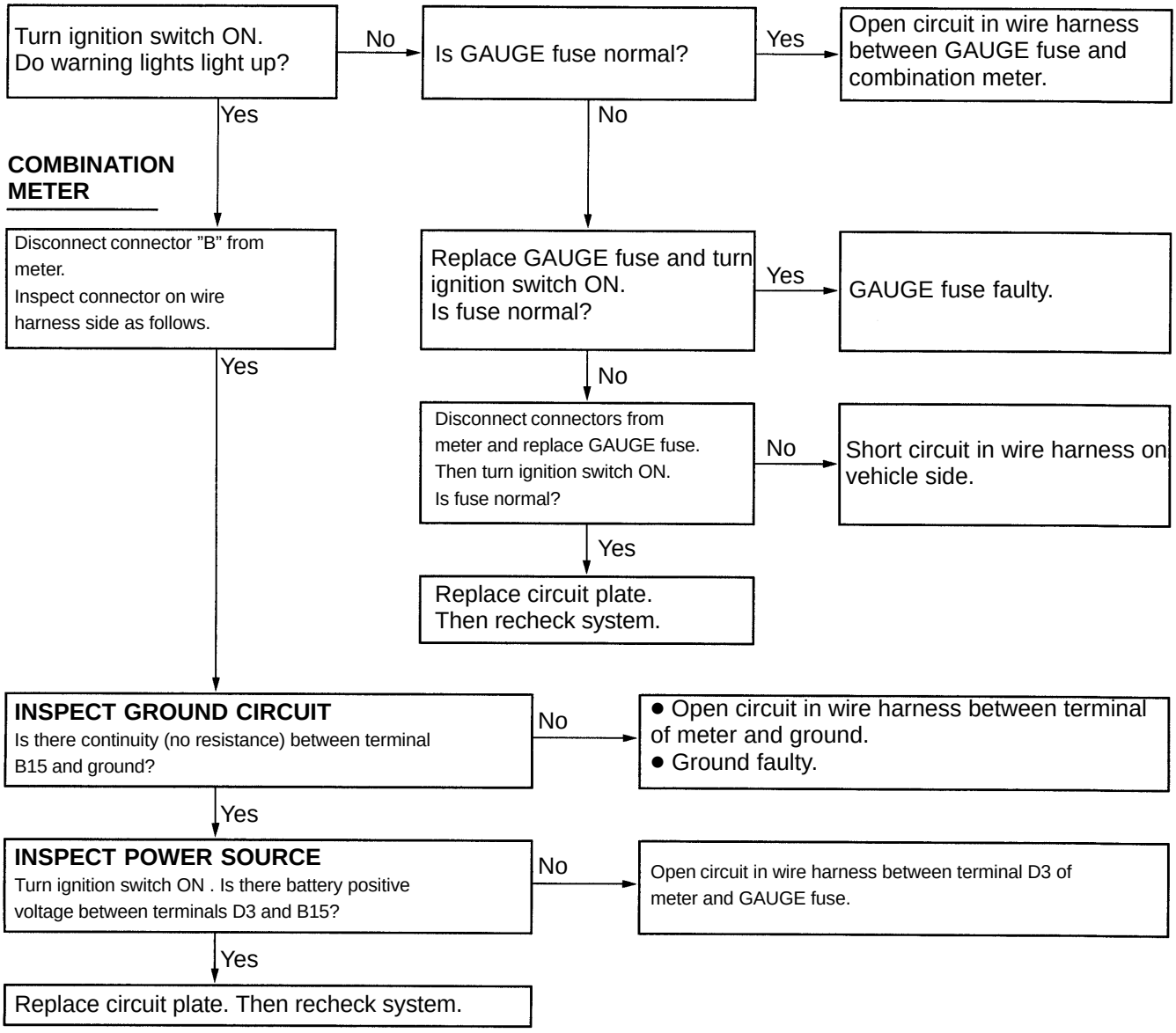
(a) When checking voltage, resistance, etc., use a high impedance type tester (It is impossible to use a simple tester).
(b) When the ignition switch is turned to START, all meters will go out but this is normal.
(c) When replacing the internal mechanism (computer parts) of the meter, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement parts (spare parts).
(d) Do not disconnect the battery while the engine is running as this would cause an instant reverse charge, resulting in damage to the components.
(e) Always disconnect the battery terminals before pulling apart connectors or terminals.
(f) To prevent damage, handle meters with care.

Trouble		Refer to
All Meters, Gauges, and Illuminations	No display at all.	1
	The four indicator needles do not light up.	Replace combination meter computer.
	One indicator needle does not light up.	2
	The character plate is not illuminated at one or two locations.	3
	Brightness does not change even when light control switch is operated (OFF↔TAIL).	4
	Brightness does not change even when rheostat volume is turned.	5
	Remains dimmed when the light control switch is turned OFF.	Replace combination meter computer.
	Does not go out while starter running.	6
Speedometer	Speedometer does not operate while driving.	7
	Vehicle speed signal (4P) faulty.	8
Tachometer	Tachometer does not operate while engine running.	9
Fuel Gauge	Does not operate or operation is abnormal.	10
Fuel Level Warning	Warning light does not light up or always lights up.	11
Engine Coolant Temperature Gauge	Does not operate or operation is abnormal.	12
Low Oil Pressure warning	Abnormal operation or warning light does not light up.	13
Brake Warning	Abnormal operation or warning light does not light up.	14
Rear Lights Warning	Abnormal operation or warning light does not light up.	15
Open Door Warning	Abnormal operation or warning light does not light up.	16
Engine Oil Level Warning	Abnormal operation or warning light does not light up.	17
Seat Belt Warning Chime	Abnormal operation or chime does not operate.	BE–92
Seat Belt Warning	Abnormal operation or warning light does not light up.	18

Trouble		Refer to
Turn Signal Indicator	Abnormal operation or Indicator does not light up.	19
O/D OFF Indicator	Abnormal operation or Indicator does not light up.	20
Shift Position Indicator	Abnormal operation or Indicator does not light up.	21
Malfunction Indicator	Abnormal operation or warning light does not light up	22
ABS Warning	Abnormal operation or warning light does not light up.	23
CRUISE Indicator	Abnormal operation or Indicator does not light up.	24
SRS Warning	Abnormal operation or warning light does not light up.	25
Discharge Warning	Abnormal operation or warning light does not light up.	26
High Beam Indicator	Abnormal operation or Indicator does not light up.	27
Window Washer Warning	Abnormal operation or warning light does not light up.	28
Taillight Indicator	Abnormal operation or Indicator does not light up.	29
Headlight Indicator	Abnormal operation or Indicator does not light up.	30

1	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**No display at all.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08429

2	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**One indicator needle does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Is LED OK?
- No → Replace the LED. Then recheck system.
- Yes ↓

Disconnect connector "B" from meter.
Inspect connector on wire harness side as follows

INSPECT GROUND CIRCUIT
Is there continuity (no resistance) between terminal B15 and ground?
- No → ● Open circuit in wire harness between terminal of meter and ground. ● Ground faulty.
- Yes ↓

INSPECT POWER SOURCE
Turn ignition switch ON . Is there battery positive voltage between terminals D3 and B15?
- No → Open circuit in wire harness between terminal D3 of meter and GAUGE fuse.
- Yes ↓

Replace circuit plate. Then recheck system.

3	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**The character plate is illuminated on one side.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Is bulb OK?
- No → Replace the LED. Then recheck system.
- Yes ↓

Disconnect connector "B" from meter.
Inspect connector on wire harness side as follows.

INSPECT GROUND CIRCUIT
Is there continuity (no resistance) between terminal B15 and ground?
- No → ● Open circuit in wire harness between terminal D3 of meter and ground. ● Ground faulty.
- Yes ↓

INSPECT POWER SOURCE
Turn ignition switch ON . Is there battery positive voltage between terminals D3 and B15?
- No → Open circuit in wire harness between terminal D3 of meter and GAUGE fuse.
- Yes ↓

Replace circuit plate. Then recheck system.

V08430

4	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**Brightness does not change even when light control switch is operated. (OFF↔TAIL)**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

COMBINATION METER

Disconnect connector "B" from meter.
Inspect connector on wire harness side as follows.

INSPECT TAILLIGHT SIGNAL CIRCUIT
Does voltage change between terminal B8 and ground as follows?

Condition		Voltage
Light control switch position	OFF	No voltage
	TAIL or HEAD	Battery positive voltage

No → Taillight signal circuit faulty on vehicle side. Inspect illumination light system.

Yes

Replace circuit plate. Then recheck system.

5	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**Brightness does not change even when rheostat volume is turned.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

RHEOSTAT LIGHT CONTROL VOLUME

INSPECT RHEOSTAT LIGHT CONTROL VOLUME
(See page BE–)
Is operation normal?

No → Replace rheostat light control volume. Then recheck system.

Yes

COMBINATION METER

Connect connector to rheostat volume.
Disconnect connector "D" from meter.
Inspect connector on wire harness side as follows.

Turn ignition switch ON. Does voltage change evenly between terminal D1 and D2 when rheostat knob is turned?

No → Wire harness faulty between terminal D1 of meter and terminal D2 of rheostat volume and rheostat light control.

Yes

Replace circuit plate. Then recheck system.

V08431

6	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**Does not go out while starter running.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connector ”B” from meter.
Inspect connector on wire harness side as follows.

↓

Turn ignition switch START.
Is there battery positive voltage between terminal and ground or B16?

No → Wire harness faulty between terminal B16 of Meter and ST fuse.

↓ Yes

Replace circuit plate. Then recheck system.

7	**SPEEDOMETER**	**Speedometer does not operate while driving**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

INSPECT ODOMETER OPERATION
Does odometer operate while driving?

Yes → **INSPECT TRIP METER OPERATION**
Does trip meter operate while driving?

Yes → Replace speedometer. Then recheck system.

No → Go to step 7–A

↓ No

COMBINATION METER

Disconnect connector ”C” from meter.
Inspect connector on wire harness side as follows.

↓

Jack up the vehicle.
Turn ignition switch ON. Rotate propeller shaft.
Does the voltage between terminals C9 and C10 change (approx. 0V to 11V or more) per revolution of propeller shaft?

Yes → Replace circuit plate. Then recheck system.

↓ No

CONTINUED ON NEXT PAGE

V08432

8	**SPEEDOMETER**	**Vehicle speed signal (4P) faulty**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

INSPECT ODOMETER OPERATION
Does odometer operate while driving?
No → See chart 18.
Yes ↓

COMBINATION METER

Remove meter with connector connected.
Inspect connector "C" from back side as follows.

Jack up the vehicle. Turn ignition switch ON.
Rotate propeller shaft. Does the voltage between terminals C10 and ground change (approx. 0V to 5V or more) per revolution of propeller shaft?
No → Replace circuit plate. Then recheck system.
Yes ↓

Wire harness between terminal C10 of meter and*ECU faulty.

- ECM
- Suspension ECU
- Power Steering ECU
- ABS and TRAC ECU
- Cruise Control ECU

9	**TACHOMETER**	**Tachometer dose not operate while engine running.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connectors "A" and "C" from meter.
Inspect connector on wire harness side as follows.

* : An electrical tester availble to measure frrequency is necessary for this inspection.
REFERENCE : TOYOTA ELECTRICAL TESTER (09082–00050)

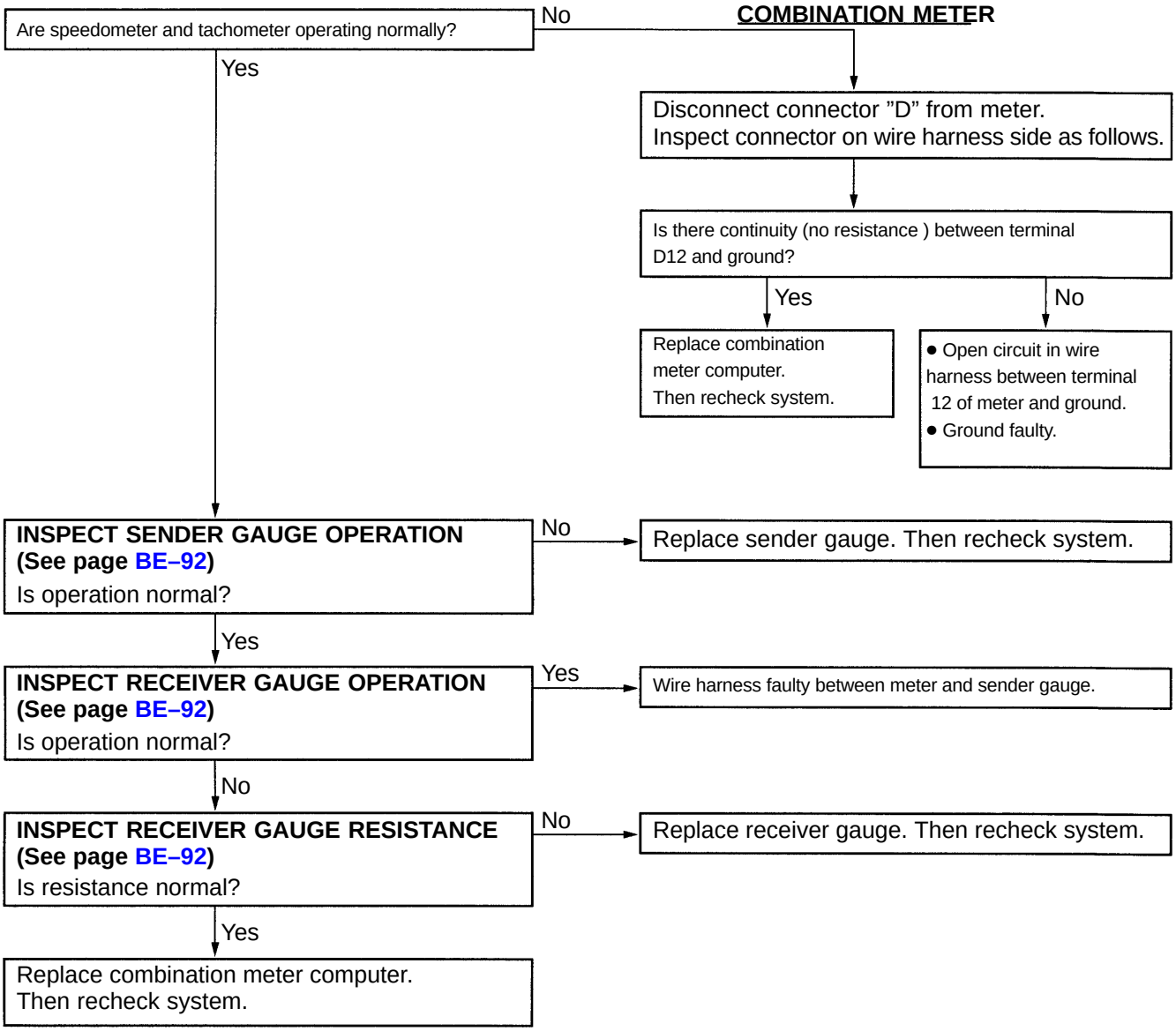
*** INSPECT TACHOMETER CIRCUIT**
With engine running, does voltage between terminals A13 and C10 fluctuate?
No → Wire harness faulty between terminal A13 of meter and igniter.
Yes ↓

Replace circuit plate. Then recheck system.

V08433

10	FUEL GAUGE	**Does not operate or operation is abnormal.**

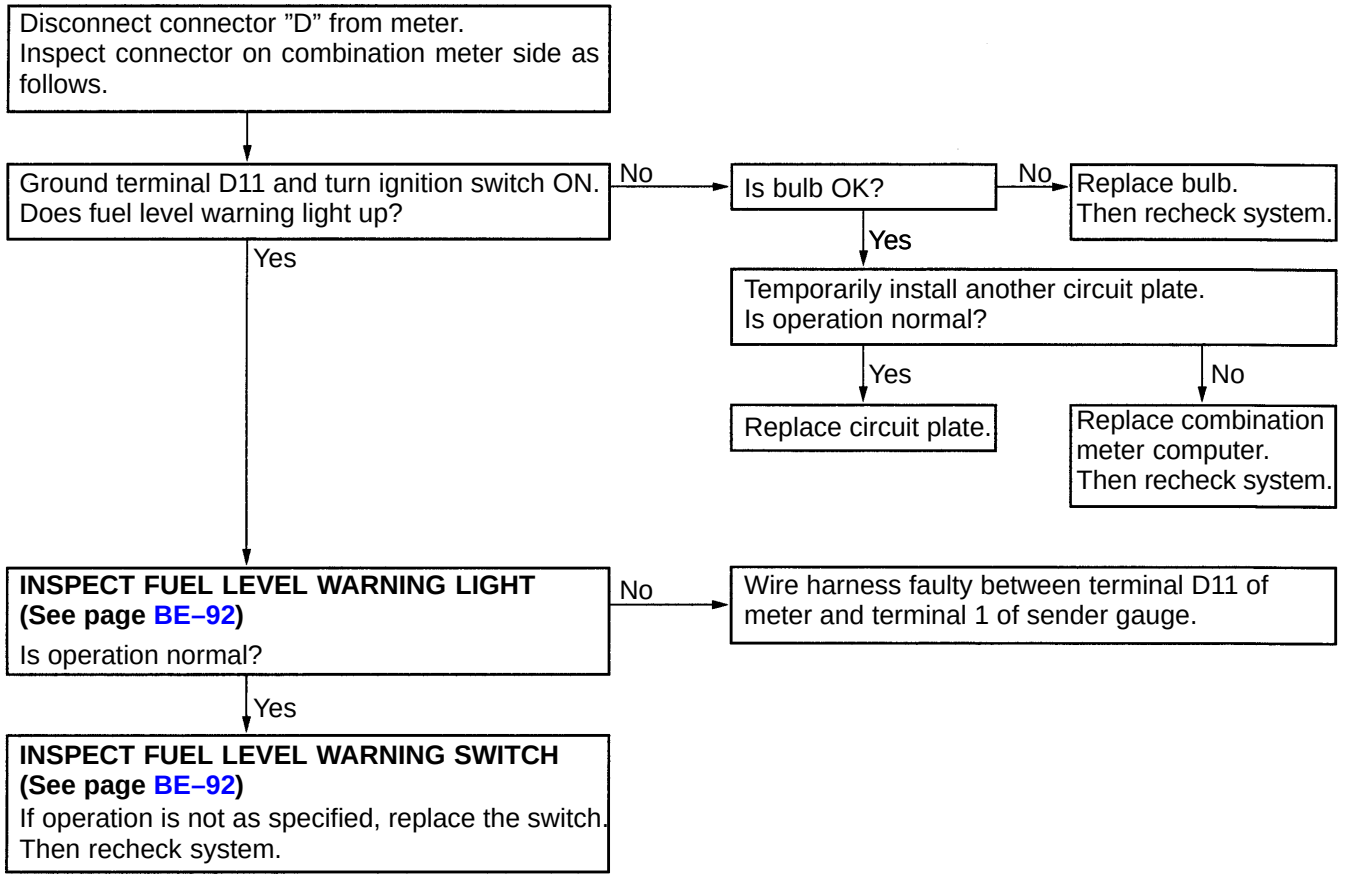
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08434

11	FUEL LEVEL WARNING	**Warning light does not light up or always lights up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



12	**ENGINE COOLANT TEMPERATURE GAUGE**	**Does not operate or operation is abnormal.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

INSPECT SENDER GAUGE GROUND CONDITION
Is there continuity (no resistance) between gauge body and engine block?
- No → Sender gauge ground condition faulty.
- Yes ↓

INSPECT RECEIVER GAUGE OPERATION (See page BE–92)
Is operation normal?
- Yes → Replace sender gauge. Then recheck system.
- No ↓

COMBINATION METER

Disconnect connector "A" from meter.
Inspect connector on wire harness side. ↓

Is there continuity between terminal A1 and ground?
- No → Wire harness faulty between terminal A1 of meter and ground.
- Yes ↓

Is there continuity between terminal A3 and ground?
- No → Wire harness faulty between terminal A3 of meter and sender gauge.
- Yes ↓

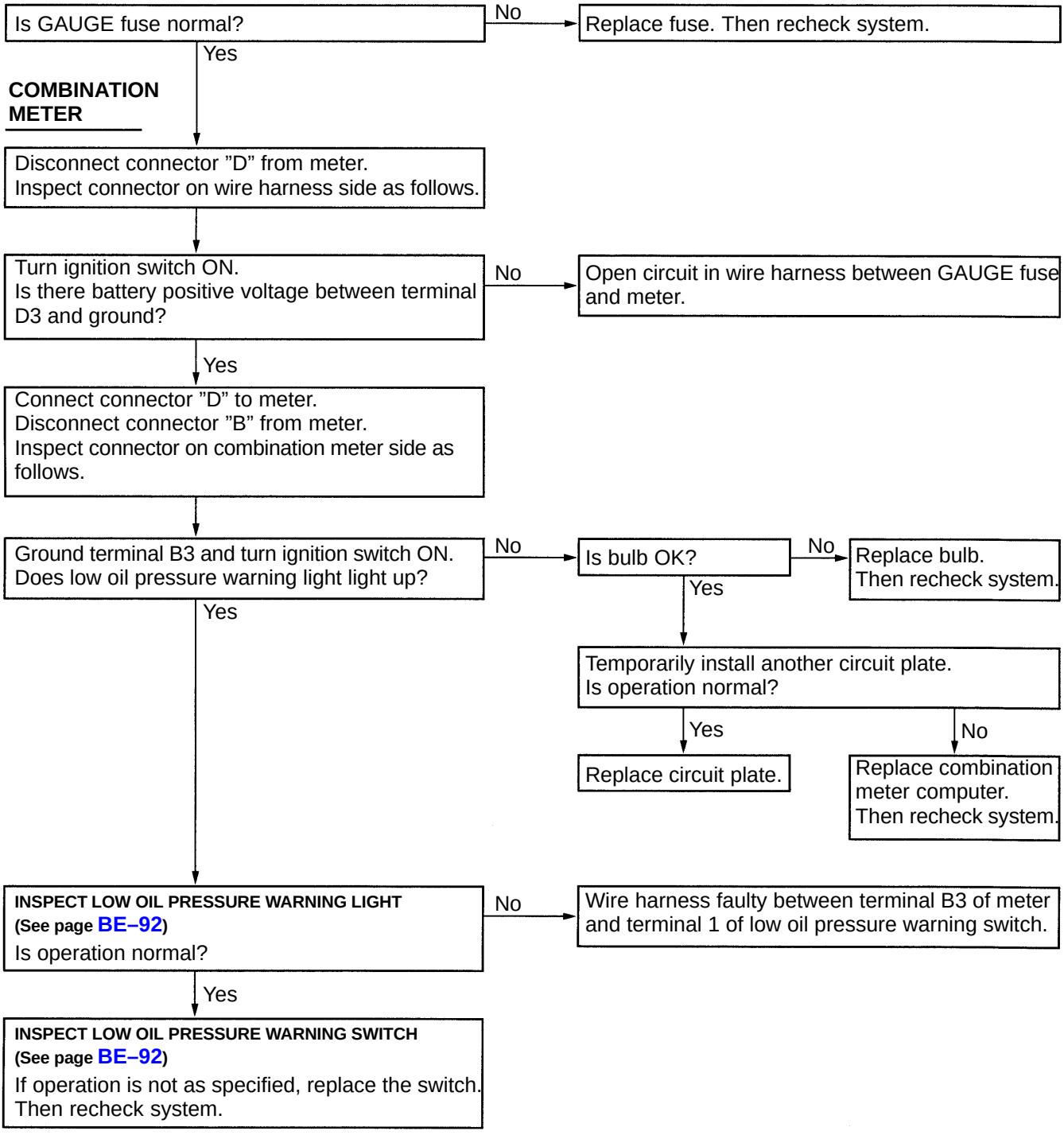
INSPECT RECEIVER GAUGE RESISTANCE (See page BE–92)
Is resistance normal?
- No → Replace receiver gauge. Then recheck system.
- Yes ↓

Replace combination meter computer.
Then recheck system.

V08436

13	LOW OIL PRESSURE WARNING	Abnormal operation or warning light does not light up.

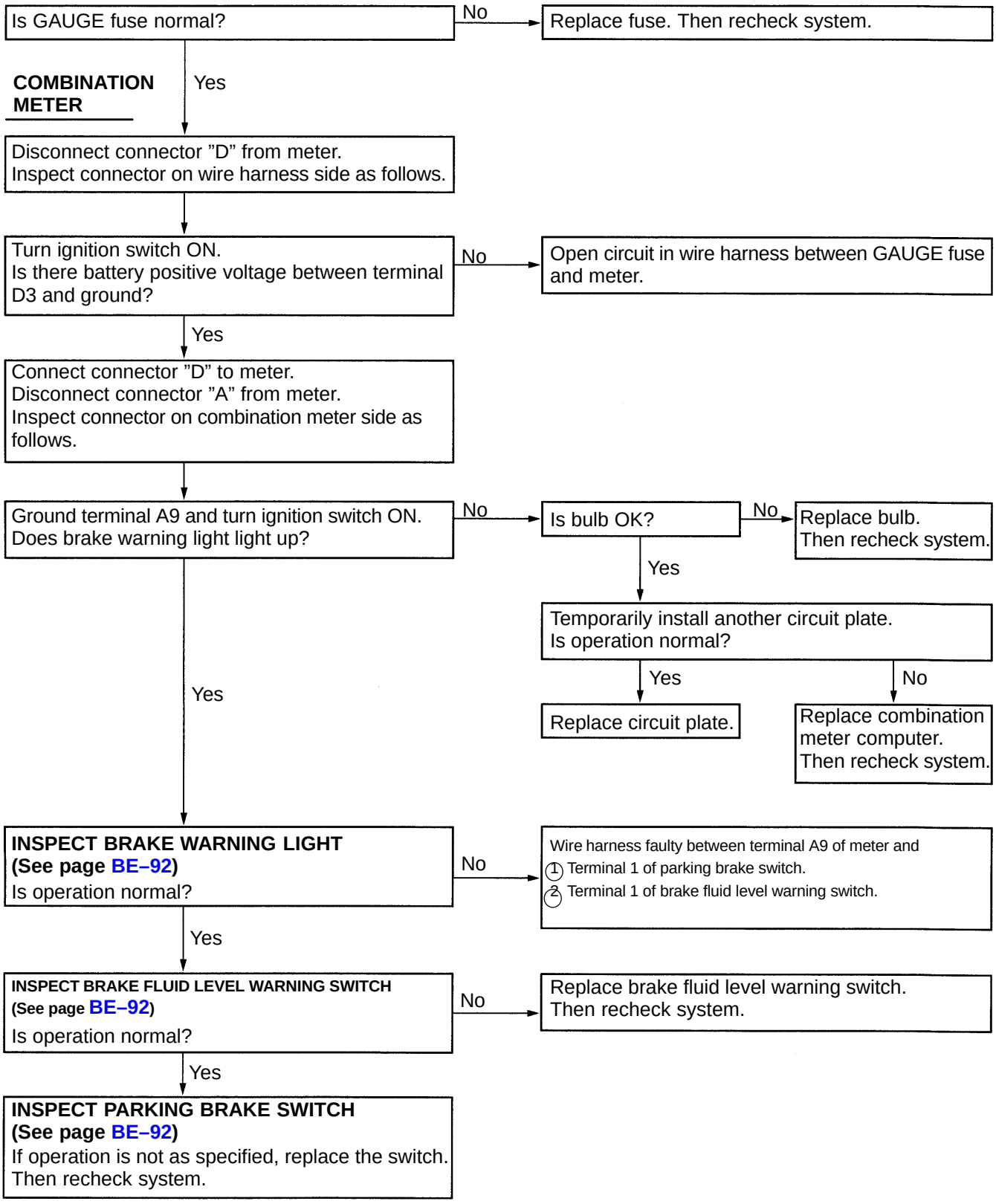
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08437

14	**BRAKE WARNING**	**Abnormal operation or warning light does not light up.**

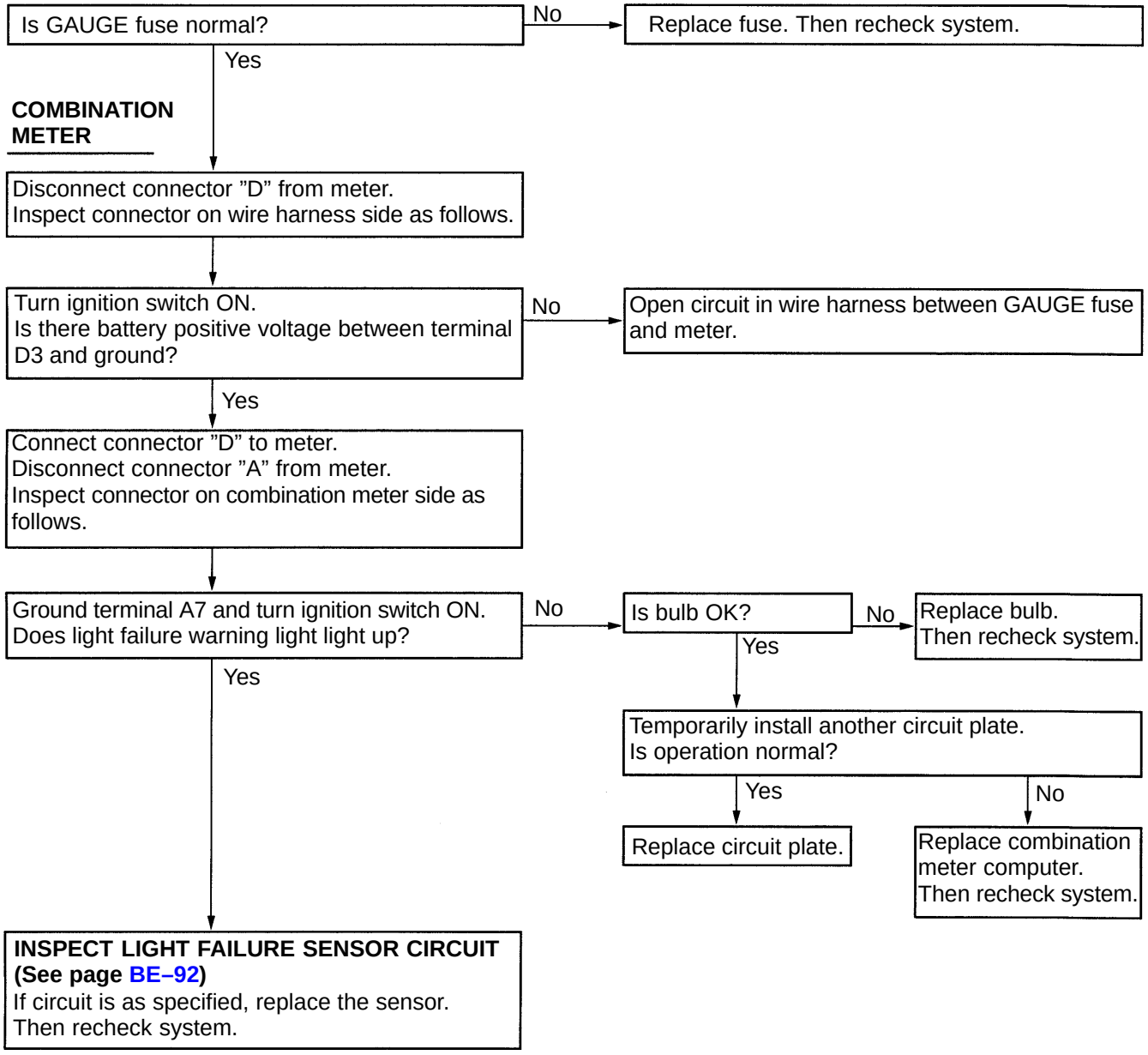
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08438

15	**REAR LIGHTS WARNING**	**Abnormal operation or warning light does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08439

16	**OPEN DOOR WARNING**	**Abnormal operation or warning light does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Is DOME fuse normal?
- No → Replace fuse. Then recheck system.
- Yes ↓

COMBINATION METER

Disconnect connector "C" from meter.
Inspect connector on wire harness side as follows.

Is there battery positive voltage between terminal C6 and ground?
- No → Open circuit in wire harness between GAUGE fuse and meter.
- Yes ↓

Connect connector "C" to meter.
Disconnect connector "C" from meter.
Inspect connector on combination meter side as follows.

Ground terminal C6.
Does open door warning light light up?
- No → Is bulb OK?
  - No → Replace bulb. Then recheck system.
  - Yes ↓ Temporarily install another circuit plate. Is operation normal?
    - Yes → Replace circuit plate.
    - No → Replace combination meter computer. Then recheck system.
- Yes ↓

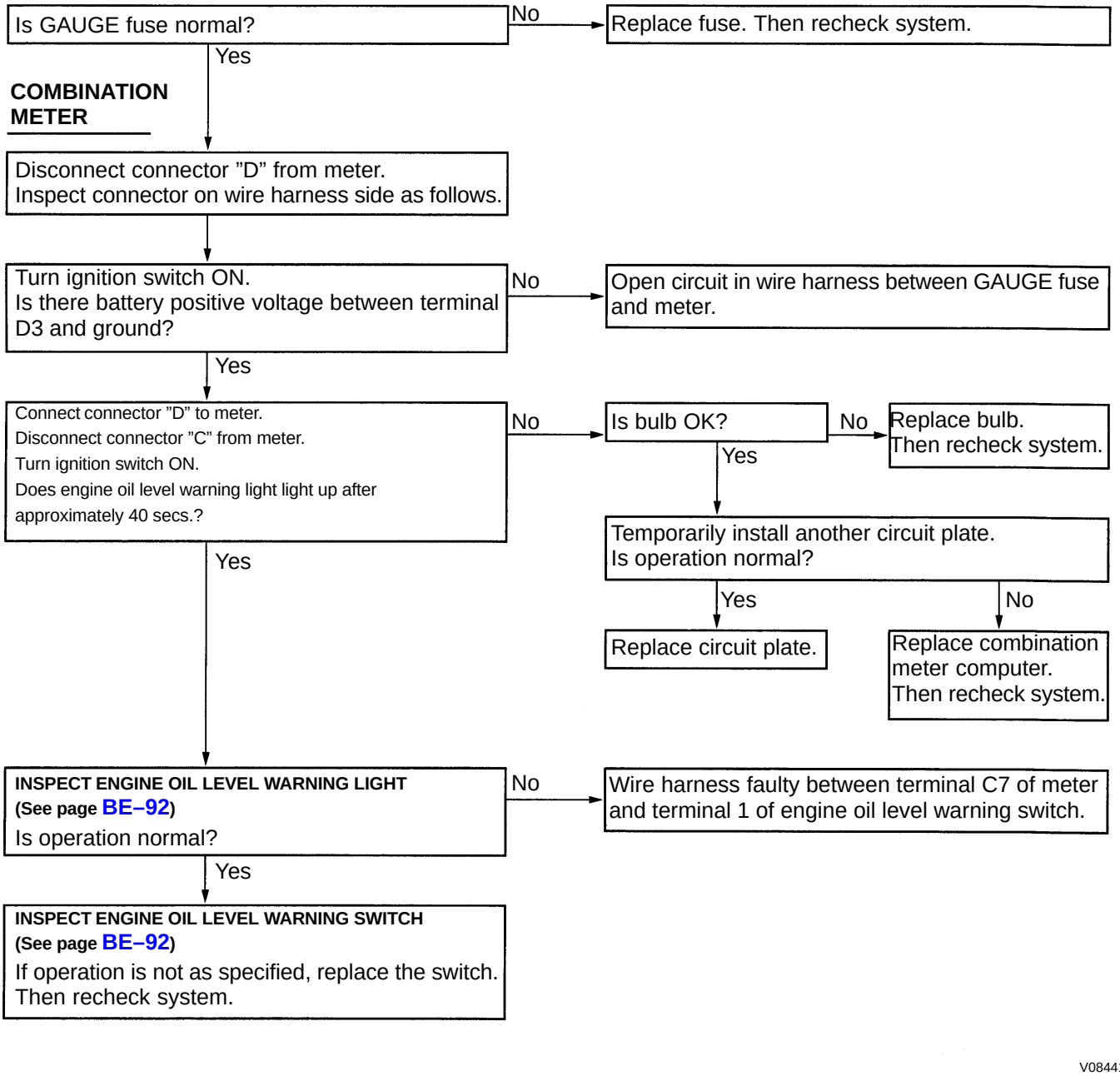
INSPECT OPEN DOOR WARNING LIGHT (See page BE–92)
Is operation normal?
- No → Wire harness faulty between terminal C6 of meter and terminal 1 of door courtesy switch.
- Yes ↓

INSPECT DOOR COURTESY SWITCH (See page BE–92)
If operation is not as specified, replace the switch. Then recheck system.

V08440

17	ENGINE OIL LEVEL WARNING	Abnormal operation or warning light does not light up.

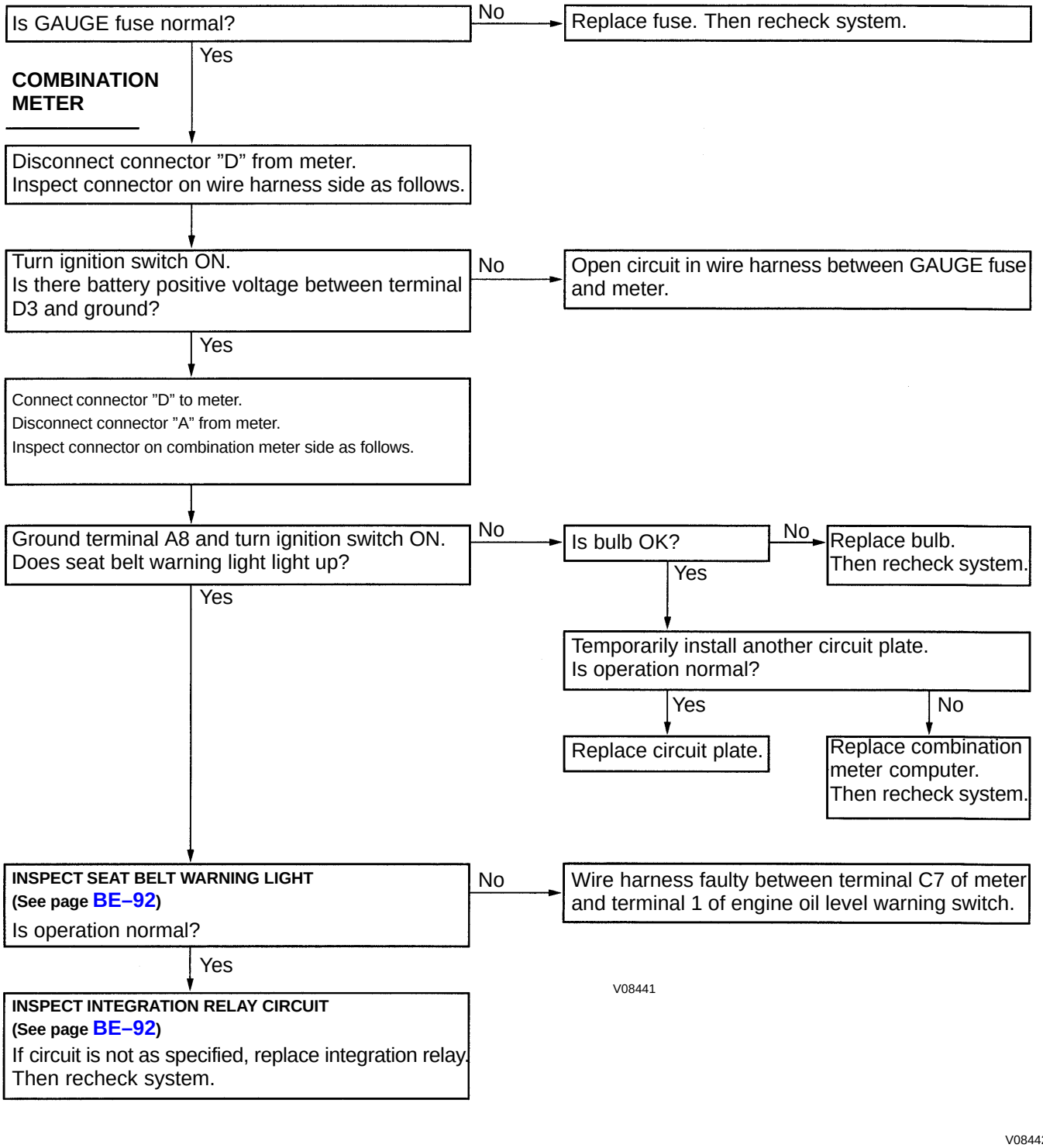
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08441

18	SEAT BELT WARNING	Abnormal operation or warning light does not light up.

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08442

19	**TURN SIGNAL INDICATOR**	**Abnormal operation or warning light does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connector "D" from meter.
Inspect connector on wire harness side as follows.

↓

Turn ignition switch ON.
Is there battery positive voltage between terminals xx and ground with the turn signal lever to left and right?

Turn signal to	Left	Right
Terminal xx	B11	B13

No → Turn signal indicator signal circuit faulty. Inspect the turn signal and hazard warning light system.

Yes ↓

Is bulb OK?

No → Replace the bulb. Then recheck system.

Yes ↓

Replace circuit plate. Then recheck system.

V08443

20	**TRAC OFF INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Inspect connector on wire harness side as follows.

Yes ↓

Ground terminal D6 and turn ignition switch ON.
Does TRAC OFF indicator light up?

No → Inspect the wire harness between terminal D6 of meter and ABS & TRAC ECU or inspect ABS & TRAC ECU.

Yes ↓

Is bulb OK?

No → Replace the bulb. Then recheck system.

Yes ↓

Replace circuit plate. Then recheck system.

No → Replace power source unit.

21	**O/D OFF INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connector "B" from meter.
Inspect connector on combination meter side as follows.

↓

Ground terminal B5 and turn ignition switch ON.
Does O/D OFF indicator light up?

Yes → O/D OFF indicator signal circuit faulty.

↓ No

Is bulb OK?

No → Replace the bulb.

↓ Yes

Replace circuit plate. Then recheck system.

22	**SHIFT POSITION INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connector "D" from meter.
Inspect connector on wire harness side as follows.

↓

Turn ignition switch ON.
Is there battery positive voltage between terminals XX and ground with turn shift lever to P through L

Shift to	P	R	N	D	2	L
Terminal XX	B12	B14	C1	C2	B10	B9

No → Shift position indicator signal circuit faulty.

↓ Yes

Is bulb OK?

No → Replace the bulb. Then recheck system.

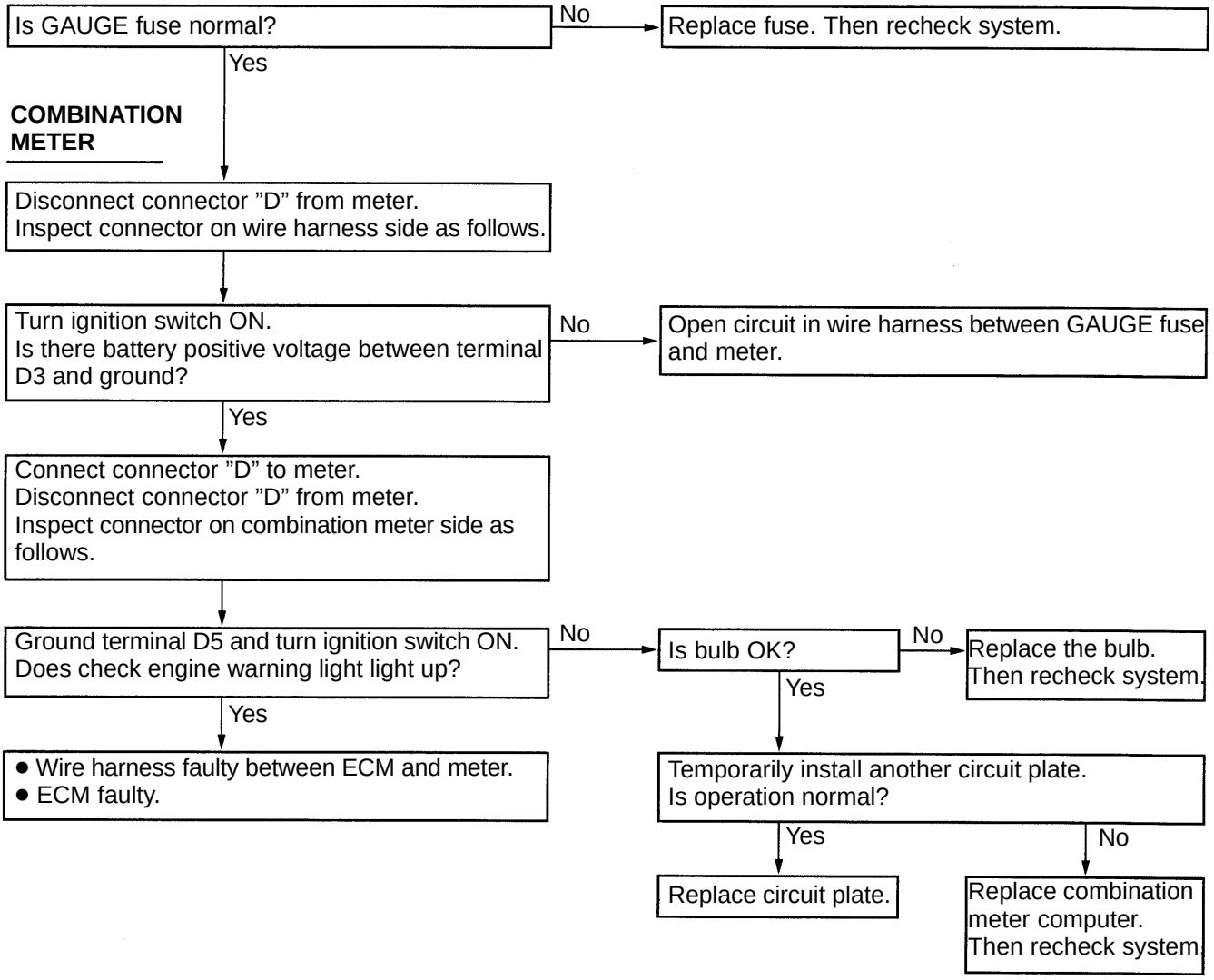
↓ Yes

Replace circuit plate. Then recheck system.

V08444

23	MALFUNCTION WARNING	**Abnormal operation or warning light does not light up.**

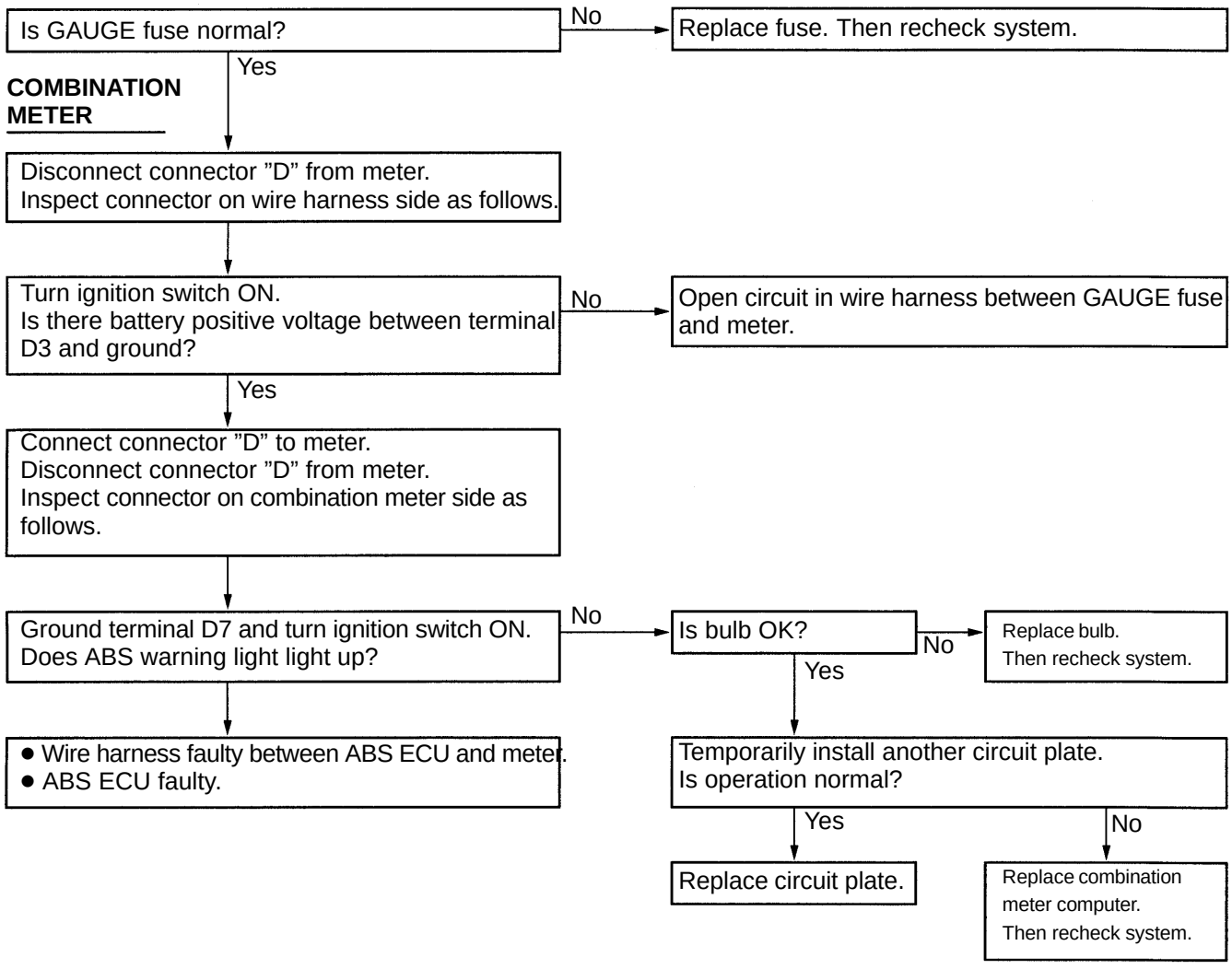
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08445

24	**ABS WARNING**	**Abnormal operation or warning light does not light up.**

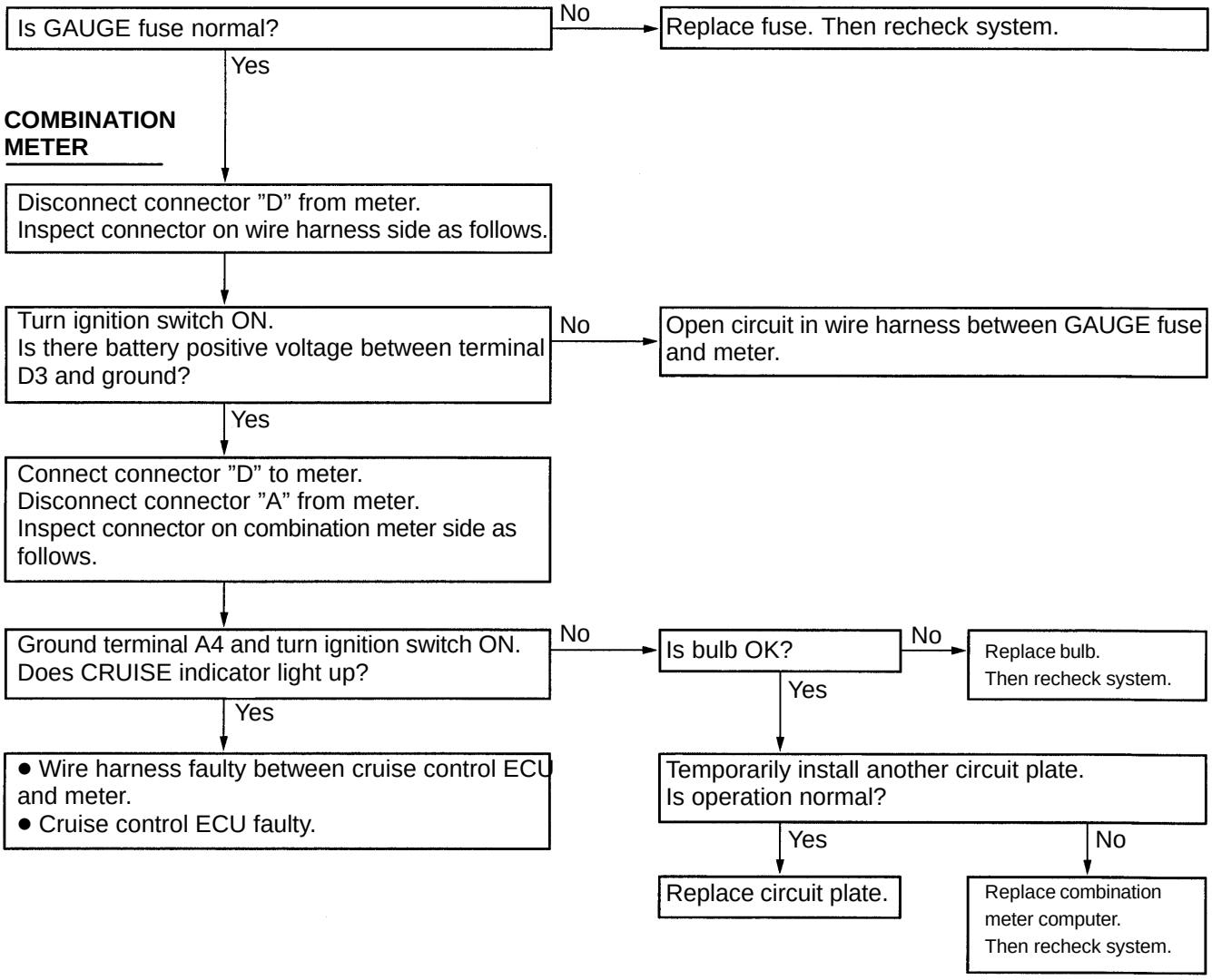
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08446

25	**CRUISE INDICATOR**	**Abnormal operation or indicator does not light up.**

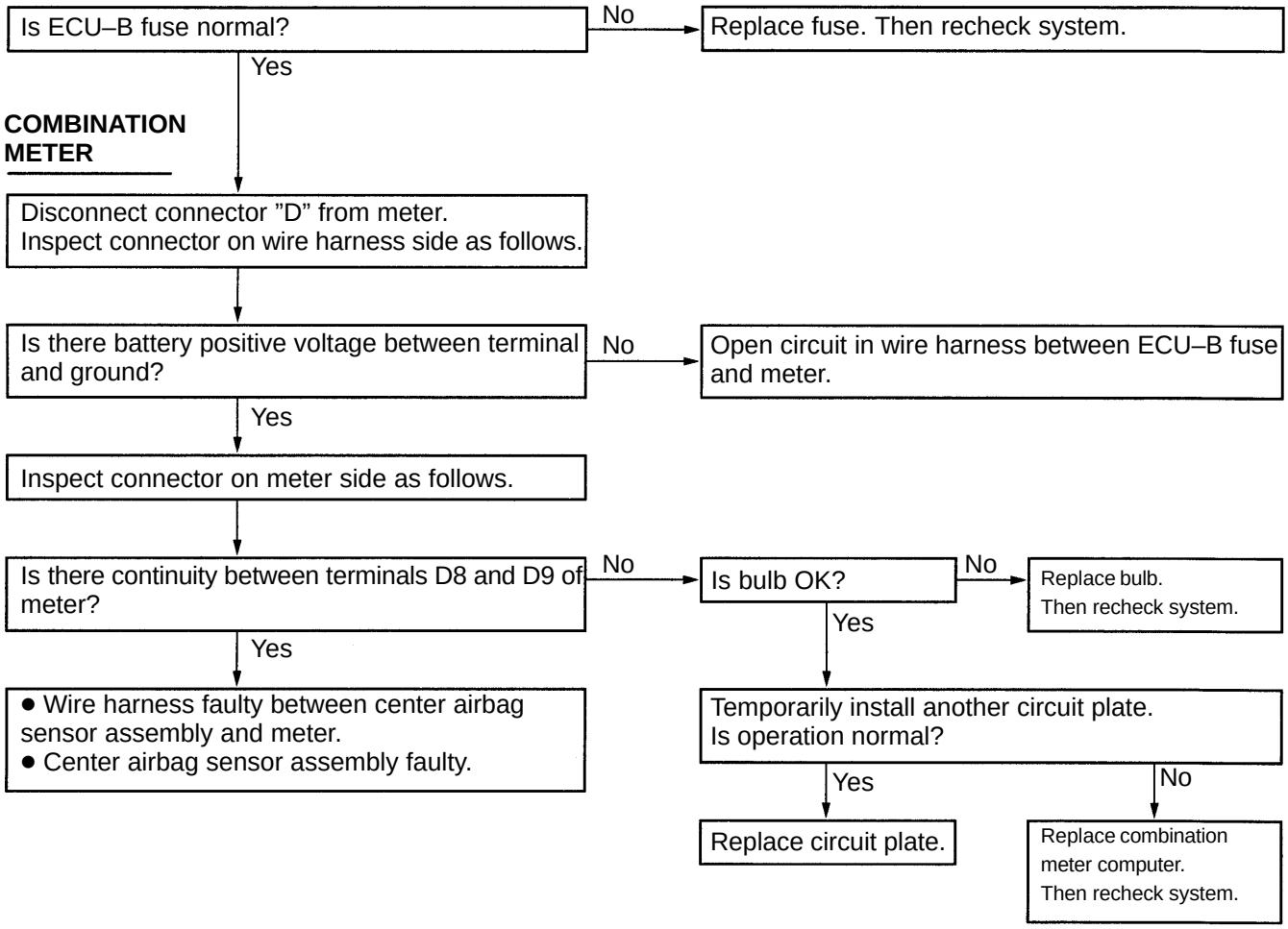
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08447

26	SRS WARNING	**Abnormal operation or warning light does not light up.**

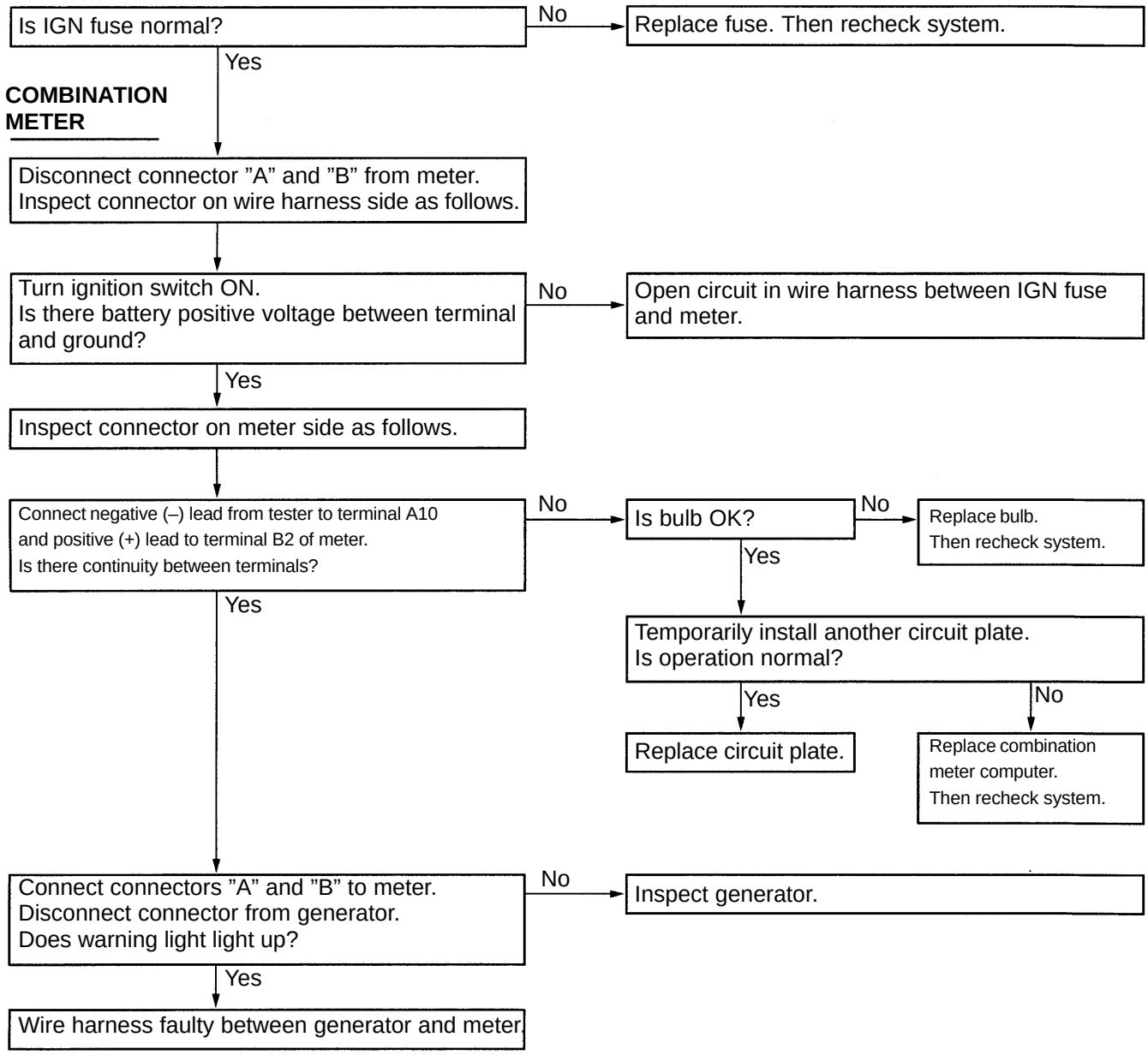
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08448

27	**DISCHARGE WARNING**	**Abnormal operation or warning light does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

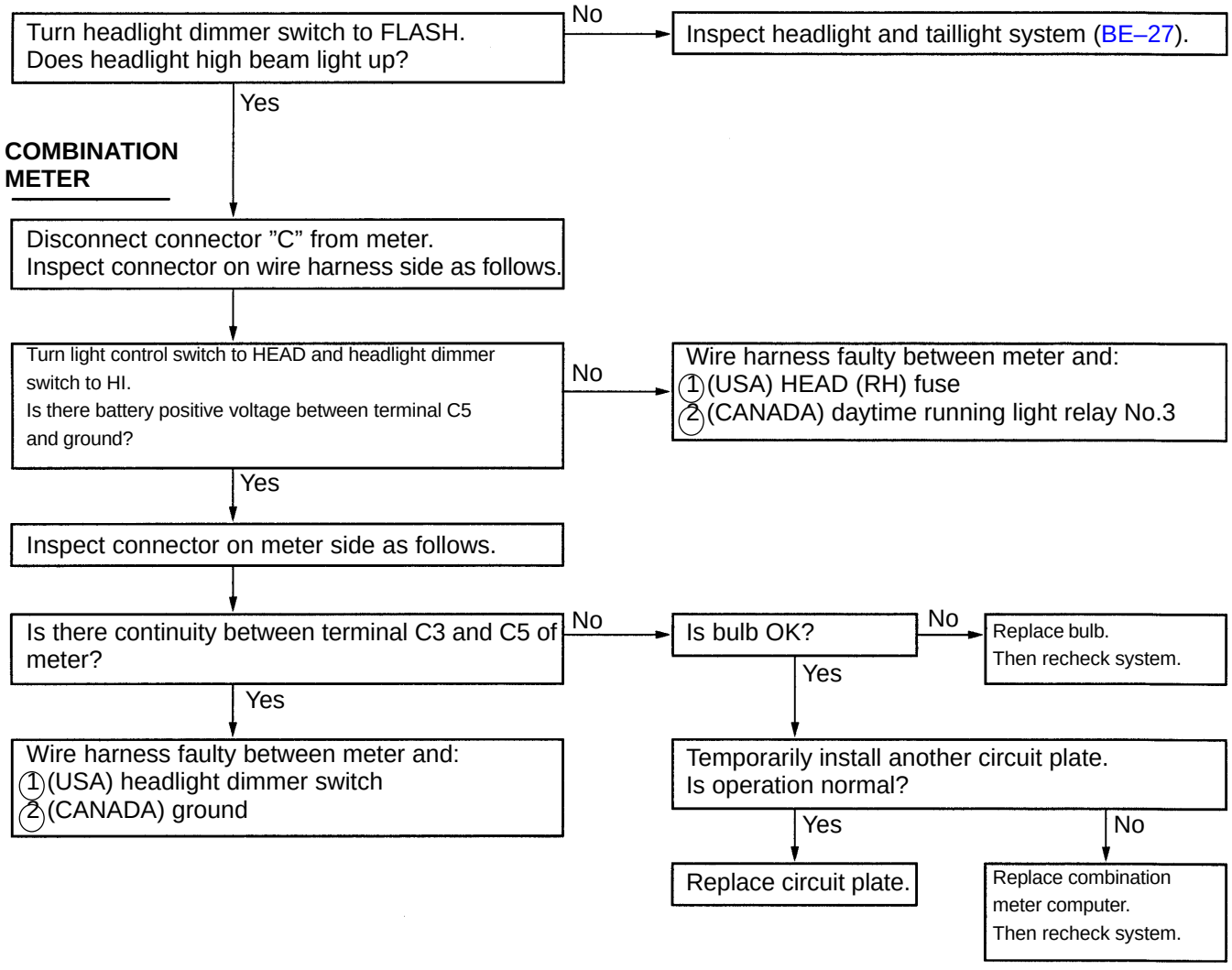


V08449

28	**HIGH BEAM INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

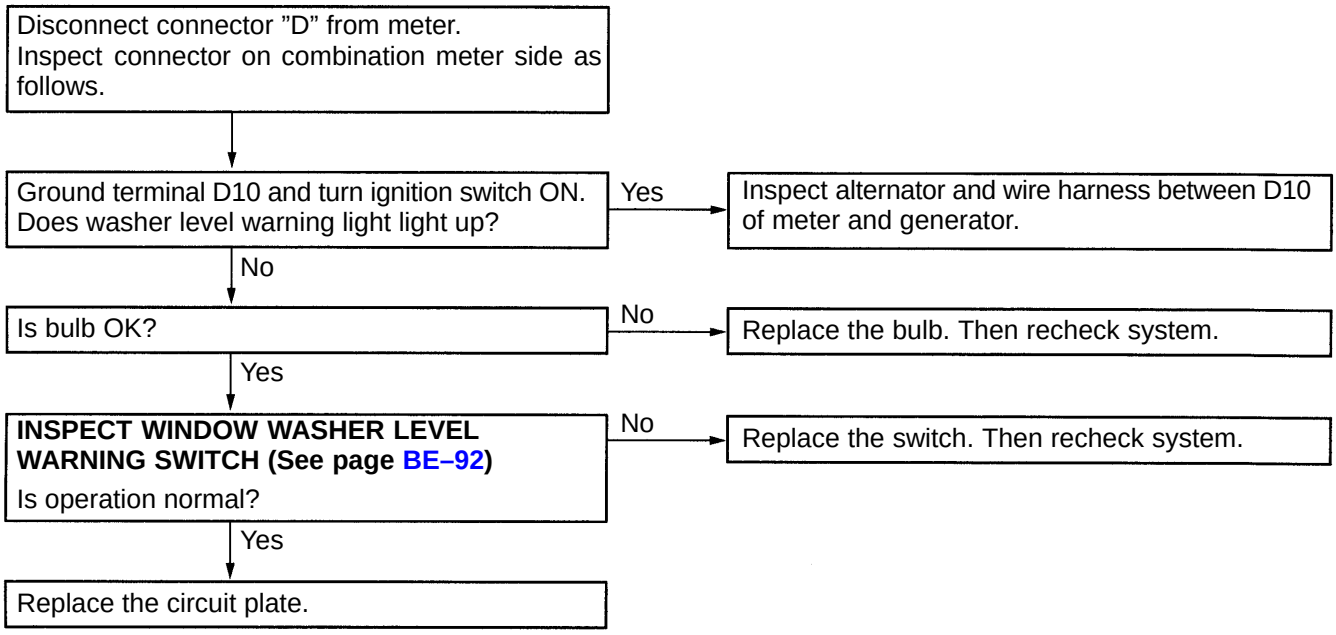
COMBINATION METER



V08450

29	**WINDOW WASHER LEVEL WARNING SWITCH**	**Abnormal operation or indicator does not light up.**

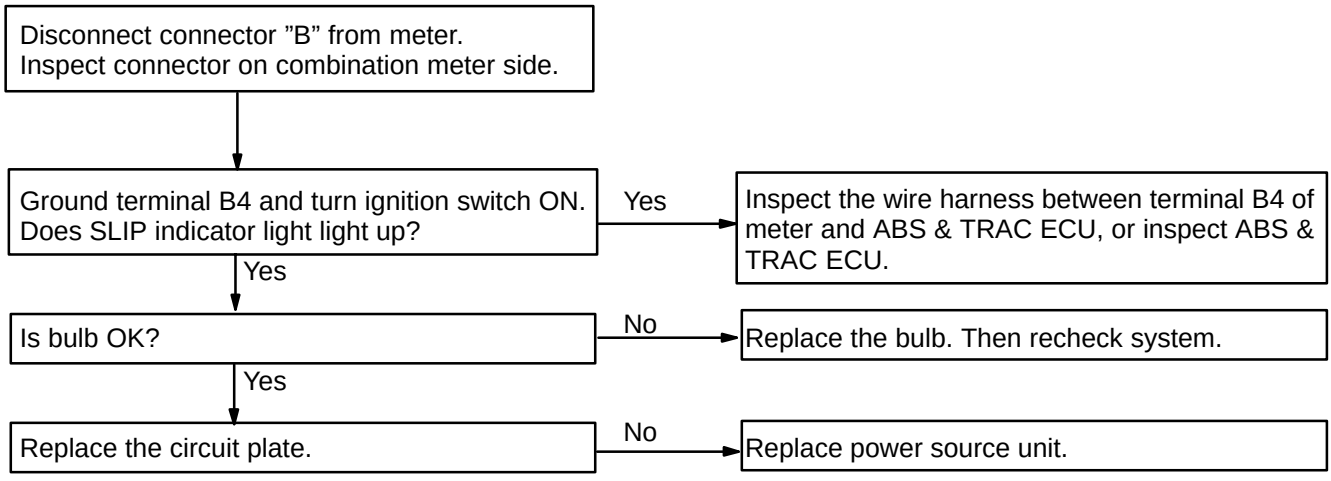
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08451

30	**SLIP INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



31	TAILLIGHT INDICATOR	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Turn the light control switch to TAIL.
Does taillight light up?

No → Inspect headlight and taillight system.
(See page BE–27).

Yes

COMBINATION METER

Disconnect connectors "C" from meter.
Inspect connector on wire harness side as follows.

Is there battery positive voltage (0 V ↔ battery positive voltage) between following terminals with light control switch TAIL?
- C5 and ground.

No → Wire harness faulty between meter and:
- Light control switch.
- Taillight Relay, Panel Relay (CANADA)

Yes

Connect connectors "B" to meter.
Disconnect connector "B" from meter.
Inspect connector on combination meter side as follows.

Ground terminal B7 and turn the light control switch to TAIL. Does taillight indicator light up?

No → Is bulb OK?

No → Replace bulb.
Then recheck system.

Yes → Temporarily install another circuit plate.
Is operation normal?

Yes → Replace circuit plate.

No → Replace combination meter computer.
Then recheck system.

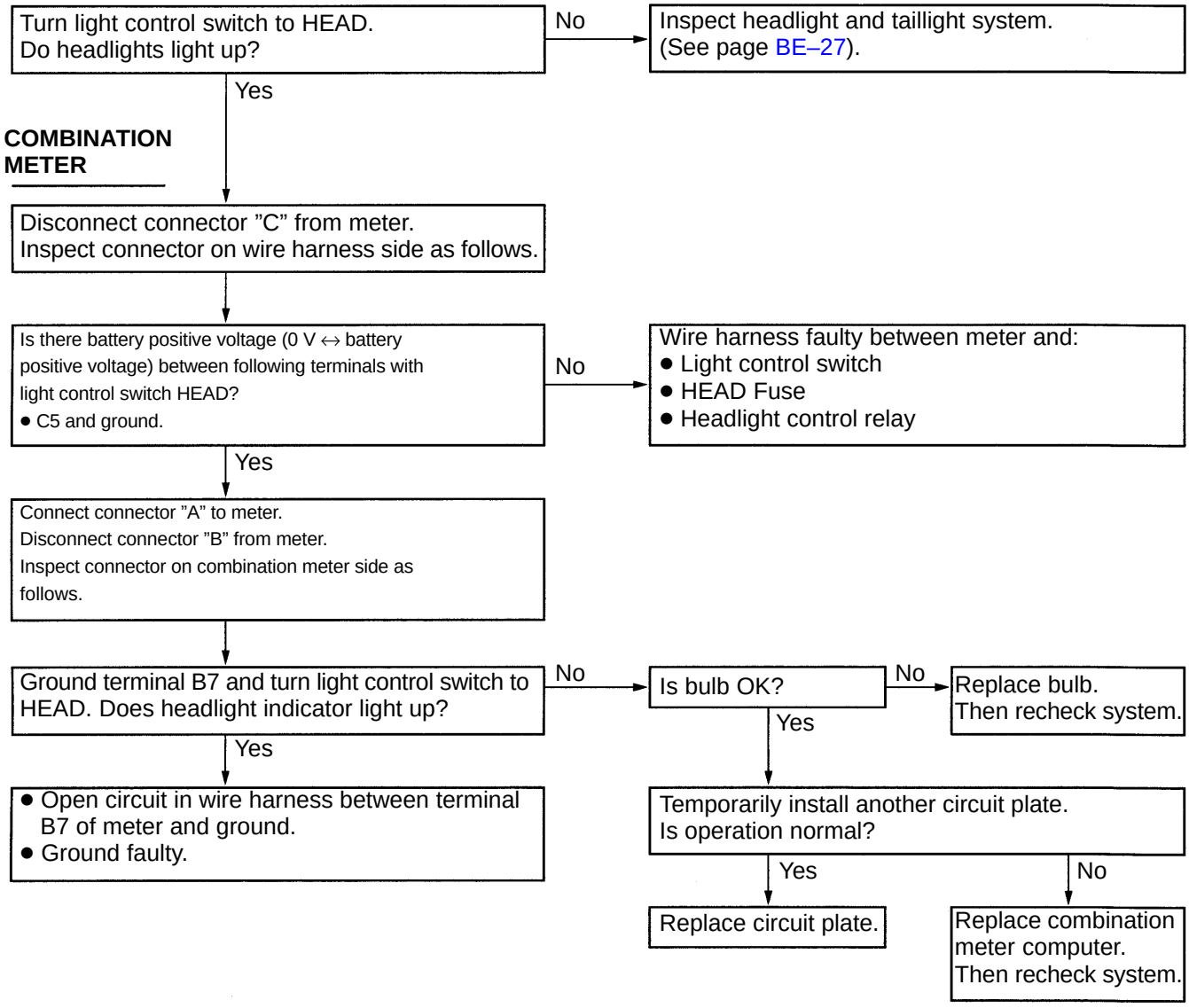
Yes

- Open circuit in wire harness between terminal B7 of meter and ground.
- Ground faulty.

V08452

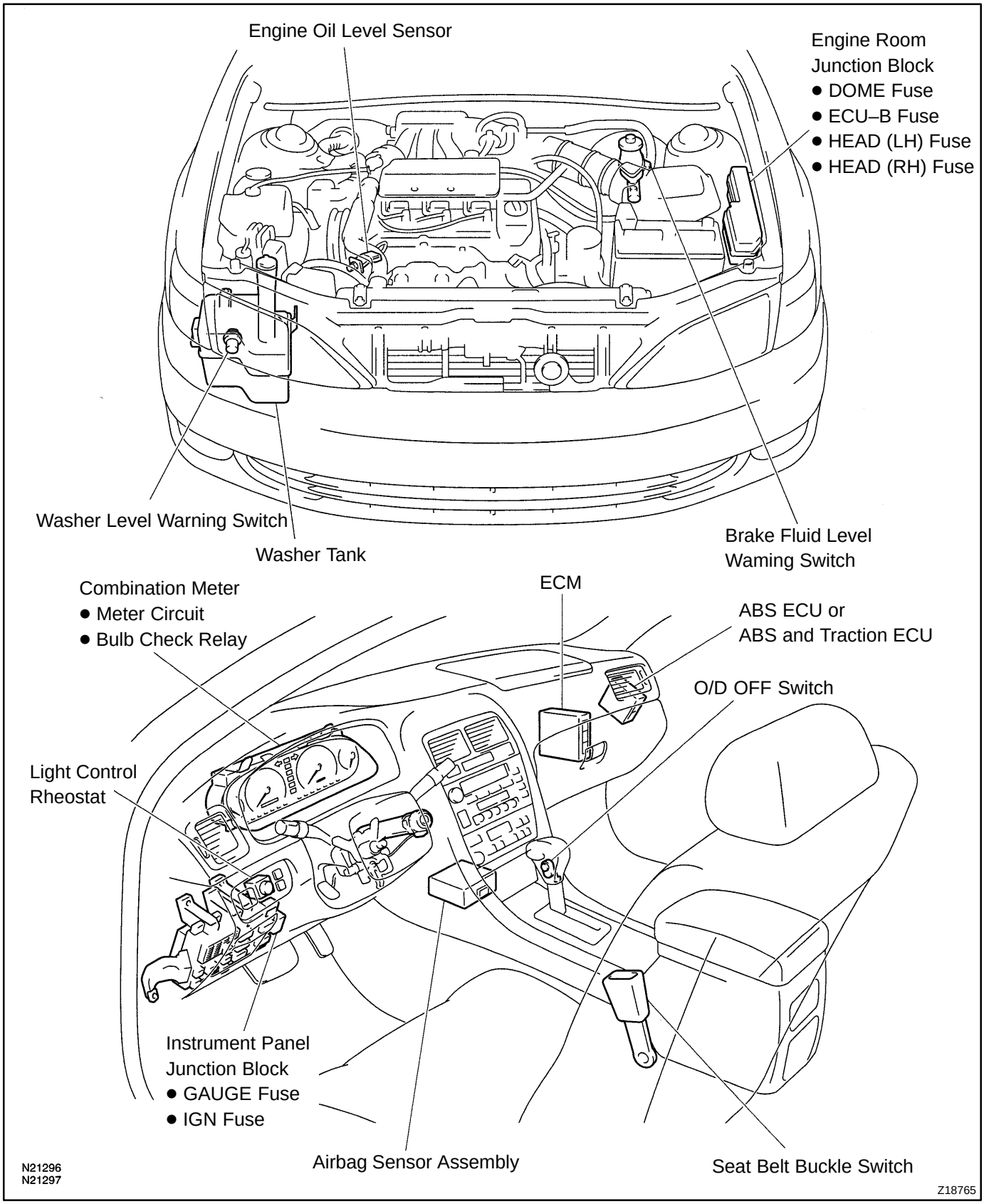
32	HEADLIGHT INDICATOR	Abnormal operation or indicator does not light up.

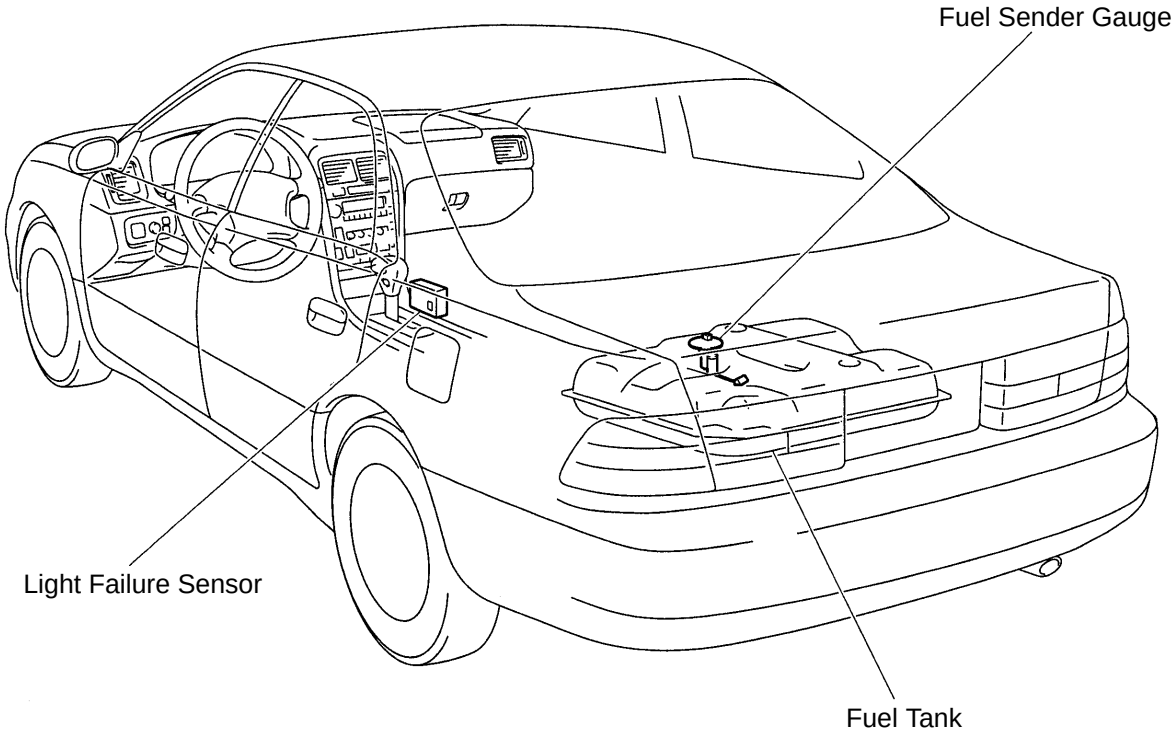
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

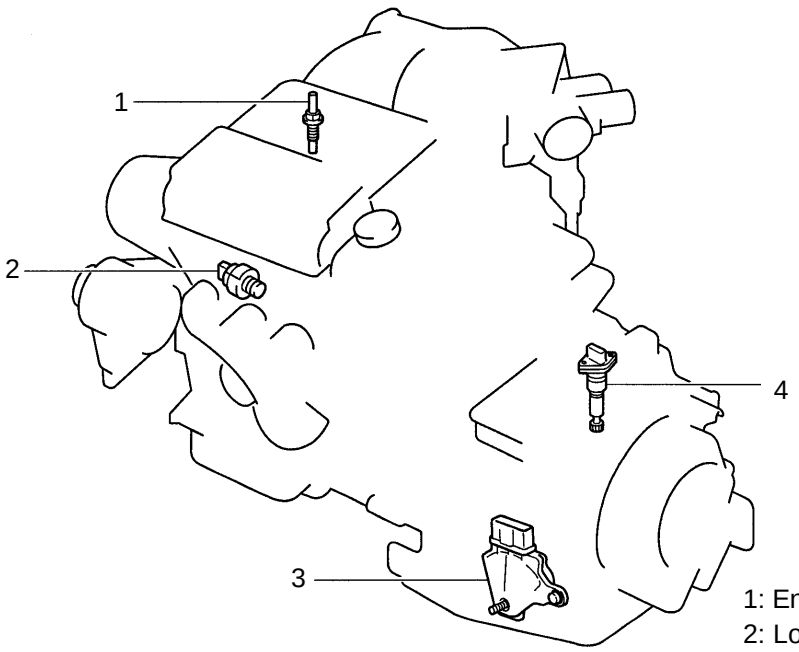


V08453

LOCATION


Engine Oil Level Sensor
Engine Room
Junction Block
● DOME Fuse
● ECU–B Fuse
● HEAD (LH) Fuse
● HEAD (RH) Fuse
Washer Level Warning Switch
Washer Tank
Brake Fluid Level
Waming Switch
Combination Meter
● Meter Circuit
● Bulb Check Relay
ECM
ABS ECU or
ABS and Traction ECU
O/D OFF Switch
Light Control
Rheostat
Instrument Panel
Junction Block
● GAUGE Fuse
● IGN Fuse
Airbag Sensor Assembly
Seat Belt Buckle Switch
N21296
N21297
Z18765





1: Engine Coolant Temperature Sender Gauge
2: Low Oil Pressure Switch
3: Park/Neutral Position Switch
4: Vehicle Speed Sensor

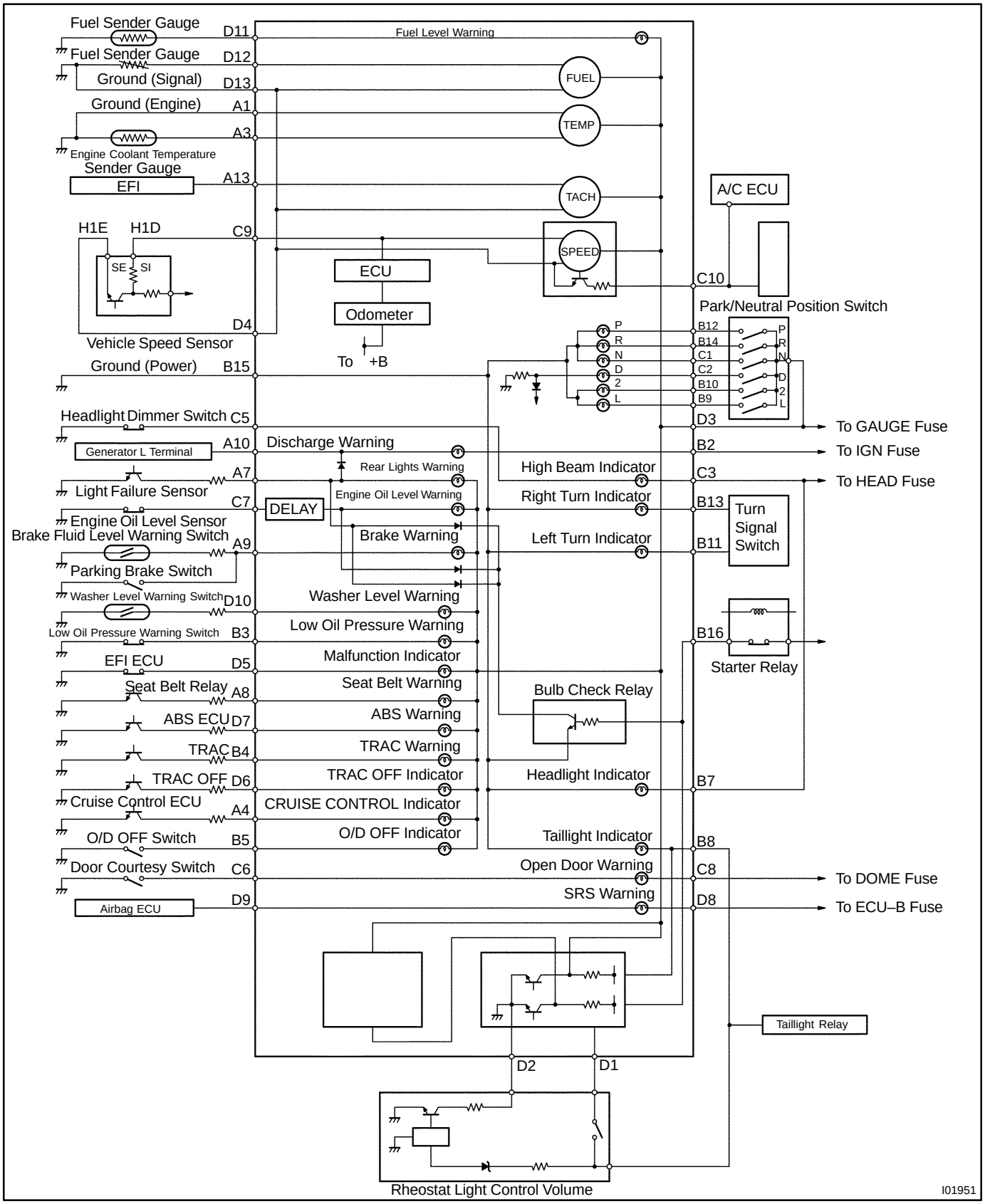
N21298
N21299

Z18766

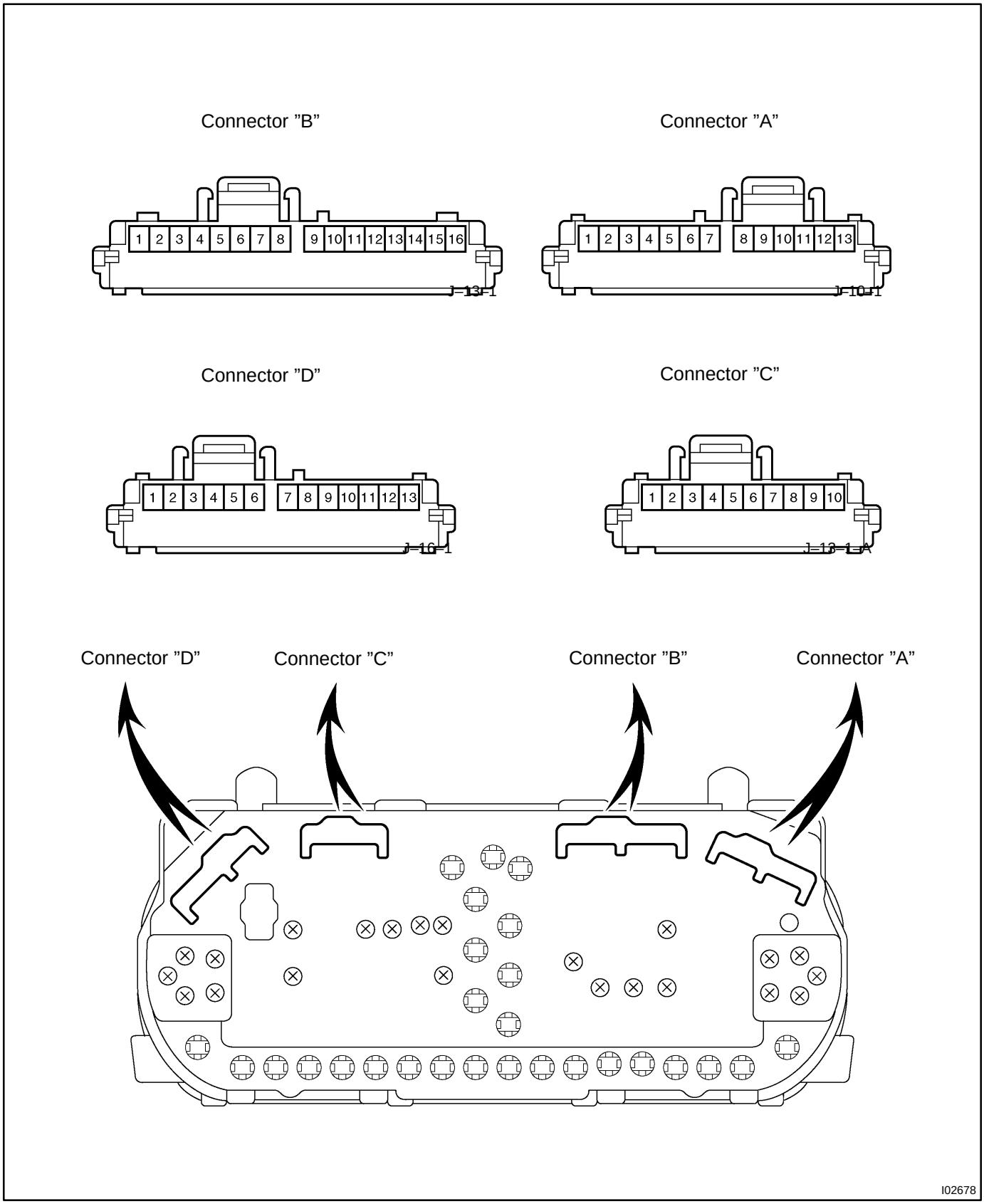
BE05F–05

CIRCUIT

1. WIRING DIAGRAM

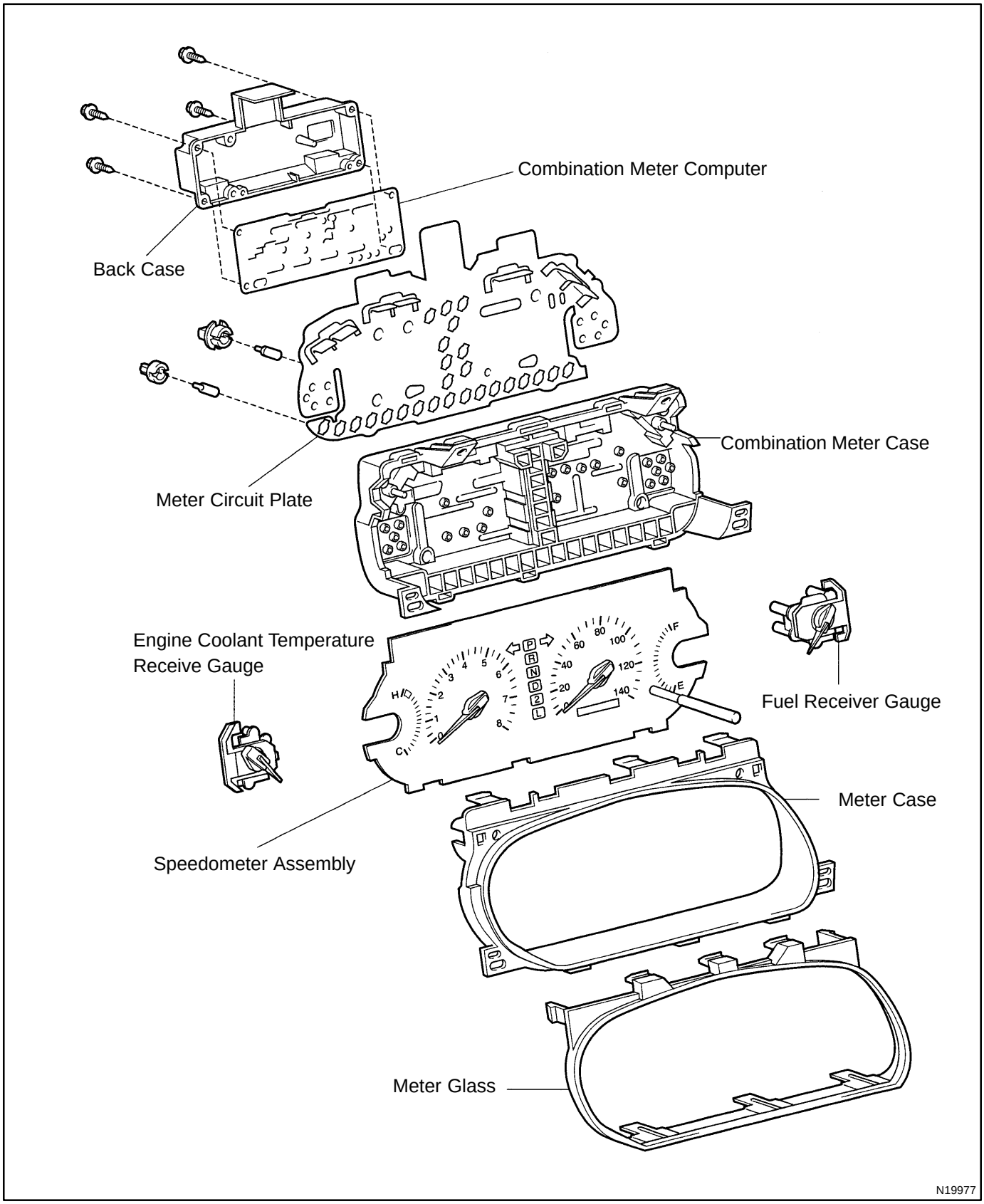


2. CONNECTOR DIAGRAMS



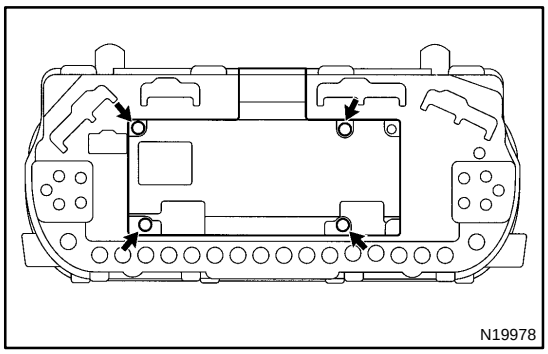
BE05G–01

COMPONENTS



BE05H–01

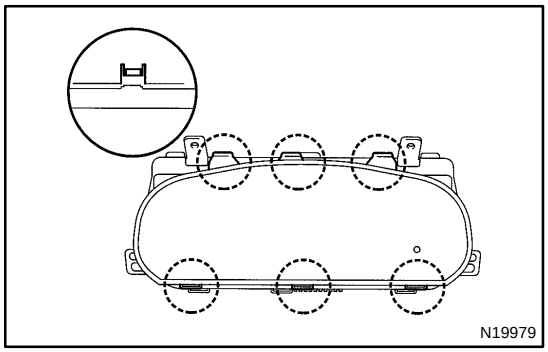
DISASSEMBLY



1. REMOVE BACK COVER

(a) Remove the 4 screws.

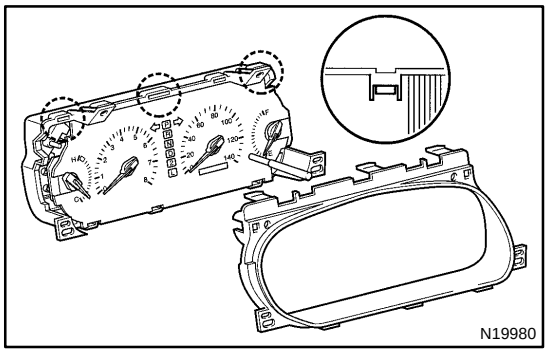
(b) Remove the back cover from the meter case.



2. REMOVE METER GLASS

(a) Remove the 6 claws.

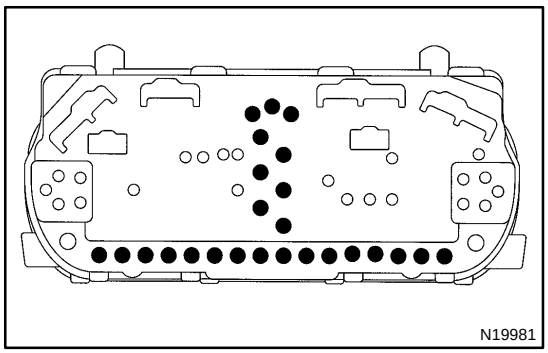
(b) Remove the meter glass from the meter case.



3. REMOVE METER PLATE

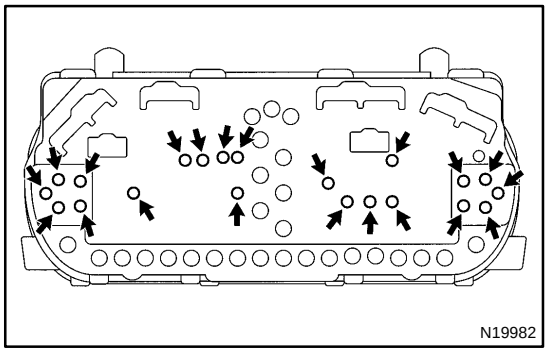
(a) Remove the 3 claws.

(b) Remove the meter plate from the meter case.



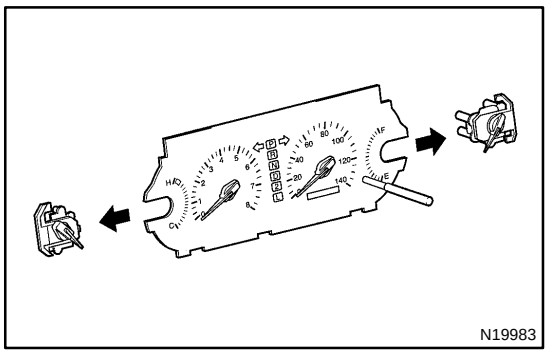
4. REMOVE METER CIRCUIT PLATE

(a) Remove the 27 bulbs.



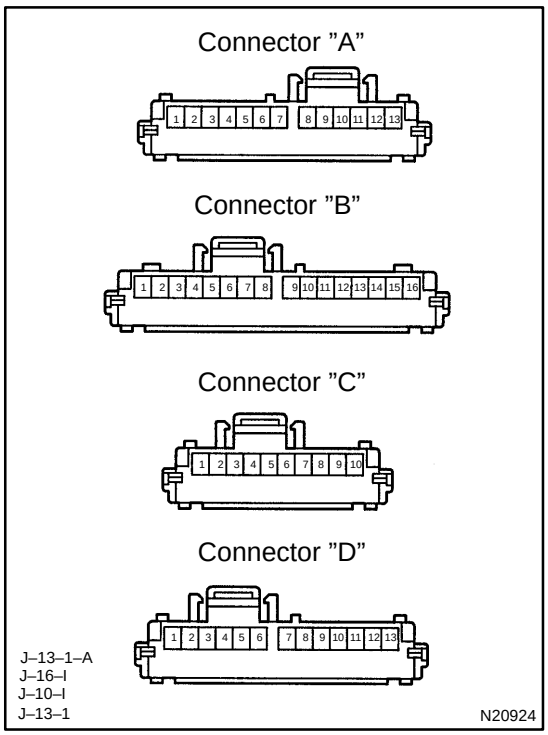
(b) Remove the 22 screws.

(c) Remove the meter circuit plate from the meter case.



5. **REMOVE SPEEDOMETER ASSEMBLY**
6. **REMOVE FUEL GAUGE**
7. **REMOVE ENGINE COOLANT TEMPERATURE GAUGE**

BE05I–03



INSPECTION

1. INSPECT COMBINATION METER WIRING CIRCUIT

Disconnect the connector ”A”, connector ”B”, connector ”C” and connector ”D” from the combination meter and inspect the connectors on the wire harness side.

Park/Neutral Position Switch:

Tester connection	Condition	Specified condition
B12 – Ground	Ignition switch ON and shift lever position ”P”	Battery positive voltage
B14 – Ground	Ignition switch ON and shift lever position ”R”	Battery positive voltage
C1 – Ground	Ignition switch ON and shift lever position ”N”	Battery positive voltage
C2 – Ground	Ignition switch ON and shift lever position ”D”	Battery positive voltage
B10 – Ground	Ignition switch ON and shift lever position ”2”	Battery positive voltage
B9 – Ground	Ignition switch ON and shift lever position ”L”	Battery positive voltage

Turn Signal Switch and Hazard Warning Switch:

Tester connection	Condition	Specified condition
B13 – Ground	Hazard warning switch ON	Battery positive voltage ↔ 0V
B13 – Ground	Ignition switch ON and turn signal switch to ”Right”	Battery positive voltage ↔ 0V
B11 – Ground	Hazard warning switch ON	Battery positive voltage ↔ 0V
B11 – Ground	Ignition switch ON and turn signal switch to ”Left”	Battery positive voltage ↔ 0V

Headlight:

Tester connection	Condition	Specified condition
C3 – C5	Light control switch ”HEAD” (Dimmer switch ”LO”)	No voltage
C3 – C5	Light control switch ”HEAD” (Dimmer switch ”HI” or ”Flash”)	Battery positive voltage

GAUGE Fuse:

Tester connection	Condition	Specified condition
D3 – Ground	Ignition switch position ACC, START	No voltage
D3 – Ground	Ignition switch position ON	Battery positive voltage

IGN Fuse:

Tester connection	Condition	Specified condition
B2 – Ground	*2 Ignition switch position LOCK, ACC, START	No voltage
B2 – Ground	*2 Ignition switch position ON	Battery positive voltage

Fuel Sender Gauge:

Tester connection	Condition	Specified condition
D12 – D13	Float position Full, Approx. 91.1 mm (3.587 in.)	Approx. 4.6V
D12 – D13	Float position 1/2, Approx. 34.2 mm (1.346 in.)	Approx. 2.4V
D12 – D13	Float position Empty, Approx. 30.8 mm (1.213 in.)	Approx. 0.3V
D11 – D12	Ignition switch ON	Approx. 5V

Ground (Signal):

Tester connection	Condition	Specified condition
D13 – Ground	Constant	Continuity

Ground (Engine):

Tester connection	Condition	Specified condition
A1 – Ground	Constant	Continuity

Ground (Power):

Tester connection	Condition	Specified condition
B15 – Ground	Constant	Continuity

Generator ”L” Terminal:

Tester connection	Condition	Specified condition
A10 – Ground	Engine stop	Continuity
A10 – Ground	Engine running	Battery positive voltage

Engine Oil Level Warning Switch:

Tester connection	Condition	Specified condition
C7 – Ground	Oil temperature above approx. 55 ˚C (131 ˚F) and switch position OFF (float down)	No continuity
C7 – Ground	Oil temperature below approx. 55 ˚C (131 ˚F)	Continuity
C7 – Ground	Oil temperature above approx. 55 ˚C (131 ˚F) and switch position ON (float up)	Continuity

DOME fuse:

Tester connection	Condition	Specified condition
C8 – Ground	Constant	Battery positive voltage

Rheostat Light Control:

Tester connection	Condition	Specified condition
D1 – Ground	Light control switch TAIL or HEAD and turn rheostat volume knob.	Voltage changes no voltage or voltage fluctuates

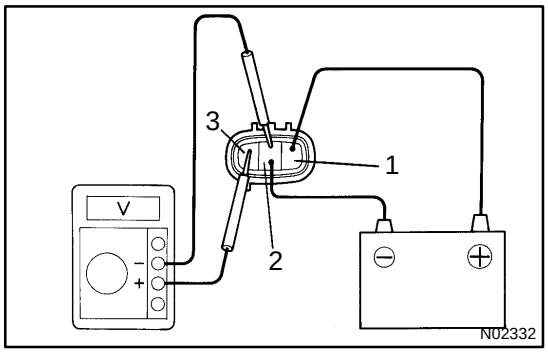
*2 Shift lever position is ”N” or ”P” position.

If circuit is not as specified, refer to BE–60 wiring diagram and inspect the circuit connected to other parts.

2. INSPECT SPEEDOMETER ON–VEHICLE

Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.
HINT:
Tire wear and tire over or under inflation will increase the indication error.
If error is excessive, replace the speedometer.

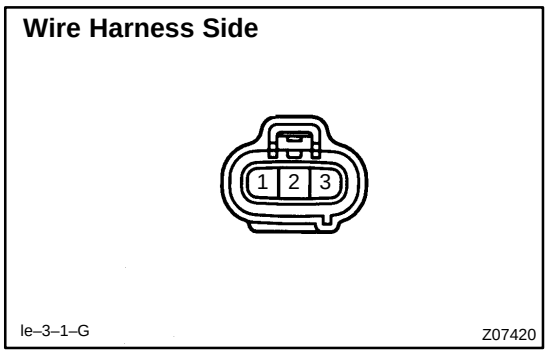
USA (mph)		CANADA (km/h)	
Standard indication	Allowable range	Standard indication	Allowable range
20	18 – 24	20	17 – 24
40	38 – 44	40	38 – 46
60	56 – 66	60	57.5 – 67
80	78 – 88	80	77 – 88
100	98 – 110	100	96 – 109
120	118 – 132	120	115 – 130
		140	134 – 151.5
		160	153 – 173



3. INSPECT VEHICLE SPEED SENSOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2.
(b) Connect the positive (+) lead from the tester to terminal 3 and the negative (–) lead to terminal 2.
(c) Rotate the shaft.
(d) Check that there is voltage change from approx. 0 V to 11 V or more between terminals 2 and 3.

HINT:
The voltage change should be performed 4 times for every revolution of the speed sensor shaft.
If operation is not as specified, replace the sensor.



4. INSPECT VEHICLE SPEED SENSOR CIRCUIT

Disconnect the connector from sensor and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
1 – Ground	Ignition switch LOCK or ACC	No voltage
1 – Ground	Ignition switch ON	Battery positive voltage

If circuit is not as specified, inspect power source or wire harness.

5. INSPECT TACHOMETER ON–VEHICLE

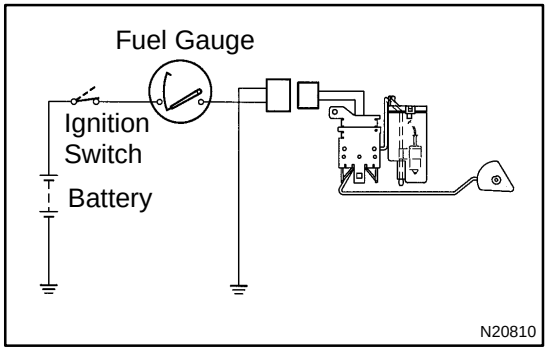
(a) Connect a tune–up test tachometer, and start the engine.

NOTICE:

- **Reversing the connection of the tachometer will damage the transistors and diodes inside.**
- **When removing or installing the tachometer, be careful not to drop or subject it to heavy shocks.**

(b) Compare the tester and tachometer readings.
DC 13.5 V 25 ˚C at (77˚F)

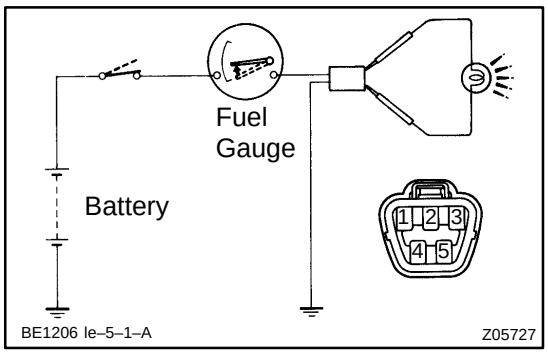
Standard indication	Allowable range
700	630 – 770
1,000	900 – 1,100
2,000	1,850 – 2,150
3,000	2,800 – 3,200
4,000	3,800 – 4,200
5,000	4,800 – 5,200
6,000	5,750 – 6,250
7,000	6,700 – 7,300



6. INSPECT FUEL RECEIVER GAUGE OPERATION

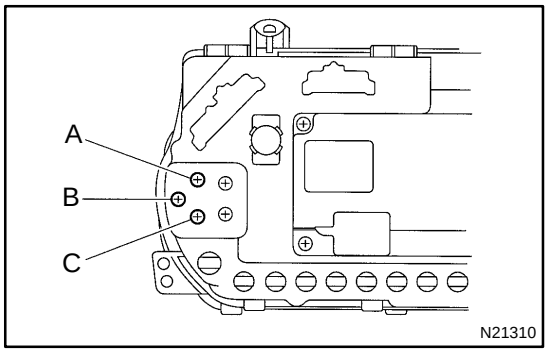
(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON, check that the receiver gauge needle indicates EMPTY.



(c) Connect terminals 2 and 3 on the wire harness side connector through a 3.4–W test bulb.
(d) Turn the ignition switch ON, check that the bulb lights up and the receiver gauge needle moves toward ”E” side.

HINT:
Because of the silicon oil in the gauge, it will take a short time for needle to stabilize.
If operation is not as specified, inspect the receiver gauge resistance.

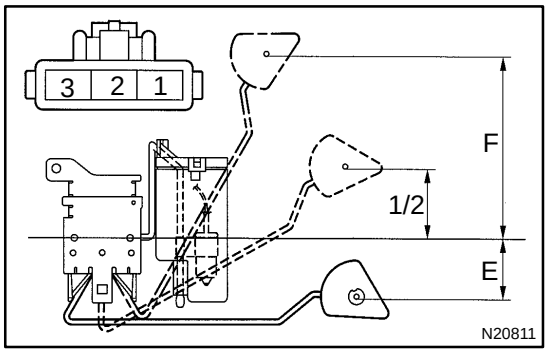


7. INSPECT FUEL RECEIVER GAUGE RESISTANCE

Measure the resistance between terminals.

Tester connection	Resistance (Ω)
A – B	Approx. 270.8
A – C	Approx. 91.3
B – C	Approx. 179.5

If resistance value is not as specified, replace the receiver gauge.

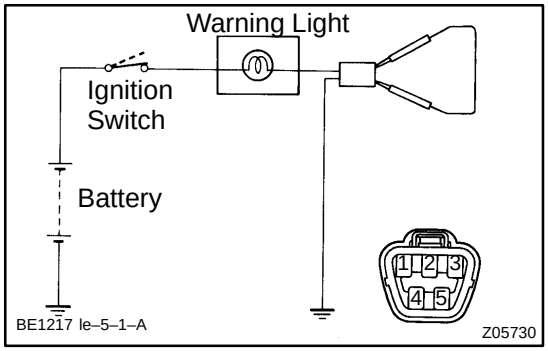


8. INSPECT FUEL SENDER GAUGE RESISTANCE

Measure the resistance between terminals 2 and 3 for each float position.

Float position mm (in.)	Resistance (Ω)
F: Approx. 91.1 (3.587)	Approx. 3.0
1/2: Approx. 34.2 (1.346)	Approx. 31.7
E: Approx. 30.8 (1.213)	Approx. 110.0

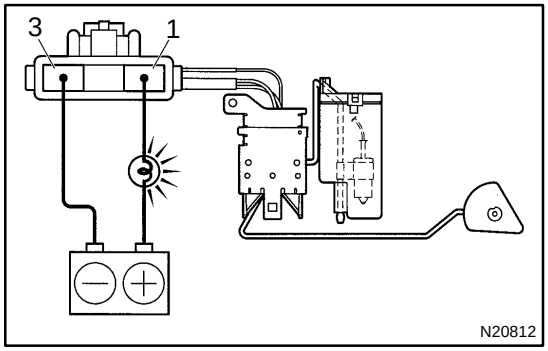
If resistance value is not as specified, replace the sender gauge.



9. INSPECT FUEL LEVEL WARNING LIGHT

(a) Disconnect the connector from the sender gauge.
(b) Connect terminals 1 and 3 on the wire harness side connector.
(c) Turn the ignition switch ON, check that the warning light lights up.

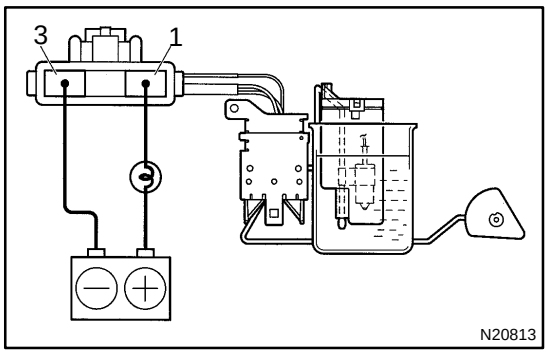
If the warning light does not light up, test the bulb or inspect wire harness.



10. INSPECT FUEL LEVEL WARNING SWITCH

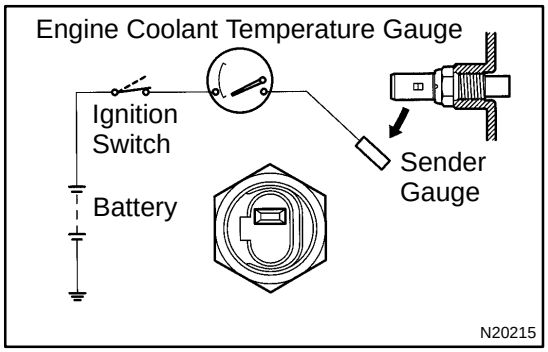
(a) Apply battery positive voltage between terminals 1 and 3 through a 3.4–W test bulb, check that the bulb lights up.

HINT:
It takes a short time for the bulb to light up.



(b) Submerge the switch in fuel, check that the bulb goes out.

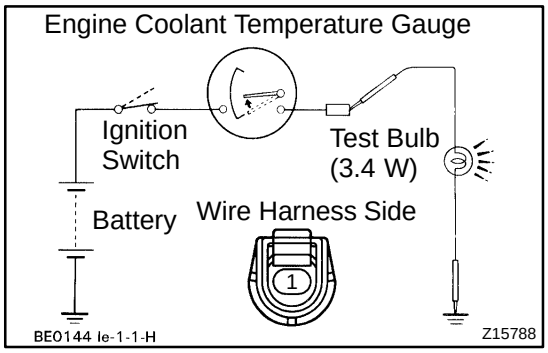
If operation is not as specified, replace the sender gauge.



11. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE OPERATION

(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON and check that the receiver gauge needle indicates COOL.



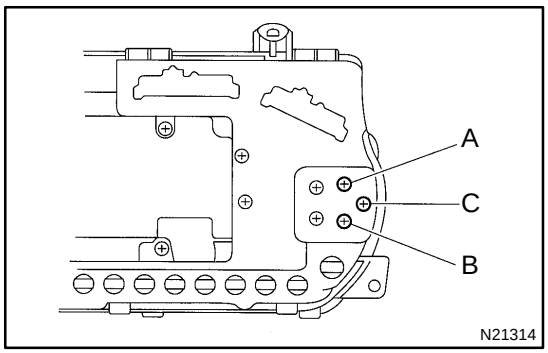
(c) Ground terminal on the wire harness side connector through a 3.4–W test bulb.

(d) Turn the ignition switch ON, and check that the bulb lights up and the receiver gauge needle moves to the hot side.

If operation is as specified, replace the sender gauge.

Then recheck the system.

If operation is not as specified, measure the receiver gauge resistance.



12. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE RESISTANCE

Measure the resistance between terminals.

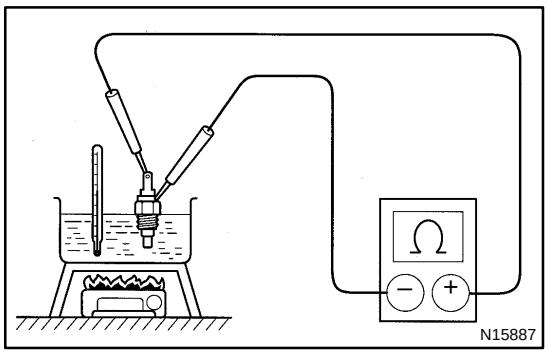
Tester connection	Resistance (Ω)
A – B	Approx. 54.0
A – C	Approx. 175.7
B – C	Approx. 229.7

HINT:

Connect the test leads so that the current from the ohmmeter can flow according to the above order.

This circuit includes the diode.

If resistance value is not as specified, replace the receiver gauge.

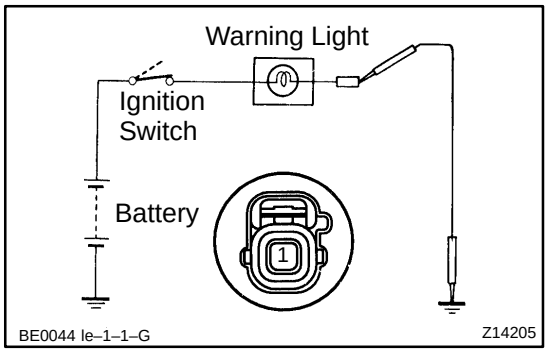


13. INSPECT ENGINE COOLANT TEMPERATURE SENDER GAUGE RESISTANCE

Measure the resistance between the terminal and gauge body.

Temperature ˚C(˚F)	Resistance (Ω)
50 (122.0)	160 – 240
120 (248.0)	17.1 – 21.2

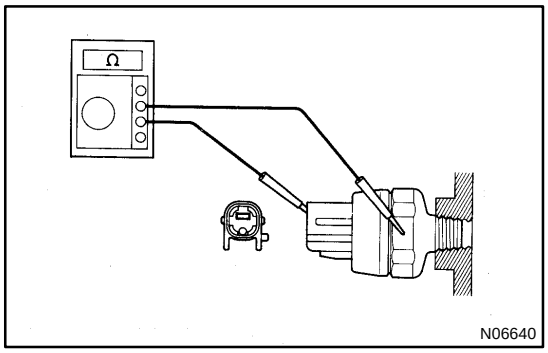
If resistance value is not as specified, replace the engine coolant temperature sender gauge.



14. INSPECT LOW OIL PRESSURE WARNING LIGHT

(a) Disconnect the connector from the warning switch and ground terminal on the wire harness side connector.
(b) Turn the ignition switch ON and check that the warning light lights up.

If the warning light does not light up, test the bulb.

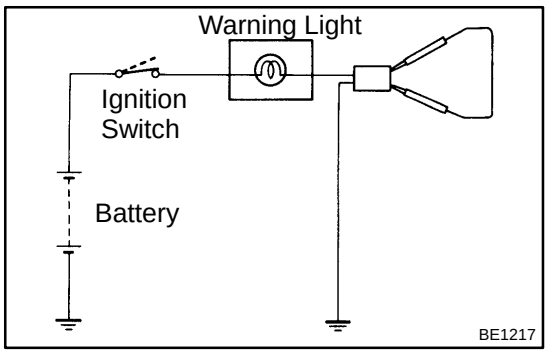


15. INSPECT LOW OIL PRESSURE SWITCH

(a) Disconnect the connector from the switch.
(b) Check that continuity exists between terminal and ground with the engine stopped.
(c) Check that no continuity exists between terminal and ground with the engine running.

HINT:

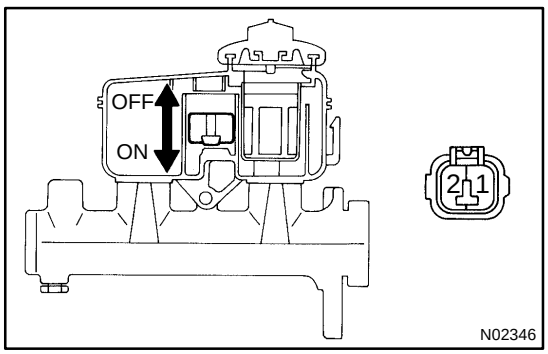
Oil pressure should be over 24.5 kPa (0.25 kgf/cm^2, 3.55 psi).
If operation is not as specified, replace the switch.



16. INSPECT BRAKE SYSTEM WARNING LIGHT

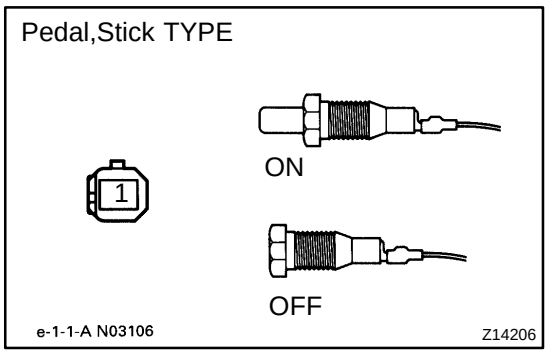
(a) Disconnect the connector from the brake fluid warning switch.
(b) Release the parking brake pedal.
(c) Connect the terminals on the wire harness side of the level warning switch connector.
(d) Start the engine, check that the warning light lights up.

If the warning light does not light up, test the bulb or wire harness.



17. INSPECT BRAKE FLUID LEVEL WARNING SWITCH

(a) Remove the reservoir tank cap and strainer.
(b) Disconnect the connector.
(c) Check that no continuity exists between the terminals with the switch OFF (float up).
(d) Use syphon, etc. to take fluid out of the reservoir tank.
(e) Check that continuity exists between the terminals with the switch ON (float down)



(f) Pour the fluid back in the reservoir tank.

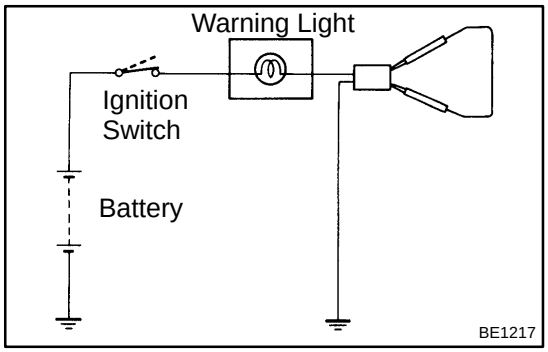
If operation is not as specified, replace the switch.

18. INSPECT PARKING BRAKE SWITCH

(a) Check that continuity exists between the terminal and switch body with the switch ON (switch pin released).

(b) Check that no continuity exists between the terminal and switch body with the switch OFF (switch pin pushed in).

If operation is not as specified, replace the switch or inspect ground point.



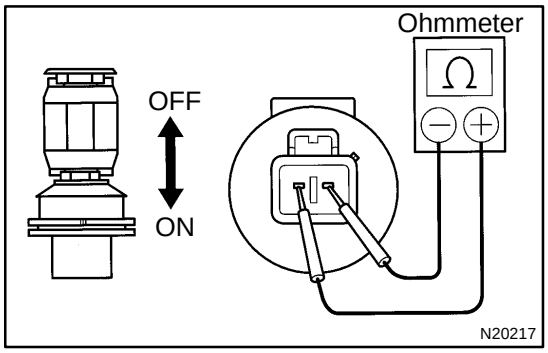
19. INSPECT WASHER LEVEL WARNING LIGHT

(a) Disconnect the connectors from the level warning switch and parking brake switch.

(b) Connect terminals on the wire harness side connector of the level warning switch connector.

(c) Remove the GAUGE fuse and turn the ignition switch ON, and check that the warning light comes on.

If the warning light does not light up, test the bulb.

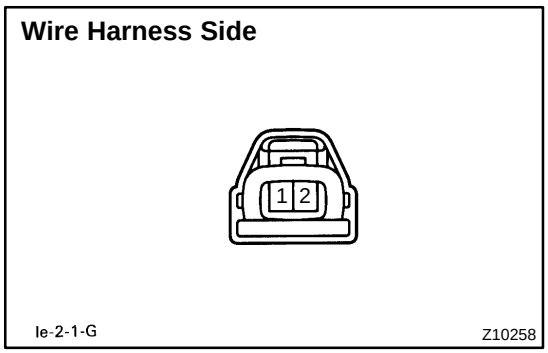


20. INSPECT WASHER LEVEL WARNING SWITCH

(a) Check that no continuity exists between terminals with the switch OFF (float up).

(b) Check that continuity exists between terminals with the switch ON (float down).

If operation is not as specified, replace the switch.

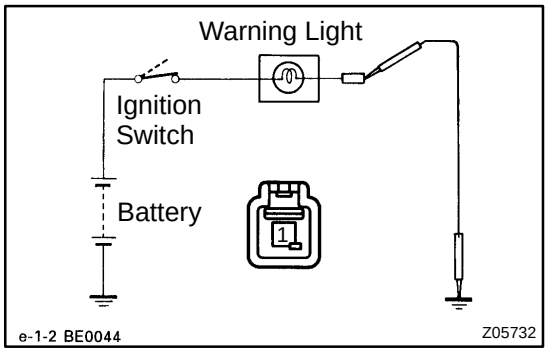


21. INSPECT WINDOW WASHER LEVEL WARNING SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

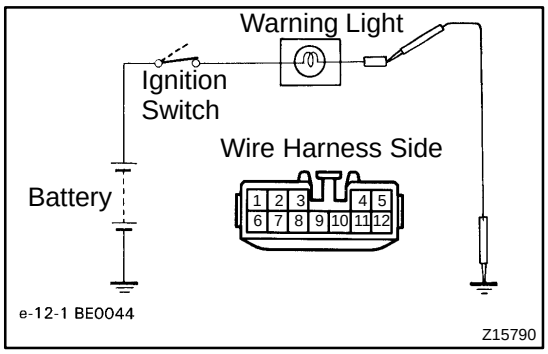
If continuity is not as specified, inspect the wire harness or ground point.



22. INSPECT OPEN DOOR WARNING LIGHT

Disconnect the connector from the door courtesy switch and ground terminal 1 on the wire harness side, and check that the warning light lights up.

If the warning light does not light up, inspect the bulb or wire harness.

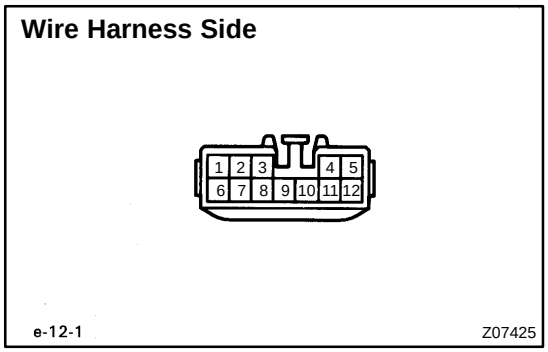


23. INSPECT WARNING LIGHT

(a) Disconnect the connector from the light failure sensor and ground terminal 4 on the wire harness side connector.

(b) Start the engine, check that the warning light lights up.

If the warning light does not light up, test the bulb or inspect wire harness.



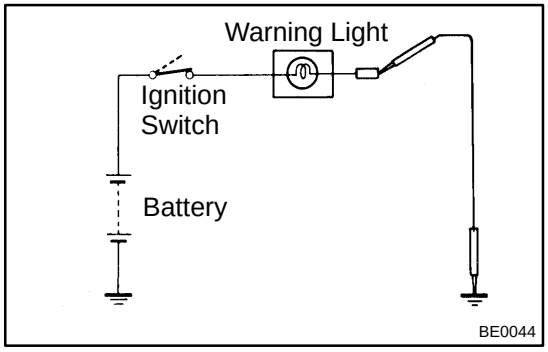
24. INSPECT LIGHT FAILURE SENSOR CIRCUIT

Disconnect the connector from the sensor and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity*
2 – Ground	Constant	Continuity*
9 – Ground	Constant	Continuity*
10 – Ground	Constant	Continuity*
11 – Ground	Constant	Continuity*
12 – Ground	Constant	Continuity*
3 – Ground	Light control switch OFF	No voltage
3 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
4.8 – Ground	Ignition switch LOCK or ACC	No voltage
4.8 – Ground	Ignition switch ON	Battery positive voltage
7 – Ground	Stop light switch OFF	No voltage
7 – Ground	Stop light switch ON	Battery positive voltage

*: There is resistance because this circuit is grounded through the bulb.

If the circuit is as specified, replace the sensor. If the circuit is not as specified, inspect the circuits connected to other parts.



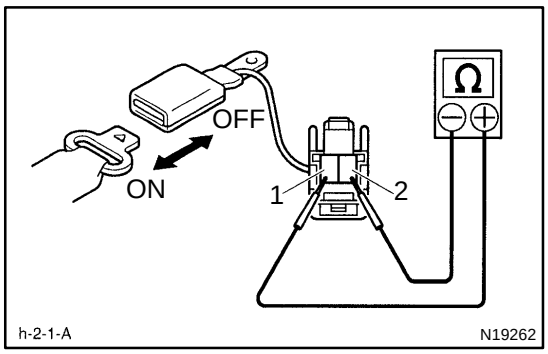
25. INSPECT SEAT BELT WARNING LIGHT

(a) Remove the integration relay from the instrument panel junction block.

(b) Ground terminal 2 on the integration relay with the connectors still connected.

(c) Turn the ignition switch ON and check that the warning light lights up.

If the warning light does not light up, inspect the bulb or wire harness.

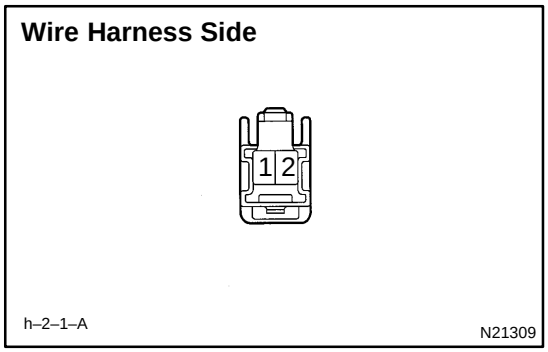


26. INSPECT BUCKLE SWITCH CONTINUITY

(a) Check that continuity exists between terminals 1 and 2 on the switch side connector with the switch ON (belt fastened).

(b) Check that no continuity exists between terminals 1 and 2 on the switch side connector with the switch OFF (belt unfastened).

If operation is not as specified, replace the front seat inner belt.

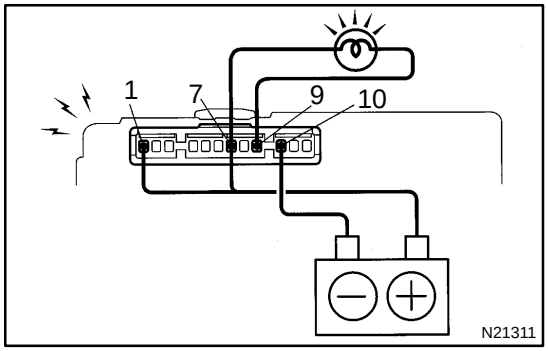


27. INSPECT BUCKLE SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
–	Turn the ignition switch ON	Chime sounds for 4 – 8 sec.
–	Ground terminal 1 and turn the ignition switch ON	No chime sound

If the circuit is not as specified, inspect the circuits connected to other parts.



28. INSPECT INTEGRATION RELAY SEAT BELT WARNING SYSTEM OPERATION

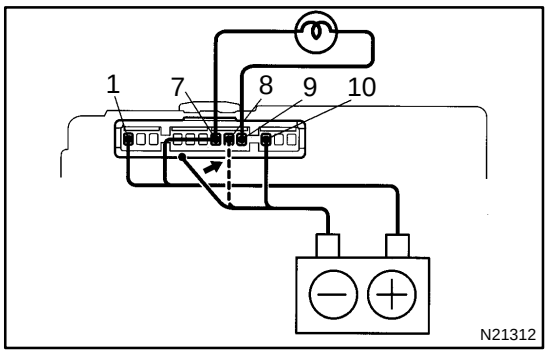
(a) Connect the positive (+) lead from the battery to terminals 1 and 7.

(b) Connect the terminal 7 to terminal 9 through the 3.4 W test bulb.

(c) Connect the negative (–) lead from the battery to terminal 10.

(d) Check that the bulb lights and the buzzer sounds for 4 to 8 seconds.

(e) Return to step (a) and operate the chime again.



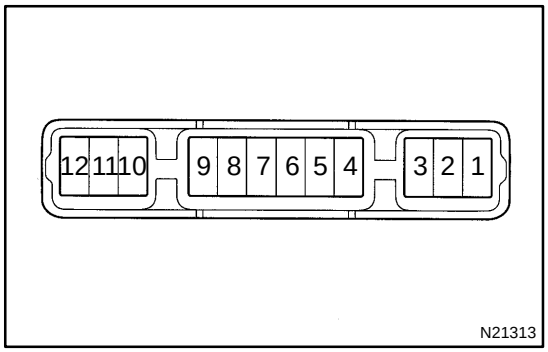
(f) Connect the negative (–) lead from the battery to terminal 8.

(g) Check that the buzzer stops sounding.

HINT:

Check the buzzer within a period of 4 to 8 seconds.

If operation is not as specified, replace the relay.



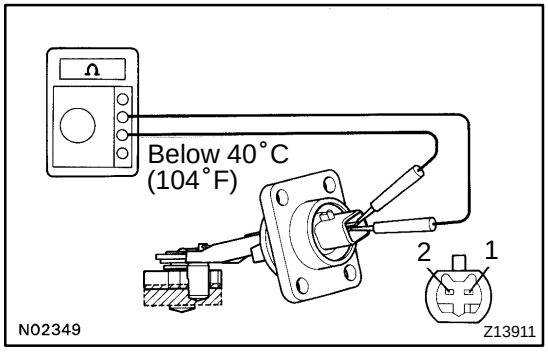
29. Seat belt warning : INSPECT INTEGRATION RELAY CIRCUIT

Remove the relay from the junction block No.1 and inspect the connectors on the junction block side.

Tester connection	Condition	Specified condition
8 – Ground	Driver's buckle switch OFF (Seat best unfastened)	No continuity
8 – Ground	Driver's buckle switch ON (Seat best fastened)	Continuity
10 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage
7 – Ground 9 – Ground	Ignition switch position OFF or ACC	No voltage
7 – Ground 9 – Ground	Ignition switch position ON	Battery positive voltage

If the circuit is as specified, try to replace the relay with a new one.

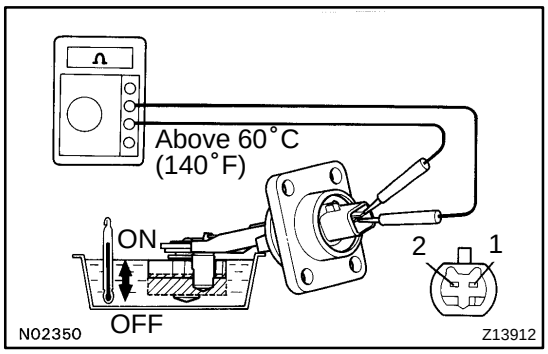
If the circuit is not as specified, inspect the circuits connected to other parts.



30. INSPECT ENGINE OIL LEVEL WARNING SWITCH CONTINUITY

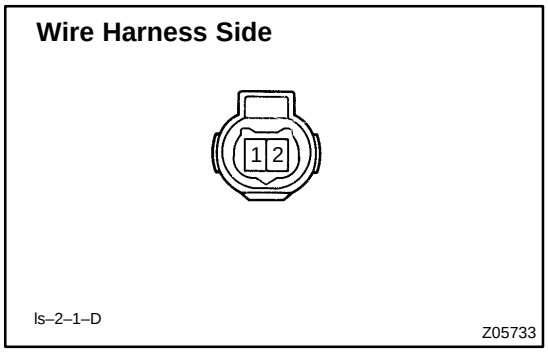
(a) Check that continuity exists between terminal with the switch in each position.

(b) Heat the switch to above 60˚C (140˚F) in an oil bath.



(c) Check that continuity exists between terminals with the switch ON (float up).
(d) Check that no continuity exists between terminals with the switch OFF (float down).

If operation is not as specified, replace the switch.

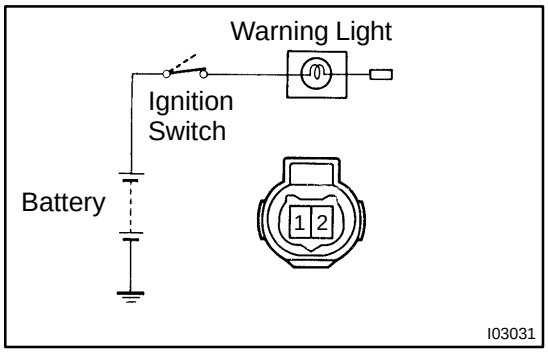


31. INSPECT ENGINE OIL LEVEL WARNING SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

If continuity is not as specified, inspect the wire harness or ground point.

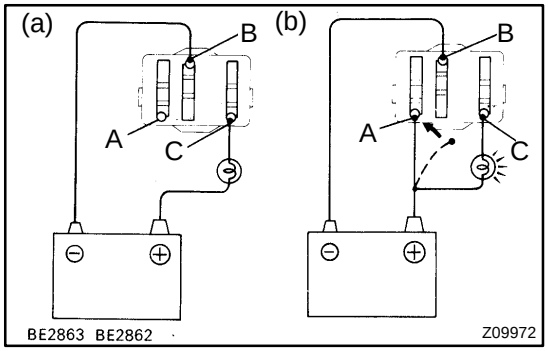


32. INSPECT ENGINE OIL LEVEL WARNING LIGHT

(a) Disconnect the connector from the switch.
(b) Turn the IG switch ON, the warning light lights up.
(c) The warning light lights up after 40 sec. from the engine has started.

If the warning light does not light up, inspect bulb or wire harness.

33. INSPECT LIGHT CONTROL RHEOSTAT
(See page BE–43)



34. INSPECT BULB CHECK RELAY OPERATION

(a) Connect the positive (+) lead from the battery to terminal C through a 1.4–W test bulb and the negative (–) lead to terminal B, check that the test bulb does not light up.
(b) Connect the positive (+) lead from the battery to terminal A and check that the test bulb lights up.

If operation is not as specified, replace the relay.

BE05J–01

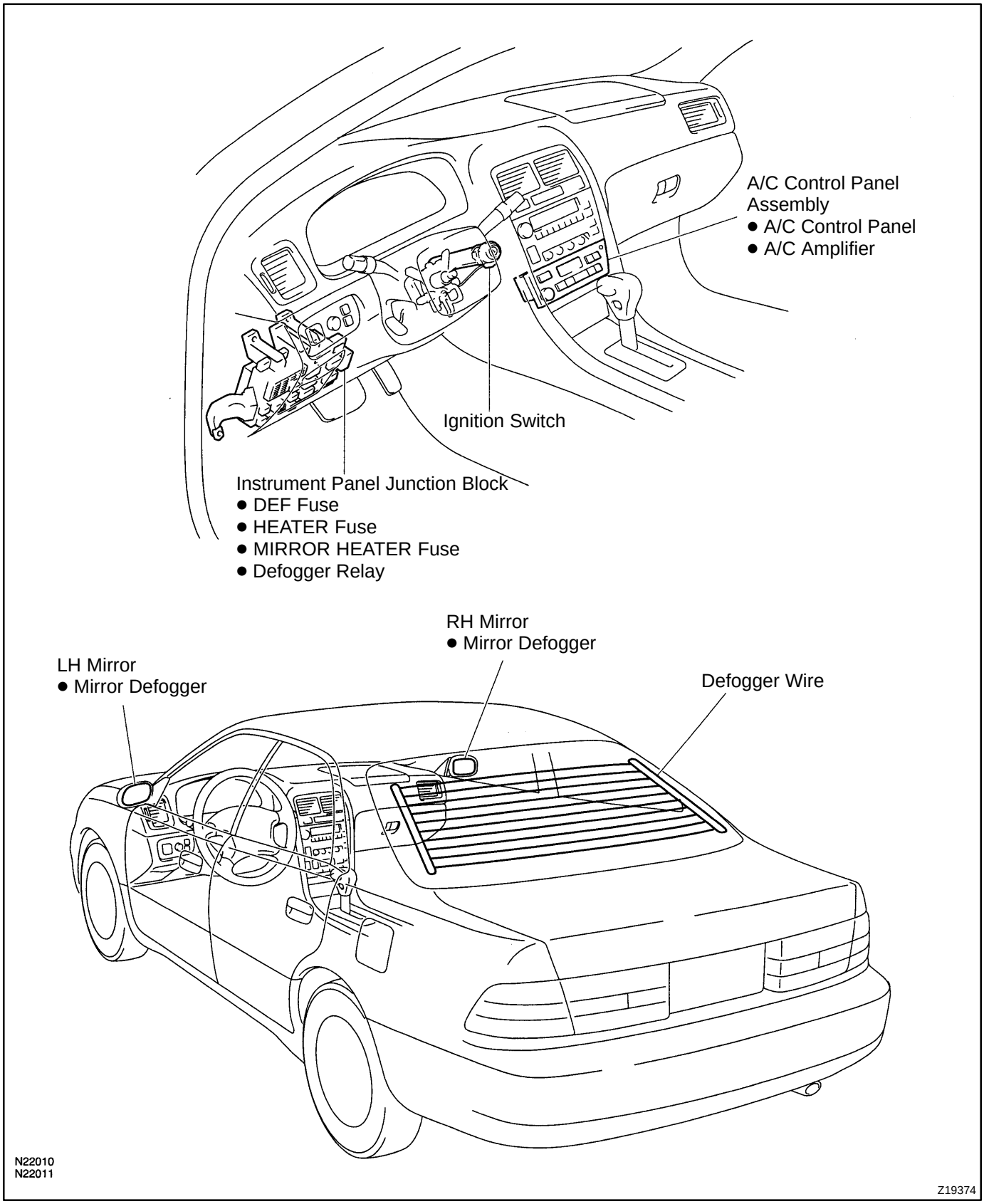
REASSEMBLY

Reassembly is in the reverse of the disassembly(See page BE–90).

DEFOGGER SYSTEM

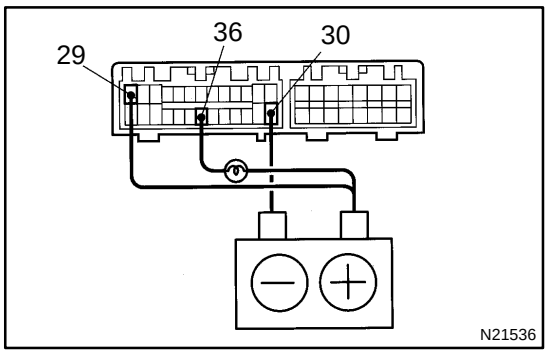
LOCATION

BE05K–04



BE05L–03

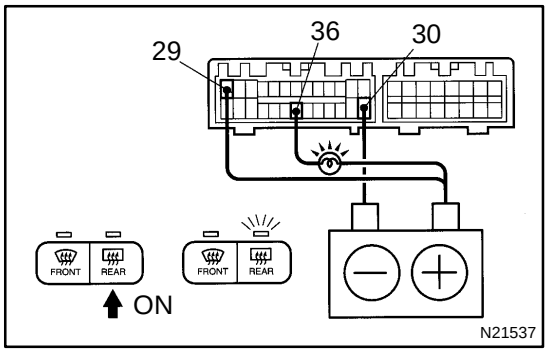
INSPECTION



1. A/C control panel assembly:
INSPECT DEFOGGER SWITCH OPERATION

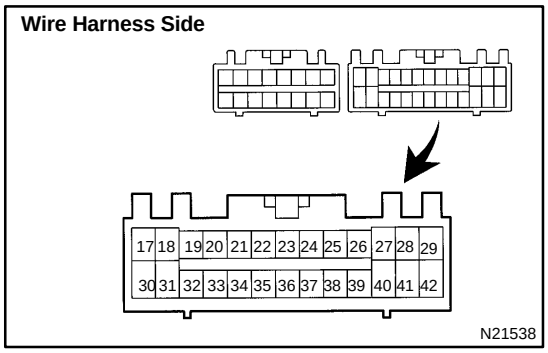
(a) Connect the positive (+) lead from the battery to terminal 29 and negative (–) lead to terminal 30.

(b) Connect the positive (+) lead from the battery to terminal 36 through a 1.4 W test bulb.



(c) Turn the defogger switch ON and check that the test bulb and indicator light turn ON, then turn OFF after approx. 15 minutes.

If operation is not as specified, proceed to inspect the A/C control assembly.
(See page AC–105)

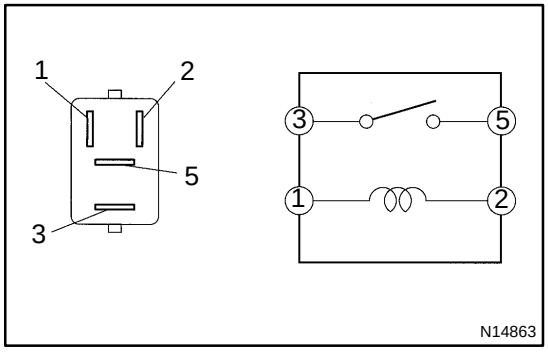


2. INSPECT DEFOGGER SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on wire harness side.

Tester connection	Condition	Specified condition
30 – Ground	Constant	Continuity
29 – Ground	Ignition switch position ACC or LOCK	No voltage
29 – Ground	Ignition switch position ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

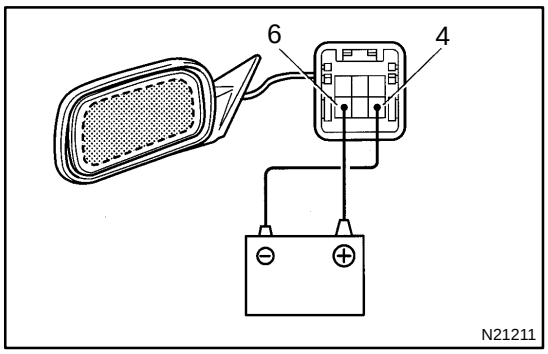


3. INSPECT DEFOGGER RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

4. INSPECT DEFOGGER RELAY CIRCUIT
(See page BE–11)



5. INSPECT MIRROR DEFOGGER OPERATION

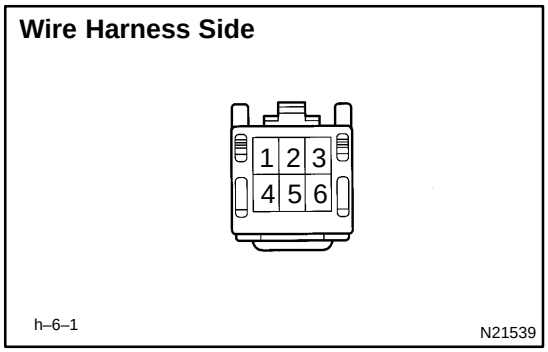
(a) Connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 4.

(b) Check that the mirror becomes warm.

HINT:

It will take a short time for the mirror to become warm.

If the mirror does not become warm, replace the mirror assembly.

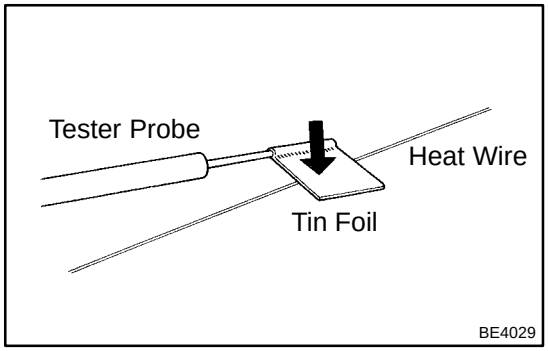


6. INSPECT MIRROR DEFOGGER CIRCUIT

Disconnect the connector from the outside mirror and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
4 – Ground	Constant	Continuity
6 – Ground	Ignition switch position ON (Defogger switch OFF)	No voltage
6 – Ground	Ignition switch position ON (Defogger switch ON)	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



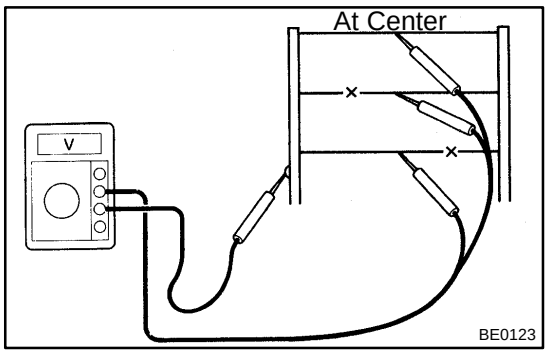
7. INSPECT DEFOGGER WIRE

NOTICE:

- **When cleaning the glass, use a soft, dry cloth, and wipe the glass in the direction of the wire. Take care not to damage the wires.**
- **Do not use detergents or glass cleaners with abrasive ingredients.**
- **When measuring voltage, wind a piece of tin foil around the top of the negative probe and press the foil against the wire with your finger, as shown.**

(a) Turn the ignition switch ON.

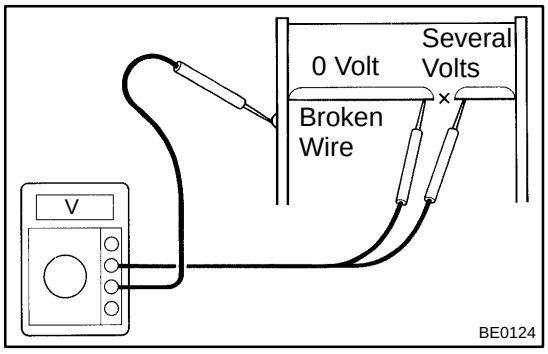
(b) Turn the defogger switch ON.



(c) Inspect the voltage at the center of each heat wire.

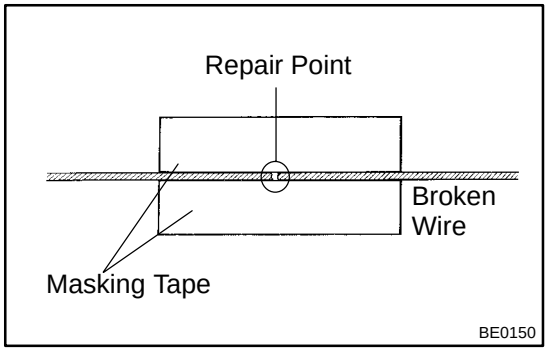
Voltage	Criteria
Approx. 5V	Okay (No break in wire)
Approx. 10V or 0V	Broken wire

HINT:
If there is approximately 10 V, the wire is broken between the center of the wire and the positive (+) end. If there is no voltage, the wire is broken between the center of the wire and ground.



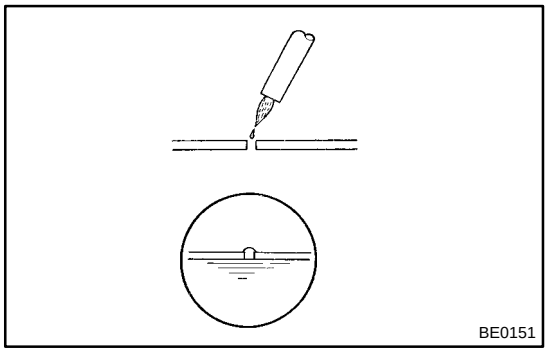
(d) Place the voltmeter positive (+) lead against the defogger positive (+) terminal.
(e) Place the voltmeter negative (–) lead with the foil strip against the heat wire at the positive (+) terminal end and slide it toward the negative (–) terminal end.
(f) The point where the voltmeter deflects from zero to several V is the place where the heat wire is broken.

HINT:
If the heat wire is not broken, the voltmeter indicates 0 V at the positive (+) end of the heat wire but gradually voltage increases to approx. 12 V as the meter probe moves to the other end.



8. IF NECESSARY, REPAIR DEFOGGER WIRE

(a) Clean the broken wire tips with grease, wax and silicone remover.
(b) Place the masking tape along both sides of the wire for repair.
(c) Thoroughly mix the repair agent (Dupont paste No. 4817).

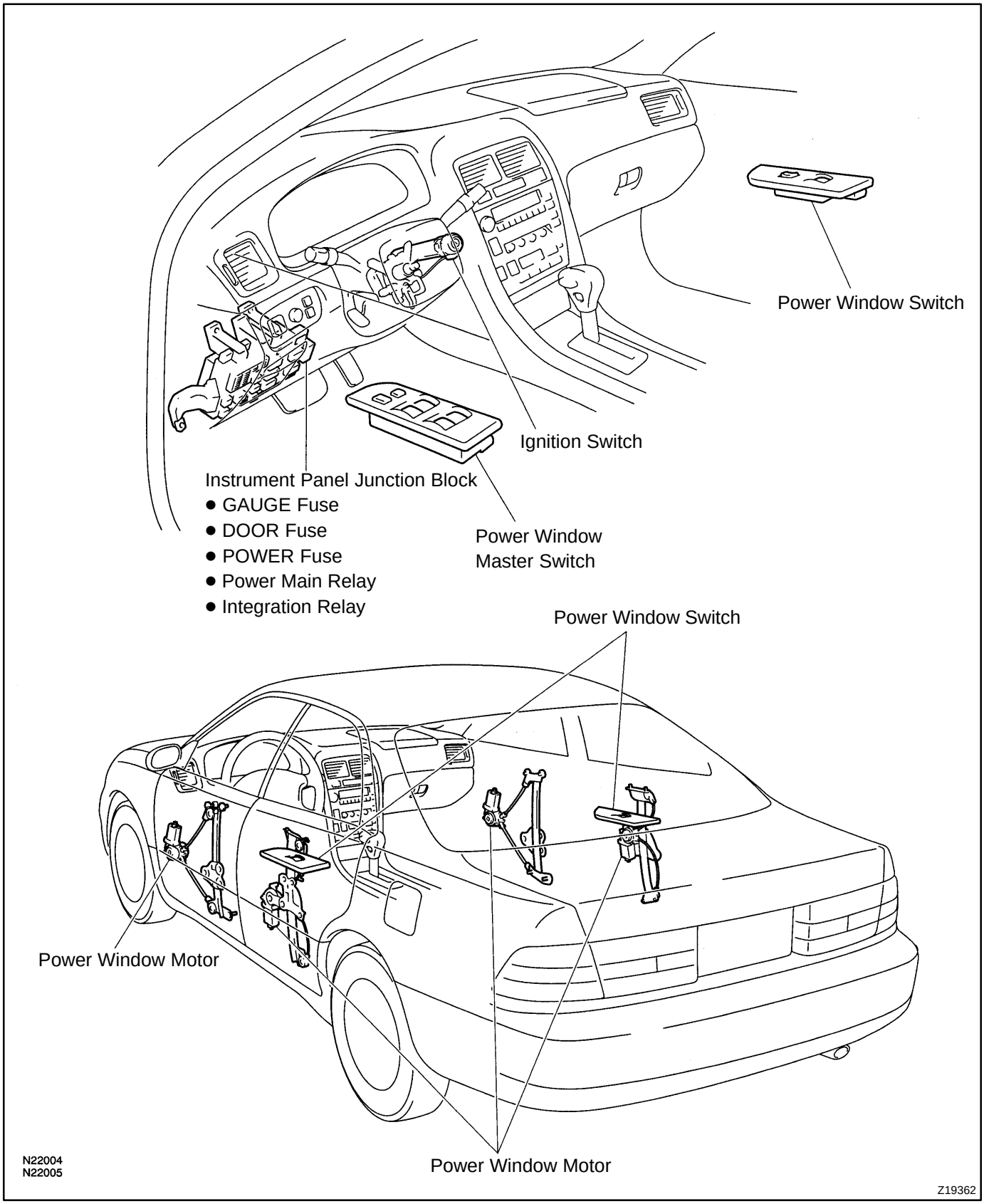


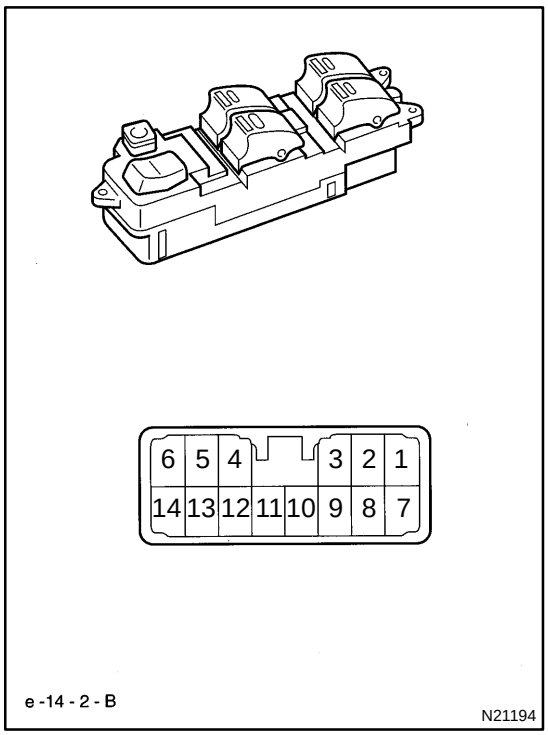
(d) Using a fine tip brush, apply a small amount of the agent to the wire.
(e) After a few minutes, remove the masking tape.
(f) Do not repair the defogger wire for at least 24 hours.

POWER WINDOW CONTROL SYSTEM

LOCATION

BE05M–01





BE05N–02

INSPECTION

1. INSPECT POWER WINDOW MASTER SWITCH CONTINUITY

(a) Inspect the front driver's switch.

Window unlock:

Switch position	Tester connection	Specified condition
UP	1 – 13 6 – 7	Continuity
OFF	1 – 6 – 13	Continuity
DOWN	1 – 6 7 – 13	Continuity

Window lock:

Switch position	Tester connection	Specified condition
UP	1 – 13 6 – 7	Continuity
OFF	1 – 6 – 13	Continuity
DOWN	1 – 6 7 – 13	Continuity

If continuity is not as specified, replace the master switch.

(b) Inspect the front passenger's switch.

Window unlock:

Switch position	Tester connection	Specified condition
UP	1 – 5 7 – 12	Continuity
OFF	1 – 5 – 12	Continuity
DOWN	1 – 12 5 – 7	Continuity

Window lock:

Switch position	Tester connection	Specified condition
UP	7 – 12	Continuity
OFF	5 – 12	Continuity
DOWN	5 – 7	Continuity

If continuity is not as specified, replace the master switch.

(c) Inspect the rear left switch.

Window unlock:

Switch position	Tester connection	Specified condition
UP	1 – 9 7 – 10	Continuity
OFF	1 – 9 – 10	Continuity
DOWN	1 – 10 7 – 9	Continuity

Window lock:

Switch position	Tester connection	Specified condition
UP	7 – 10	Continuity
OFF	9 – 10	Continuity
DOWN	7 – 9	Continuity

If continuity is not as specified, replace the master switch.

(d) Inspect the rear right switch.

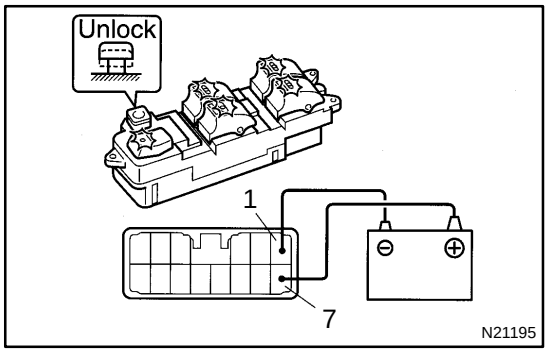
Window unlock:

Switch position	Tester connection	Specified condition
UP	1 – 14 7 – 11	Continuity
OFF	1 – 11 – 14	Continuity
DOWN	1 – 11 7 – 14	Continuity

Window lock:

Switch position	Tester connection	Specified condition
UP	7 – 11	Continuity
OFF	11 – 14	Continuity
DOWN	7 – 14	Continuity

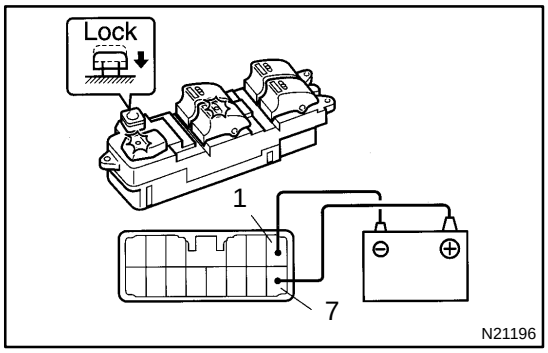
If continuity is not as specified, replace the master switch.



2. INSPECT POWER WINDOW MASTER SWITCH ILLUMINATION

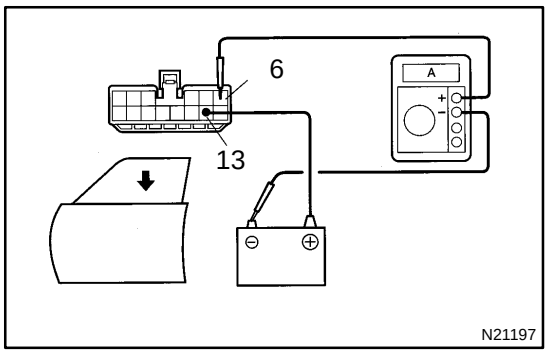
(a) Set the window lock switch to the unlock position.

(b) Connect the positive (+) lead from the battery to terminal 7 and the negative (–) lead to terminal 1, and check that all the illuminations light up.



(c) Set the window lock switch to the lock position, check that all the passenger's power window switch illuminations go out.

If operation is not as specified, replace the master switch.



3. INSPECT ONE TOUCH POWER WINDOW SYSTEM/ CURRENT OF CIRCUIT (Using an ammeter)

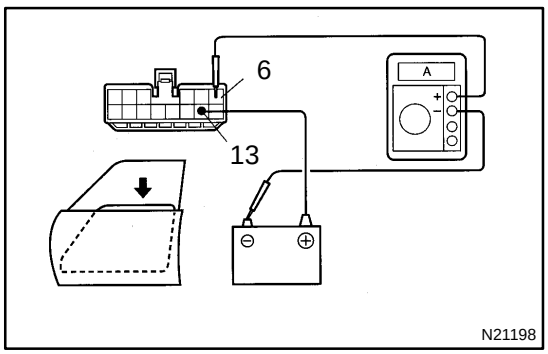
(a) Disconnect the connector from the master switch.

(b) Connect the positive (+) lead from the ammeter to terminal 6 on the wire harness side connector and the negative (–) lead to negative (–) terminal of the battery.

(c) Connect the positive (+) lead from the battery to terminal 13 on the wire harness side connector.

(d) As the window goes down, check that the current flow is approximately 7 A.

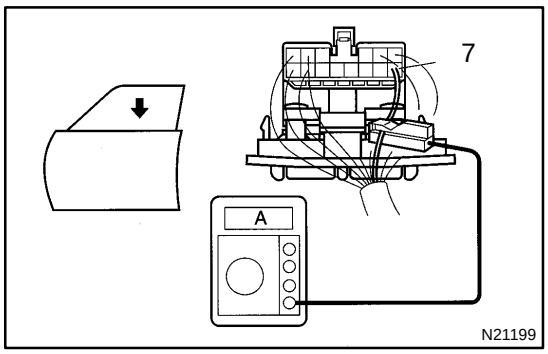
(e) Check that the current increases up to approximately 14.5 A or more when the window stops going down.



HINT:

The circuit breaker opens some 4 – 40 seconds after the window stops going down, so that check must be made before the circuit breaker operates.

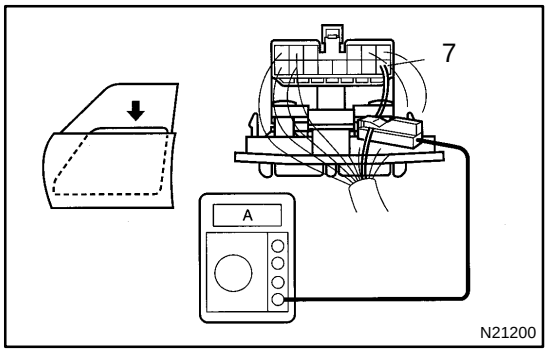
If the operation is as specified, replace the master switch.

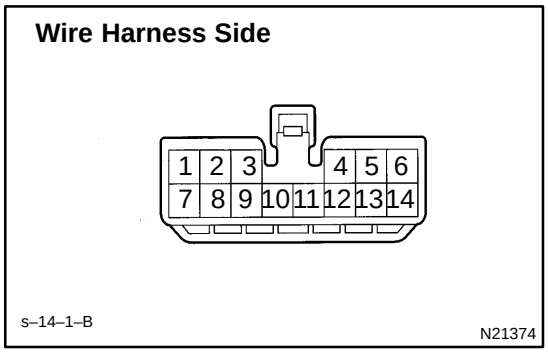


4. INSPECT ONE TOUCH POWER WINDOW SYSTEM/ CURRENT OF CIRCUIT (Using an ammeter with a current–measuring probe)

(a) Remove the master switch with connector connected.
(b) Attach a current–measuring probe to terminal 7 of the wire harness.
(c) Turn the ignition switch ON and set the power window switch in the down position.
(d) As the window goes down, check that the current flow is approximately 7 A.
(e) Check that the current increases up to approximately 14.5 A or more when the window stops going down.

HINT:
The circuit breaker opens some 4 – 40 seconds after the window stops going down, so that check must be made before the circuit breaker operates.
If operation is as specified, replace the master switch.



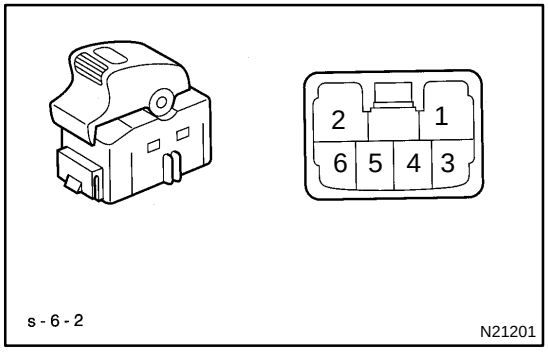


5. INSPECT POWER WINDOW MASTER SWITCH CIRCUIT

Disconnect the connector from the master switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
7 – Ground	Ignition switch position LOCK or ACC	*No voltage
7 – Ground	Ignition switch position ON	Battery positive voltage

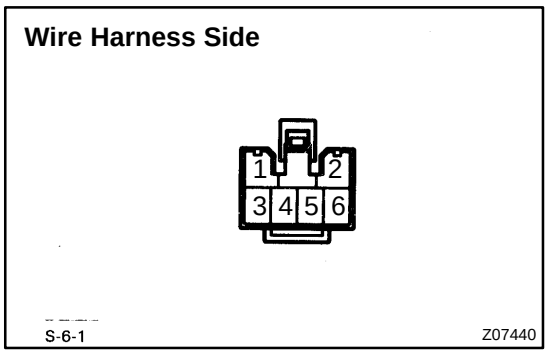
* Exceptions: During 60 seconds after the ignition switch is turned ON → OFF (ACC) or until driver or a passenger's door is opened after the ignition switch is turned ON → OFF (ACC).
If the circuit is not as specified, inspect the circuits connected to other parts.



6. INSPECT POWER WINDOW SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
UP	1 – 3 2 – 5	Continuity
OFF	1 – 3 2 – 4	Continuity
DOWN	2 – 4 3 – 5	Continuity

If continuity is not as specified, replace the switch.



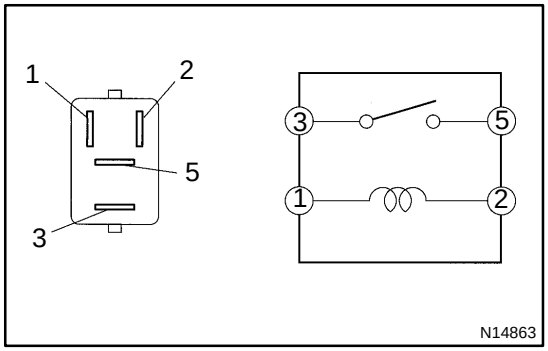
7. INSPECT POWER WINDOW SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Ignition switch position ON and master switch position OFF	No voltage
1 – Ground	Ignition switch positrion ON and master switch position DOWN	Battery positive voltage
4 – Ground	Ignition switch position ON and master switch position OFF	No voltage
4 – Ground	Ignition switch position ON and master switch position UP	Battery positive voltage
5 – Ground	Ignition switch position LOCK or ACC	*No voltage
5 – Ground	Ignition switch position ON	Battery positive voltage

*Exceptions: During 60 seconds period after the ignition switch is turned ON → OFF (ACC) or until driver or a passenger's door is opened after the ignition switch is turned ON → OFF (ACC).

If the circuit is not as specified, inspect the circuits connected to other parts.

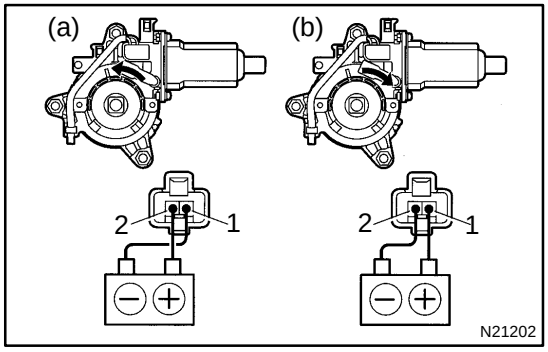


8. INSPECT POWER MAIN RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

9. INSPECT POWER MAIN RELAY CIRCUIT
(See page BE–11)

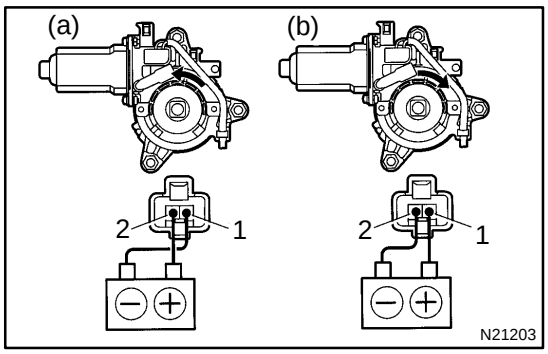


10. Driver's Door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

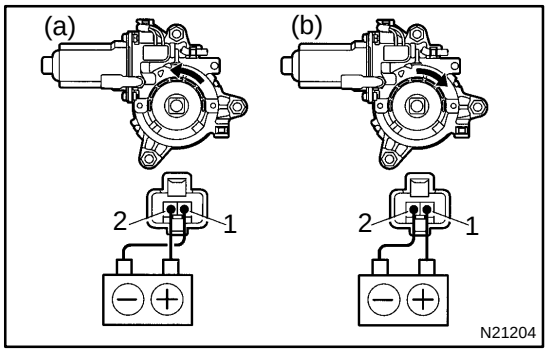


11. Front Passenger's Door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

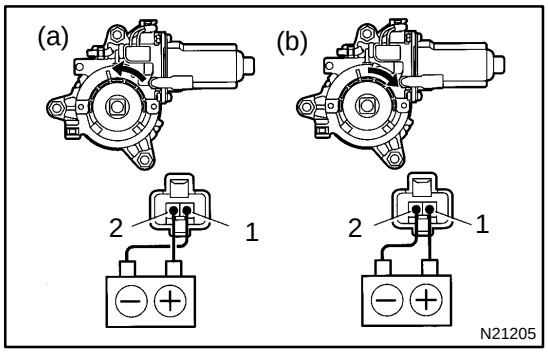


12. Rear Left Side Door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

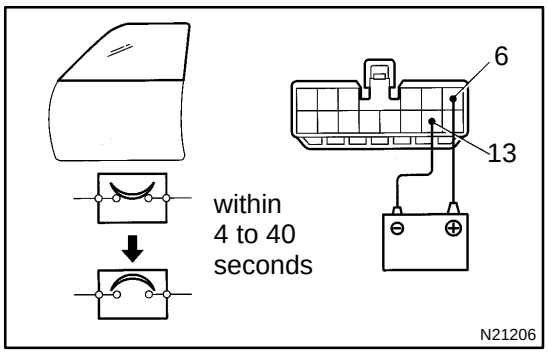


13. Rear Right Side Door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

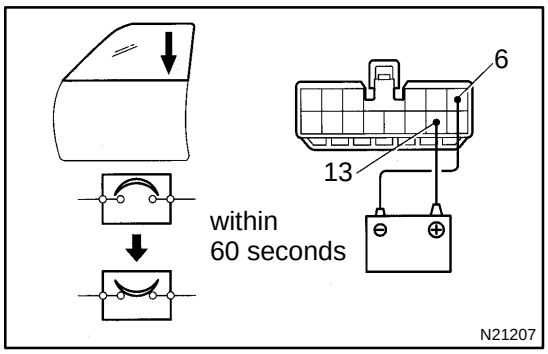


14. Driver's Door:
INSPECT POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

(a) Disconnect the connector from the master switch.

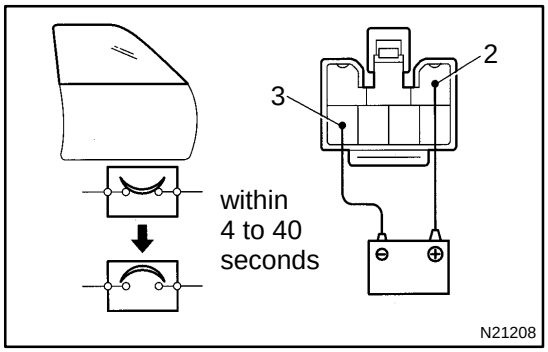
(b) Connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 13 on the wire harness side connector and raise the window to full closed position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within approximately 4 to 40 seconds.



(d) Reverse the polarity, check that the window begins to descend within approximately 60 seconds.

If operation is not as specified, replace the motor.

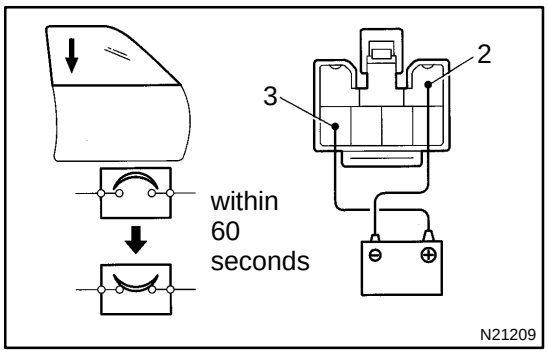


15. Front Passenger's Door Motor:
INSPECT POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

(a) Disconnect the connector from the power window switch.

(b) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3 on the wire harness side connector, and raise the window to full closed position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within approximately 4 to 40 seconds.



(d) Reverse the polarity, check that the window begins to descend within approximately 60 seconds.

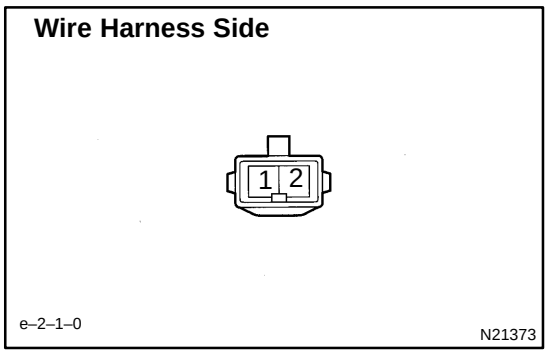
If operation is not as specified, replace the motor.

16. Rear Left Side Door:
INSPECT POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

See step of Front Passenger Door Motor.

17. Rear Right Side Door:
INSPECT POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

See step of Front Passenger Door Motor.



18. INSPECT POWER WINDOW MOTOR CIRCUIT

(a) Disconnect the connector from the motor.

(b) Connect the connector to the master switch and power window switch.

(c) Inspect the connector on the wire harness side.

Driver's Door Motor

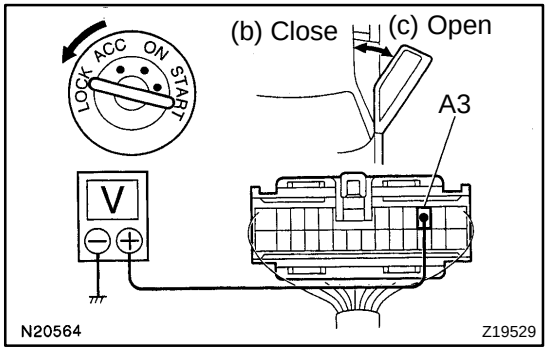
Tester connection	Condition	Specified condition
1 – Ground	*Master switch position DOWN or OFF	No voltage
1 – Ground	*Master switch position UP	Battery positive voltage
2 – Ground	*Master switch position UP or OFF	No voltage
2 – Ground	*Master switch position DOWN	Battery positive voltage

Except Driver's Door Motor

Tester connection	Condition	Specified condition
1 – Ground	*Master switch position UP or OFF	No voltage
1 – Ground	*Master switch position DOWN	Battery positive voltage
1 – Ground	*Power window switch position UP or OFF	No voltage
1 – Ground	*Power window switch position DOWN	Battery positive voltage
2 – Ground	*Master switch position DOWN or OFF	No voltage
2 – Ground	*Master switch position UP	Battery positive voltage
2 – Ground	*Power window switch position DOWN or OFF	No voltage
2 – Ground	*Power window switch position UP	Battery positive voltage

*: Set the window lock switch to the unlock position.(except driver's door motor)

If the circuit is not as specified, inspect the circuits connected to other parts.



19. Key–Off Power Window Signal: INSPECT INTEGRATION RELAY OPERATION

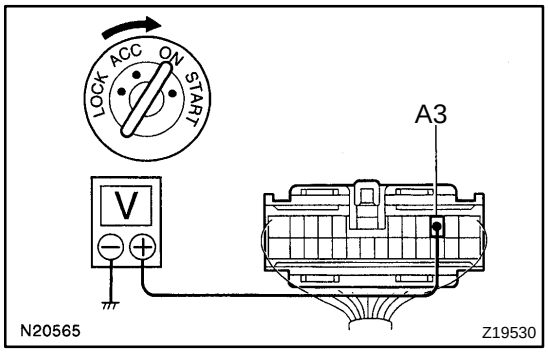
HINT:

When the relay circuit is as specified, inspect the key–off power window signal.

(a) Connect the positive (+) lead from the voltmeter to terminal A3 and the negative (–) lead to body ground.

(b) Close the door with ignition switch turned to LOCK or ACC, and check that the meter needle indicates battery positive voltage.

(c) Open the door and check that the meter needle indicates 0 V.



(d) Turn the ignition switch ON and check that the meter needle indicates battery positive voltage again.

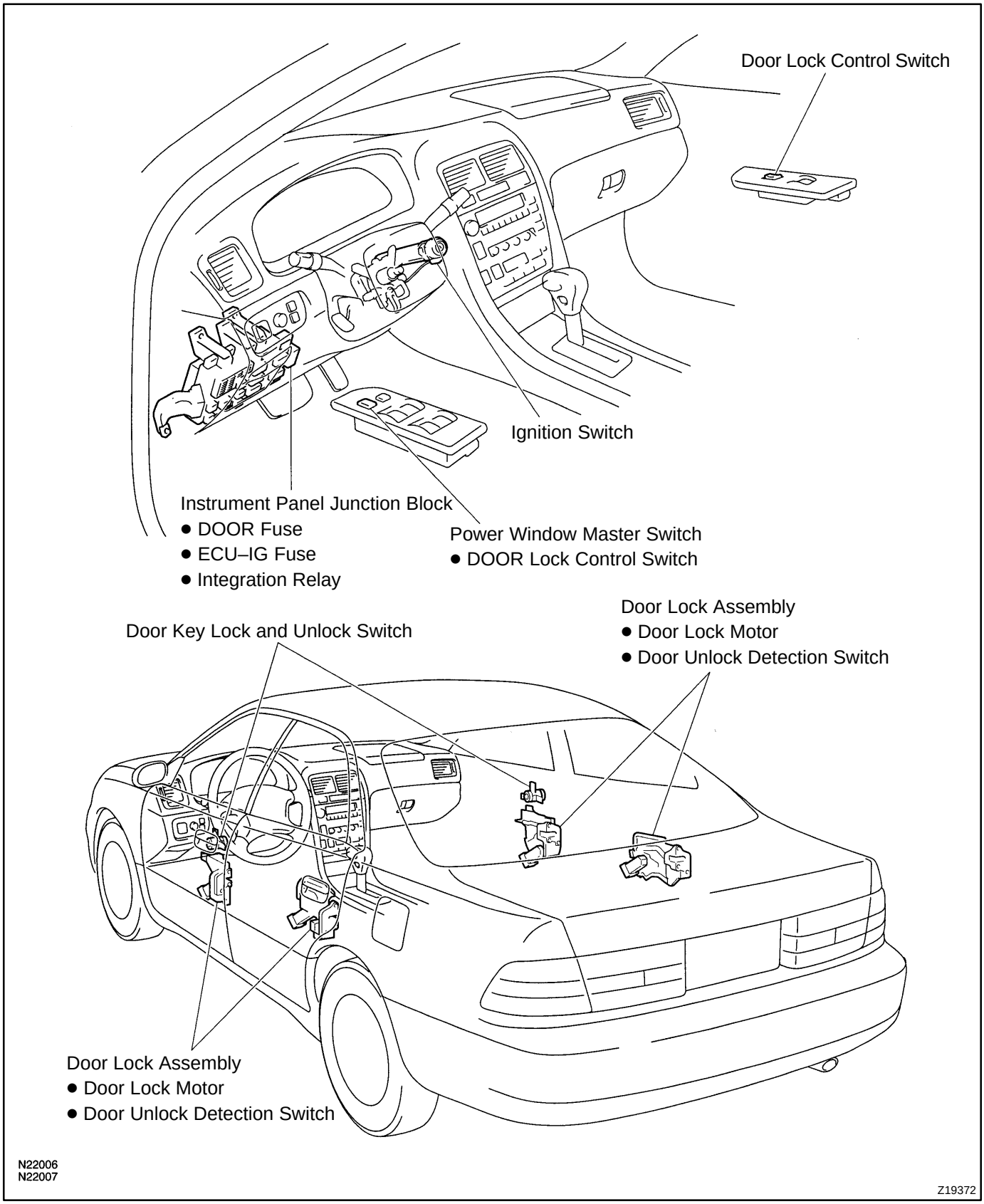
If operation is not as specified, replace the relay.

20. INSPECT INTEGRATION RELAY CIRCUIT
(See page BE–20)

POWER DOOR LOCK CONTROL SYSTEM

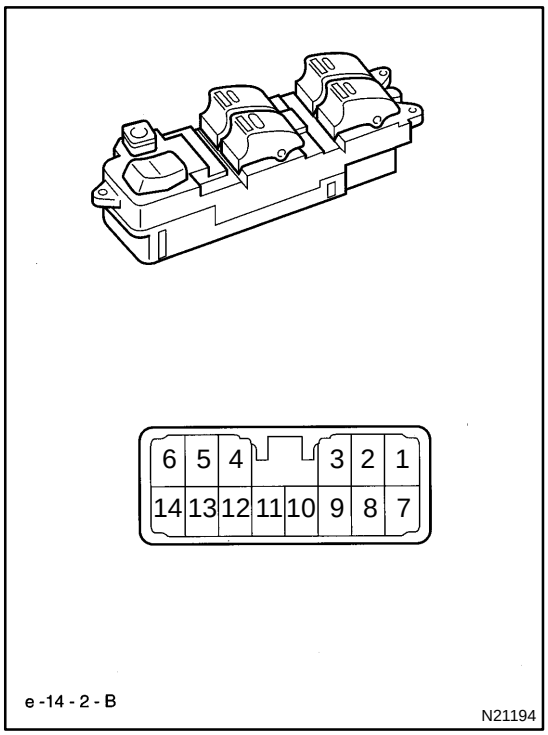
BE05O–01

LOCATION



BE05P–01

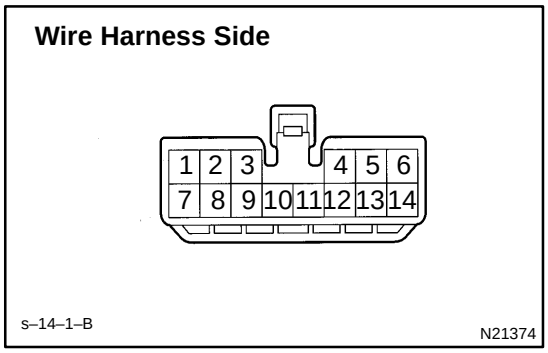
INSPECTION



1. Master Switch:
INSPECT DRIVER'S DOOR LOCK CONTROL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	1 – 4	Continuity
OFF	–	No continuity
UNLOCK	1 – 3	Continuity

If continuity is not as specified, replace the switch.

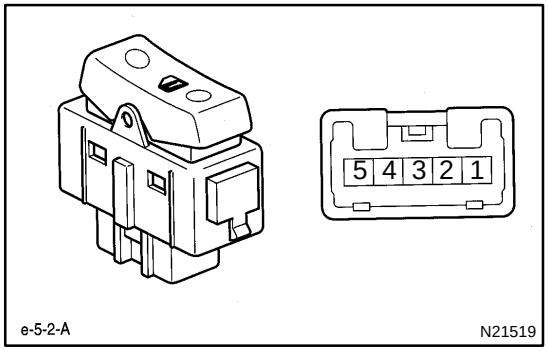


2. Master Switch:
INSPECT DRIVER'S DOOR LOCK CONTROL SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
3 – Ground	Constant	Battery positive voltage
4 – Ground	Constant	Battery positive voltage

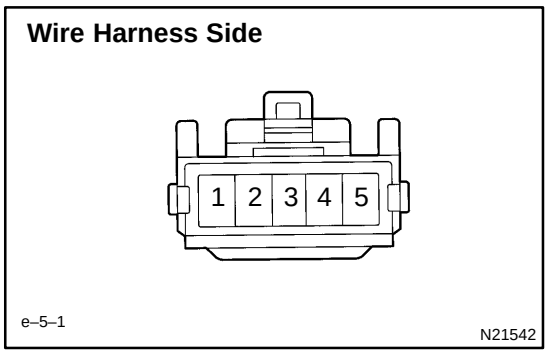
If the circuit is not as specified, inspect the circuits connected to other parts.



3. INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	2 – 3	Continuity
OFF	–	No continuity
UNLOCK	1 – 2	Continuity

If continuity is not as specified, replace the switch.

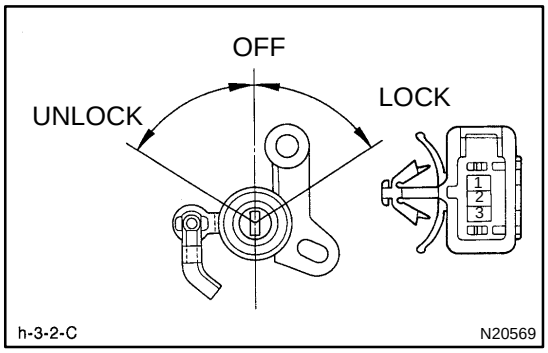


4. INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage
3 – Ground	Constant	Battery positive voltage
4 – Ground	Ignition switch position LOCK or ACC	No voltage
4 – Ground	Ignition switch position ON	Battery positive voltage

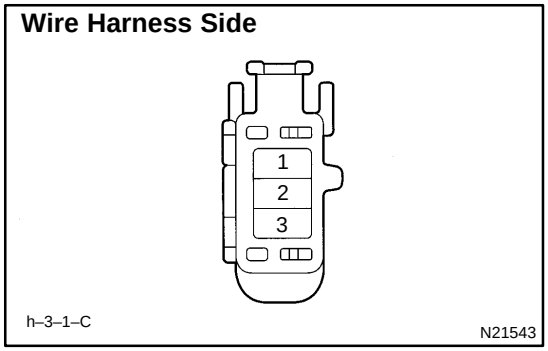
If the circuit is not as specified, inspect the circuits connected to other parts.



5. INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	1 – 2	Continuity
OFF	–	No continuity
UNLOCK	1 – 3	Continuity

If continuity is not as specified, replace the switch.

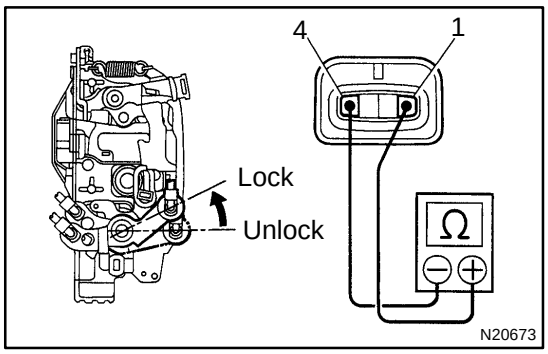


6. INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
2 – Ground	Constant	Battery positive voltage
3 – Ground	Constant	Battery positive voltage

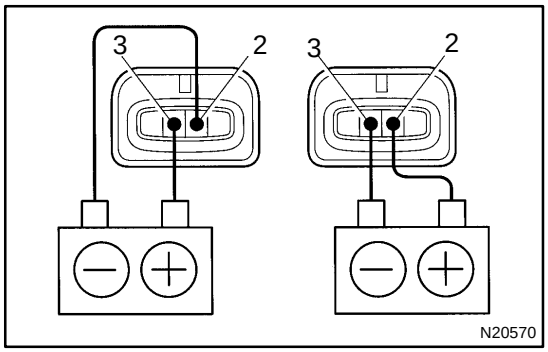
If the circuit is not as specified, inspect the circuits connected to other parts.



7. INSPECT DOOR UNLOCK DETECTION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	–	No continuity
ON (Door Lock set to UNLOCK)	1 – 4	Continuity

If continuity is not as specified, replace the switch.

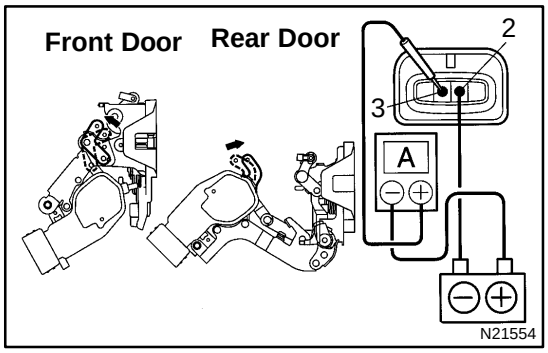


8. INSPECT MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 2, and check that the door lock link moves to UNLOCK position.

(b) Reverse the polarity and check that the door lock link moves to LOCK position.

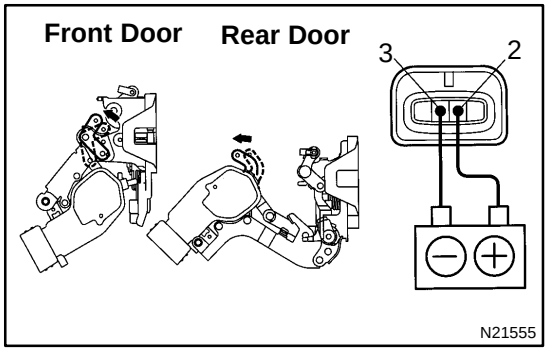
If operation is not as specified, replace the door lock assembly.



9. INSPECT PTC THERMISTOR OPERATION (Using an ammeter)

(a) Connect the positive (+) lead from the battery to terminal 3.

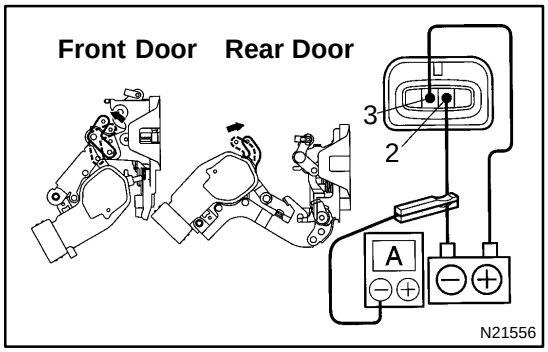
(b) Connect the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to battery negative (–) terminal, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



(c) Disconnect the leads from terminals.

(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3, and check that the door lock moves to the LOCK position.

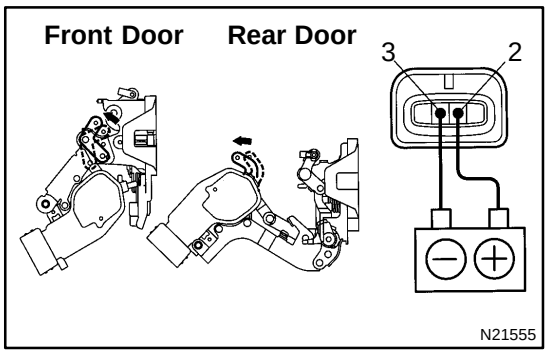
If operation is not as specified, replace the door lock assembly.



10. INSPECT PTC THERMISTOR OPERATION (Using an ammeter with a current–measuring probe)

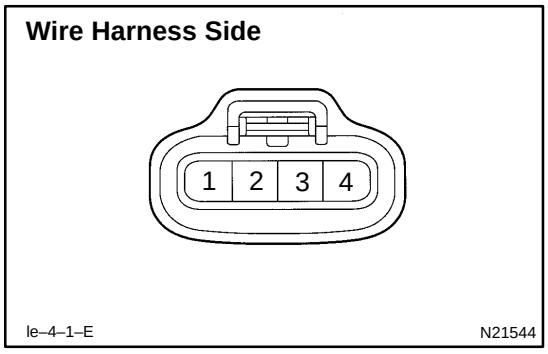
(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 2.

(b) Attach a current–measuring probe to either the positive (+) lead or the negative (–) lead, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



(c) Disconnect the leads from terminals.
(d) Approximately 60 seconds later, reverse the polarity, and check that the door lock moves to the LOCK position.

If operation is not as specified, replace the door lock assembly.

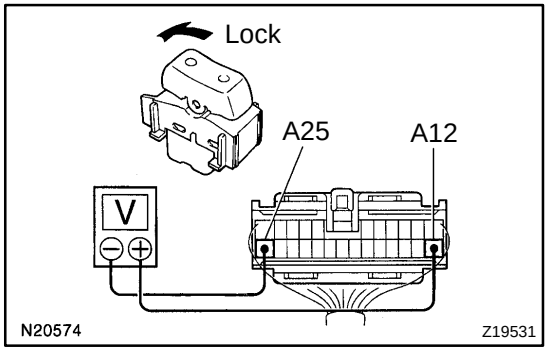


11. INSPECT DOOR LOCK ASSEMBLY CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
4 – Ground	Constant	Continuity
1 – Ground 3 – Ground	Door lock manual switch OFF or LOCK	No voltage
1 – Ground 3 – Ground	Door lock manual switch UNLOCK	Battery positive voltage
2 – Ground	Door lock manual switch OFF or UNLOCK	No voltage
2 – Ground	Door lock manual switch LOCK	Battery positive voltage

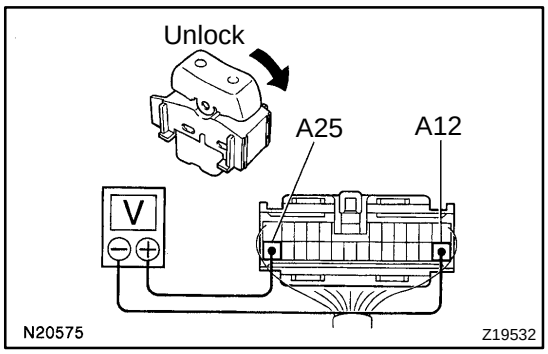
If the circuit is not as specified, inspect the circuits connected to other parts.



12. Door Lock Signal: INSPECT INTEGRATION RELAY OPERATION

HINT:
When the relay circuit is as specified, inspect the door lock signal.

(a) Connect the positive (+) lead from the voltmeter to terminal A12 and the negative (–) lead to terminal A25.
(b) Set the door lock control switch to UNLOCK and check that the voltage rises from 0 V to battery positive voltage for approximately 0.2 seconds.



(c) Reverse the polarity of the voltmeter leads.
(d) Set the door lock control switch to LOCK and check that the voltage rises from 0 V to battery positive voltage for approximately 0.2 seconds.

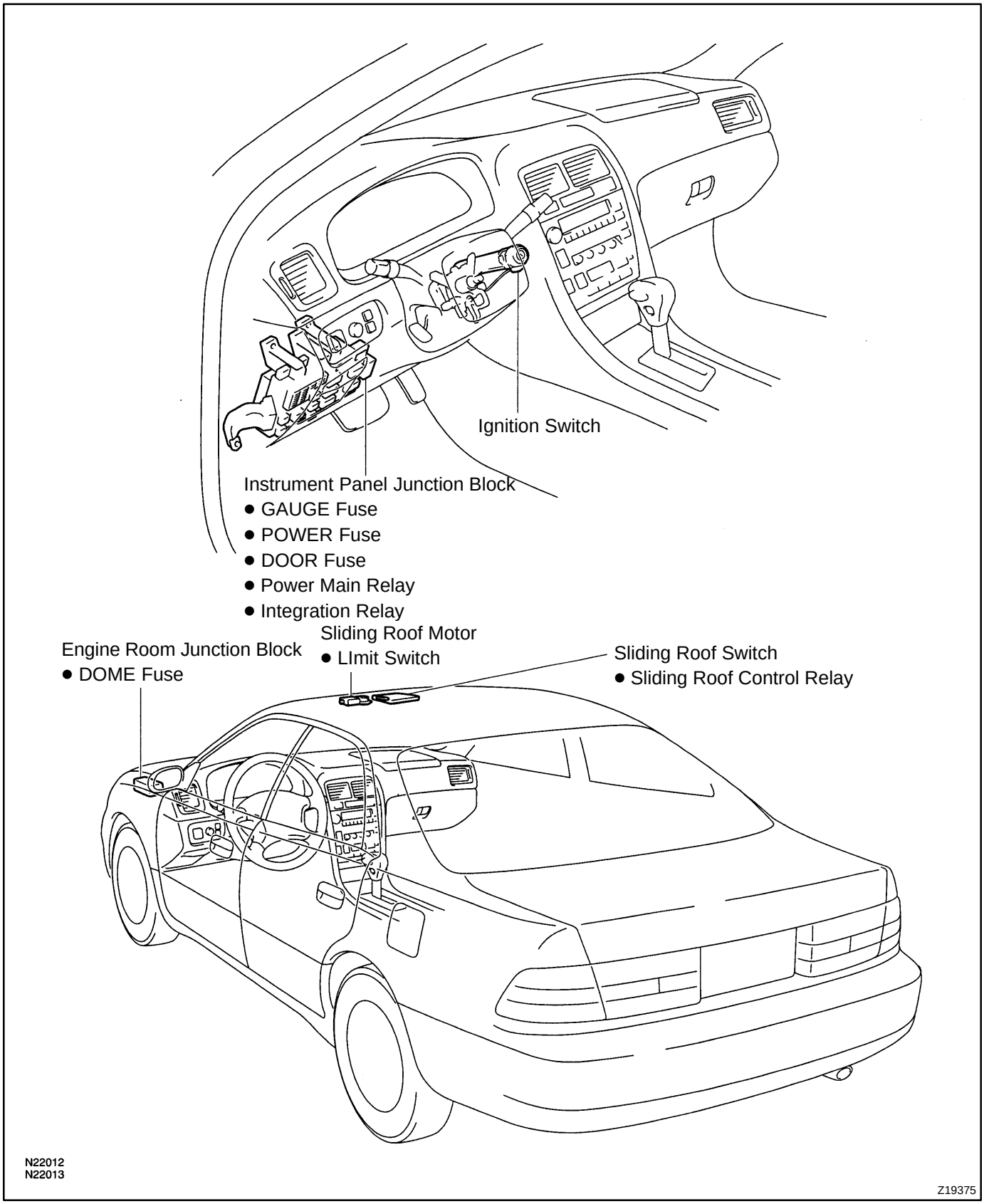
If operation is not as specified, replace the relay.

13. INSPECT INTEGRATION RELAY CIRCUIT
(See page BE–20)

SLIDING ROOF SYSTEM

LOCATION

BE05Q–01

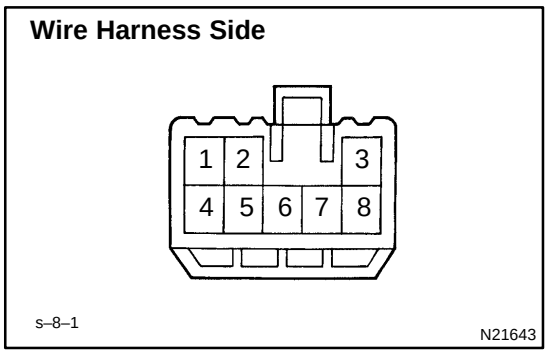


BE05R–01

INSPECTION

1. INSPECT SLIDING ROOF CONTROL RELAY AND SWITCH CIRCUIT

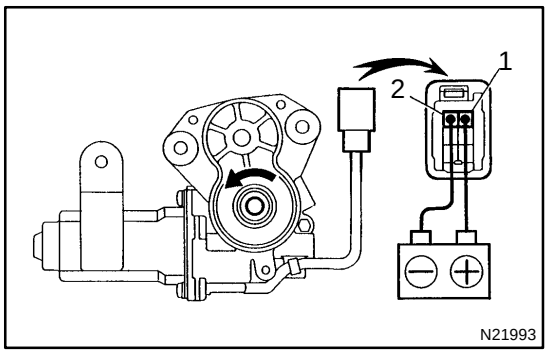
Disconnect the connector from the relay and switch and inspect the connector on the wire harness side, as shown in the chart.



Tester connection	Condition	Specified condition
1 – 5	Constant	Continuity
2 – Ground	Constant	Continuity
3 – Ground	No.1 limit switch OFF (Sliding roof closed)	No continuity
3 – Ground	No.1 limit switch ON (Sliding roof opened)	Continuity
7 – Ground	No.2 limit switch OFF (Sliding roof tilted up or open approx. 200 mm (7.87 in.))	No continuity
7 – Ground	No.2 limit switch ON (Except for conditions mentioned above)	Continuity
4 – Ground	Ignition switch LOCK or ACC	*No voltage
	Ignition switch ON	Battery positive voltage

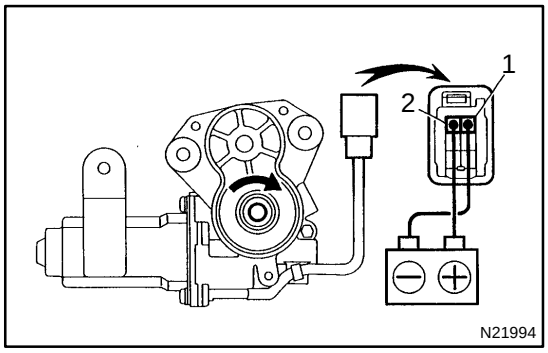
*Exceptions: For 60 seconds after the ignition switch is turned ON → OFF (ACC) or until driver or passenger door is opened after the ignition switch is turned ON → OFF (ACC).

If the circuit is as specified, replace the relay and switch.



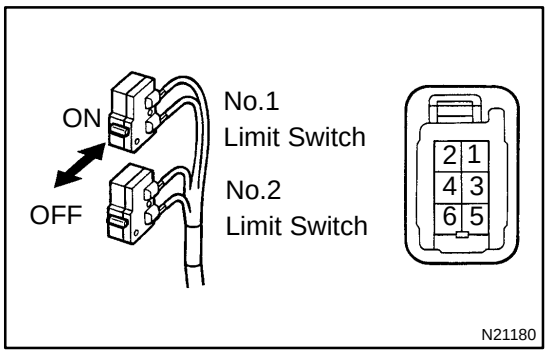
2. INSPECT SLIDING ROOF MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise (moves of the close and up side).



(b) Reverse the polarity, check that the motor turns clockwise. (moves of the open and down side).

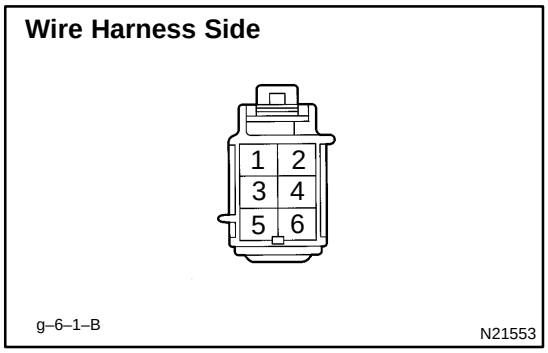
If operation is not as specified, replace the motor.



3. INSPECT SLIDING ROOF LIMIT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
No.1 limit switch OFF (SW pin released)	4 – 5	No continuity
No.1 limit switch ON (SW pin pushed in)	4 – 5	Continuity
No.2 limit switch OFF (SW pin released)	4 – 6	No continuity
No.2 limit switch ON (SW pin pushed in)	4 – 6	Continuity

If continuity is not as specified, replace the switch.

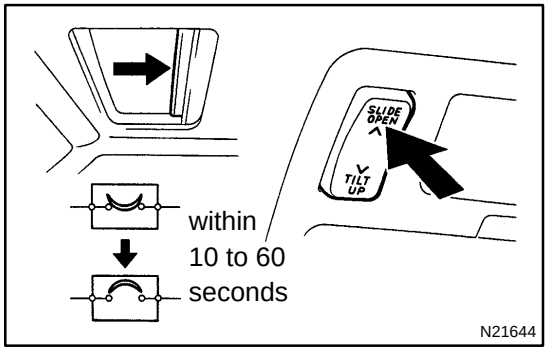


4. INSPECT SLIDING ROOF MOTOR AND LIMIT SWITCH CIRCUIT

Disconnect the connector from the limit switch and inspect the connector on the wire harness side.

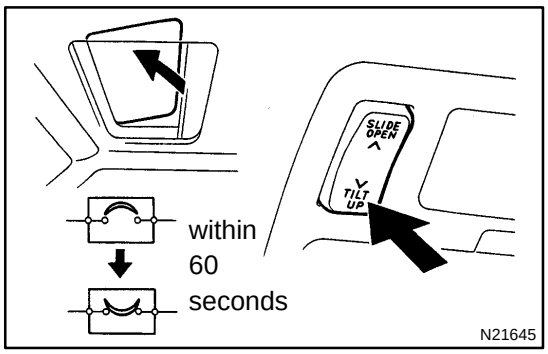
Tester connection	Condition	Specified condition
3 – Ground	Constant	Continuity
4 – Ground	Constant	Continuity

If the circuit is not as specified, inspect the circuits connected to other parts.



5. INSPECT CIRCUIT BREAKER OPERATION

(a) With the sliding roof in the fully opened position, hold the sliding roof switch in ”OPEN” position and check that there is a circuit breaker operation noise within 10 to 60 seconds.



(b) With the sliding roof in fully opened position, hold the sliding roof switch in "TILT UP" position and check that the sliding roof begins to close within 60 seconds.

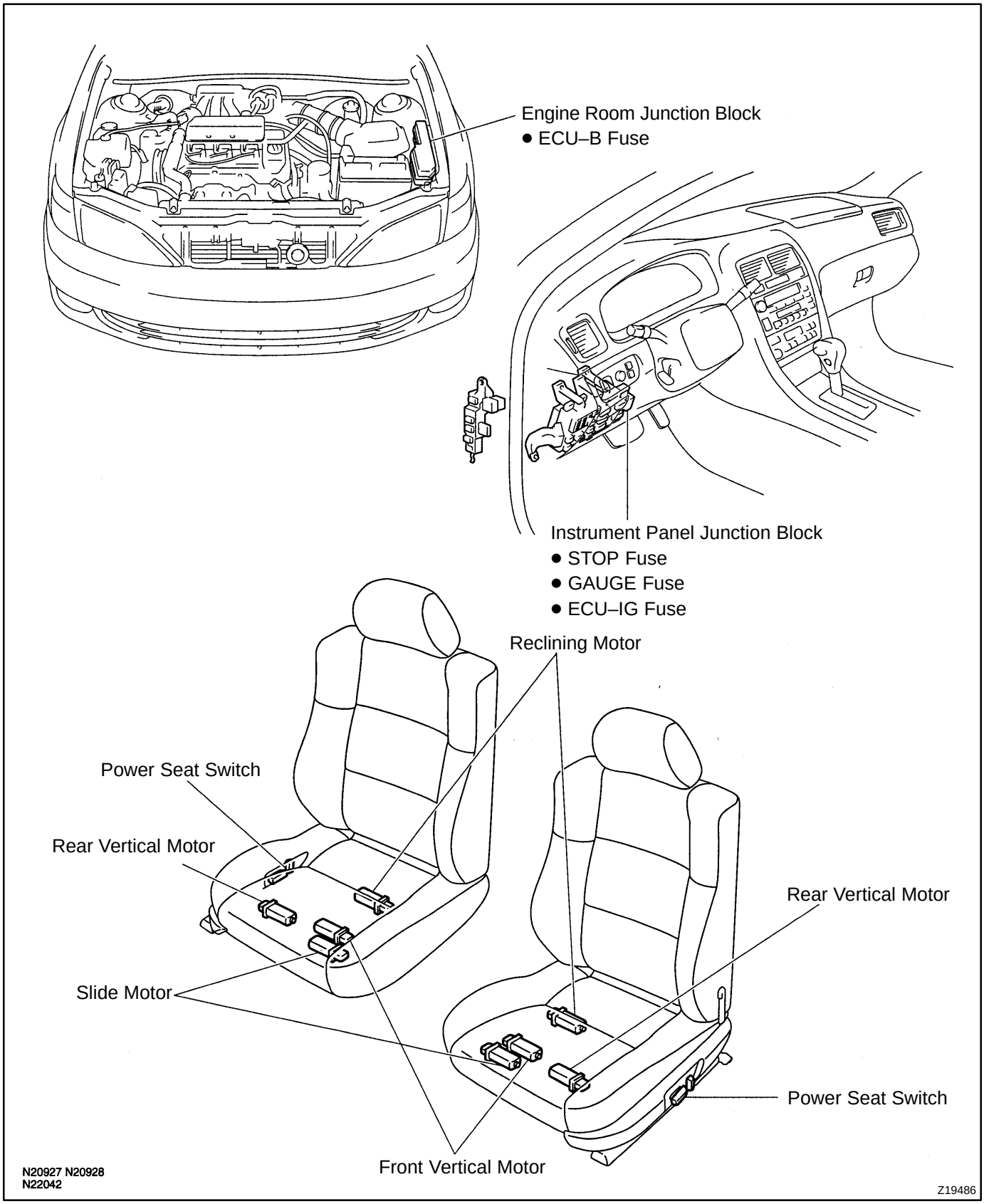
If operation is not as specified, replace the motor.

6. INSPECT KEY–OFF SLIDING ROOF OPERATION
(See integration relay circuit on page BE–20)

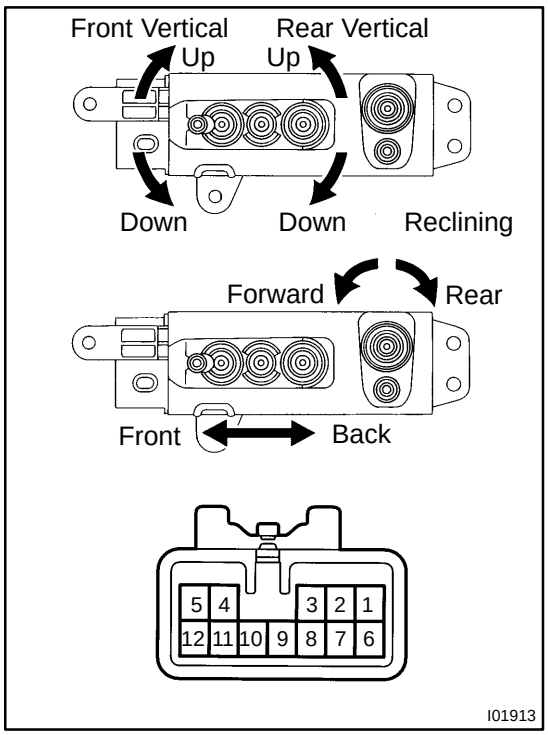
POWER SEAT CONTROL SYSTEM

BE05S–01

LOCATION



BE05T–03



INSPECTION

1. INSPECT DRIVER'S POWER SEAT SWITCH CONTINUITY

Slide Switch:

Switch position	Tester connection	Specified condition
FRONT	4 – 7 8 – 11	Continuity
OFF	4 – 7 – 8	Continuity
BACK	4 – 11 7 – 8	Continuity

Front vertical switch:

Switch position	Tester connection	Specified condition
UP	7 – 9 10 – 11	Continuity
OFF	7 – 9 – 10	Continuity
DOWN	7 – 10 9 – 11	Continuity

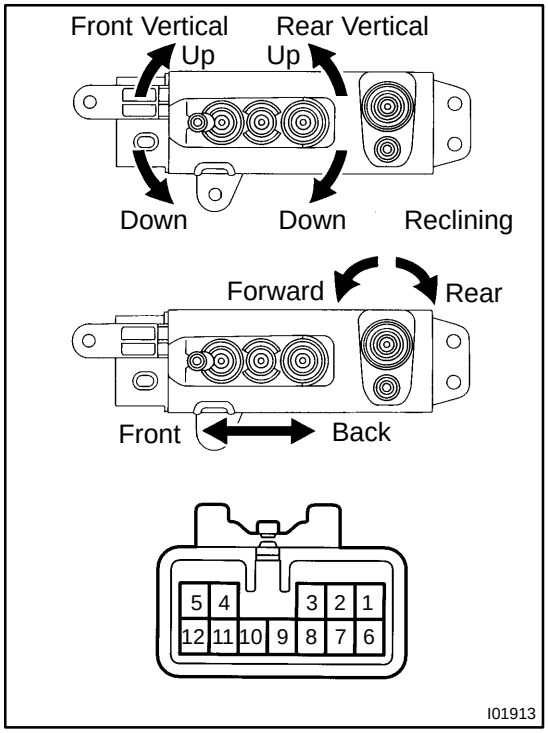
Rear vertical switch:

Switch position	Tester connection	Specified condition
UP	2 – 11 3 – 7	Continuity
OFF	2 – 3 – 7	Continuity
DOWN	2 – 7 3 – 11	Continuity

Reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 – 11 5 – 7	Continuity
OFF	1 – 5 – 7	Continuity
REAR	1 – 7 5 – 11	Continuity

If continuity is not as specified, replace the switch.



2. INSPECT PASSENGER'S POWER SEAT SWITCH CONTINUITY

Slide switch:

Switch position	Tester connection	Specified condition
FRONT	4 – 7 8 – 11	Continuity
OFF	4 – 7 – 8	Continuity
BACK	4 – 11 7 – 8	Continuity

Front vertical switch:

Switch position	Tester connection	Specified condition
UP	7 – 10 9 – 11	Continuity
OFF	7 – 9 – 11	Continuity
DOWN	7 – 11 9 – 10	Continuity

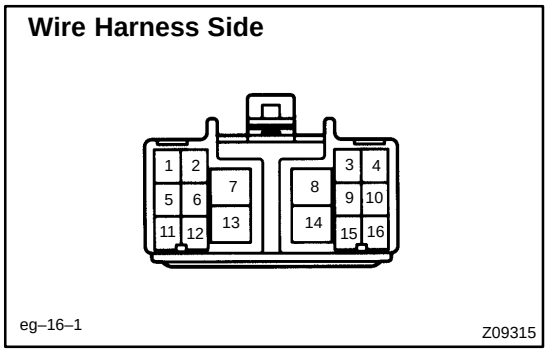
Rear vertical switch:

Switch position	Tester connection	Specified condition
UP	2 – 7 3 – 11	Continuity
OFF	2 – 3 – 7	Continuity
DOWN	2 – 11 3 – 7	Continuity

Reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 – 11 5 – 7	Continuity
OFF	1 – 5 – 7	Continuity
REAR	1 – 7 5 – 11	Continuity

If continuity is not as specified, replace the switch.



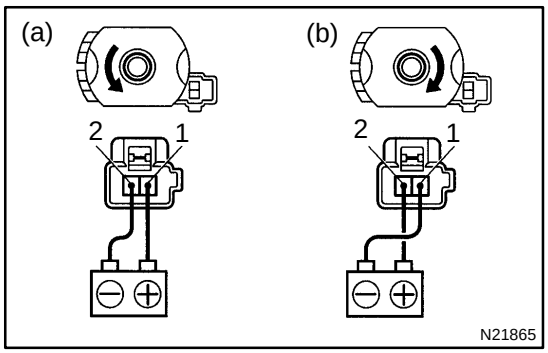
3. INSPECT POWER SEAT SWITCH CIRCUIT

(a) Disconnect the switch connector and connect the seat wire harness to the floor wire harness.

(b) Inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
7 – Ground	Constant	Continuity
11 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.

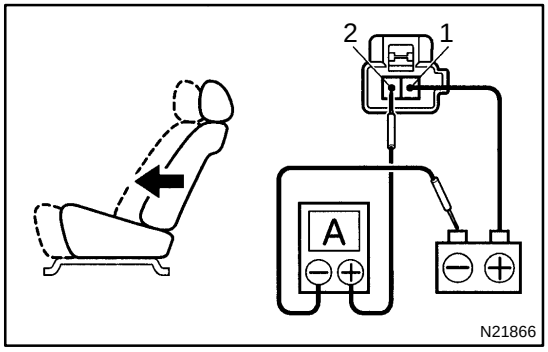


4. INSPECT SLIDE MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

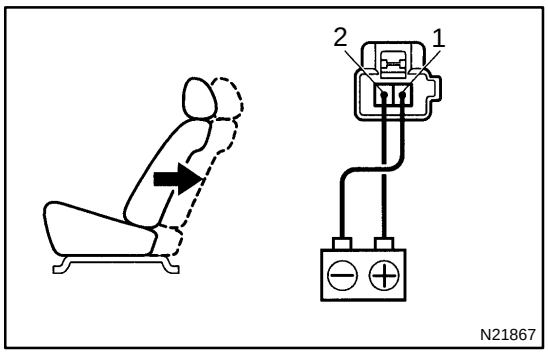
If operation is not as specified, replace the seat adjuster.



5. INSPECT SLIDE MOTOR PTC THERMISTOR OPERATION

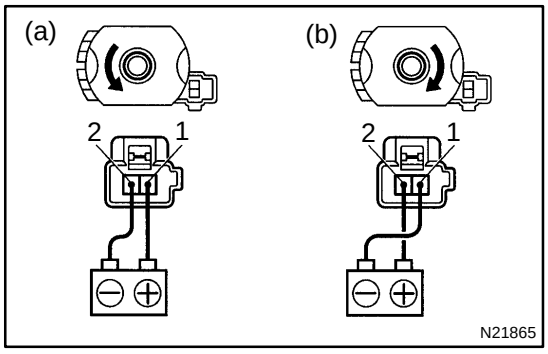
(a) Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to the battery negative (–) terminal, then move the seat cushion to the front position.

(b) Continue to apply voltage, check that current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the leads from terminals.
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the seat cushion begins to move backwards.

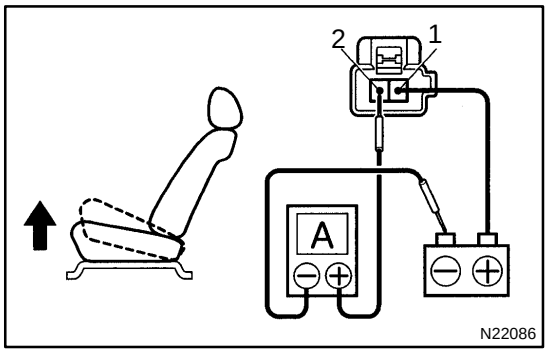
If operation is not as specified, replace the seat adjuster.



6. INSPECT FRONT VERTICAL MOTOR OPERATION

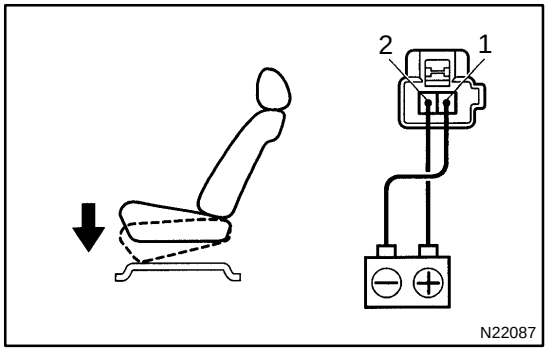
(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.
(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the seat adjuster.



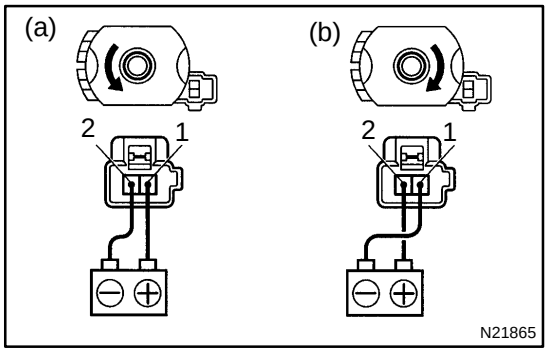
7. INSPECT FRONT VERTICAL MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to the battery negative (–) terminal, then move the seat cushion to the highest position.
(b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the leads from the terminals.
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the seat cushion begins to descend.

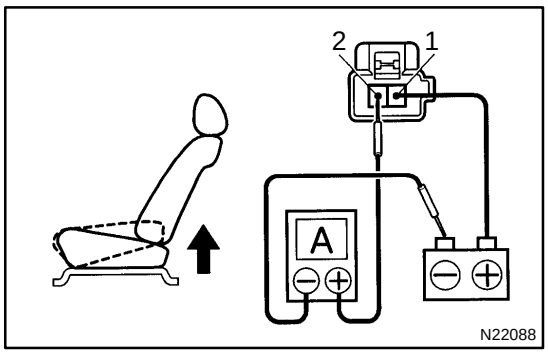
If operation is not as specified, replace the seat adjuster.



8. INSPECT REAR VERTICAL MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.
(b) Reverse the polarity, check that the motor turns clockwise.

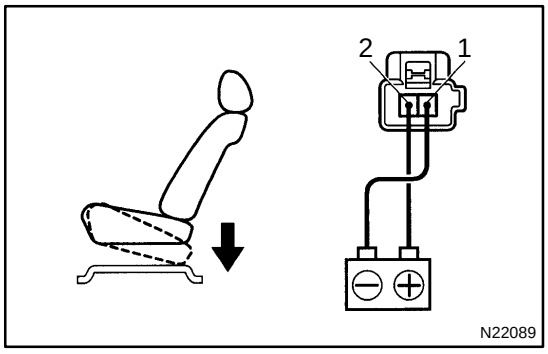
If operation is not as specified, replace the seat adjuster.



9. INSPECT REAR VERTICAL MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to the battery negative (–) terminal, then move the seat cushion to the highest position.

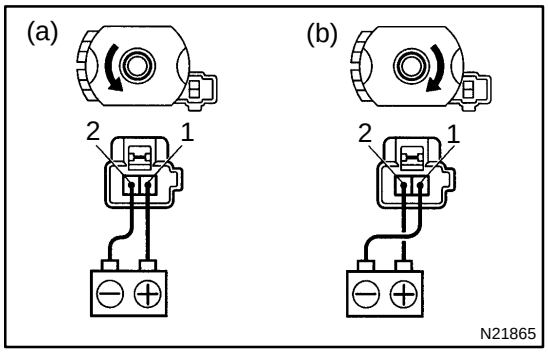
(b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the leads from the terminals.

(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the seat cushion begins to descend.

If operation is not as specified, replace the seat adjuster.

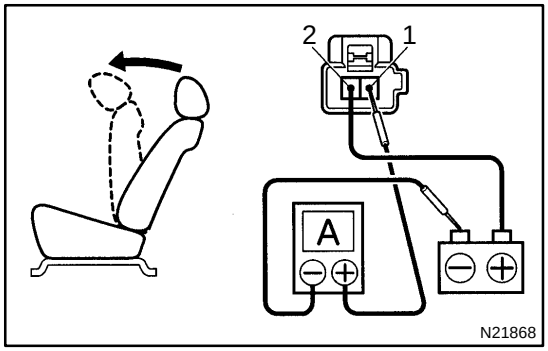


10. INSPECT RECLINING MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

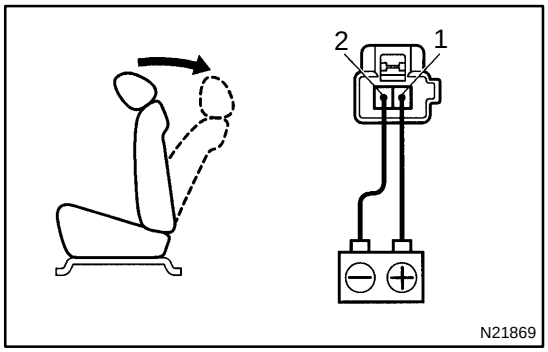
If operation is not as specified, replace the seat adjuster.



11. INSPECT RECLINING MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2, the positive (+) lead from the ammeter to terminal 1 and the negative (–) lead to the battery negative (–) terminal, then recline the seat back to the most forward position.

(b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the leads from the terminals.

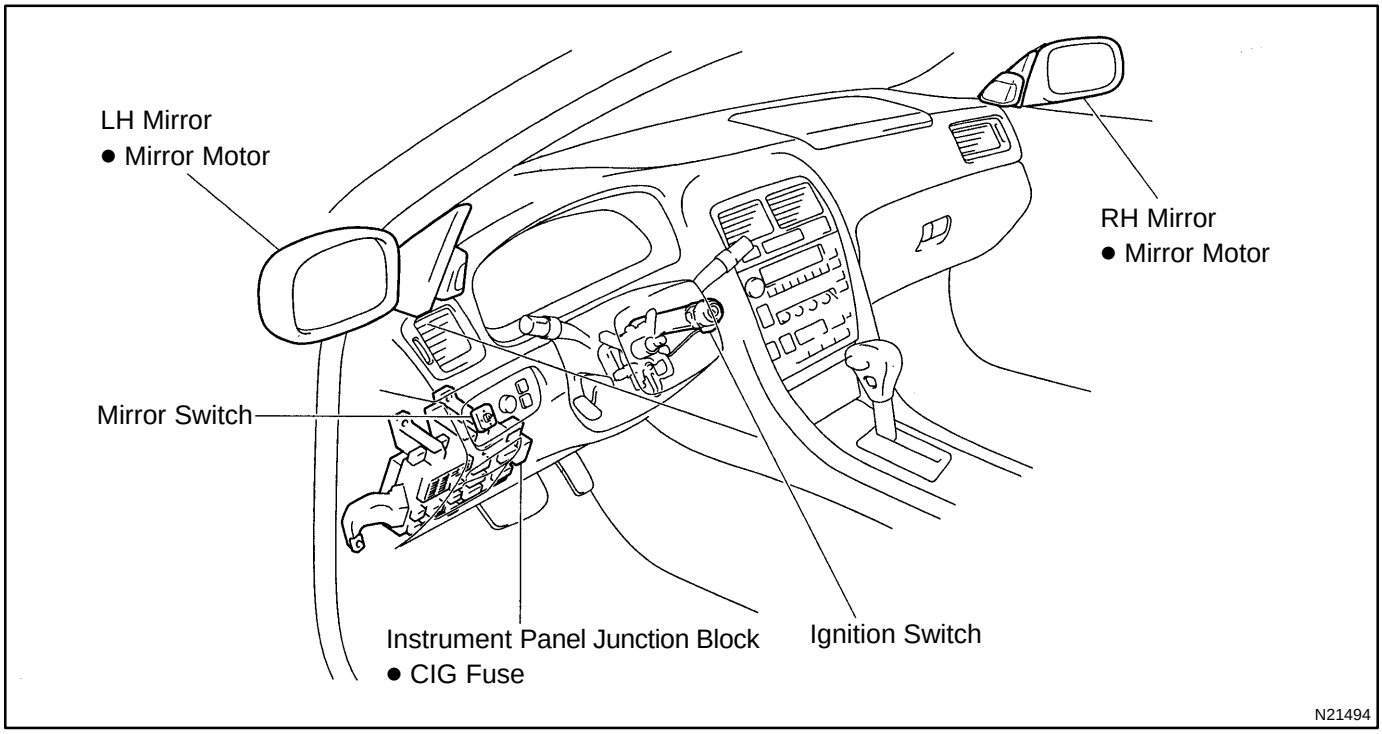
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the seat back starts to fall backward.

If operation is not as specified, replace the seat adjuster.

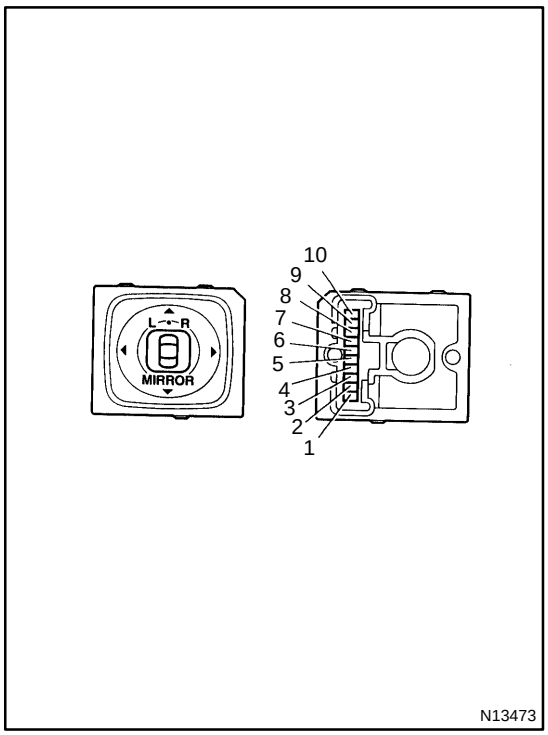
POWER MIRROR CONTROL SYSTEM

BE05U–01

LOCATION



BE05V–01



INSPECTION

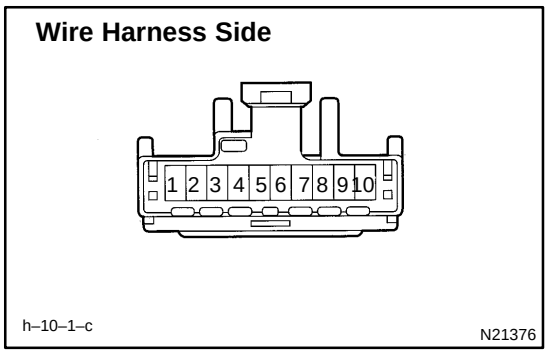
1. Master switch left side:
INSPECT MIRROR SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
UP	3 – 4 7 – 8	Continuity
DOWN	3 – 8 4 – 7	Continuity
LEFT	4 – 9 7 – 8	Continuity
RIGHT	4 – 7 8 – 9	Continuity

2. Master switch right side:
INSPECT MIRROR SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
UP	2 – 4 1 – 7 – 8	Continuity
DOWN	4 – 7 1 – 2 – 8	Continuity
LEFT	4 – 10 1 – 7 – 8	Continuity
RIGHT	4 – 7 1 – 8 – 10	Continuity

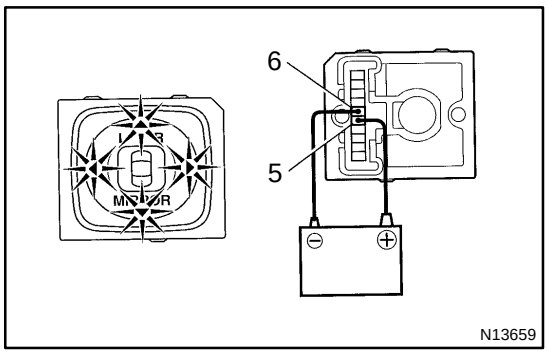
If continuity is not as specified, replace the switch.
If continuity is as specified. inspect the switch circuit.



3. INSPECT MIRROR SWITCH CIRCUIT
Disconnect the connector from the switch and inspect the connector on the wire harness side.

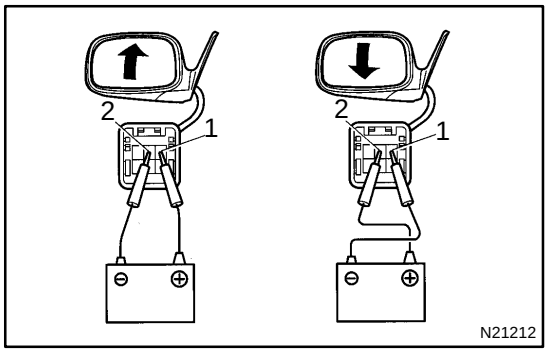
Tester connection	Condition	Specified condition
8 – Ground	Constant	Continuity
4 – Ground	Ignition switch position LOCK	No voltage
4 – Ground	Ignition switch position ACC or ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



4. INSPECT INDICATOR LIGHT OPERATION

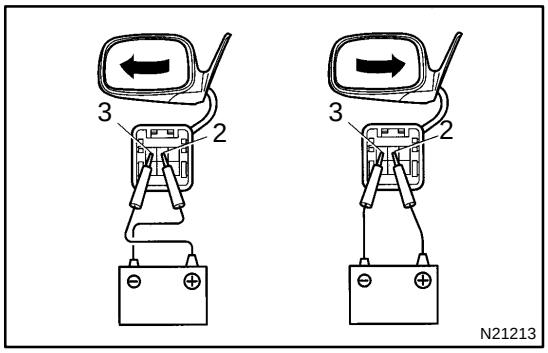
Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 6, and check that the indicator light does not light up, replace the switch.



5. INSPECT MIRROR MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the mirror turns upward.

(b) Reverse the polarity, and check that the mirror turns downward.



(c) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 2, and check that the mirror turns to the left side.

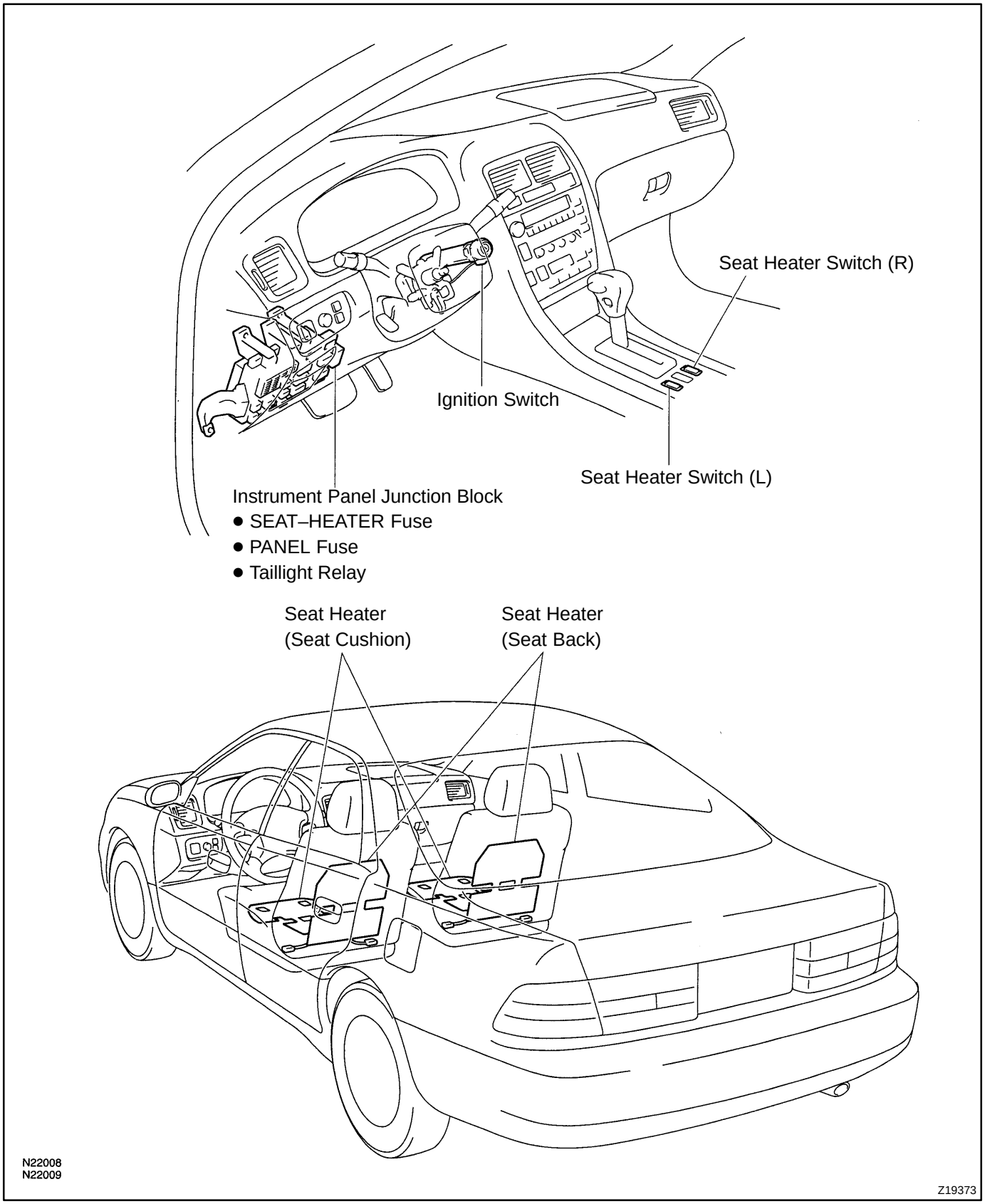
(d) Reverse the polarity, and check that the mirror turns to the right side.

If operation is not as specified, replace the mirror.

SEAT HEATER SYSTEM

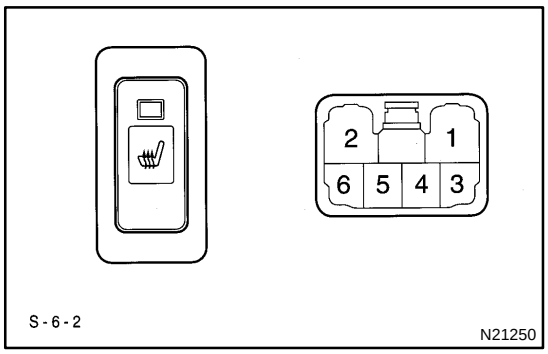
LOCATION

BE05W–01



BE05X–01

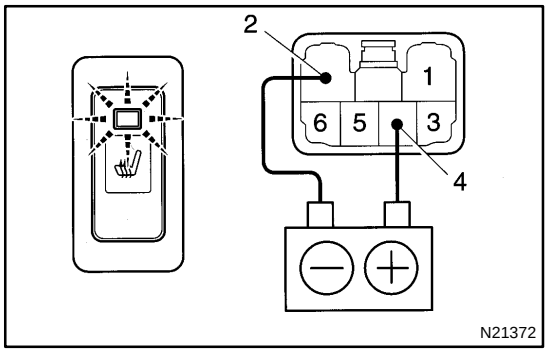
INSPECTION



1. INSPECT SEAT HEATER SWITCH CONTINUITY

Condition	Tester connection	Specified condition
OFF	2 – 6	Continuity
ON	2 – 4 – 6	Continuity
Illumination circuit	1 – 3	Continuity

If continuity is not as specified, replace the switch or bulb.

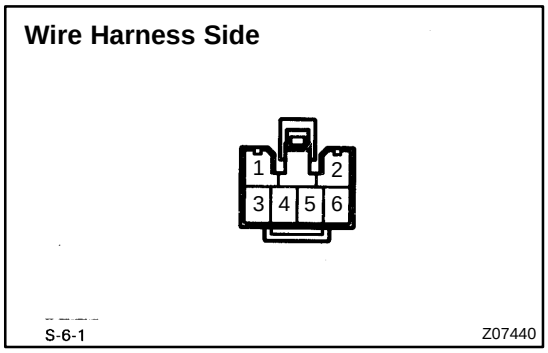


2. INSPECT SEAT HEATER SWITCH INDICATOR

(a) Connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to terminal 2.

(b) Push the switches, check that the indicator lights up.

If operation is not as specified, replace the switch and inspect the circuits connected to other parts.



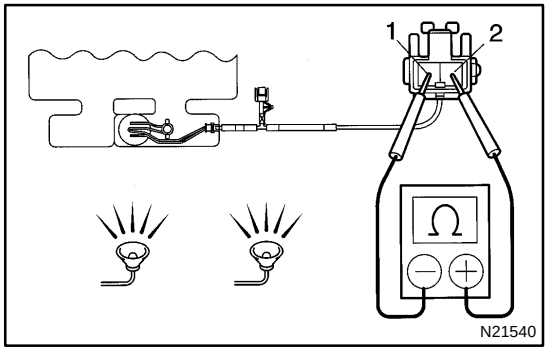
3. INSPECT SEAT HEATER SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	*Continuity
6 – Ground	Constant	*Continuity
4 – Ground	Ignition switch position LOCK or ACC	No voltage
4 – Ground	Ignition switch position ON	Battery positive voltage

*: There is resistance because this circuit is grounded through the resistance.

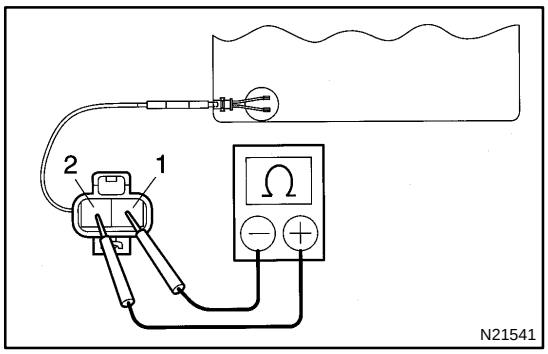
If the circuit is not as specified, inspect the circuits connected to other parts.



4. INSPECT SEAT CUSHION CONTINUITY

(a) Heat the 2 thermostats with light. Check that there is no continuity above 45˚C (113˚F) between terminals 1 and 2.

(b) Cool the 2 thermostats below 15˚C (59˚F). Check that there is continuity between terminals 1 and 2.



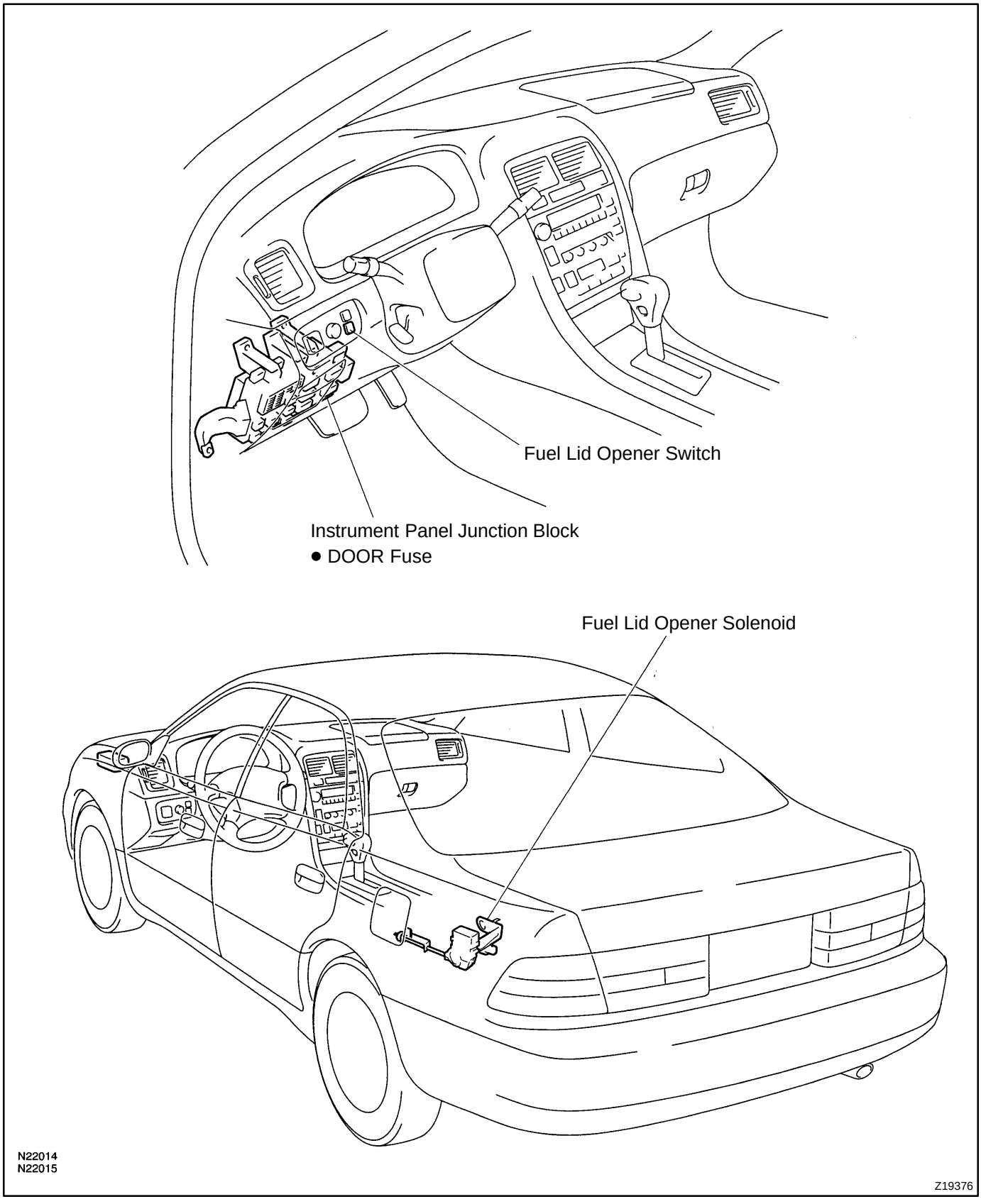
5. INSPECT SEAT BACK CONTINUITY

Check that there is continuity between terminals 1 and 2.
If continuity is not as specified, replace the seat back pad.

FUEL LID OPENER SYSTEM

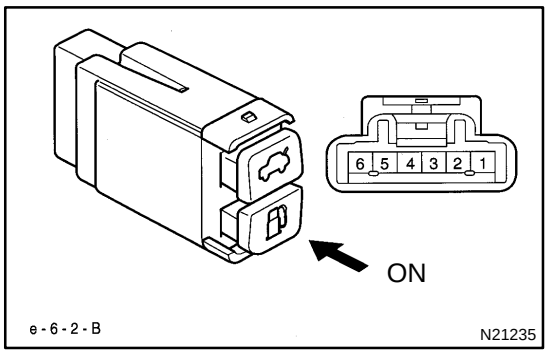
LOCATION

BE05Y–01



BE05Z–01

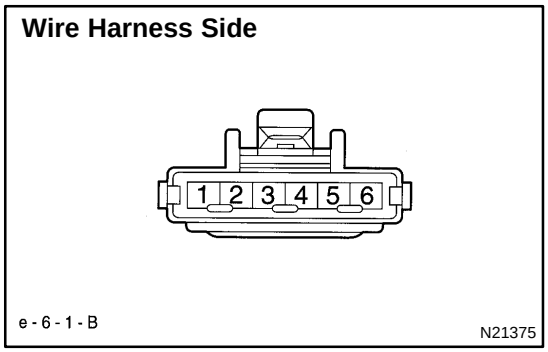
INSPECTION



1. INSPECT FUEL LID OPENER SWITCH CONTINUITY

(a) Check that continuity exists between terminals 2 and 3 with the switch ON.
(Switch button pushed)

(b) Check that no continuity exists between terminals 2 and 3 with the switch OFF.
(Switch button released)

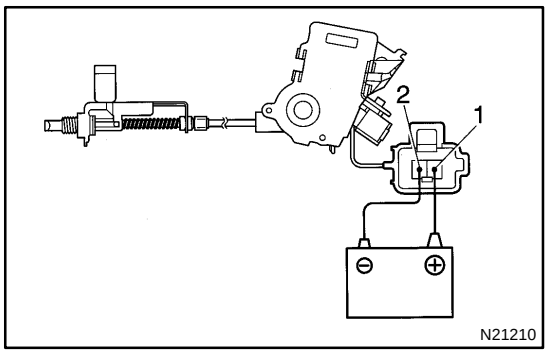


2. INSPECT FUEL LID OPENER SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
3 – Ground	Constant	Battery positive voltage

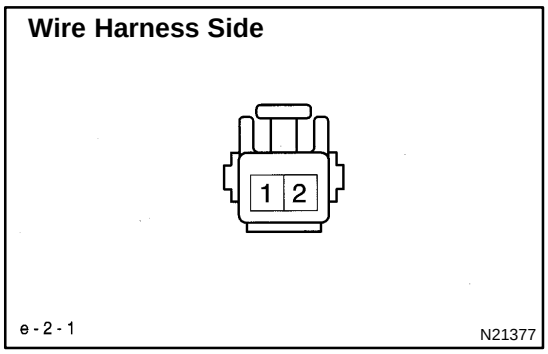
If the circuit is not specified, inspect power source or wire harness.



3. INSPECT FUEL LID OPENER SOLENOID OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the solenoid operates in the open direction.

If operation is not as specified, replace the solenoid.



4. INSPECT FUEL LID OPENER SOLENOID CIRCUIT

Disconnect the connector from the solenoid and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Fuel lid opener switch OFF	No voltage
1 – Ground	Fuel lid opener switch ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

AUDIO SYSTEM

BE060–01

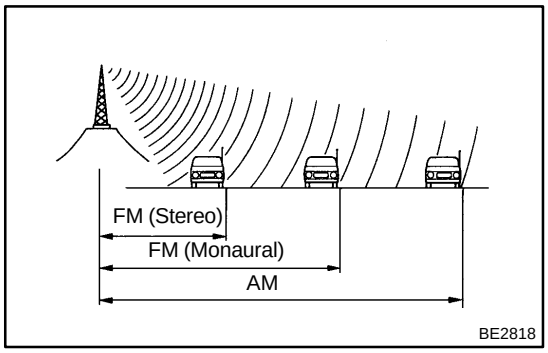
DESCRIPTION

1. RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows:

Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM		FM	
Modulation method	Amplitude modulation			Frequency modulation	

LF: Low frequency MF: Medium Frequency HF: High Frequency VHF: Very High Frequency

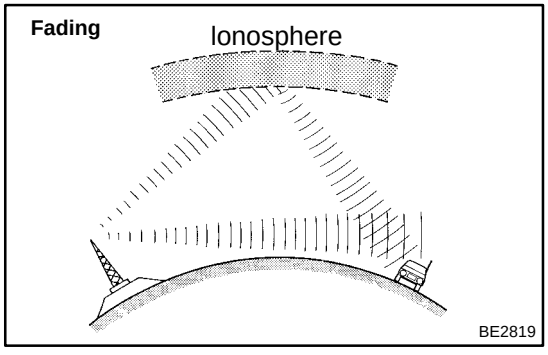


2. SERVICE AREA

There are great differences in the size of the service area for AM and FM monaural. Sometimes FM stereo broadcasts cannot be received even through AM can be received in very clearly.
Not only does FM stereo have the smallest service area, but it also picks up static and other types of interference (”noise”) easily.

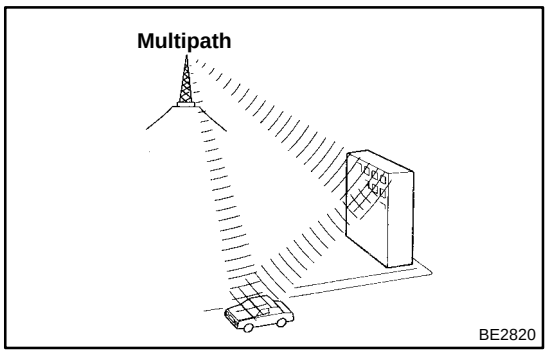
3. RECEPTION PROBLEMS

Besides the problem of static, there are also the problems called ”fading”, ”multipath” and ”fade out”. These problems are caused not by electrical noise but by the nature of the radio waves themselves.



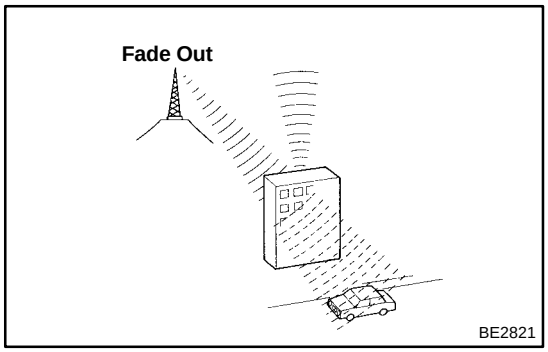
(a) Fading

Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals from the same transmitter that reach the vehicle’s antenna directly. This type of interference is called ”fading”.



(b) Multipath

One type of interference caused by the bounce of radio waves off of obstructions is called ”multipath”. Multipath occurs when a signal from the broadcast transmitter antenna bounces off buildings and mountains and interferes with the signal that is received directly.



(c) Fade Out

Because FM radio waves are of higher frequencies than AM radio waves, they bounce off buildings, mountains, and other obstructions. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind a building or other obstruction. This is called ”fade out”.

4. NOISE PROBLEMS

(a) Questionnaire for noise:

It is very important for noise troubleshooting to have good understanding of the claims from the customers, so that make the best use of following questionnaire and diagnose the problem accurately.

AM	Noise occurs at a specific place.	Strong possibility of foreign noise.
	Noise occurs when listening to faint broadcasting.	There is a case that the same program is broadcasted from each local station and that may be the case you are listening different station if the program is the same.
	Noise occurs only at night.	Strong possibility of the beat from a distant broadcasting.
FM	Noise occurs while driving and at a specific place.	Strong possibility of multipath noise and fading noise caused by the changes of FM waves.

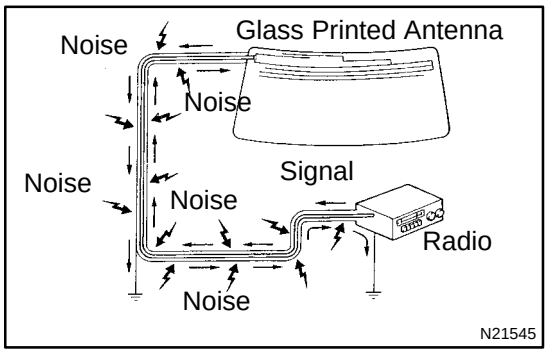
HINT:

In the case that the noise occurrence condition does not meet any of the above questionnaire, check based on the ”Trouble Phenomenon”.

Refer to above descriptions for multipath and fading.

(b) Matters that require attention when checking:

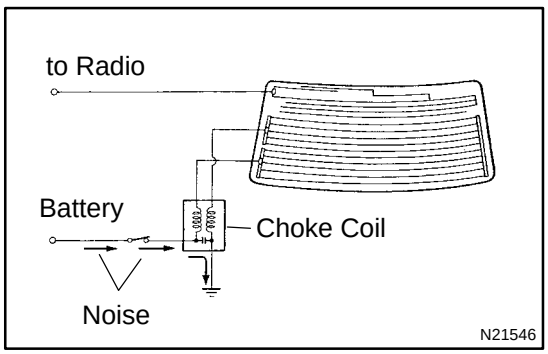
- Noise coming into the radio usually has no harm for practical use as the noise protection is taken and it is hardly thinkable for an extremely loud noise to come in. When extremely loud noise comes into the radio, check if the grounding is normal where the antenna is installed.
- Check if all the regular noise prevention parts are properly installed and if there is any installation of non–authorized parts and non–authorized wiring.
- If you leave the radio under out of tune (not tuning), it is easy to diagnose the phenomenon as noise occurs frequently.



(c) Antenna and noise:

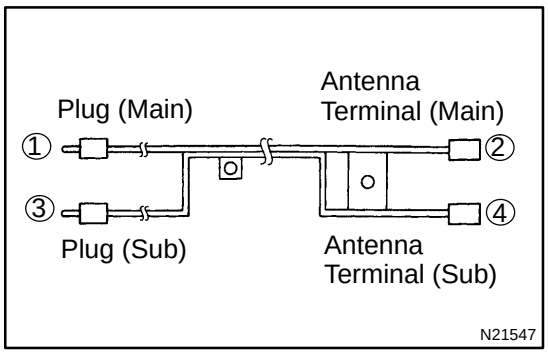
Electronic signal received by the antenna will reach to the radio transmitting through the core wire of the coaxial cable. Any noise wave other than radio wave is mixed into this core wire, that naturally causes noise in the radio and poor sound quality. In order to prevent these noises from mixing into the radio, the core wire inside the coaxial cable is covered with a mesh wire called shield wire. This shield wire shelters the noise and transmits it to the ground, thus preventing noise from mixing in.

If this shield wire has grounding failure, that causes noise.



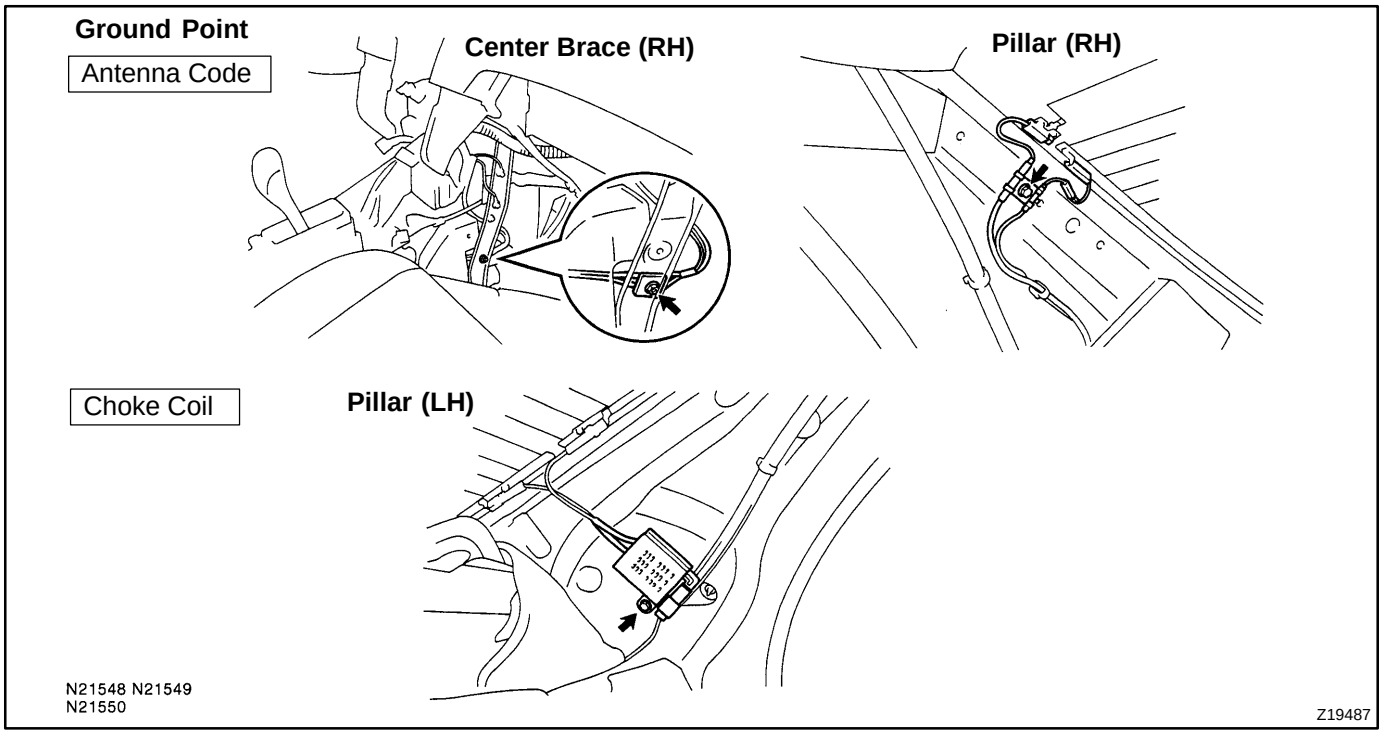
(d) Choke coil and noise:

The choke coil is connected in the rear window defogger circuit. This is connected so to prevent noise from mixing into the radio by making the noise current included in the power source of the rear window defogger flow to the ground.



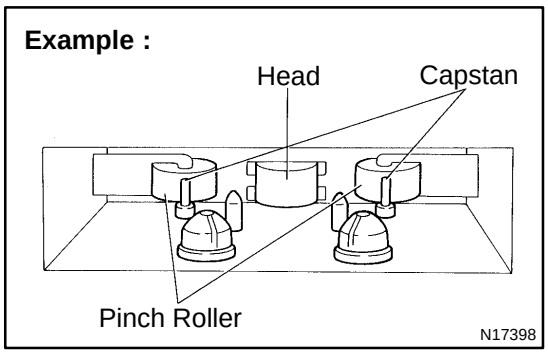
(e) Antenna code continuity check and grounding point:
HINT:
During troubleshooting, in case that the antenna code continuity check, grounding check and grounding check of the choke coil are needed, please check refering to the following illustration.

Terminal connection	Normal condition
(1) ↔ (2)	Continuity
(3) ↔ (4)	No continuity



5. COMPACT DISC PLAYER

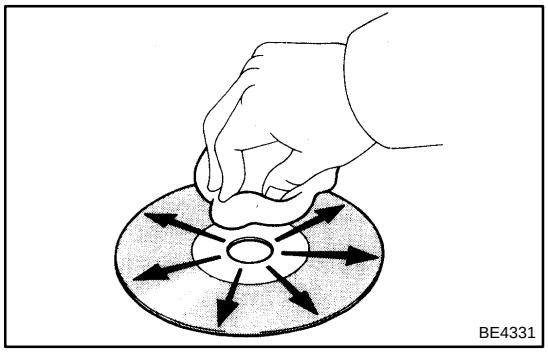
Compact Disc (hereafter called ”CD”) Players use a laser beam pick–up to read the digital signals recorded on the CD and reproduce analog signals of the music, etc. There are 4.7 in. (12 cm) and 3.2 in. (8 cm) discs in the CD player.
HINT:
Never attempt to disassemble or oil any part of the player unit. Do not insert any object other than a disc into the magazine.
NOTICE:
CD players use an invisible laser beam which could cause hazardous radiation exposure. Be sure to operate the player correctly as instructed.



6. Tape Player/Head Cleaning:
MAINTENANCE

(a) Raise the cassette door with your finger.
Next, using a pencil or similar object, push in the guide.

(b) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.



7. CD Player/Disc Cleaning:
MAINTENANCE

If the disc gets dirty, clean the disc by wiping the surface from the center to outside in the radial directions with a soft cloth.

NOTICE:

Do not use a conventional record cleaner or anti–static preservative.

BE061–01

TROUBLESHOOTING

NOTICE:

When replacing the internal mechanism (computer part) of the audio system, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement part (spare part).

HINT:

This inspection procedure is a simple troubleshooting which should be carried out on the vehicle during system operation and was prepared on the assumption of system component troubles (except for the wires and connectors, etc.).

Always inspect the trouble taking the following items into consideration.

Open or short circuit of the wire harness

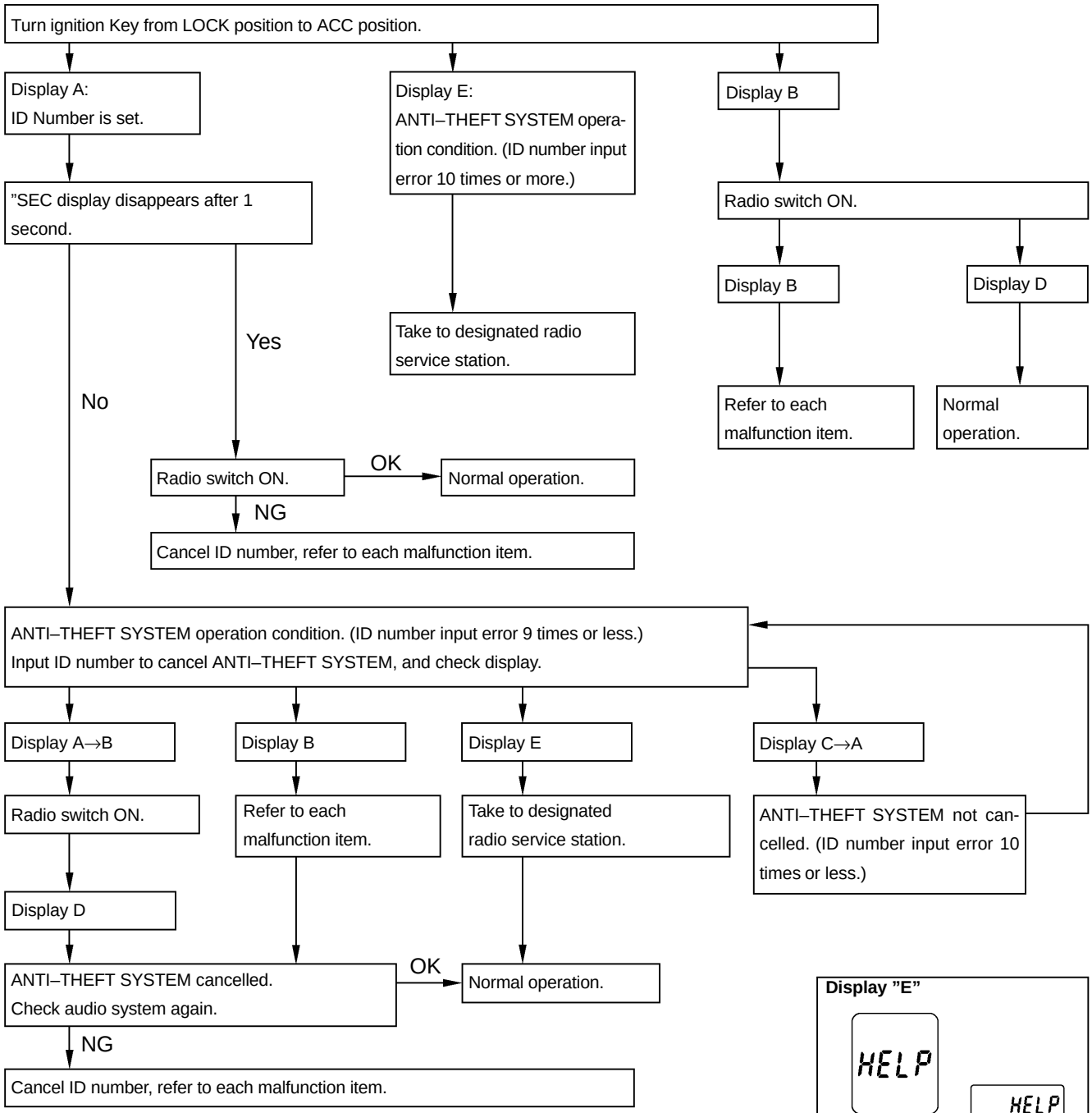
Connector or terminal connection fault

For audio systems with anti–theft system, troubleshooting items marked (*) indicate that ”Troubleshooting for ANTI–THEFT SYSTEM” should be carried out first.

	Problem	No.
Radio	Radio not operating when power switch turned to ’ON’.	1
	Display indicates when power switch turned to ’ON’, but no sound (including ’noise’) is produced.	2
	Noise present, but AM – FM not operating.	3
	Any speaker does not work.	4
	Either AM or FM does not work.	5
	Few preset turning bands.	5
	Reception poor.	6
	Sound quality poor.	7
	Preset memory disappears.	8
Tape Player	Cassette tape cannot be inserted.	9
	Cassette tape inserts, but no power.	10
	Power coming in, but tape player not operating.	11
	Any speaker does not work.	12
	Sound quality poor.	13
	Tape jammed, malfunction with tape speed or auto–reverse.	14
	Cassette tape will not eject.	15
CD Player	CD cannot be inserted.	16
	CD inserted, but no power.	17
	Power coming in, but CD player not operating.	18
	Sound jumps.	19
	Sound quality poor (Volume faint).	20
	Any speaker does not work.	21
	CD will not be ejected.	22
Noise	Noise occurs	23
	Noise produced by vibration or shock while driving.	24
	Noise produced when engine starts.	25

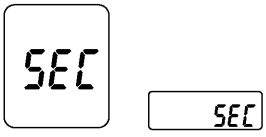
The term ”AM” includes LW,MW and SW, and the term ”FW” includes UKW.

Troubleshooting for ANTI–THEFT SYSTEM



Liquid Crystal Display (LCD) or VFD for Audio System

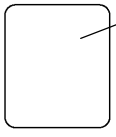
Display "A"



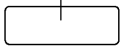
2 DIN Type

1 DIN Type

Display "B"

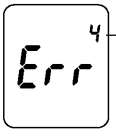


2 DIN Type

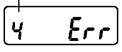


1 DIN Type

Display "C"



2 DIN Type



1 DIN Type

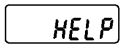
Display "D" Example:

2 DIN Type

1 DIN Type

Display "E"

2 DIN Type



1 DIN Type

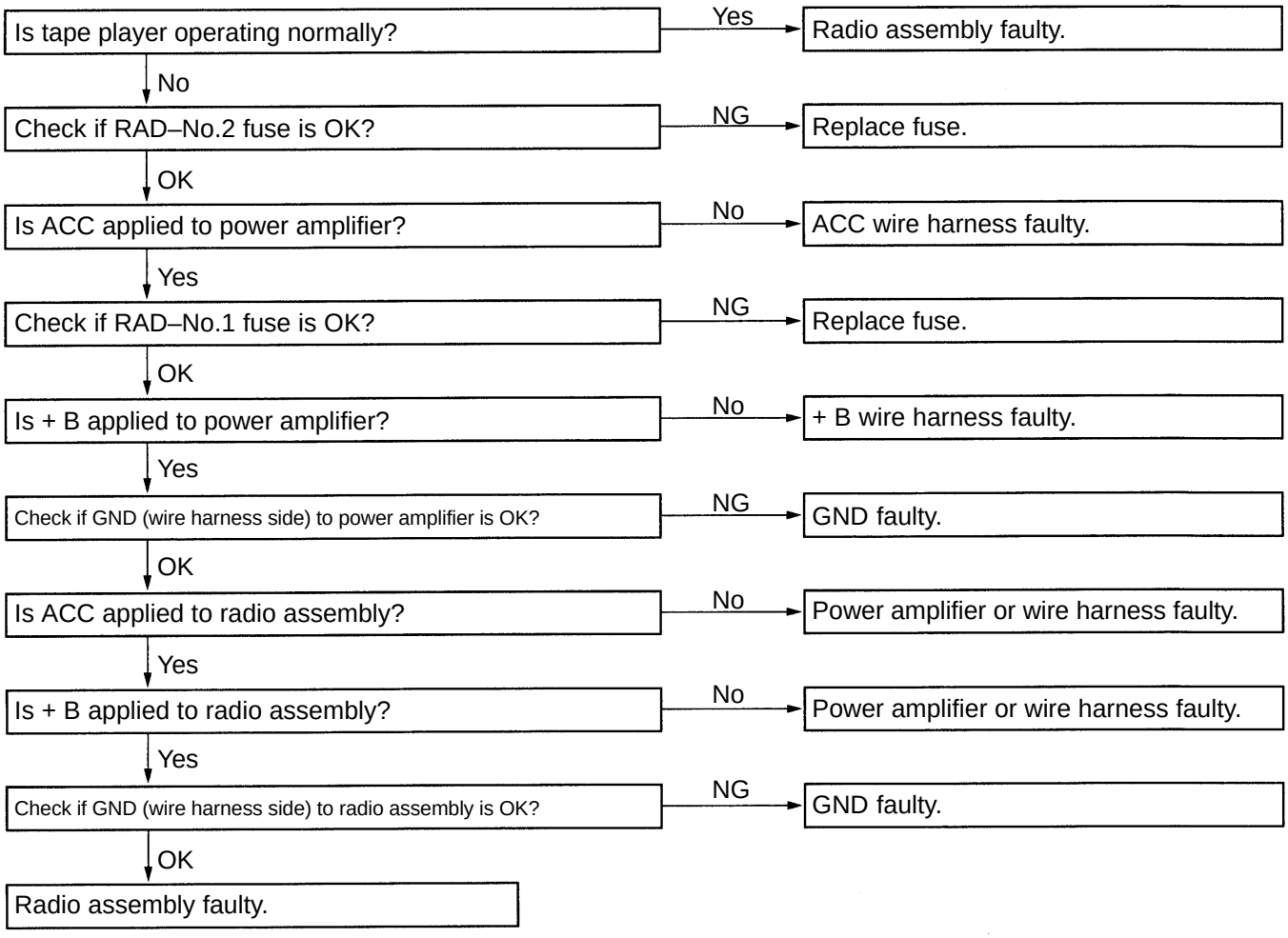
HINT:

- Refer to Owner's Manual for operation details of ANTI–THEFT SYSTEM.
- When the ID number has been cancelled, reset the same number after completing the operation, or inform the customer that it has been cancelled.

V08418

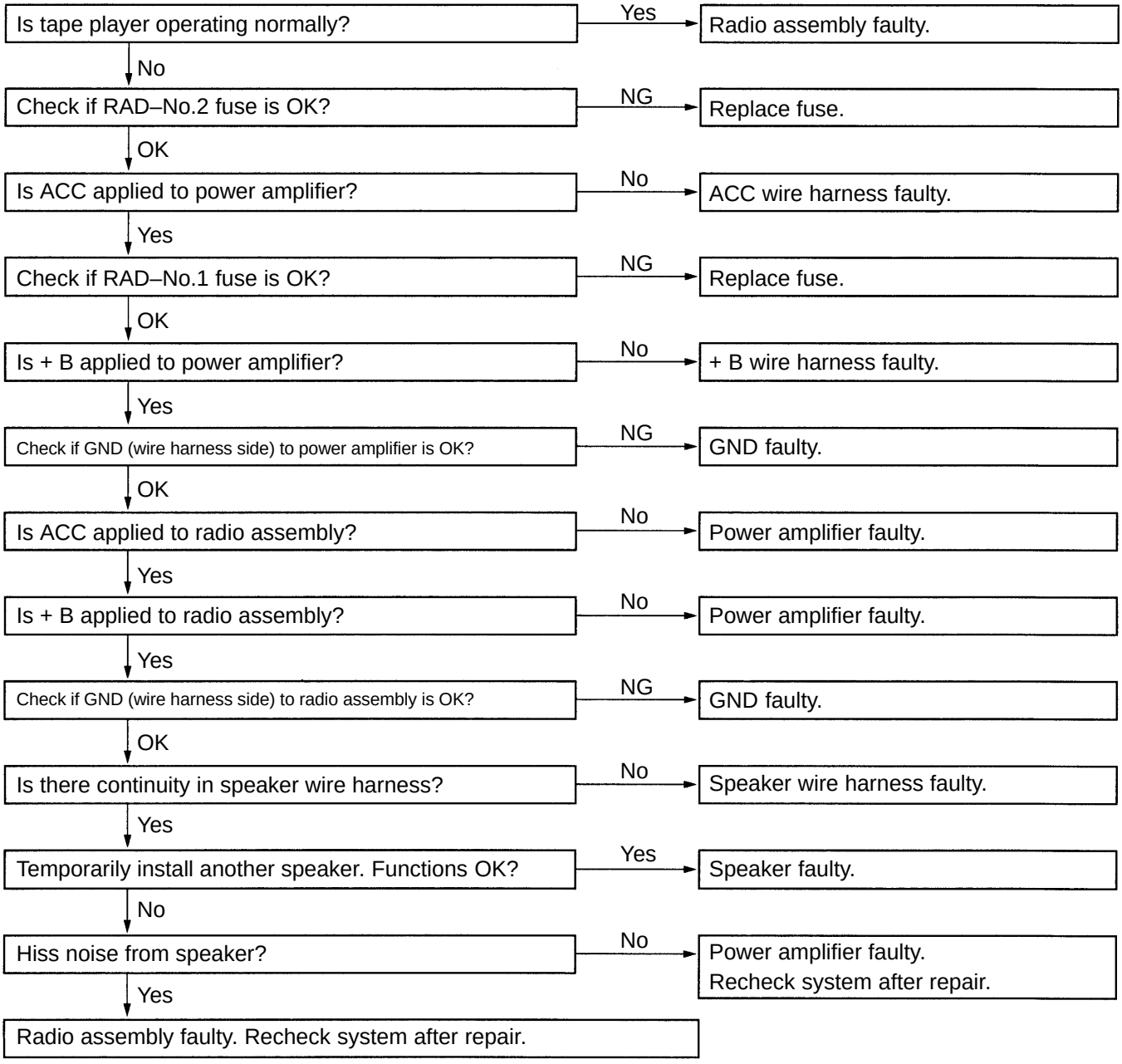
*

1	Radio	RADIO NOT OPERATING WHEN POWER SWITCH TURNED TO "ON"



V08480

2	Radio	DISPLAY INDICATES WHEN POWER SWITCH TURNED TO "ON", BUT NO SOUND (INCLUDING "NOISE") IS PRODUCED



V08481

3	Radio	NOISE PRESENT, BUT AM–FM NOT OPERATING

Go to No.25

If radio side faulty. → Radio faulty.

4	Radio	ANY SPEAKER DOSE NOT WORK

Is tape player operating normally? Yes → Radio assembly faulty.

No

Is hiss noise produced by non–functioning speaker? Yes → Radio assembly faulty. Recheck system after repair.

No

Is there continuity in speaker wire harness? No → Speaker wire harness faulty.

Yes

Temporarily install another speaker? Functions OK? Yes → Speaker faulty.

No

Power amplifier faulty. Recheck system after repair.

5	Radio	EITHER AM OR FM DOES NOR WORK FEW PRESET TUNING BANDS

Problem with radio wave signals or location? Yes → Poor signals, poor location.

No

Are both AM and FM defective? Yes → Radio assembly faulty.

No

Is power for the antenna being output from the radio assembly? No → Radio assembly faulty.

Yes

Go to No.16

Is tape player operating normally? Yes → Radio assembly faulty.

No

Temporarily install another speaker. Functions OK? Yes → Speaker faulty.

No

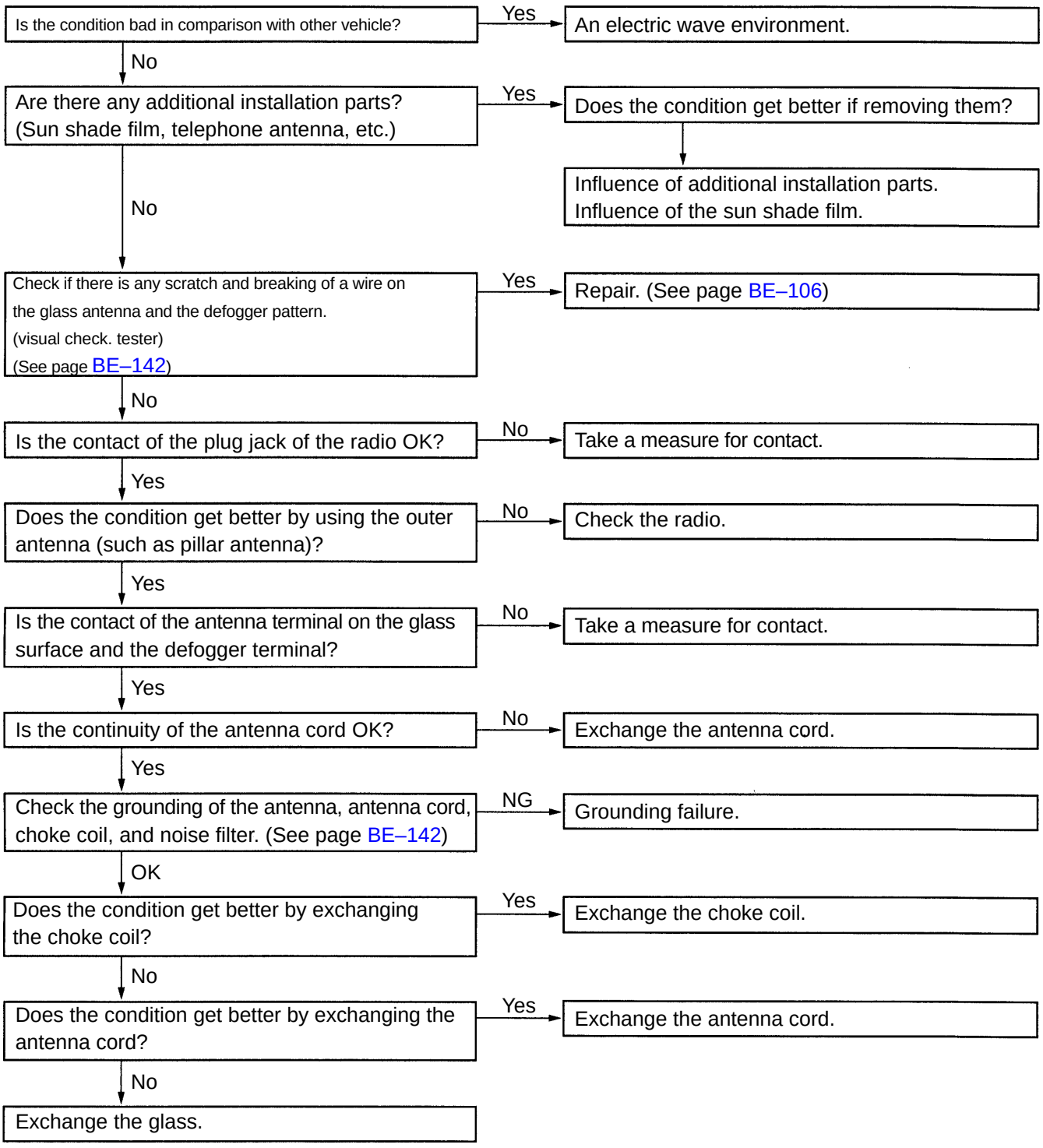
Hiss noise from speaker? No → Power amplifier faulty. Recheck system after repair.

Yes

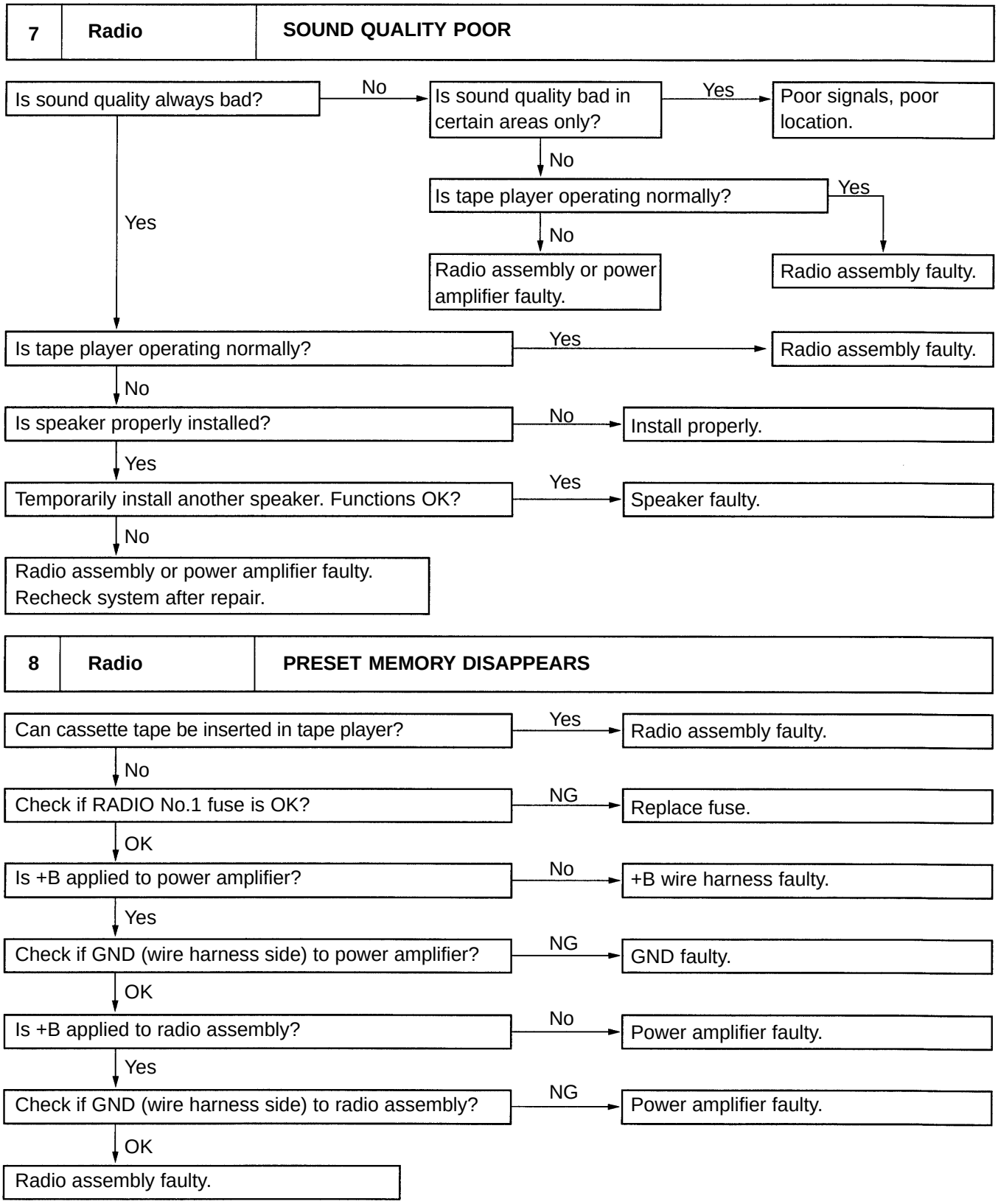
Radio assembly faulty. Recheck system after repair.

V08482

6	Radio	POOR RECEPTION

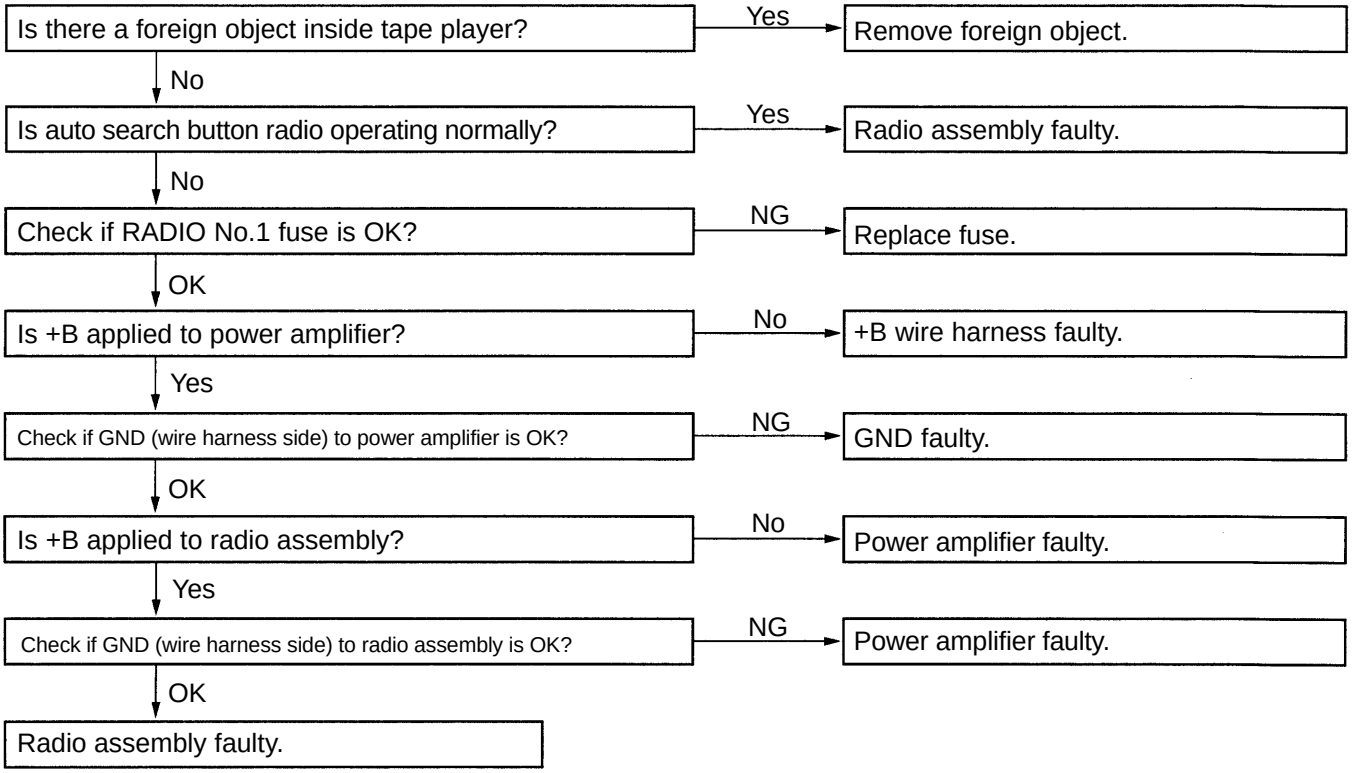


V08549

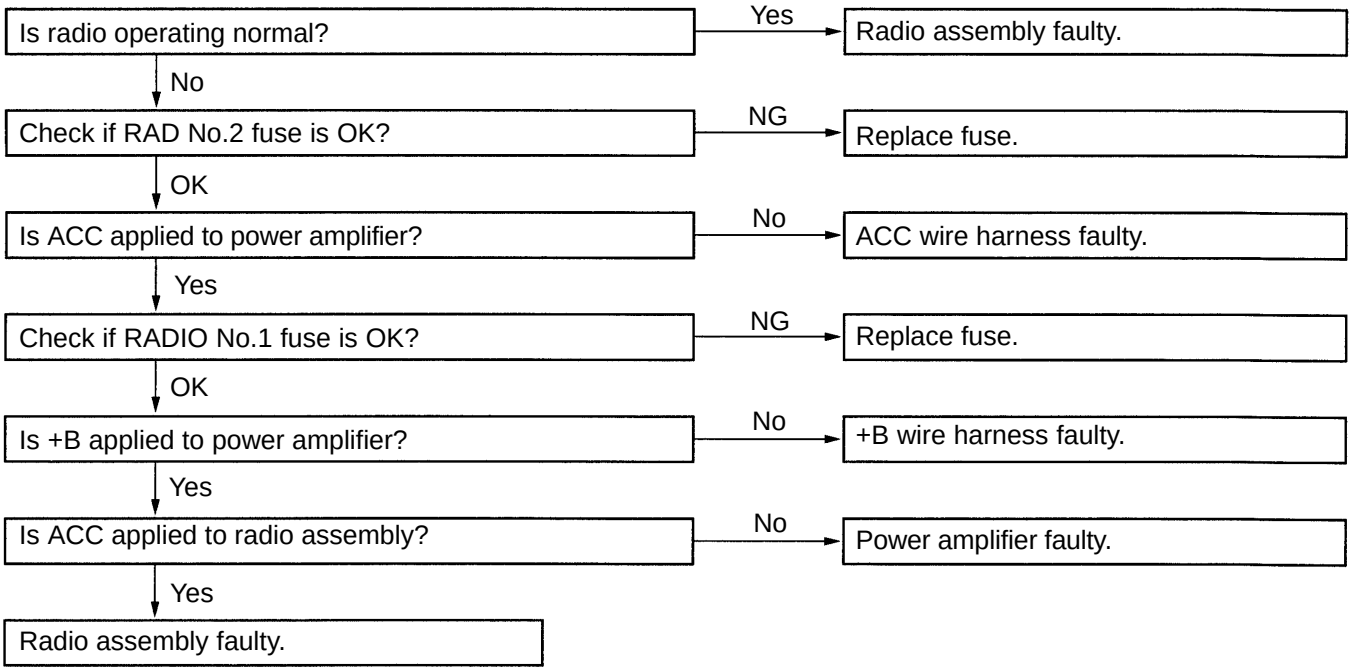

7
Radio
SOUND QUALITY POOR
Is sound quality always bad?
No
Is sound quality bad in certain areas only?
Yes
Poor signals, poor location.
No
Is tape player operating normally?
Yes
Radio assembly faulty.
No
Radio assembly or power amplifier faulty.
Yes
Is tape player operating normally?
Yes
Radio assembly faulty.
No
Is speaker properly installed?
No
Install properly.
Yes
Temporarily install another speaker. Functions OK?
Yes
Speaker faulty.
No
Radio assembly or power amplifier faulty.
Recheck system after repair.
8
Radio
PRESET MEMORY DISAPPEARS
Can cassette tape be inserted in tape player?
Yes
Radio assembly faulty.
No
Check if RADIO No.1 fuse is OK?
NG
Replace fuse.
OK
Is +B applied to power amplifier?
No
+B wire harness faulty.
Yes
Check if GND (wire harness side) to power amplifier?
NG
GND faulty.
OK
Is +B applied to radio assembly?
No
Power amplifier faulty.
Yes
Check if GND (wire harness side) to radio assembly?
NG
Power amplifier faulty.
OK
Radio assembly faulty.

V08483

9	Tape Player	CASSETTE TAPE CANNOT BE INSERTED

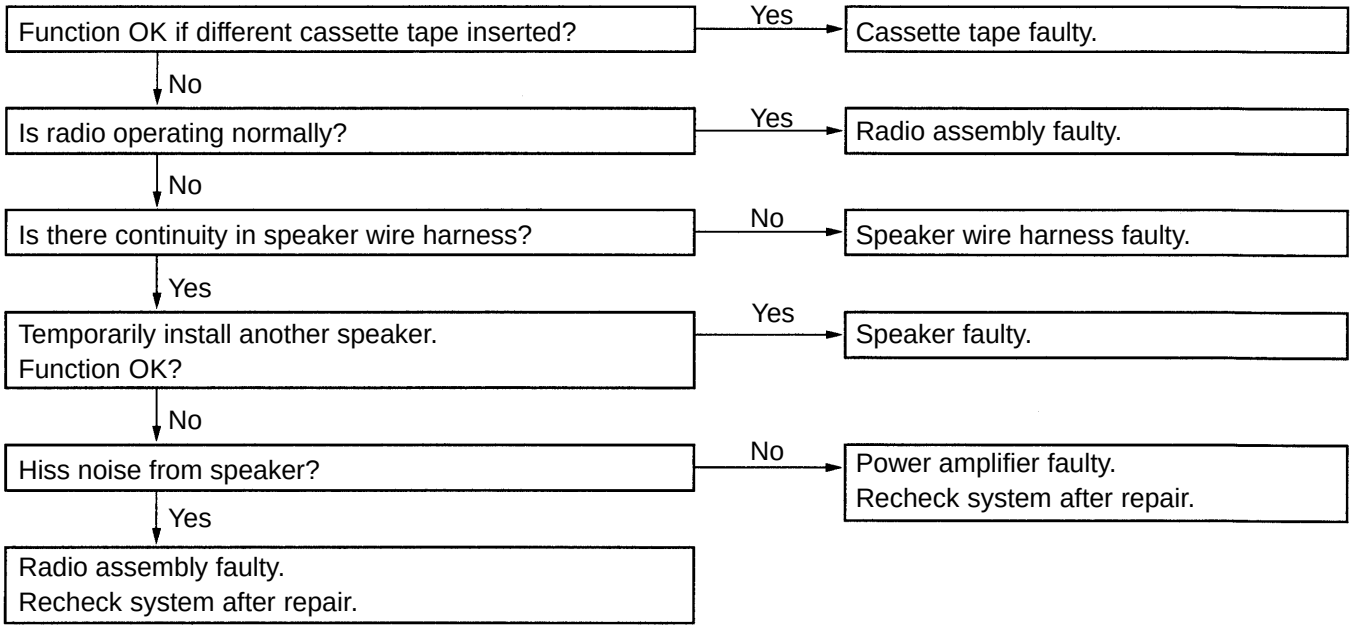


10	Tape Player	CASSETTE TAPE INSERTED, BUT NO POWER

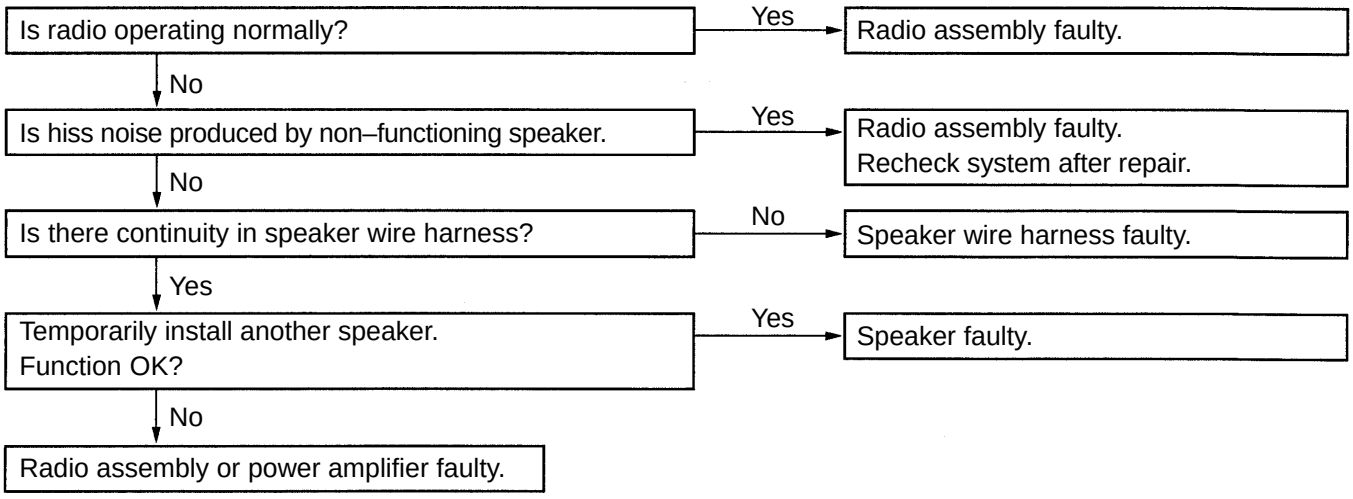


V08484

11	Tape Player	POWER COMING IN, BUT TAPE PLAYER NOT OPERATING



12	Tape Player	EITHER SPEAKER DOES NOT WORK



V08485

13	Tape Player	SOUND QUALITY POOR (VOLUME FAINT)

Function OK if different cassette tape inserted?
- Yes → Cassette tape faulty.
- No → Operates normally after cleaning the heads?
  - Yes → Head dirty.
  - No → Is radio operating normally?
    - Yes → Radio assembly faulty.
    - No → Is speaker properly installed?
      - No → Install properly.
      - Yes → Temporarily install another speaker. Function OK?
        - Yes → Speaker faulty.
        - No → Radio assembly faulty.

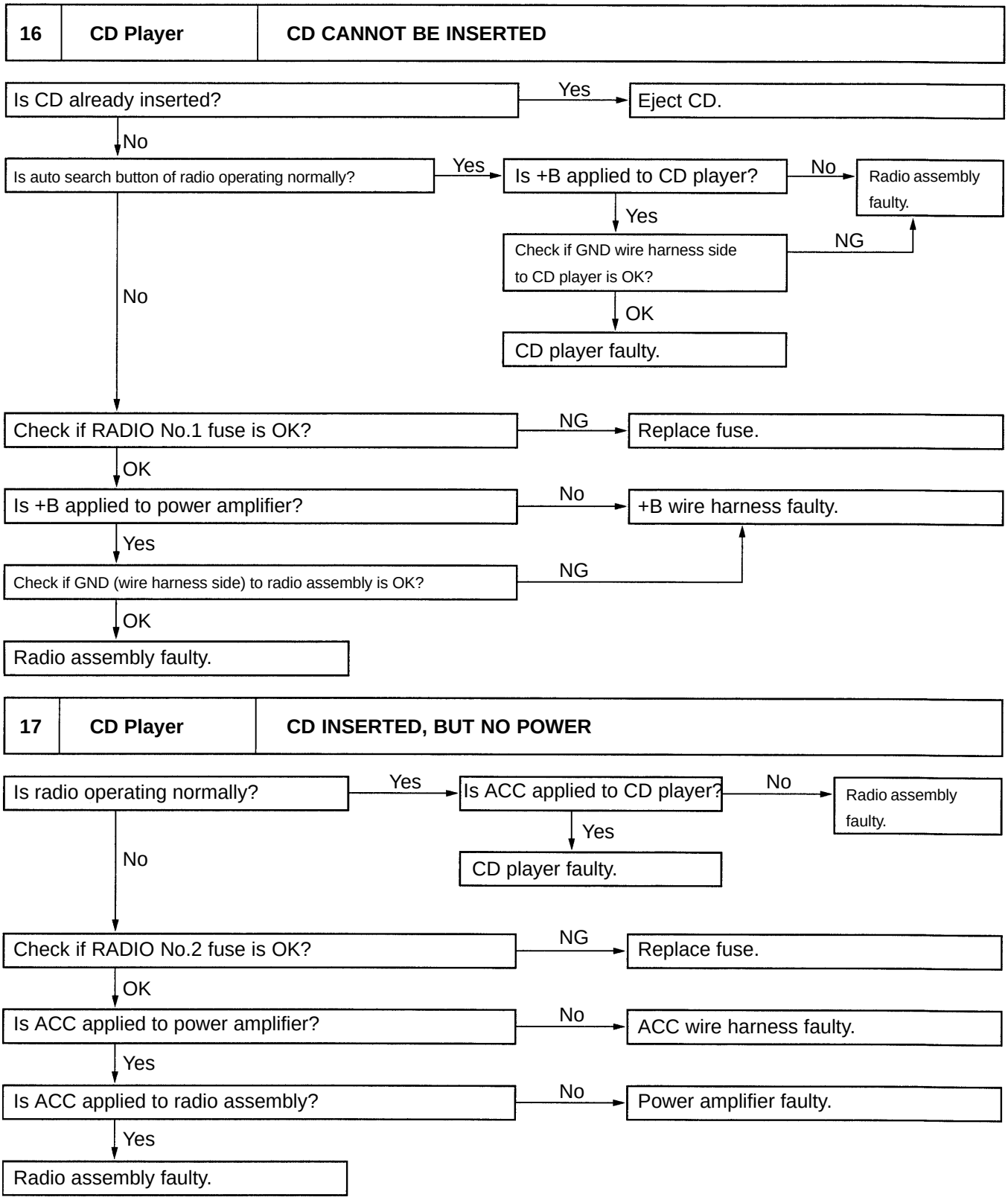
14	Tape Player	TAPE JAMMED MALFUNCTION WITH TAPE SPEED OR AUTO–REVERSE

Function OK if different tape (less than 120 mins.) is inserted?
- Yes → Cassette tape faulty.
- No → Is there a foreign object inside tape player?
  - Yes → Remove foreign object.
  - No → Operates normally after cleaning the heads?
    - Yes → Head dirty.
    - No → Radio assembly faulty.

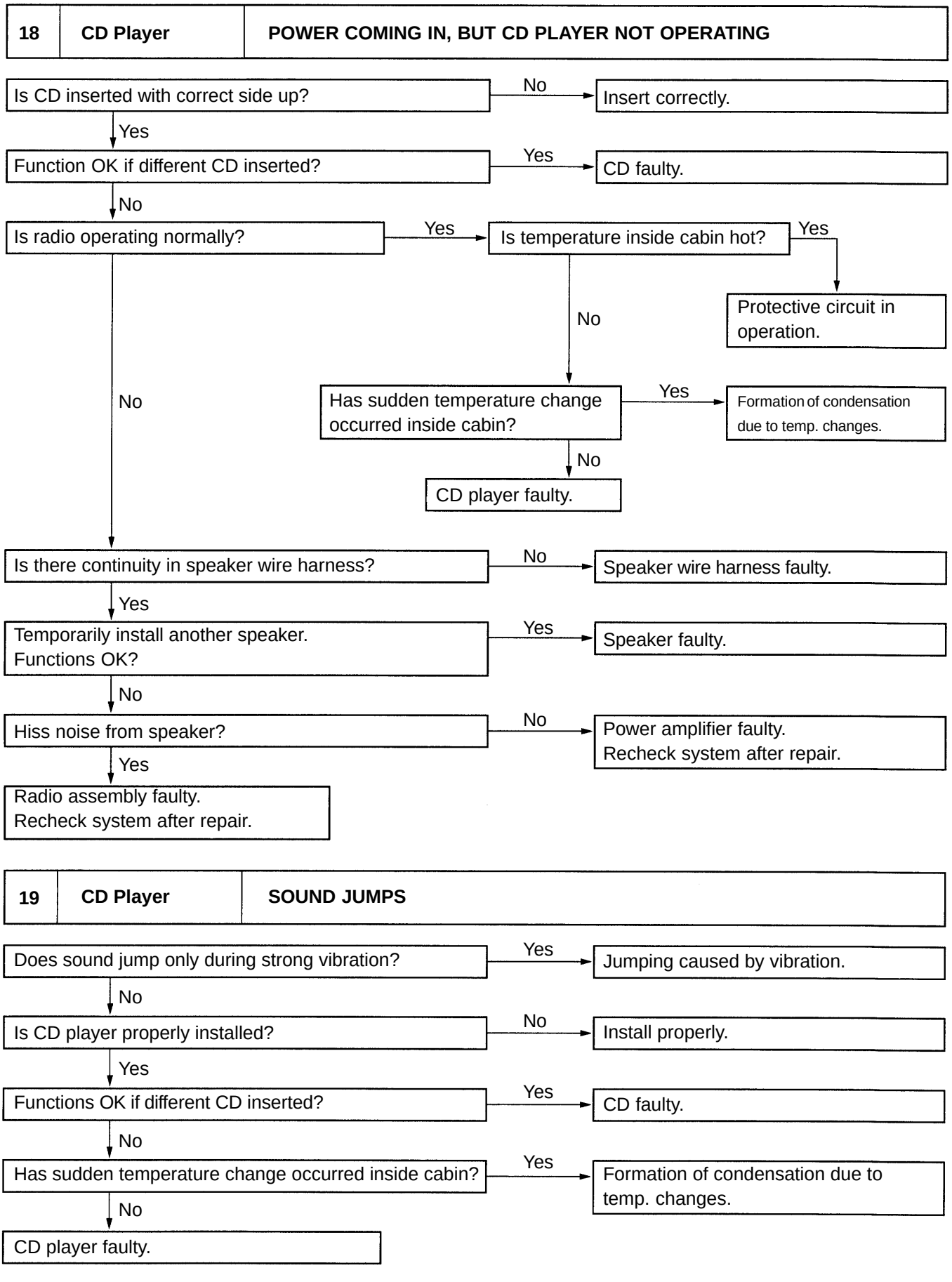
15	Tape Player	CASSETTE TAPE WILL NOT EJECTED

Is tape player operating normally?
- No → Cassette tape jammed.
- Yes → Is auto search button of radio operating normally?
  - Yes → Radio assembly faulty.
  - No → Check if RADIO No.1 fuse is OK?
    - NG → Replace fuse.
    - OK → Is –B applied to power amplifier?
      - No → +B wire harness faulty.
      - Yes → Is +B applied to radio assembly?
        - No → Power amplifier faulty.
        - Yes → Radio assembly faulty.

V08486

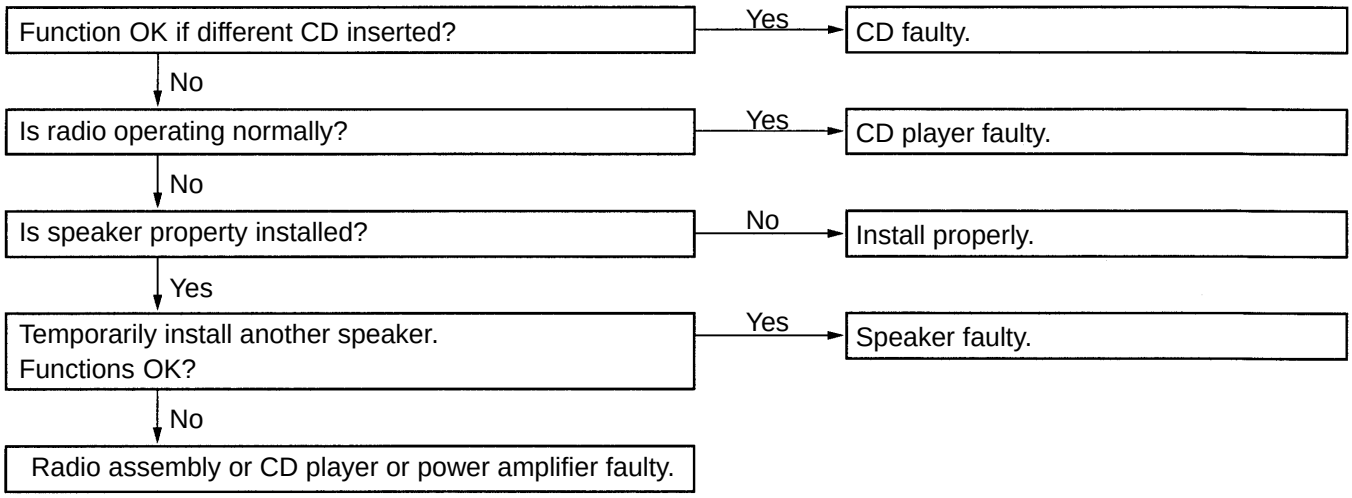

16
CD Player
CD CANNOT BE INSERTED
Is CD already inserted?
Yes
Eject CD.
No
Is auto search button of radio operating normally?
Yes
Is +B applied to CD player?
No
Radio assembly faulty.
Yes
Check if GND wire harness side to CD player is OK?
NG
OK
CD player faulty.
No
Check if RADIO No.1 fuse is OK?
NG
Replace fuse.
OK
Is +B applied to power amplifier?
No
+B wire harness faulty.
Yes
Check if GND (wire harness side) to radio assembly is OK?
NG
OK
Radio assembly faulty.
17
CD Player
CD INSERTED, BUT NO POWER
Is radio operating normally?
Yes
Is ACC applied to CD player?
No
Radio assembly faulty.
Yes
CD player faulty.
No
Check if RADIO No.2 fuse is OK?
NG
Replace fuse.
OK
Is ACC applied to power amplifier?
No
ACC wire harness faulty.
Yes
Is ACC applied to radio assembly?
No
Power amplifier faulty.
Yes
Radio assembly faulty.

V08487

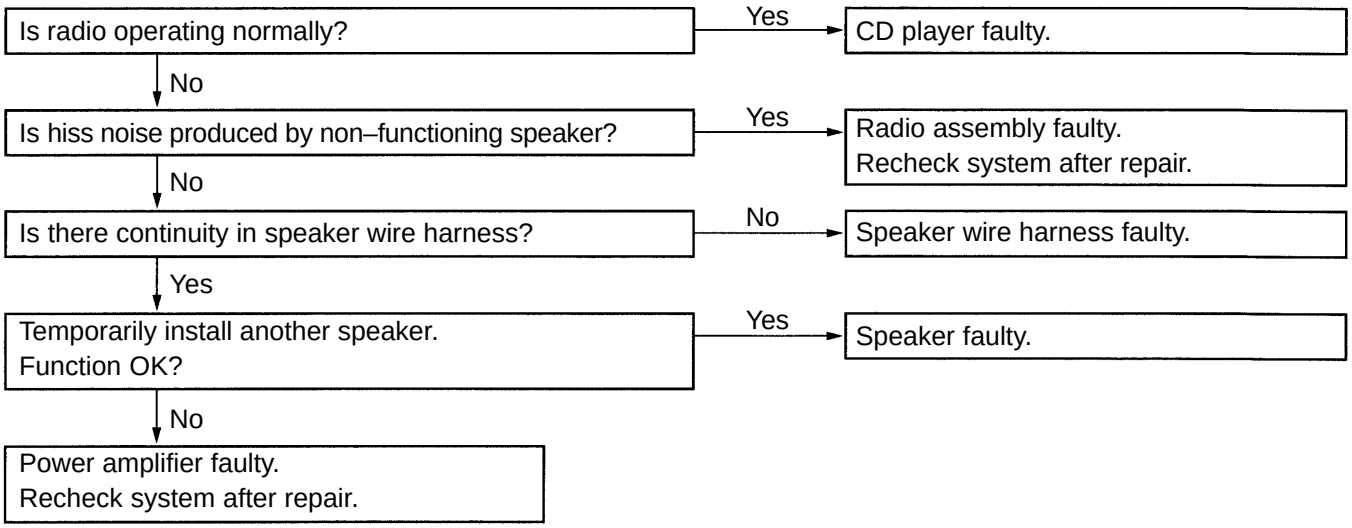

18
CD Player
POWER COMING IN, BUT CD PLAYER NOT OPERATING
Is CD inserted with correct side up?
No
Insert correctly.
Yes
Function OK if different CD inserted?
Yes
CD faulty.
No
Is radio operating normally?
Yes
Is temperature inside cabin hot?
Yes
Protective circuit in operation.
No
Has sudden temperature change occurred inside cabin?
Yes
Formation of condensation due to temp. changes.
No
CD player faulty.
No
Is there continuity in speaker wire harness?
No
Speaker wire harness faulty.
Yes
Temporarily install another speaker. Functions OK?
Yes
Speaker faulty.
No
Hiss noise from speaker?
No
Power amplifier faulty. Recheck system after repair.
Yes
Radio assembly faulty. Recheck system after repair.
19
CD Player
SOUND JUMPS
Does sound jump only during strong vibration?
Yes
Jumping caused by vibration.
No
Is CD player properly installed?
No
Install properly.
Yes
Functions OK if different CD inserted?
Yes
CD faulty.
No
Has sudden temperature change occurred inside cabin?
Yes
Formation of condensation due to temp. changes.
No
CD player faulty.

V08550

20	CD Player	SOUND QUALITY POOR (VOLUME FAINT)

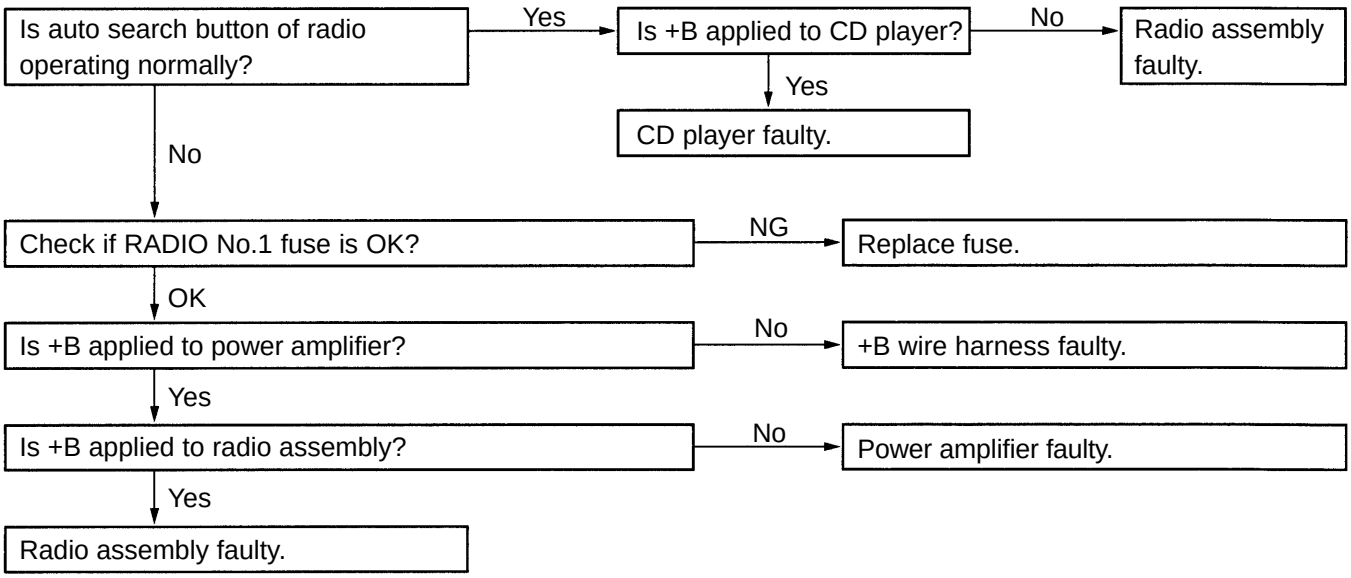


21	CD Player	EITHER SPEAKER DOES NOT WORK



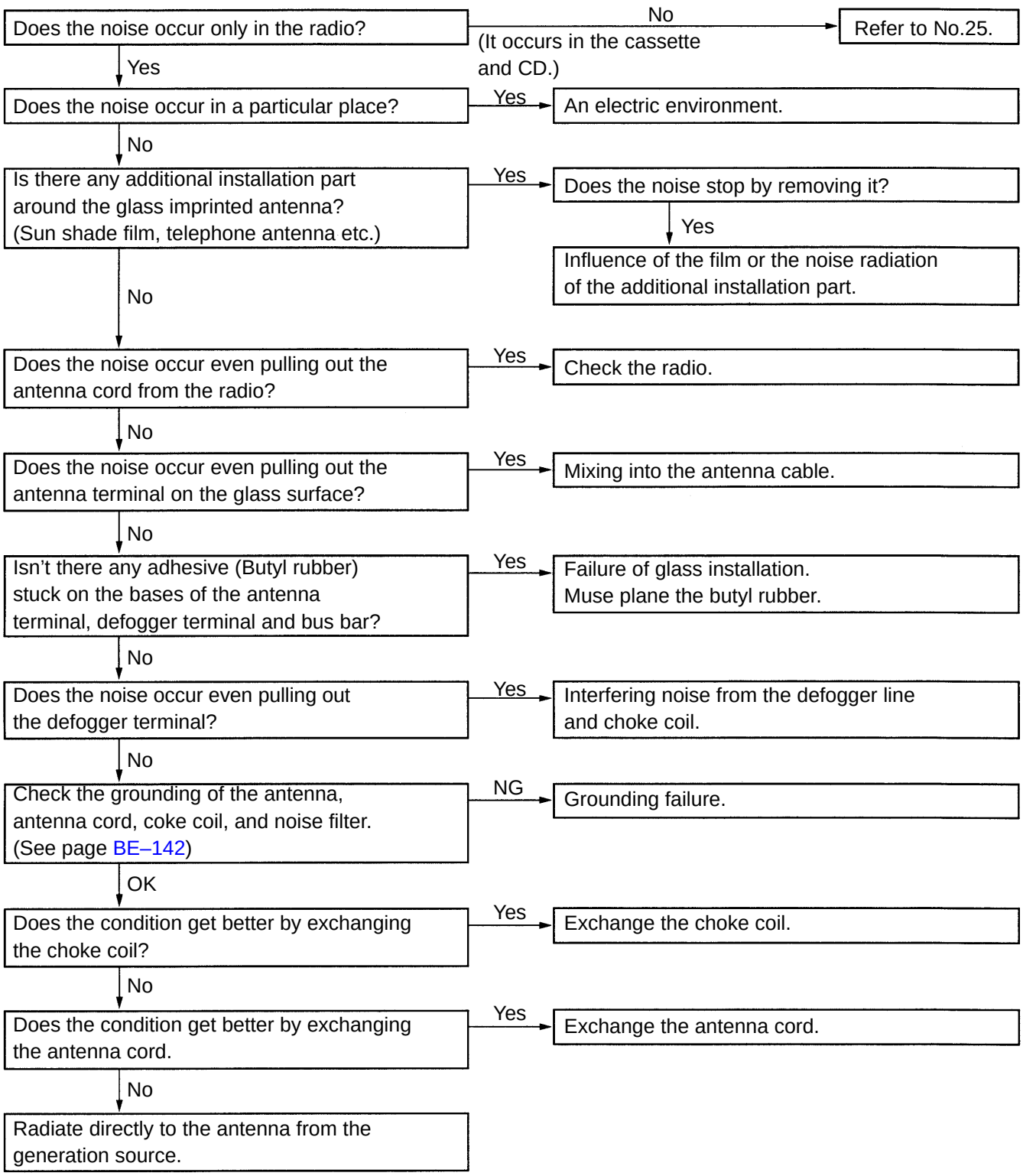
V08551

22	CD Player	CD WILL NOT BE EJECTED

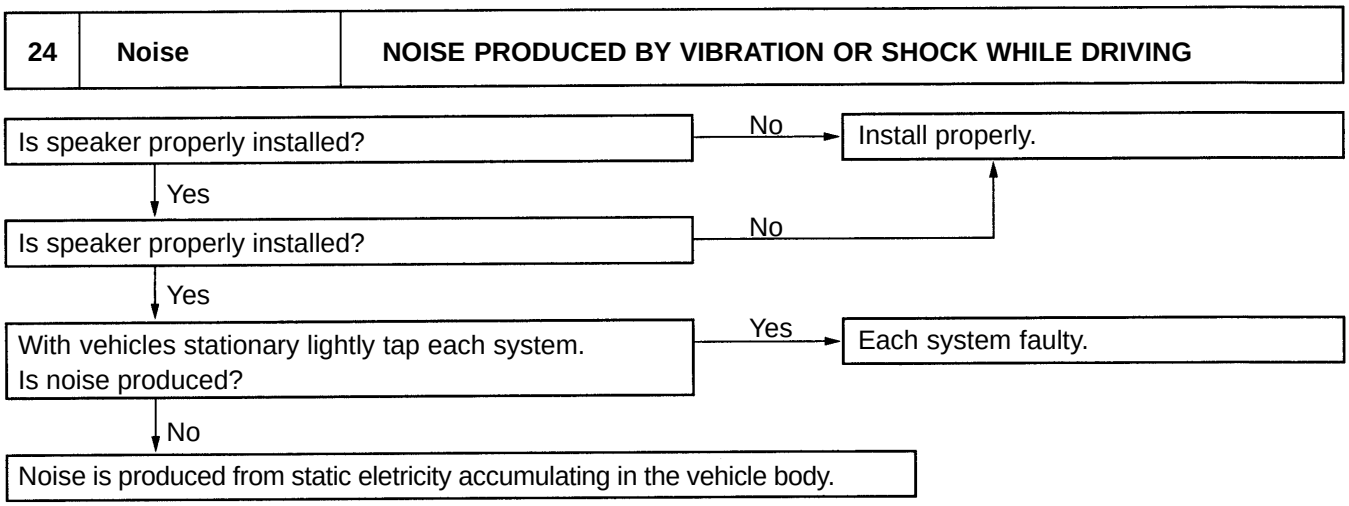


V08488

23	Noise	NOISE OCCURS

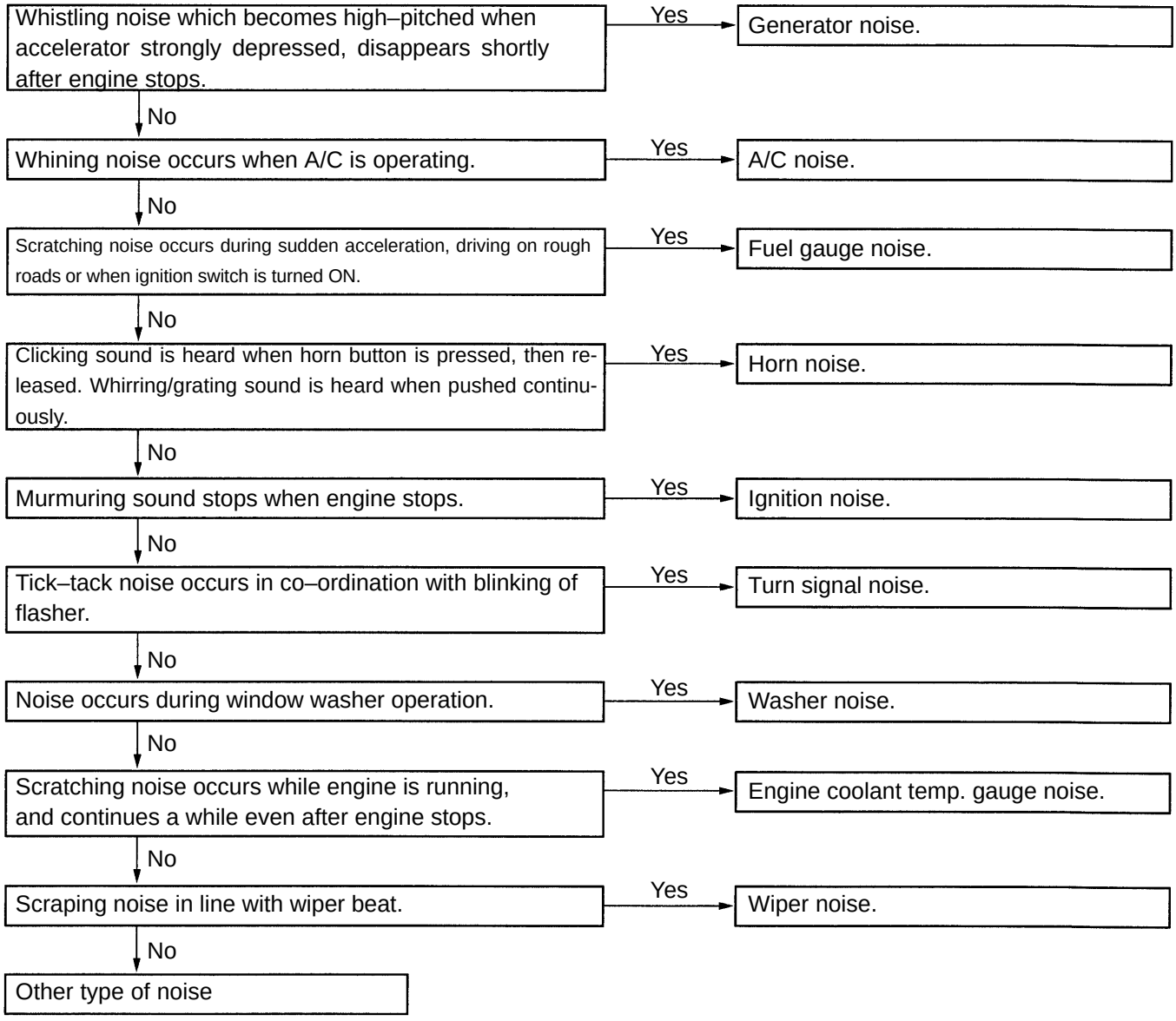


V08552


24
Noise
NOISE PRODUCED BY VIBRATION OR SHOCK WHILE DRIVING
Is speaker properly installed?
No
Install properly.
Yes
Is speaker properly installed?
No
Yes
With vehicles stationary lightly tap each system.
Is noise produced?
Yes
Each system faulty.
No
Noise is produced from static eletricity accumulating in the vehicle body.

V08553

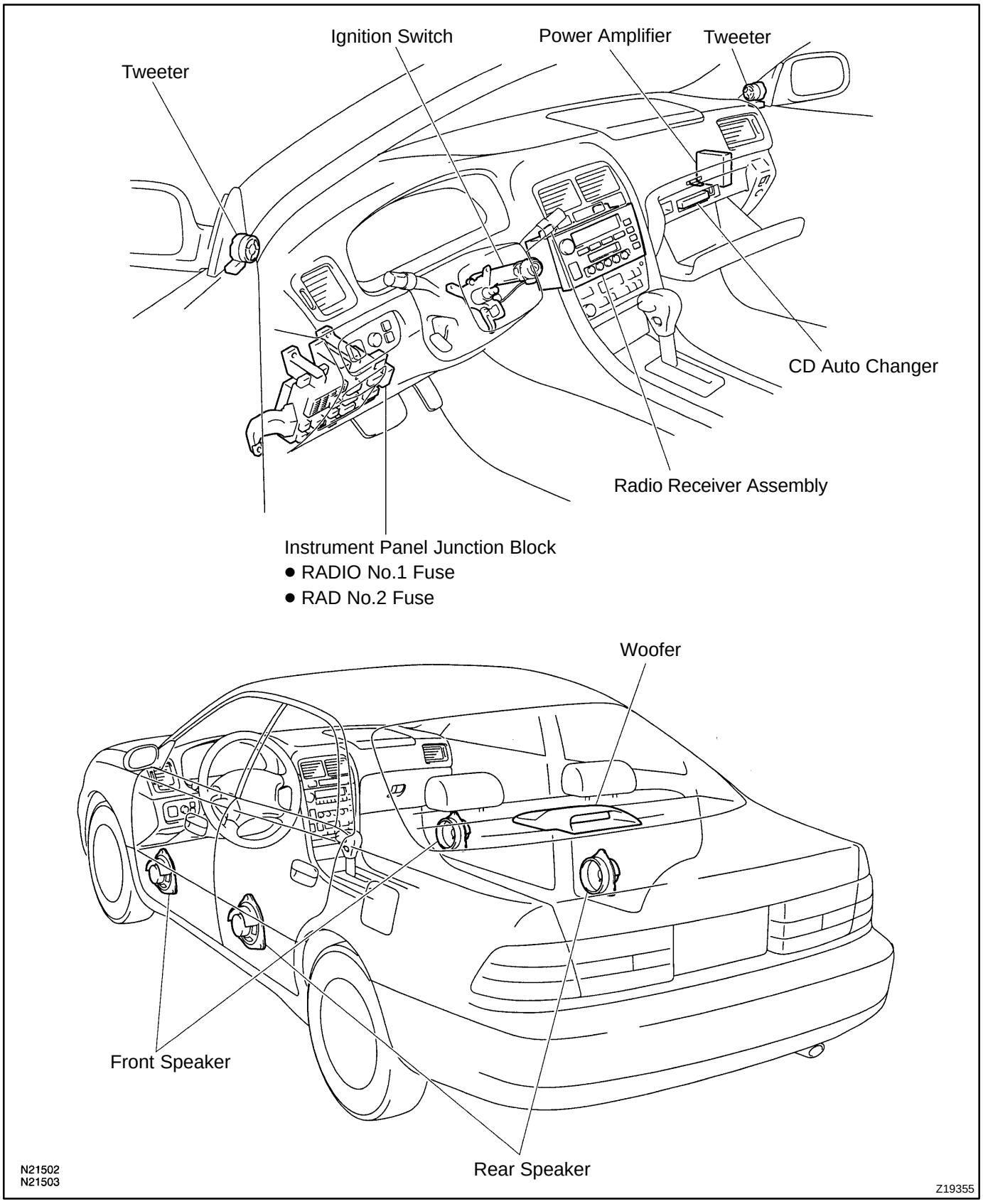
25	Noise	NOISE PRODUCED WHEN ENGINE STARTS



V08554

BE062–01

LOCATION

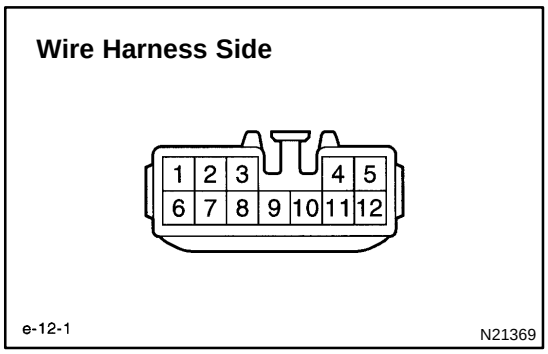


BE063–01

INSPECTION

1. INSPECT CD AUTO CHANGER CIRCUIT

Disconnect connectors from CD auto changer and inspect the connector on the wire harness side.



Tester connection	Condition	Specified condition
8 – Ground	Constant	Continuity
5 – Ground	Constant	Battery positive voltage
12 – Ground	Ignition switch LOCK	No voltage
12 – Ground	Ignition switch ACC or ON	Battery positive voltage

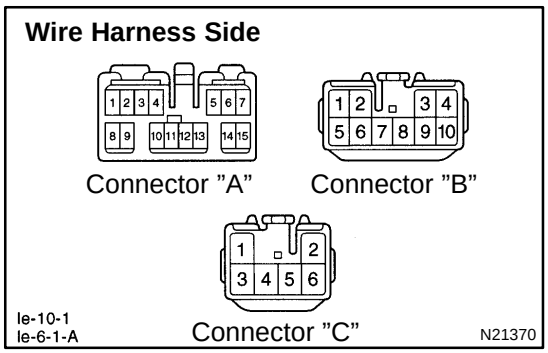
If the circuit is not as specified, inspect the circuits connected to other parts.

HINT:

- Check the wire harness between the radio receiver assembly and the CD auto changer.
- Since the signals to and from the MUTE, R^-, R^+, L^-, L^+, TX^- and TX^+ terminals are serial signals, they cannot ordinarily be measured with a tester.

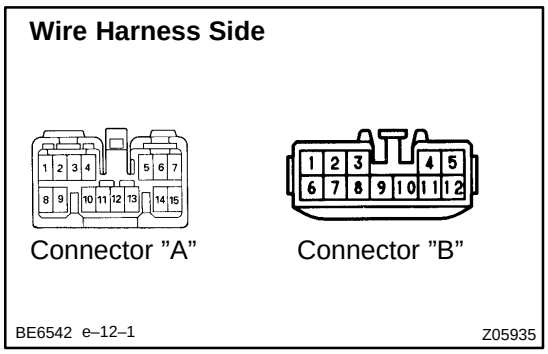
2. INSPECT POWER AMPLIFIER CIRCUIT

Disconnect the connector from power amplifier and inspect the connector on the wire harness side.



Tester connection	Condition	Specified condition
C7 – Ground	Constant	Continuity
C3 – Ground	Ignition switch LOCK	No voltage
C3 – Ground	Ignition switch ACC or ON	Battery positive voltage
C4 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



3. INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT

Disconnect the connectors from the radio receiver assembly, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
A4 – Ground	Constant	Battery positive voltage
A3 – Ground	Ignition switch LOCK	No voltage
A3 – Ground	Ignition switch ACC or ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

HINT:

Check the wire harness between radio receiver assembly and the CD auto changer, between radio receiver assembly and power amplifier.

4. INSPECT GLASS IN PRINTED ANTENNA

(Use same procedure as for ”INSPECT DEFOGGER WIRES” on page BE–126.)

5. REPAIR GLASS PRINTED ANTENNA

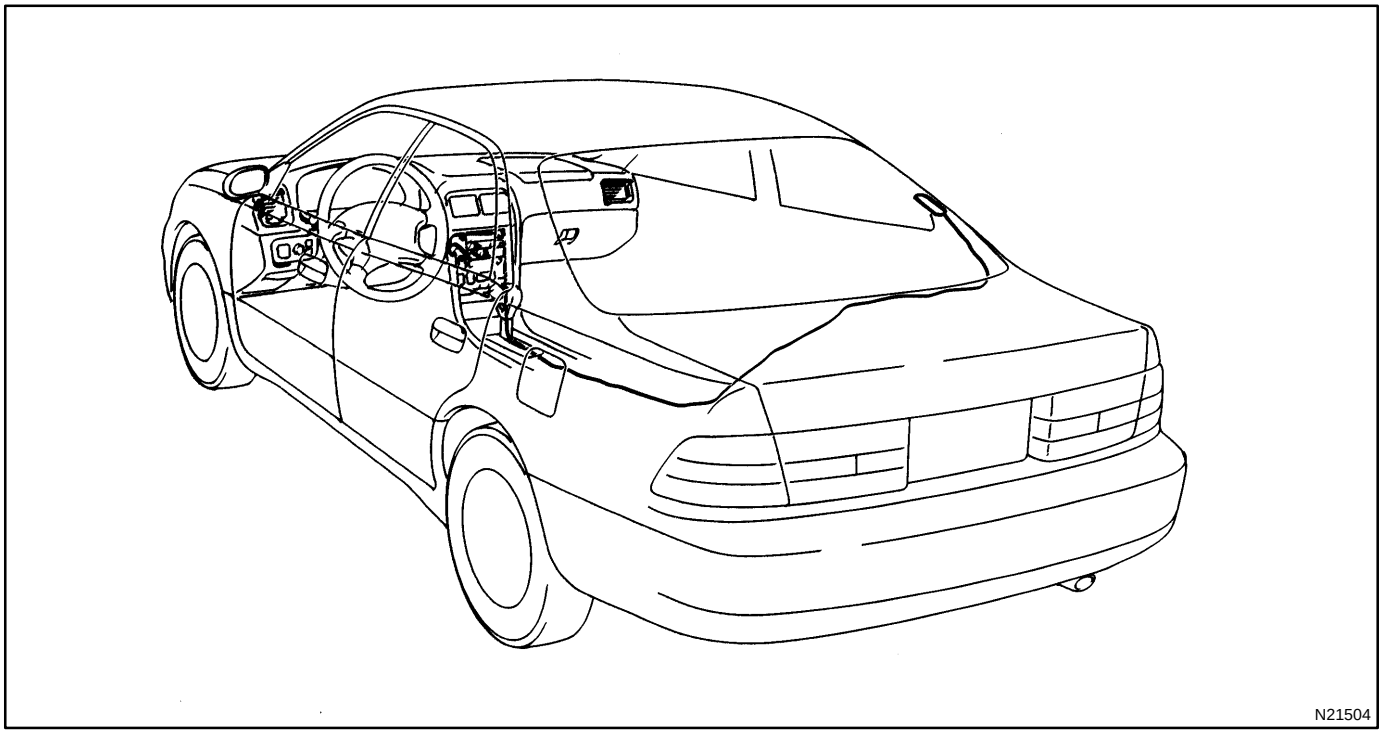
(Use same procedure as for ”REPAIR DEFOGGER WIRES” on page BE–127.)

ANTENNA CORD

BE064–01

REMOVAL

REMOVE ANTENNA CORD



(a) Remove the following parts:
- Instrument panel assembly
- Console box
- Rear seat
- Right rear poller garnish
- Package tray trim
- Room partition trim

HINT:
See BO section

(b) Remove antenna cord from glass printed antenna.
(c) Disconnect the connectors shown in the illustration.
(d) Remove the clips and antenna cord assembly.

BE065–01

INSTALLATION

Installation is in the reverse order of removal (See page BE–167).

CLOCK

TROUBLESHOOTING

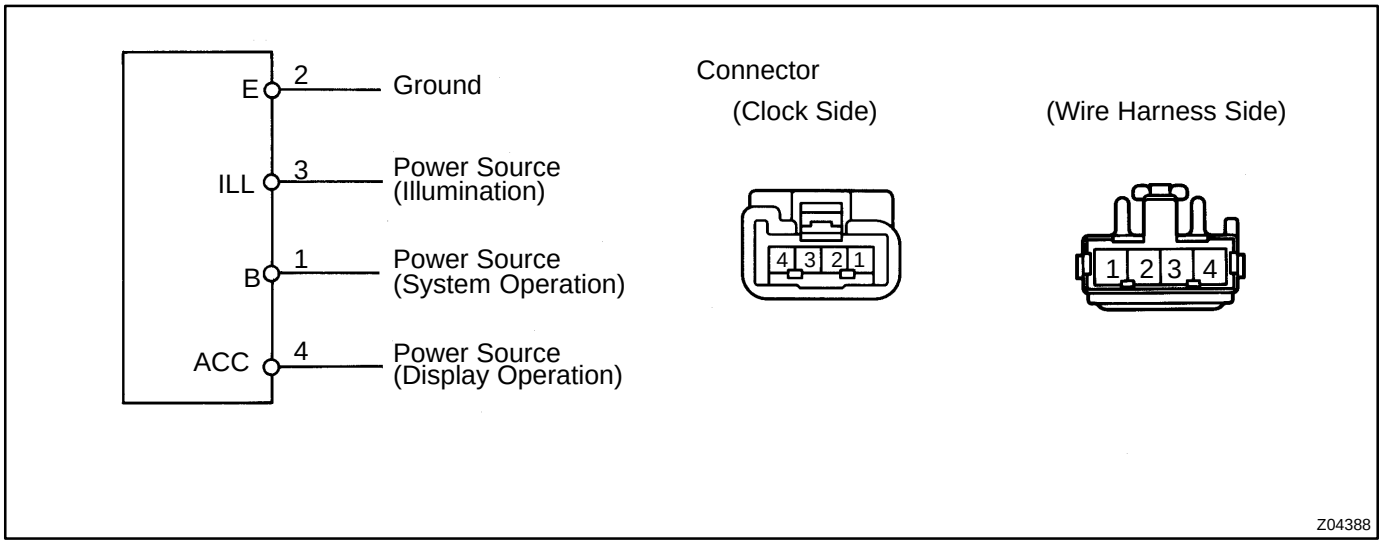
BE066–01

HINT:

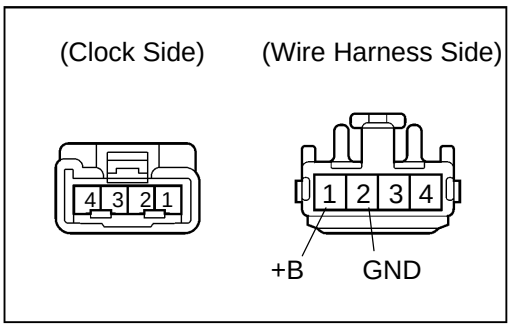
Troubleshoot the clock according to the table below.

Clock will not operate	1
Clock loses or gains time	2

± 1.5 seconds / day



1	CLOCK WILL NOT OPERATE



(a) Check that the battery positive voltage is 10 –14 V.
If voltage is not as specified, replace the battery.

(b) Check that the DOME fuse is not blown.
If the fuse is blown, replace the fuse and check for short circuit.

(c) Troubleshoot the clock as follows.
HINT:
Inspect the connector on the wire harness side.

Is there battery voltage between terminal +B and body ground?
- No → Open or short circuit in wire harness between terminal +B and DOME fuse.
- Yes ↓

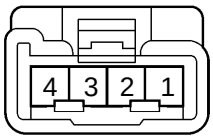
Does continuity exist between terminal GND and body ground?
- No → Open circuit in wire harness between terminal GND and body ground.
- Yes ↓

Replace clock.

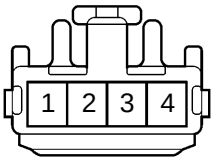
I01417

2	CLOCK LOSES OR GAINS TIME

(Clock Side)



(Wire Harness Side)



(a) Check that the battery positive voltage is 10–16 V.
If voltage is not as specified, replace the battery.

(b) Inspect the error of the clock.
Allowable error (per day): ± 1.5 sec.
If the error exceeds the allowable error, replace the clock.

(c) Check that the clock adjusting button is caught in position, and does not return.
If the button is not returned, repair or replace the clock.

(d) Troubleshoot the clock as follows.
HINT:
Inspect the connector on the wire harness side.

Is there 10 – 16 V between terminal +B and body ground?

Below 10V → Detect cause and repair, or recharge battery.

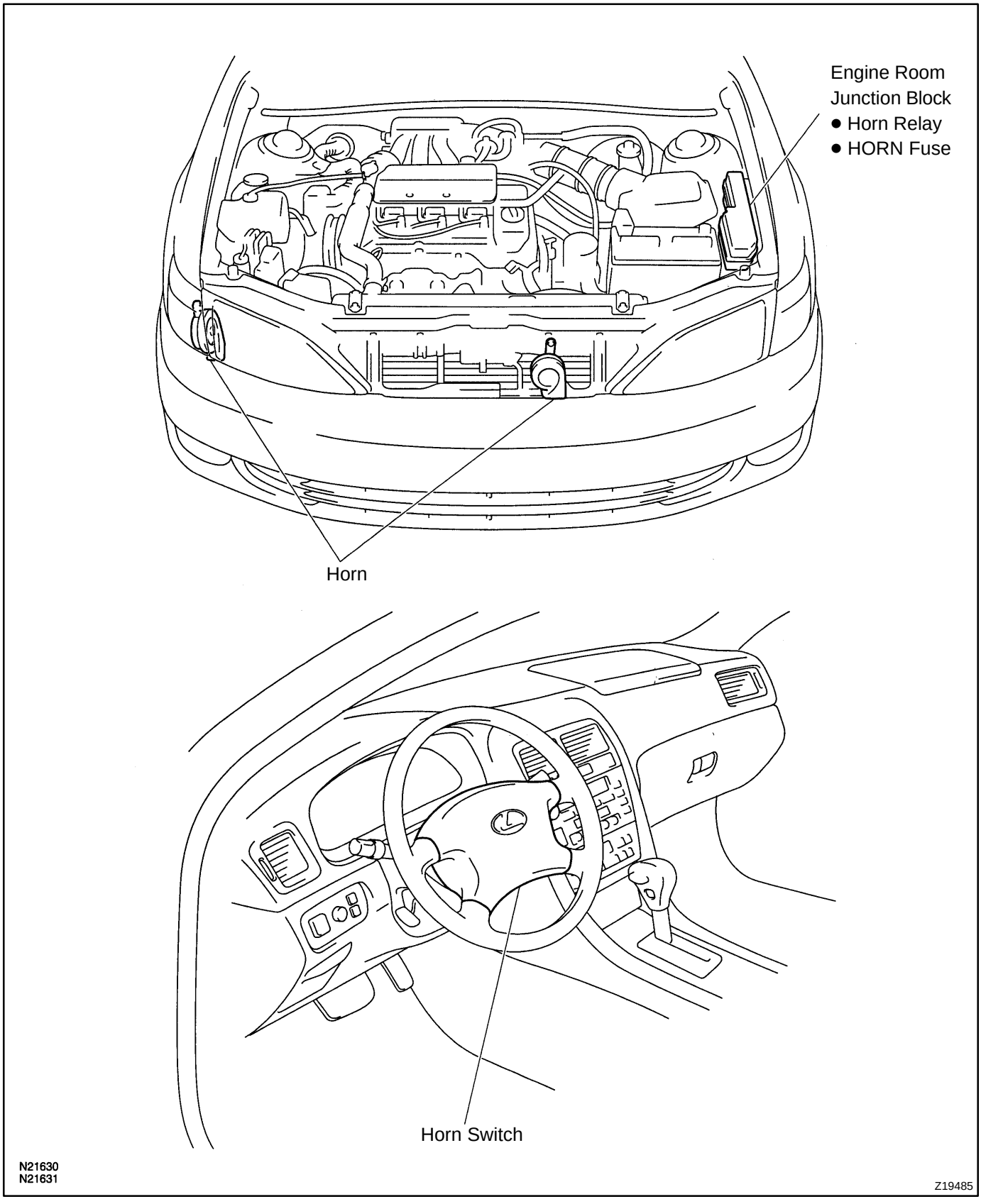
Yes ↓

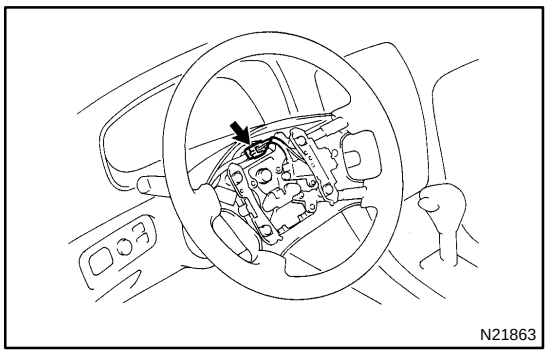
Adjust or replace clock.

I01418

HORN SYSTEM
LOCATION

BE067–01




N21863

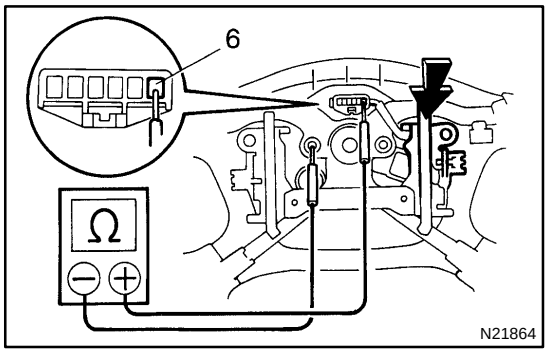
INSPECTION

1. INSPECT HORN SWITCH

(a) Disconnect the negative (–) terminal from the battery.
(b) Remove the left and right covers from the steering wheel.
(c) Using a torx socket wrench, loosen the 2 bolts.
(d) Pull up the horn pad and place it on the steering column, as shown.

HINT:
Do not disconnect the connector from the horn pad.

(e) Disconnect the connector from the slip ring. BE068–03

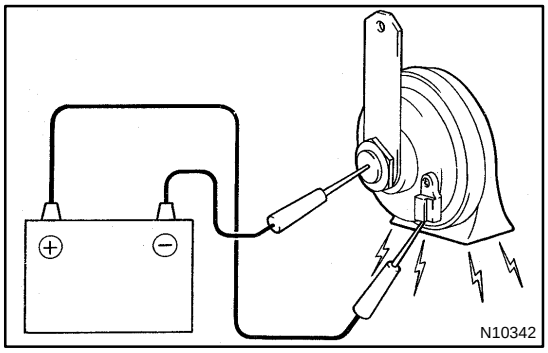


N21864

(f) Check that no continuity exists between terminal 6 of the connector and body ground.
(g) Check that continuity exists between terminal 6 of the connector and body ground when the horn contact plate is pressed against the steering spoke assembly.

If continuity is not as specified, repair or replace the steering wheel or wire harness as necessary.

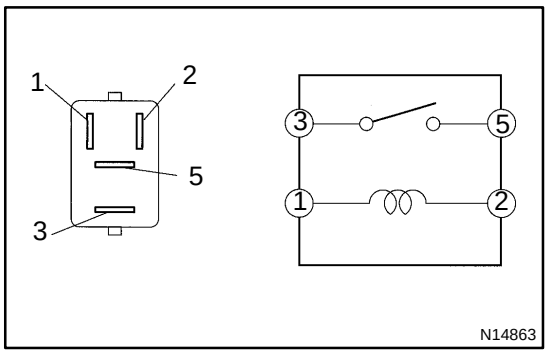
(h) Install the horn pad in place and using a torx socket wrench, torque the 2 bolts.
Torque: 7.1 N·m (72 kgf·cm, 62 in.·lbf)
(i) Install the left and right covers.
(j) Connect the negative (–) terminal to the battery.


N10342

2. INSPECT HORN OPERATION

Connect the positive (+) lead from the battery to the terminal and negative (–) lead to the horn body and check that the horn blows.

If operation is not as specified, replace the horn.



3. INSPECT HORN RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

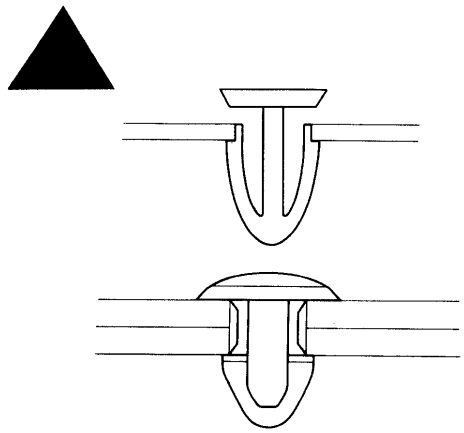
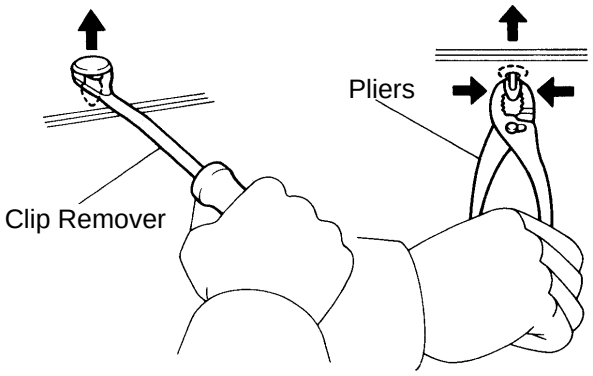
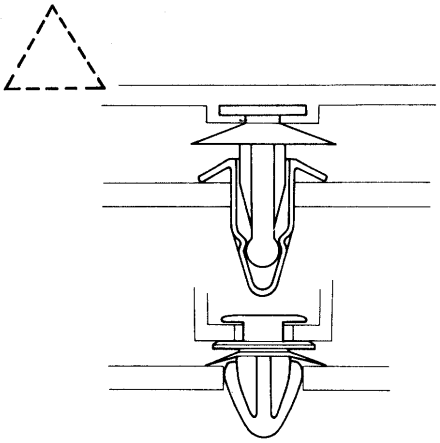
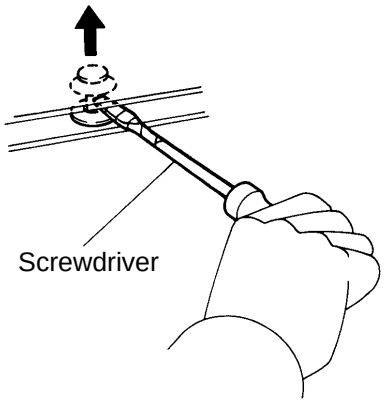
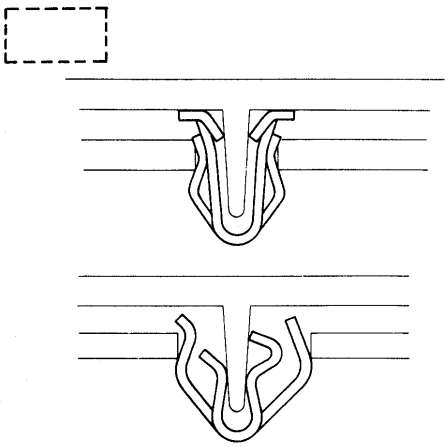
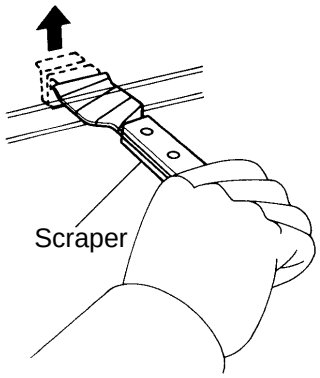
If continuity is not as specified, replace the relay.

CLIP

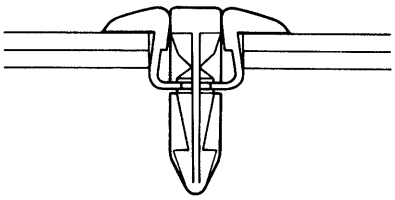
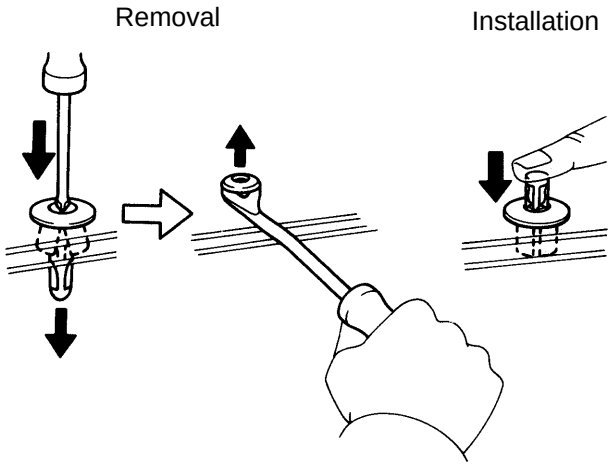
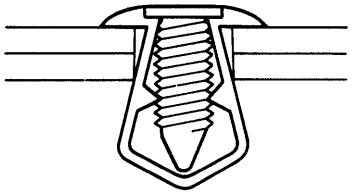
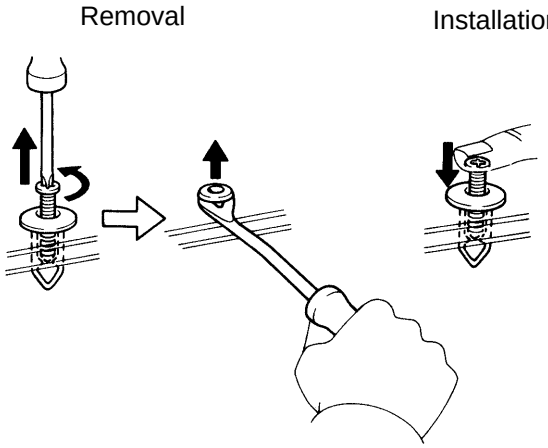
BO094–02

REPLACEMENT

The removal and installation methods of typical clips used in body parts are shown in the table below.
HINT:
If the clip is damaged during the operation, always replace it with a new clip.

Shape (Example)	Removal/Installation
	
	
	

V00005

Shape (Example)	Removal/Installation
	
	

V00012

SRS AIRBAG

BO094–02

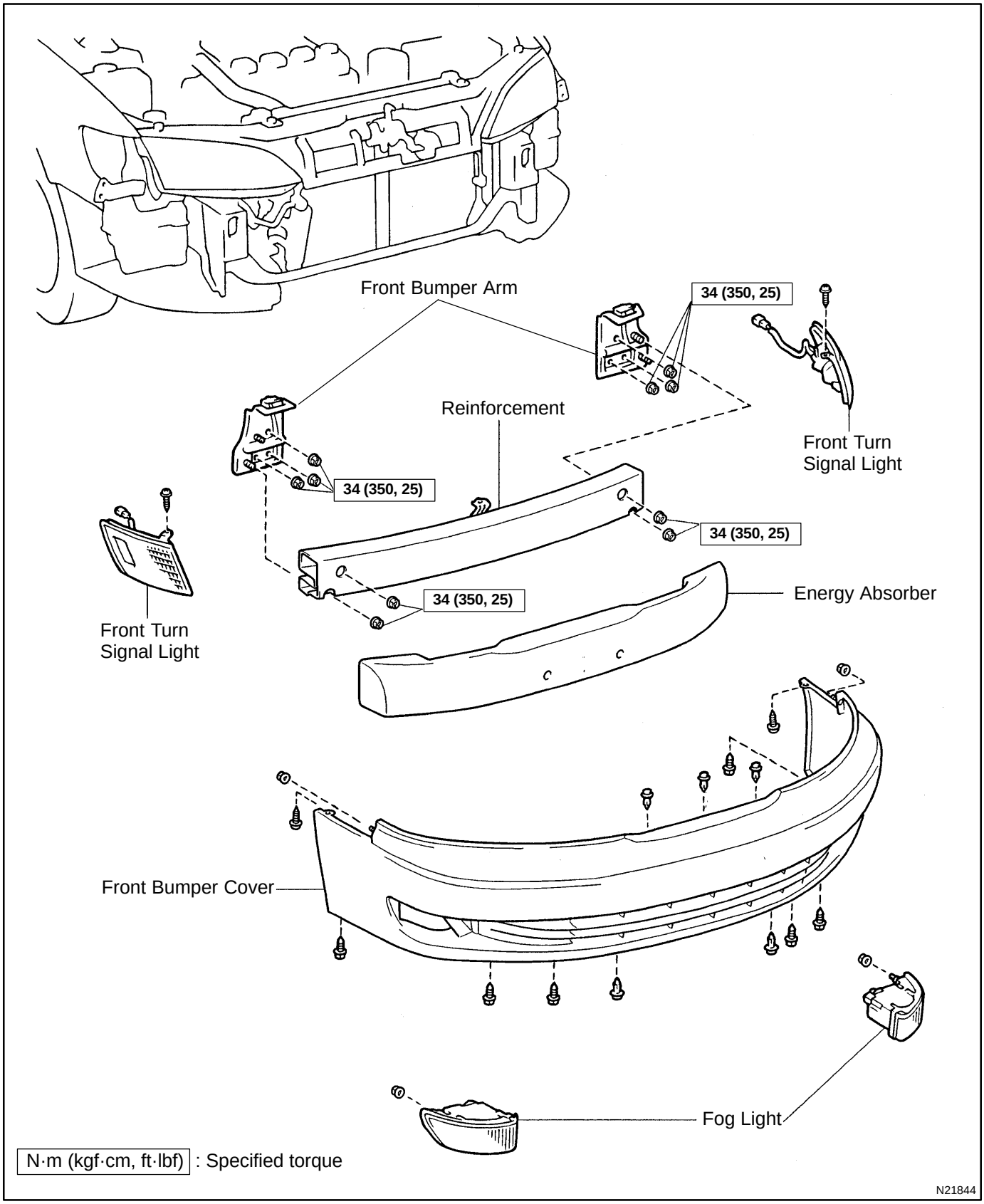
PRECAUTION

The LEXUS ES300 is equipped with an SRS (Supplemental Restraint System) such as the driver airbag ¿and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

FRONT BUMPER

BO095–05

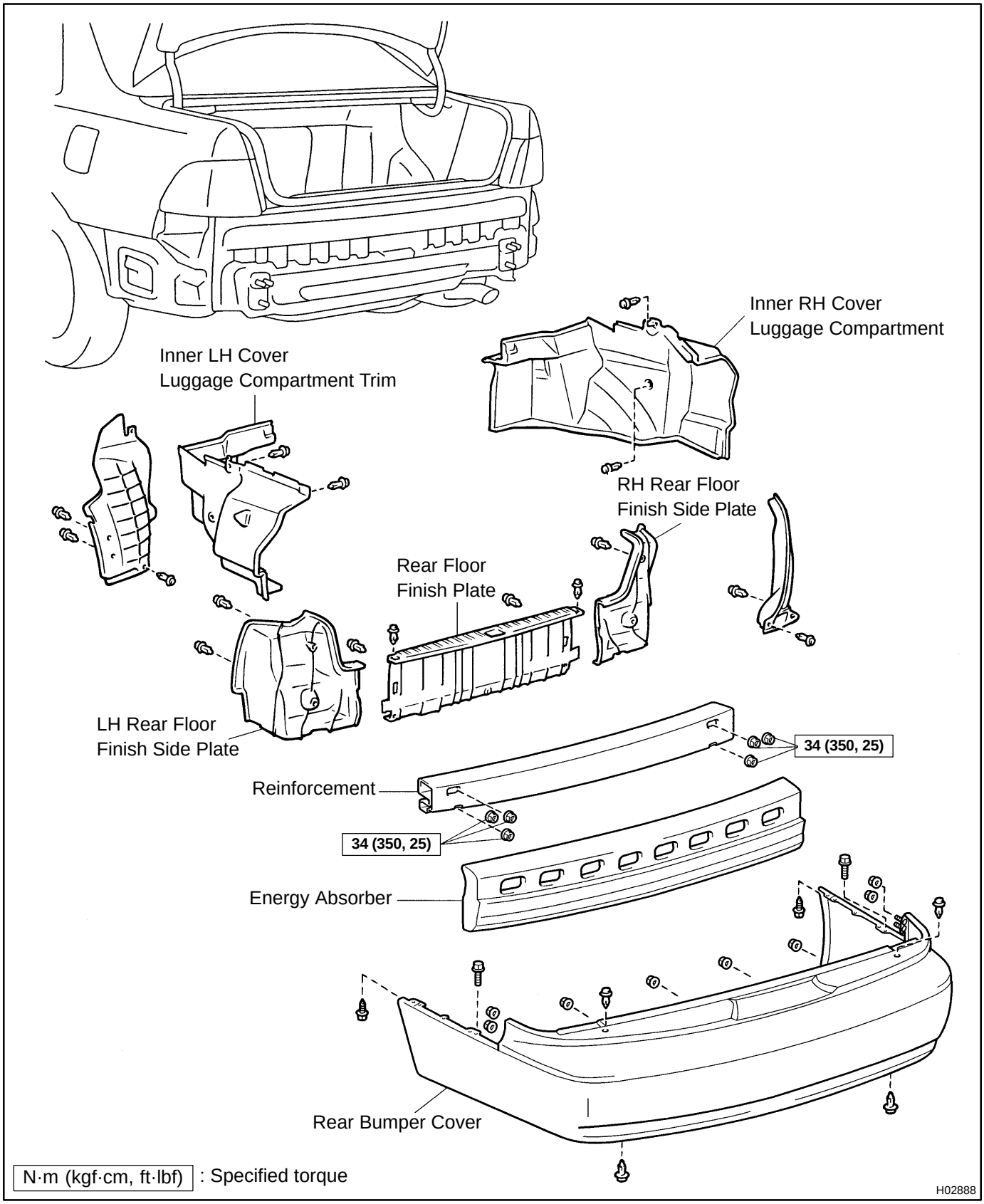
COMPONENTS



REAR BUMPER

BO096–01

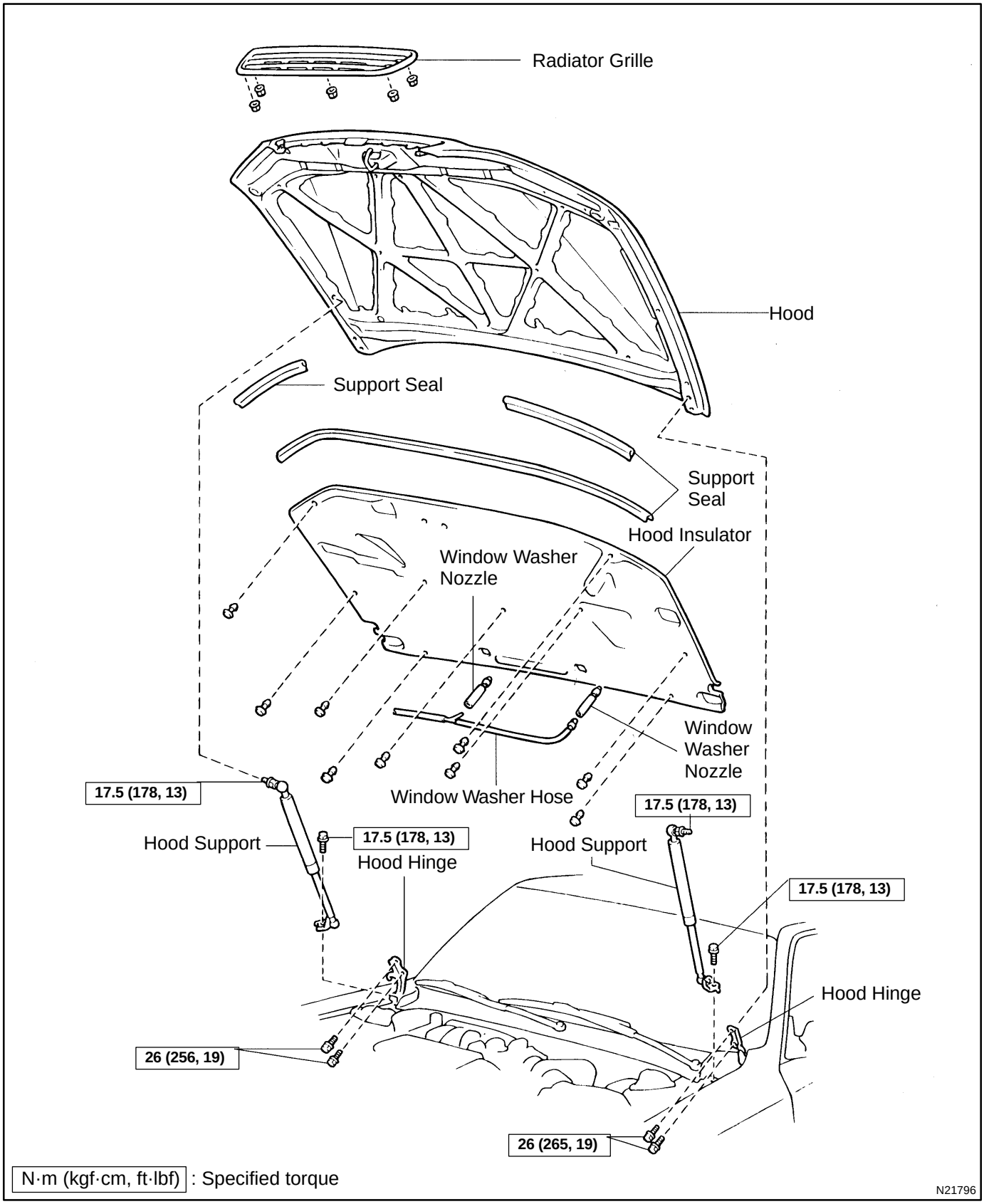
COMPONENTS



HOOD

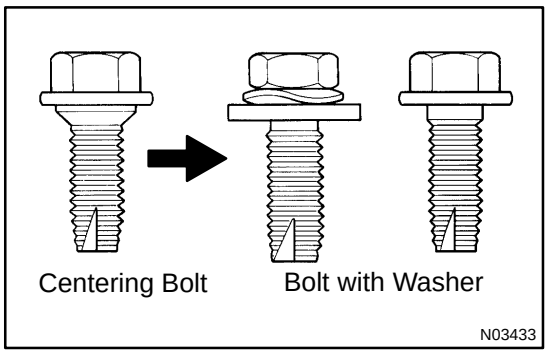
COMPONENTS

BO097–03



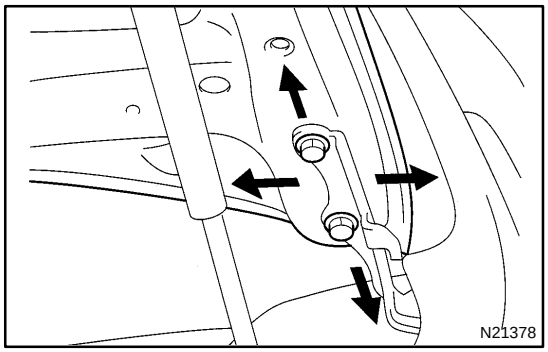
BO098–01

ADJUSTMENT



HINT:

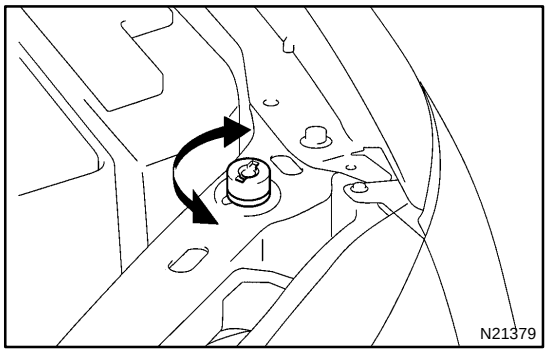
Since the centering bolt is used as the hood hinge and hood lock set bolt, the hood and hood lock cannot be adjusted with it on. Substitute the bolt with the washer for the centering bolt.



1. ADJUST HOOD IN FORWARD/REARWARD AND LEFT/RIGHT DIRECTIONS

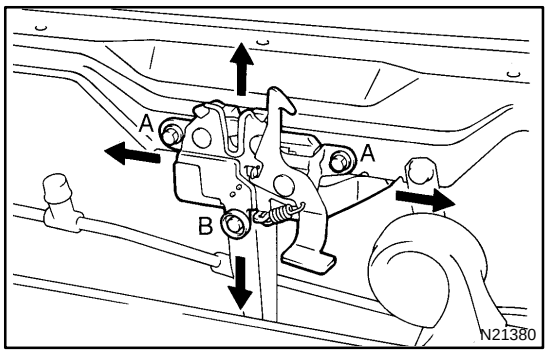
Adjust the hood by loosening the hood side hinge bolts.

Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)



2. ADJUST FRONT EDGE OF HOOD IN VERTICAL DIRECTION

Adjust the hood by turning the cushions.



3. ADJUST HOOD LOCK

Adjust the hood lock by loosening bolts.

Torque:

A bolt: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

B bolt: 11 N·m (112 kgf·cm, 8 ft·lbf)

HOOD SUPPORT

BO099–01

REPLACEMENT

1. REMOVE SUPPORT FROM HOOD

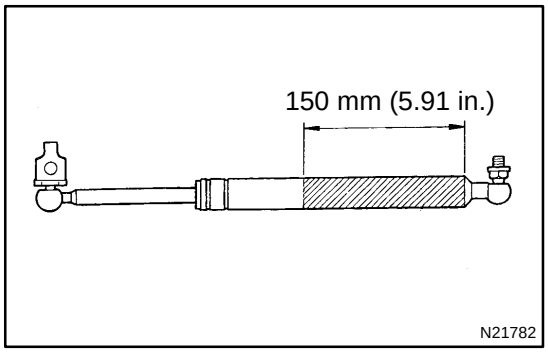
Remove the bolt and support from the hood.

HINT:

While supporting the hood with by hand, remove the hood.

2. REMOVE SUPPORT FROM BODY

Remove the bolt and support.



3. IF NECESSARY, REPLACE HOOD SUPPORT

NOTICE:

Handling the hood support

- **Do not disassemble the support because the cylinder is filled with pressurized gas.**
- **If the support is to be replaced, drill a 2.0 – 3.0 mm (0.079 – 0.118 in.) hole in the area shown in the illustration to completely release the high–pressure gas before disposing of it.**
- **When drilling, chips may fly out so work carefully.**
- **The gas is colorless, odorless and non–toxic.**
- **When working, handle the support carefully. Never score or scratch the exposed part of the piston rod, and allow any paint or oil to get on it.**
- **Do not turn the piston rod and cylinder with the support fully extended.**

4. INSTALL HOOD SUPPORT

Install the hood support.

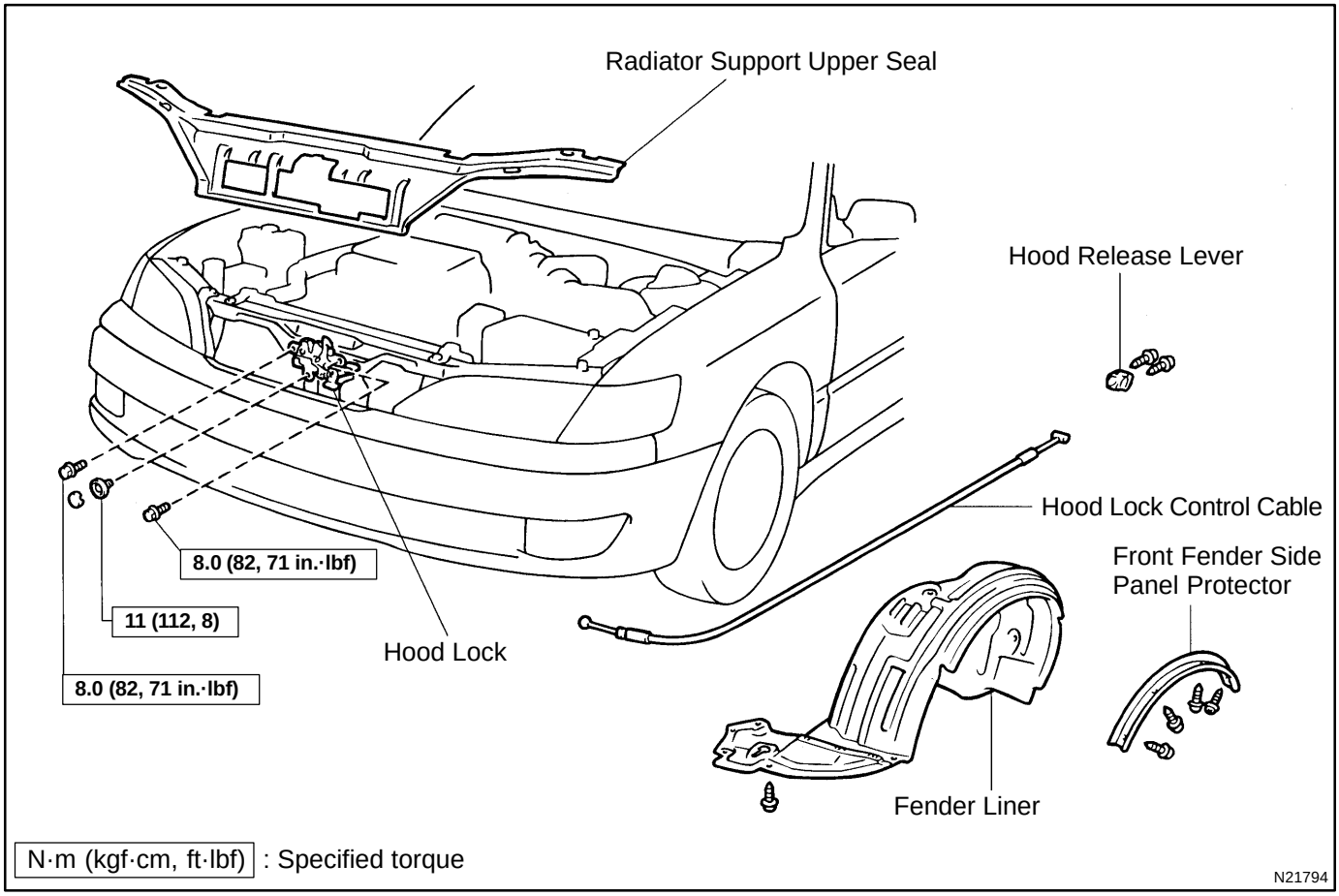
Torque: 17.5 N·m (178 kgf·cm, 13 ft·lbf)

HOOD LOCK CONTROL

HOOD LOCK CONTROL

COMPONENTS

BO09A–03

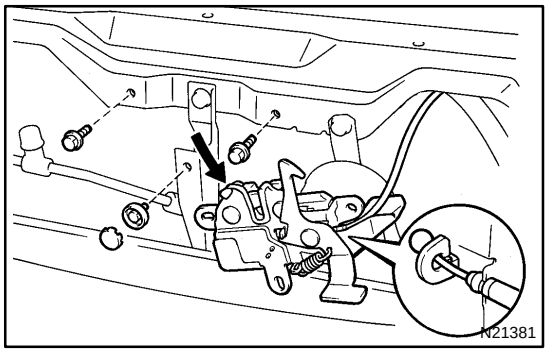


BO09B–01

REMOVAL

1. REMOVE THESE PARTS:

(a) LH front fender side panel protector
(b) LH fender liner
(c) Hood release lever
(d) Radiator support upper seal



2. REMOVE HOOD LOCK

(a) Using a screwdriver, pry out the cap.

HINT:

Tape the screwdriver tip before use.

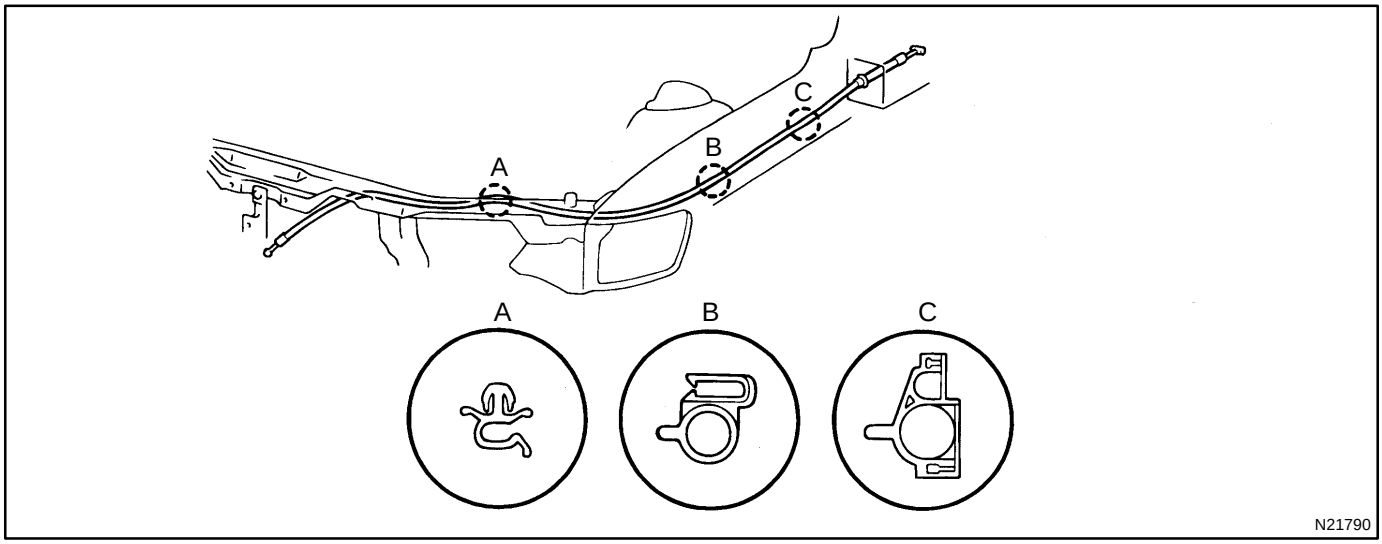
(b) Remove the 3 bolts and hood lock.
(c) Disconnect the link from the lock.

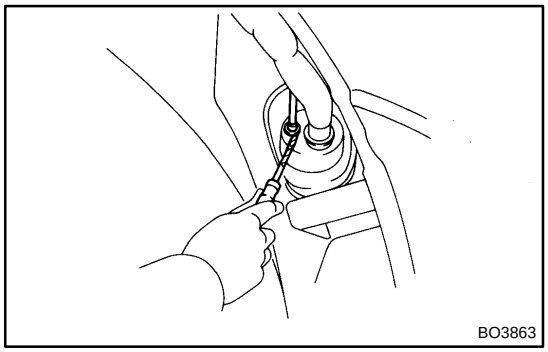
3. REMOVE HOOD LOCK CONTROL CABLE

(a) Using a screwdriver, disconnect the cable from the clamps.

HINT:

Tape the screwdriver tip before use.

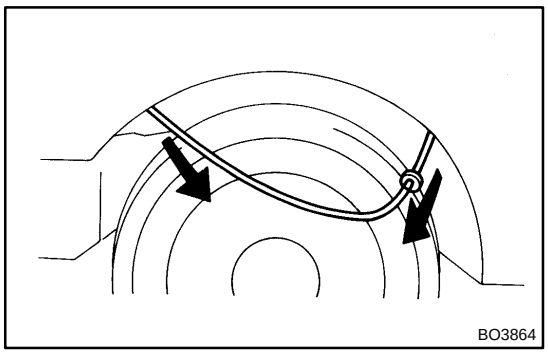




(b) Using a screwdriver, pry out the cable stopper from the grommet.

HINT:

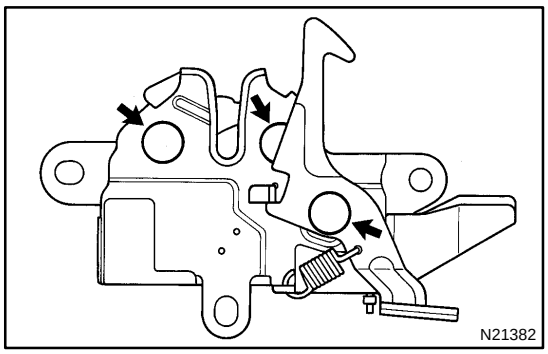
- Tape the screwdriver tip before use.
- Do not damage the grommet with the screwdriver.



(c) Pull off the cable from the front wheel housing to remove it.

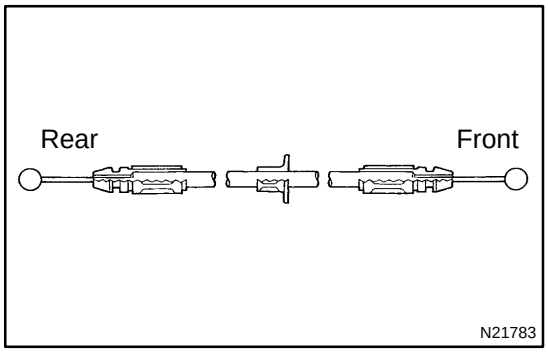
BO09C–03

INSTALLATION



1. BEFORE INSTALLING PARTS, COAT LOCK WITH MP GREASE

Apply MP grease to the sliding surface of the lock.



2. INSTALL HOOD LOCK CONTROL CABLE

(a) Push the rear side cable through the grommet.

(b) Using a screwdriver, push the cable stopper into the grommet.

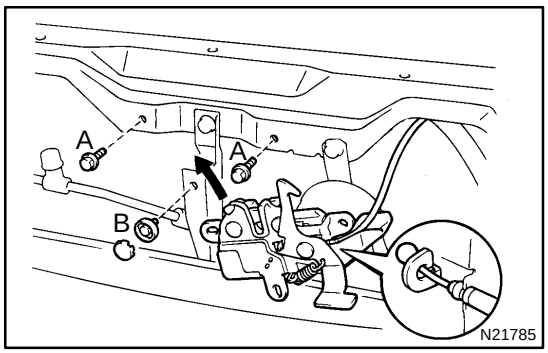
HINT:

- Tape the screwdriver tip before use.
- Do not damage the grommet with the screwdriver.

(c) Pass the front side cable through the upper radiator support.

(d) Install the cable with clamps.

3. INSTALL HOOD RELEASE LEVER



4. CHECK HOOD LOCK CONTROL FOR PROPER OPERATION

After checking for proper operation, tighten the 3 bolts to install the lock.

Torque:
A bolt: 8.0 N·m (82 kgf·cm, 71 in.·lbf)
B bolt: 11 N·m (112 kgf·cm, 8 ft·lbf)

5. INSTALL THESE PARTS:

(a) Radiator support upper seal

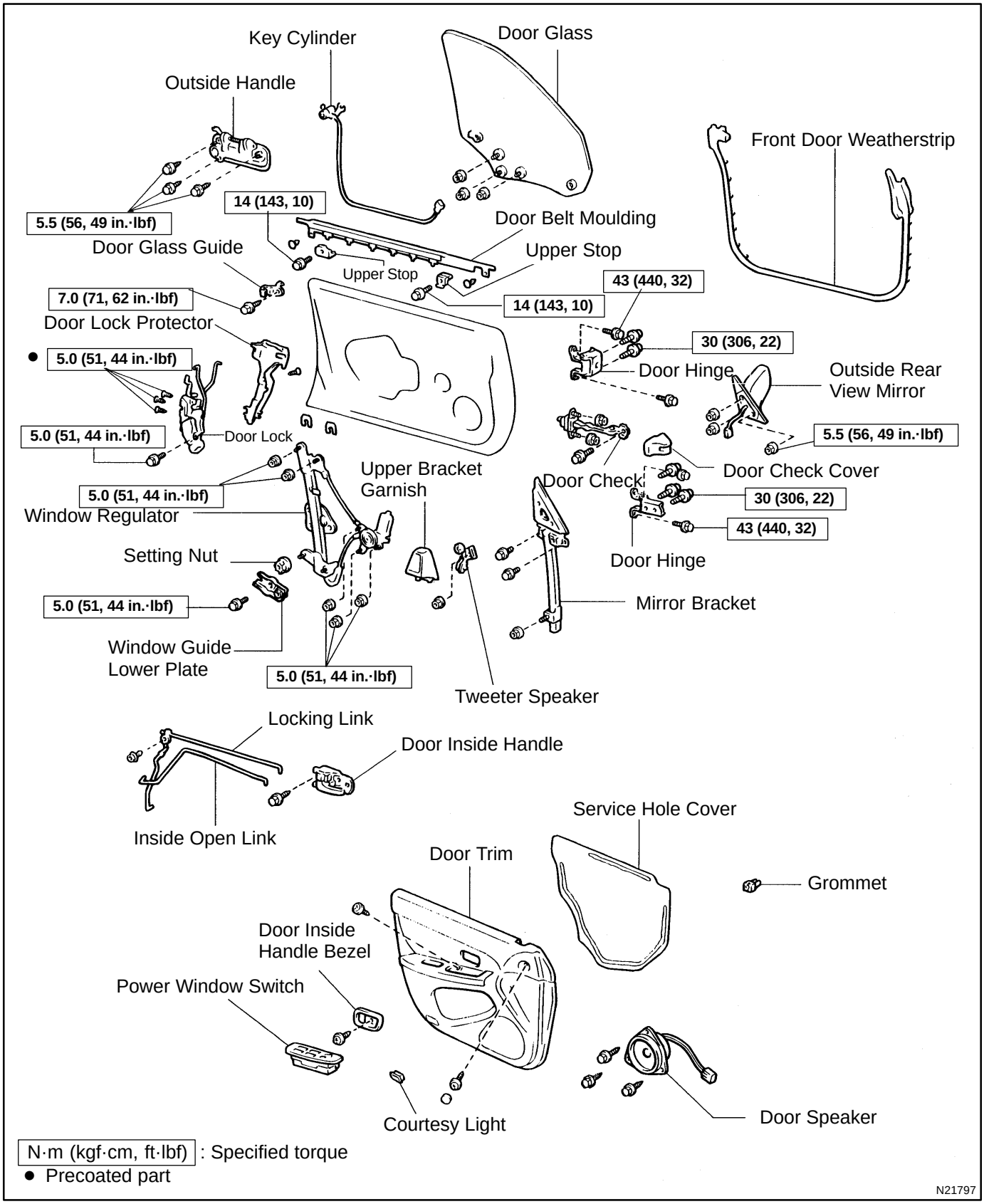
(b) LH fender liner

(c) LH front fender side panel protector

FRONT DOOR

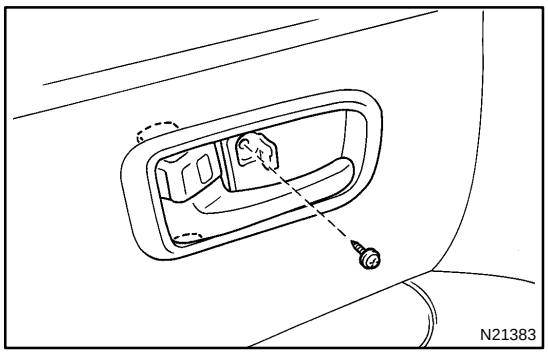
COMPONENTS

BO09D–03



BO09E–01

DISASSEMBLY



1. REMOVE DOOR INSIDE HANDLE BEZEL

(a) Open the cap, then remove the screw.

(b) Using a screwdriver, remove the inside handle bezel.

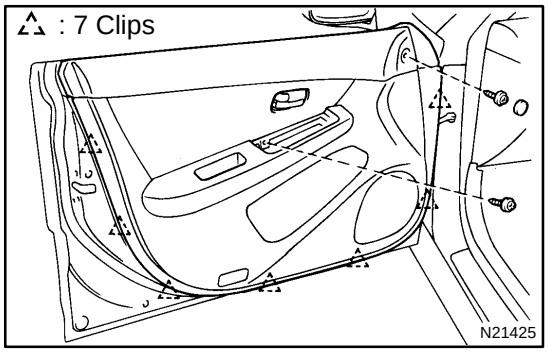
HINT:

Tape the screwdriver tip before use.

2. REMOVE THESE PARTS:

(a) Upper bracket garnish

(b) Power window switch



3. REMOVE DOOR TRIM

(a) Using a screwdriver, remove the screw cap.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 screws.

(c) Insert a screwdriver between the door panel and door trim to pry the trim out.

HINT:

Tape the screwdriver tip before use.

(d) Pull the trim upward to remove it, then disconnect the courtesy light connector.

(e) Remove the courtesy light from the door trim.

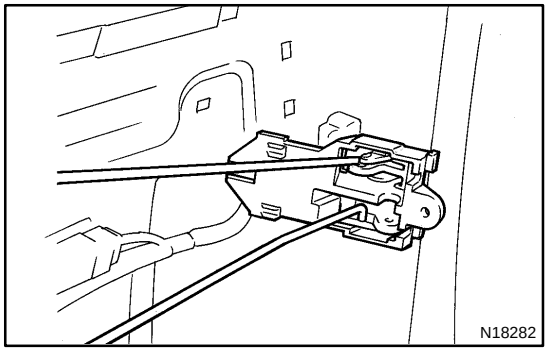
4. REMOVE THESE PARTS:

(a) Tweeter speaker

(b) Outside rear view mirror

Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(c) Front door weatherstrip



5. REMOVE DOOR INSIDE HANDLE

(a) Remove the screw.

(b) Disconnect the 2 control links from the inside handle as shown in the illustration.

6. REMOVE SERVICE HOLE COVER

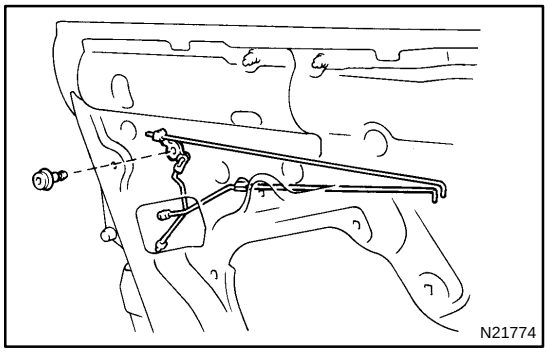
Remove the grommet, then remove the service hole cover.

HINT:

At the time of assembly, please refer to the following item.

Bring out the links through the service hole cover.

7. REMOVE SPEAKER

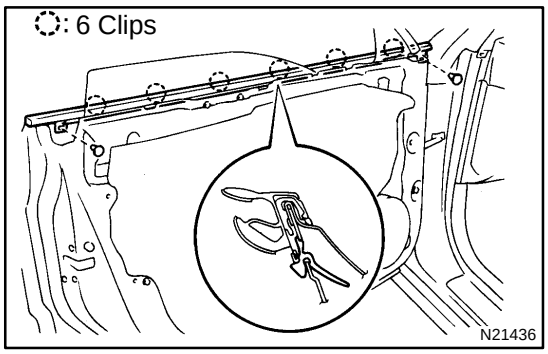


8. DISCONNECT INSIDE OPEN LINK AND LOCKING LINK

(a) Using a clip remover, remove the clip.

(b) Disconnect the 2 links from the door lock, then remove the 2 links.

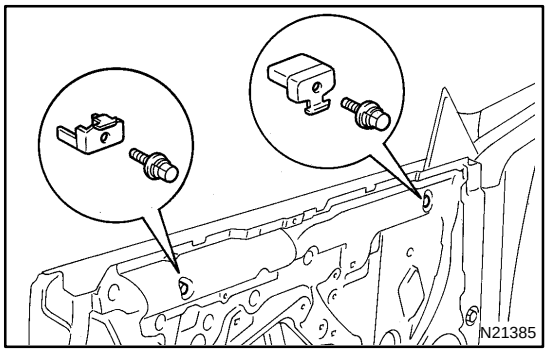
9. REMOVE FRONT DOOR WEATHERSTRIP



10. REMOVE DOOR BELT MOULDING

(a) Remove the 2 clips from the front and rear edge of the moulding shown in the illustration.

(b) Pry out the clips from the edge of moulding and remove the moulding.



11. REMOVE UPPER STOP

Remove the 2 bolts and 2 upper stops as shown in the illustration.

Torque: 14 N·m (143 kgf·cm, 10 ft·lbf)

12. REMOVE DOOR GLASS

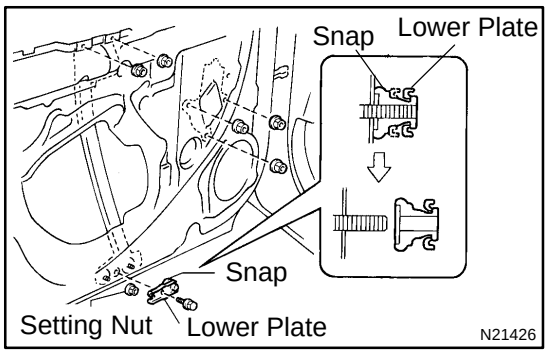
(a) Remove the 3 nuts.

(b) Pull the door glass out of the panel carefully.

HINT:

At the time of assembly, please refer to the following item.

Insert a shop rag inside the panel to prevent scratching the glass.



13. REMOVE WINDOW REGULATOR

(a) Disconnect the connector.

(b) Remove the bolt of lower plate.

Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

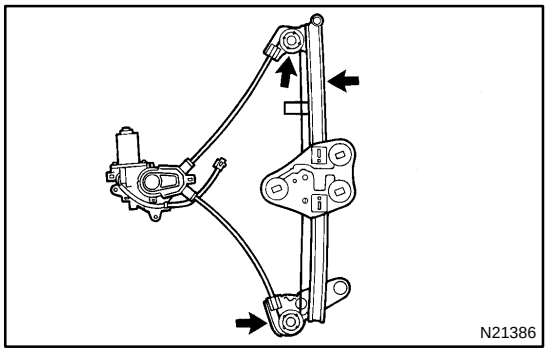
(c) Unlock the snap by pulling the lower plate.

(d) Remove the snap and lower plate from the stud bolt of lower bracket.

(e) Remove the setting nut from the lower bracket.

(f) Remove the 5 nuts and window regulator.

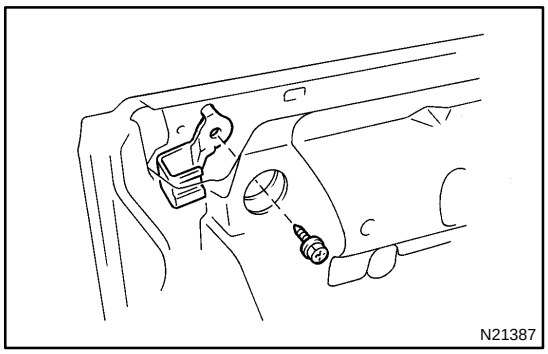
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)



HINT:

At the time of assembly, please refer to the following item.

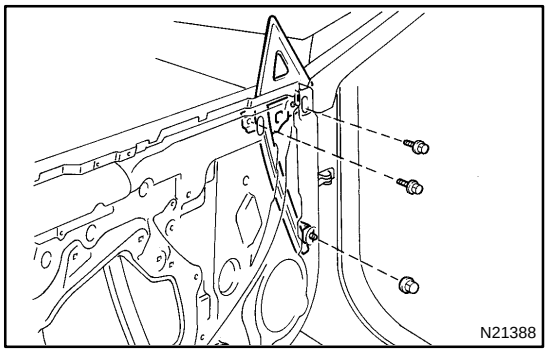
Apply MP grease to the glass guide and rollers of window regulator.



14. REMOVE DOOR GLASS GUIDE

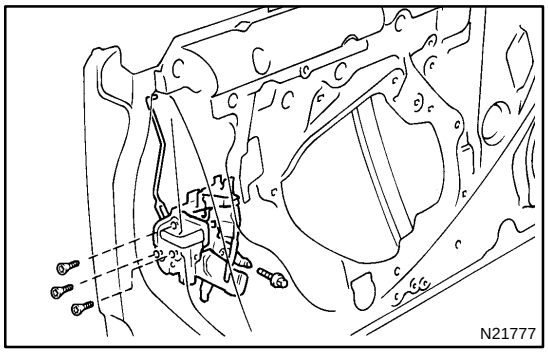
Remove the bolt and guide.

Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)



15. REMOVE MIRROR BRACKET

Remove the 2 bolts, nut and bracket.



16. REMOVE DOOR LOCK

(a) Disconnect the 2 links from the outside handle and key cylinder.

(b) Disconnect the connector.

(c) Remove the bolt.

Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

(d) Remove the 3 screws and door lock.

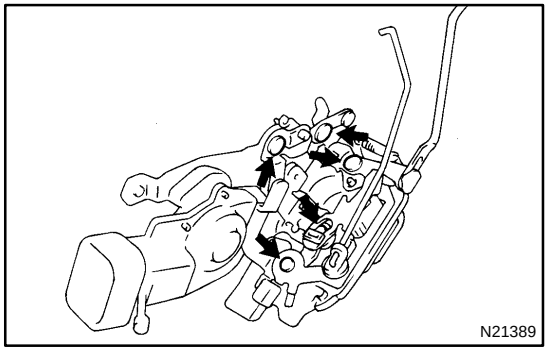
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

HINT:

At the time of assembly, please refer to the following item.

Apply adhesive to the 3 screws.

Part No.08833–00070, THREE BOND 1324 or equivalent.



HINT:

At the time of assembly, please refer to the following item.

Apply MP grease to the sliding and rotating parts of the door lock.

17. REMOVE OUTSIDE HANDLE

(a) Disconnect the connector.

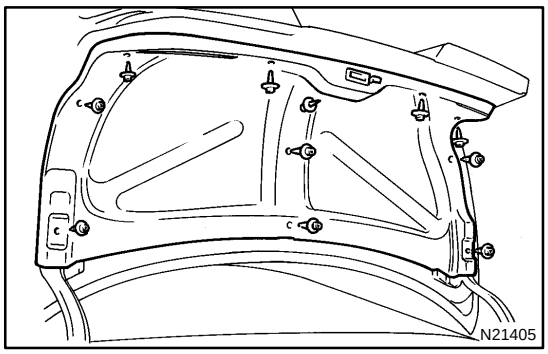
(b) Remove the 2 bolts and handle.

Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

(c) Remove the key cylinder from the handle.

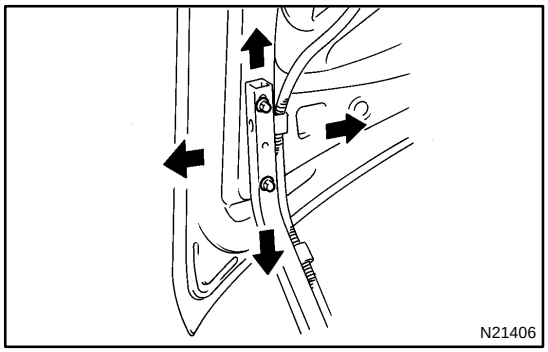
BO09U–01

ADJUSTMENT



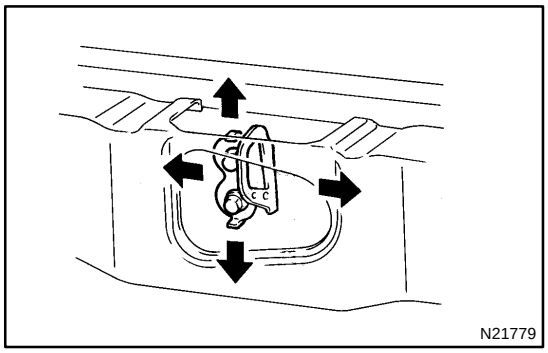
1. ADJUST LUGGAGE COMPARTMENT DOOR

(a) Remove the 11 clips and luggage compartment door trim.



(b) For forward/rearward and horizontal adjustment loosen the bolts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

(c) For vertical adjustment of the front end of the door, increase or decrease the number of washers between the hinge and the door.
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



2. ADJUST DOOR LOCK STRIKER

(a) Remove the LH and RH rear floor finish side plates.

(b) Remove the rear floor finish plate.

(c) Loosen the 2 lock striker set bolts.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)

(d) Using a hammer and a brass bar, tap the striker to adjust it.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–36).

BO09W–01

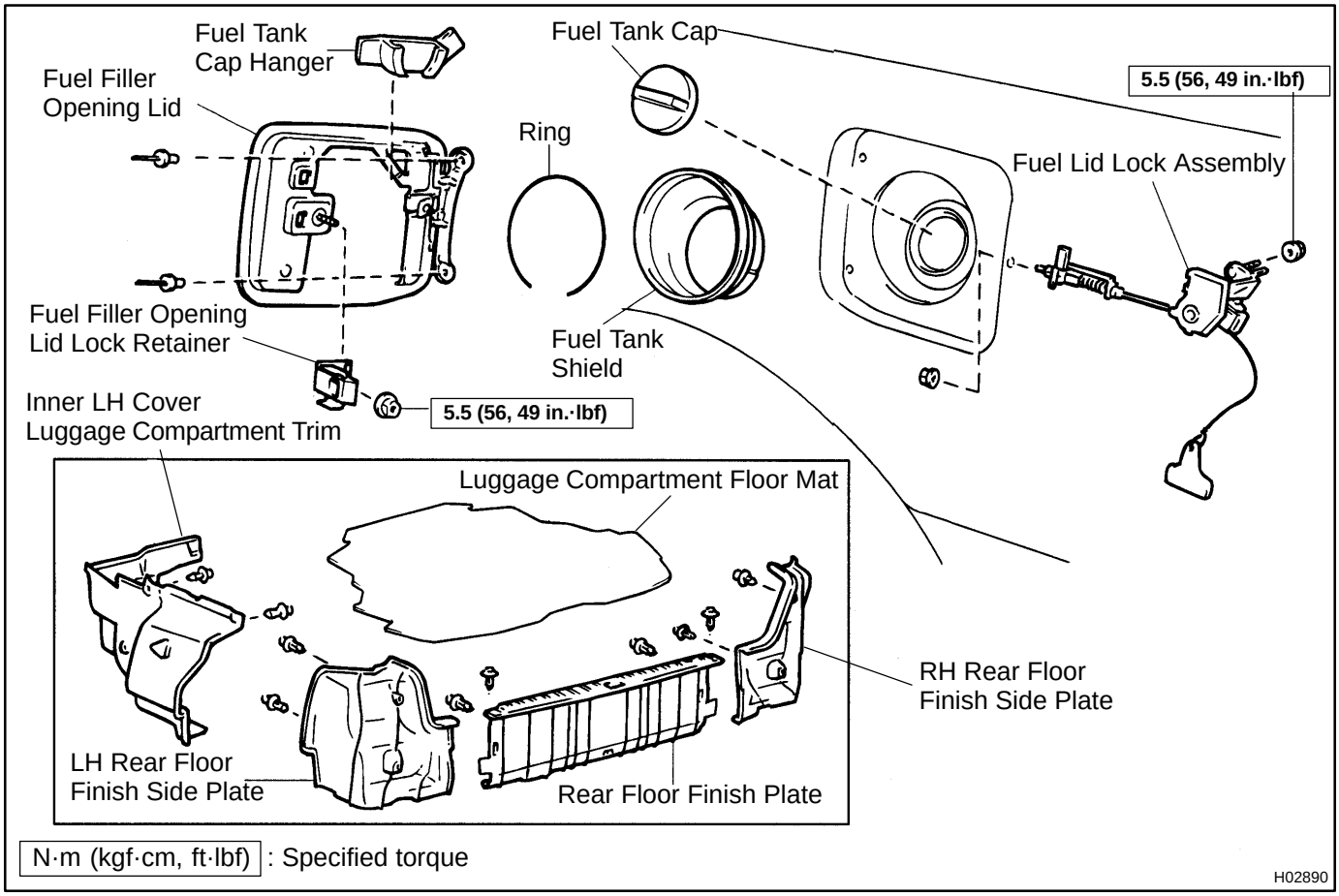
INSTALLATION

Installation is in the reverse order of removal (See page BO–34).

FUEL LID

COMPONENTS

BO09X–03

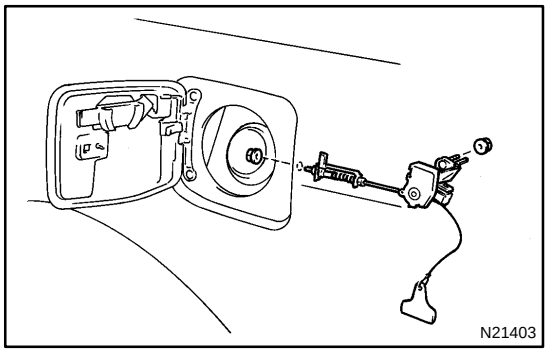


BO09Y–03

REMOVAL

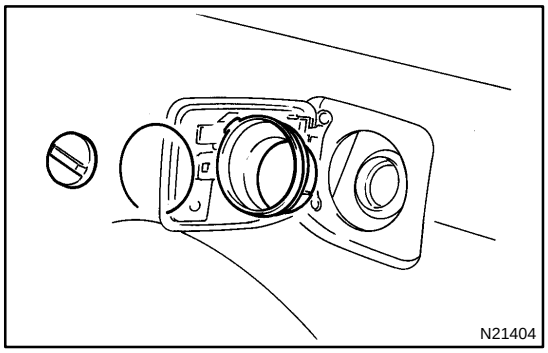
1. REMOVE THESE PART:

(a) Luggage compartment floor mat
(b) Rear floor finish plate
(c) LH rear floor finish side plate
(d) Inner LH cover luggage compartment trim



2. REMOVE FUEL LID LOCK ASSEMBLY

(a) Remove the nut from the fuel lid side.
(b) Remove the nut and lock assembly, then disconnect the connector.



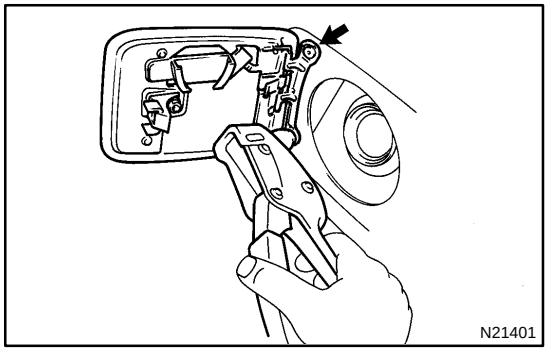
3. REMOVE FUEL INLET PIPE SHIELD

(a) Remove the ring.
(b) Remove the fuel tank cap and shield.

CAUTION:

- **Always keep the tank cap closed when it is not required to be open.**
- **Keep all fire away during the operation.**

(c) Install the cap quickly.



4. REMOVE FUEL FILLER OPENING LID

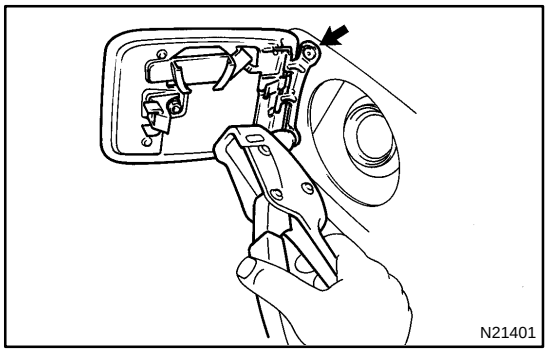
(a) Using a drill, drill out the rivet heads.
(b) Remove the fuel filler opening lid.
(c) Remove the fuel tank cap hanger and lock retainer from the opening lid.

BO09Z–01

INSTALLATION

1. INSTALL THESE PARTS:

(a) Fuel inlet pipe shield
(b) Fuel tank cap
(c) Ring
(d) Fuel lid lock assembly
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)



2. INSTALL FUEL FILLER OPENING LID

(a) Install the fuel tank cap hanger to the opening lid.
(b) Install the nut and fuel filler opening lid lock retainer to the opening lid.
Torque: 5.5 N·m (56 kgf·cm, 49 in.·lbf)
(c) Using a riveter, install the 2 rivets to the fuel filler opening lid.

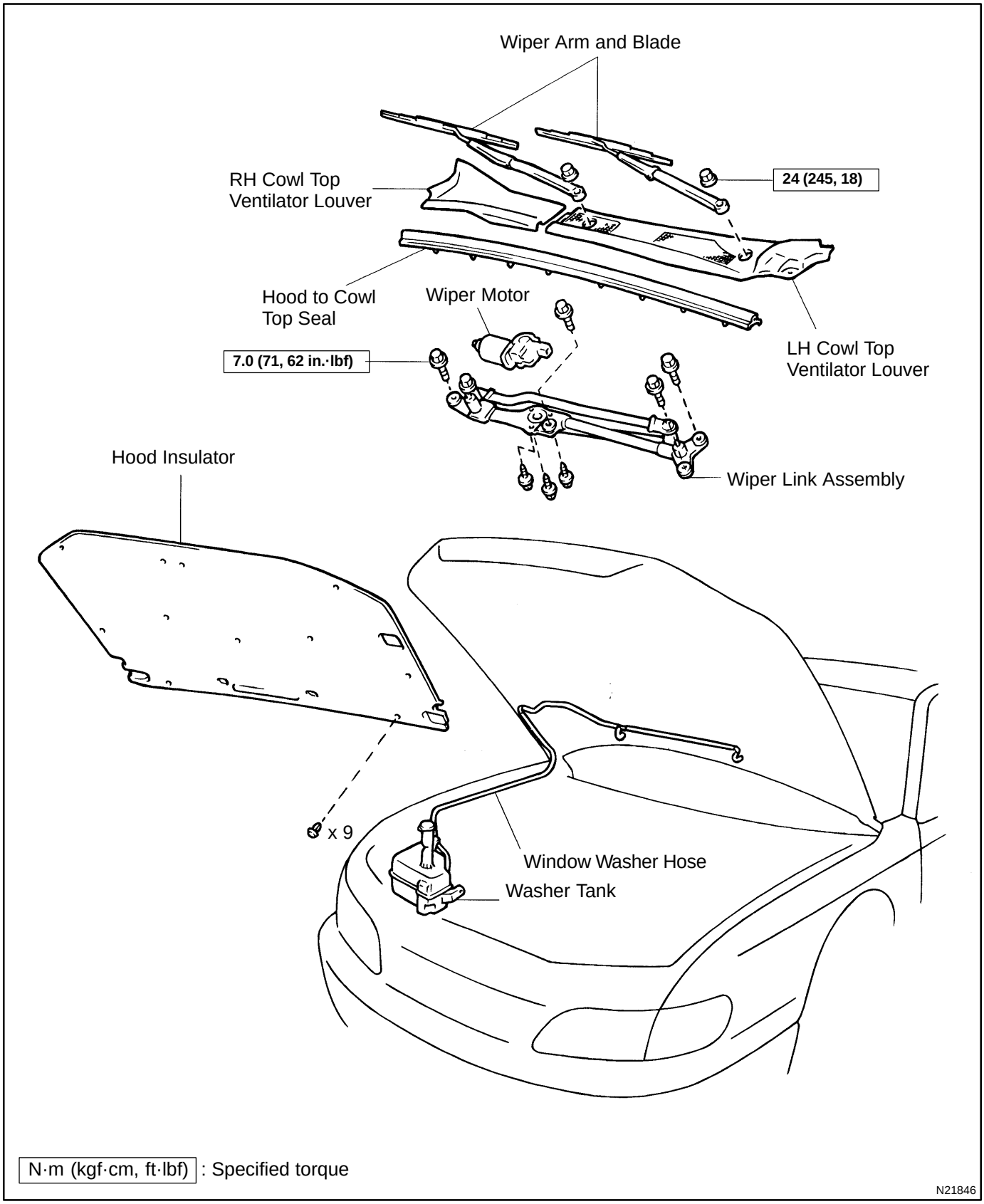
3. INSTALL THESE PARTS:

(a) Inner LH cover luggage compartment trim
(b) Rear floor finish side plates
(c) Rear floor finish plate
(d) Luggage compartment floor mat

FRONT WIPER AND WASHER

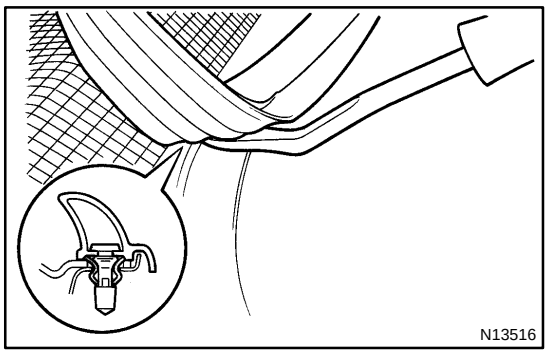
BO0A0–03

COMPONENTS



BO0A1–01

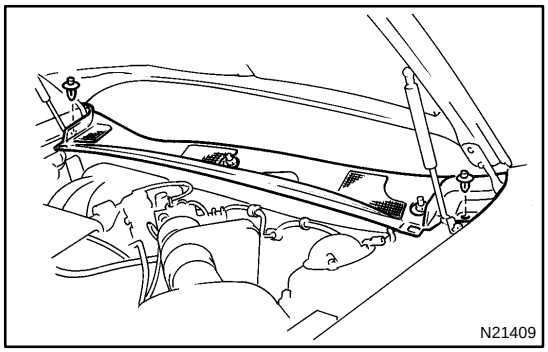
REMOVAL



1. REMOVE WIPER ARM AND BLADE ASSEMBLY

2. REMOVE COWL TOP VENTILATOR LOUVER

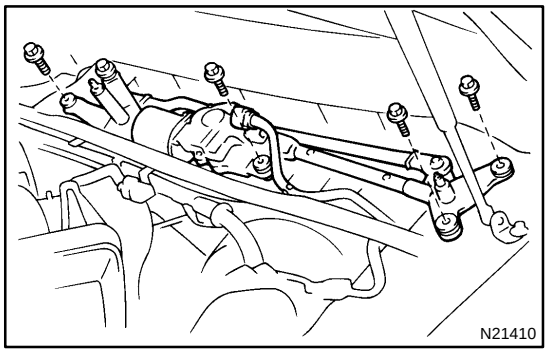
(a) Remove the hood to cowl top seal.



(b) Remove the 2 clips and cowl top ventilator louver.

HINT:

Raise the front side of the cowl top ventilator louver up and remove the cowl top ventilator louver.



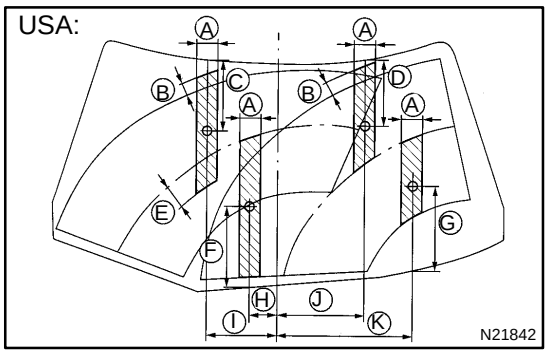
3. REMOVE WIPER MOTOR AND LINK ASSEMBLY

(a) Remove the 4 bolts.

(b) Disconnect the connector, then unfasten the bolt.

(c) Raise the front side of the wiper motor and link assembly up and remove the wiper motor and link assembly.

BO0A2–03



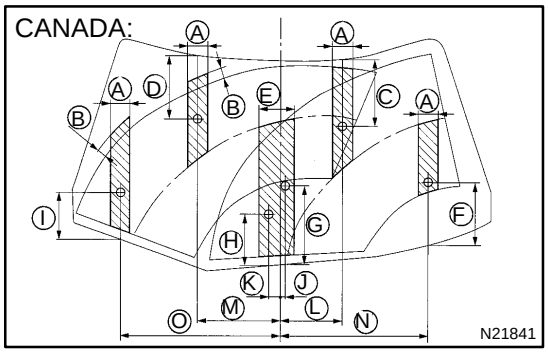
INSPECTION

INSPECT WASHER NOZZLE

(a) While operating the washer, check that the points where the washer fluid hits the windshield and the upsurge area are within the range indicated by the hatched line.

USA:

A: Approx. 150 mm (5.91 in.)
B: Approx. 50 mm (1.99 in.)
C: Approx. 251 mm (9.88 in.)
D: Approx. 243 mm (9.57 in.)
E: Approx. 100 mm (3.94 in.)
F: Approx. 297 mm (11.69 in.)
G: Approx. 306 mm (12.05 in.)
H: Approx. 90 mm (3.54 in.)
I: Approx. 230 mm (9.06 in.)
J: Approx. 280 mm (11.02 in.)
K: Approx. 440 mm (17.32 in.)

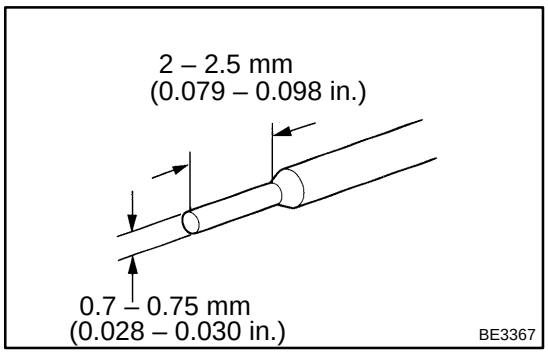


CANADA:

A: Approx. 150 mm (5.91 in.)
B: Approx. 50 mm (1.99 in.)
C: Approx. 262 mm (10.31 in.)
D: Approx. 260 mm (10.24 in.)
E: Approx. 210 mm (8.27 in.)
F: Approx. 239 mm (9.41 in.)
G: Approx. 310 mm (12.20 in.)
H: Approx. 196 mm (7.72 in.)
I: Approx. 194 mm (7.64 in.)
J: Approx. 22 mm (0.87 in.)
K: Approx. 40 mm (1.57 in.)
L: Approx. 230 mm (9.06 in.)
M: Approx. 283 mm (11.14 in.)
N: Approx. 521 mm (20.51 in.)
O: Approx. 548 mm (21.57 in.)

(b) Check that the lower point where the washer fluid hits the windshield is within the range of the wiping pattern (the area of the glass which is wiped by the wiper blades).

BO0A3–01



ADJUSTMENT

ADJUST WASHER NOZZLE

Using a tool like the one shown in the illustration, change the direction of the nozzle hole to adjust the point where washer fluid strikes the windshield.

BO0A4–01

INSTALLATION

1. INSTALL WIPER MOTOR AND LINK ASSEMBLY

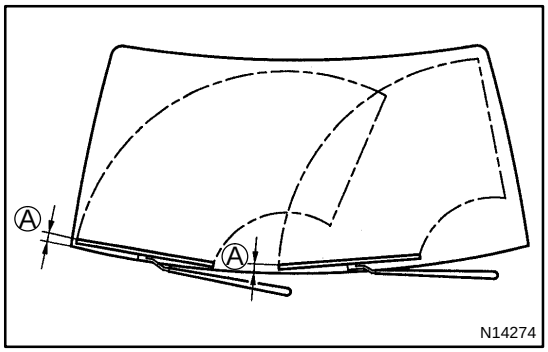
(a) Install the wiper motor and link assembly.

(b) Connect the connector.

(c) Install and torque the 5 bolts.

Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

2. INSTALL COWL TOP VENTILATOR LOUVER



3. INSTALL WIPER ARM AND BLADE ASSEMBLY

(a) Install the wiper arms and blades, and operate the wipers once and turn the wiper switch OFF.

(b) Adjust the wiper arms to the positions shown in the illustration.

A: Approx. 25 mm (0.98 in.)

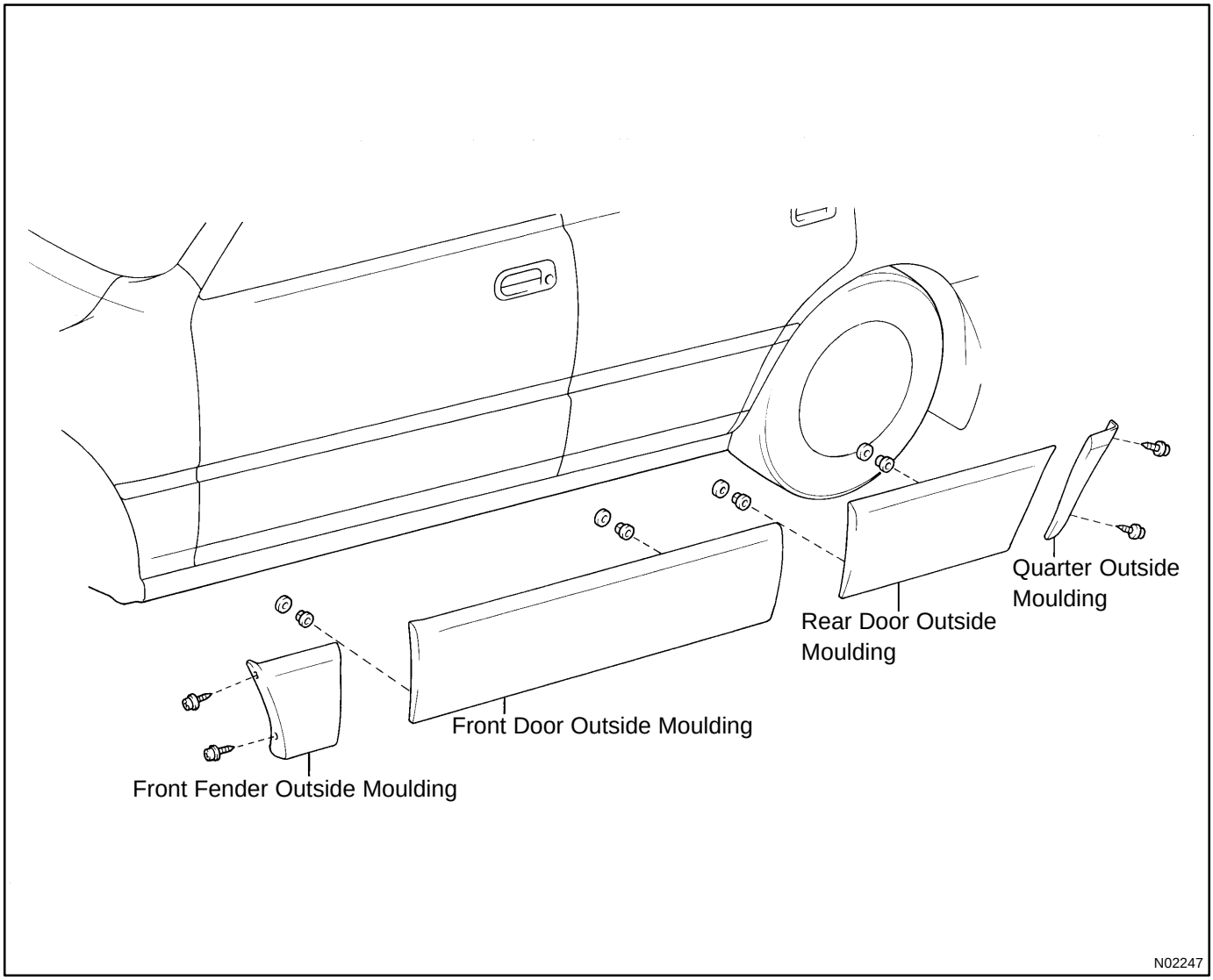
(c) Torque the nuts.

Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

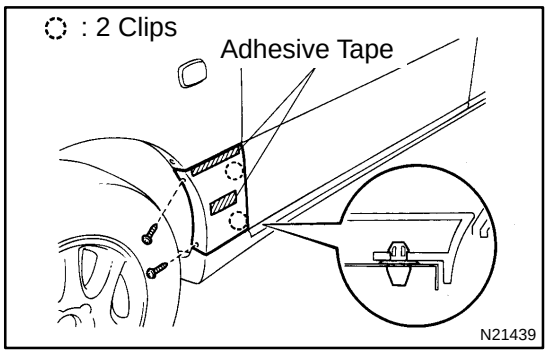
BODY OUTSIDE MOULDING

COMPONENTS

BO0A5–01



BO0A6–01



REMOVAL

1. REMOVE FRONT FENDER MOULDING

(a) Remove the 2 screws.

(b) Using a heat light, heat the moulding to 40 – 60 ˚C (104 – 140 ˚F).

NOTICE:

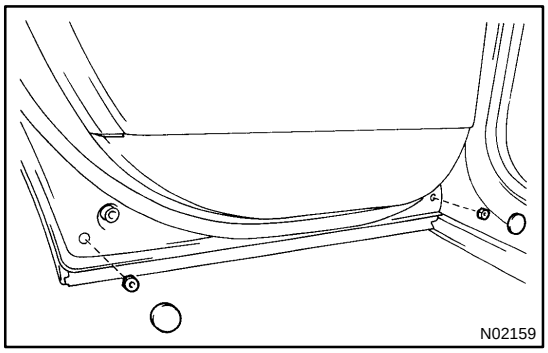
Do not heat the moulding excessively.

(c) Cut the adhesive tape with a knife.

NOTICE:

- **If reusing the moulding, take care not damage the moulding.**
- **Do not damage the body.**

(d) Remove the moulding.



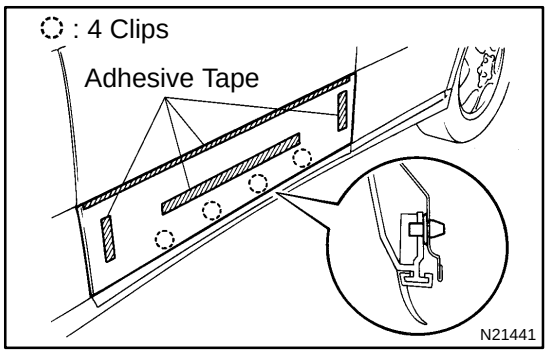
2. REMOVE FRONT DOOR OUTSIDE MOULDING

(a) Remove the 2 hole plugs and 2 nuts.

(b) Using a heat light, heat the moulding to 40 – 60 ˚C (104 – 140 ˚F).

NOTICE:

Do not heat the moulding excessively.

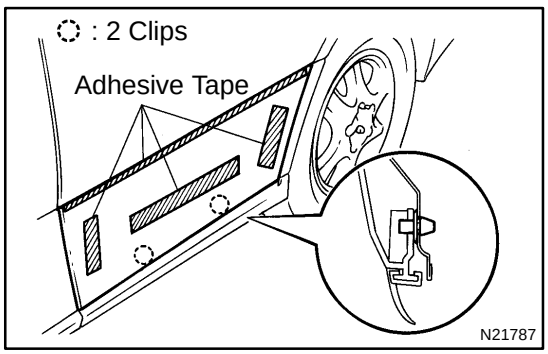


(c) Cut the adhesive tape with a knife.

NOTICE:

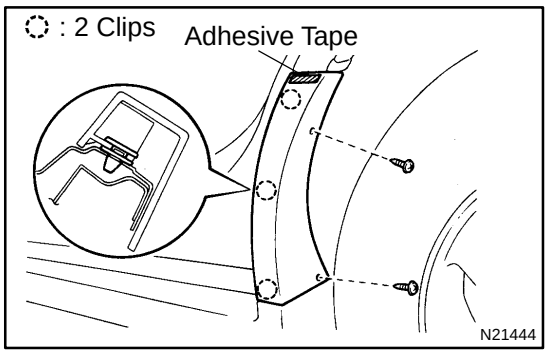
- **If reusing the moulding, take care not to damage the moulding.**
- **Do not damage the body.**

(d) Remove the moulding.



3. REMOVE REAR DOOR OUTSIDE MOULDING

Remove the rear door outside moulding in the same way as the front fender moulding.



4. REMOVE QUARTER OUTSIDE MOULDING

(a) Remove the 2 screws.

(b) Using a heat light, heat the moulding to 40 – 60 ˚C (104 – 140 ˚F).

NOTICE:

Do not heat the moulding excessively.

(c) Cut the adhesive tape with a knife.

NOTICE:

- **If reusing the moulding, take care not to damage the moulding.**
- **Do not damage the body.**

(d) Remove the moulding.

BO0A7–01

INSTALLATION

1. CLEAN BODY MOUNTING SURFACE

(a) Using a heat light, heat the body mounting surface to 40 – 60 ˚C (104 – 140 ˚F).

(b) Remove adhesive tape from the body.

(c) Wipe off stains with a cleaner.

2. CLEAN MOULDING

If reusing the moulding

(a) Using a heat light, heat the moulding to 20 – 40 ˚C (68 – 86 ˚F).

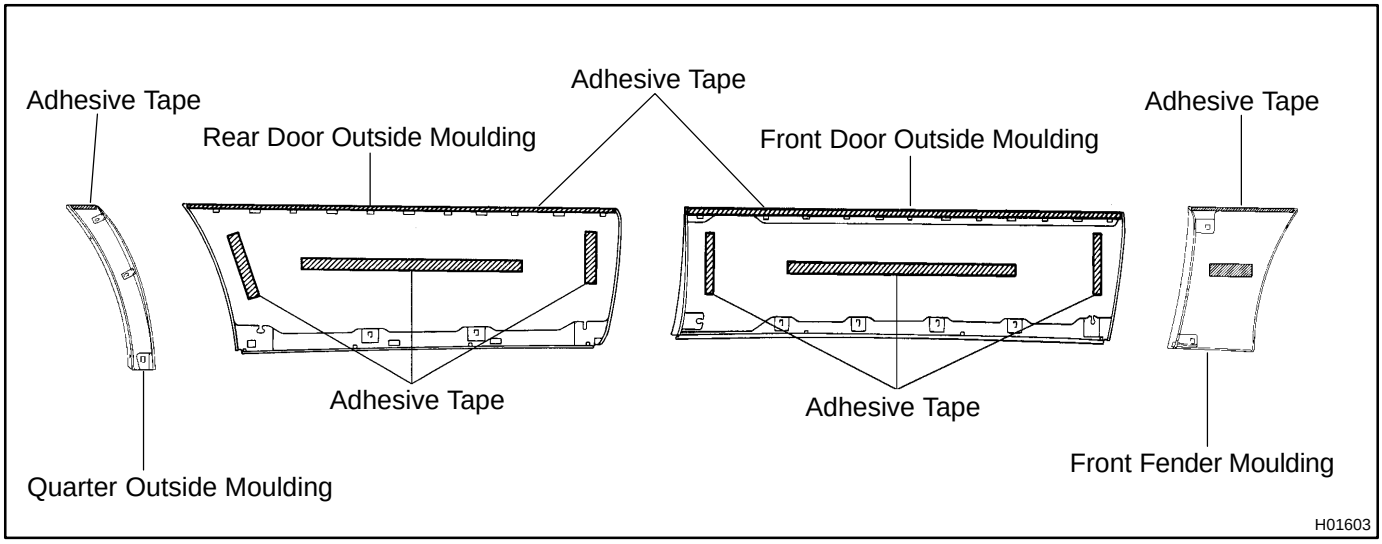
NOTICE:

Do not heat the moulding excessively.

(b) Remove the adhesive tape from the moulding.

(c) Wipe off stains with a cleaner.

(d) Apply new adhesive tape to the moulding as shown in the illustration.



3. INSTALL MOULDING

(a) Using a heat light, heat the body and moulding.
Body: 40 – 60 ˚C (104 – 140 ˚F)
Moulding: 20 – 30 ˚C (68 – 86 ˚F)

NOTICE:

Do not heat the moulding excessively.

(b) Remove the moulding release sheet from the face of moulding.

NOTICE:

When the moulding release sheet is removed, make sure that no dirt or dust can get onto the uncoated area.

(c) Align the bosses with their corresponding holes in the body, and press firmly on the moulding.

NOTICE:

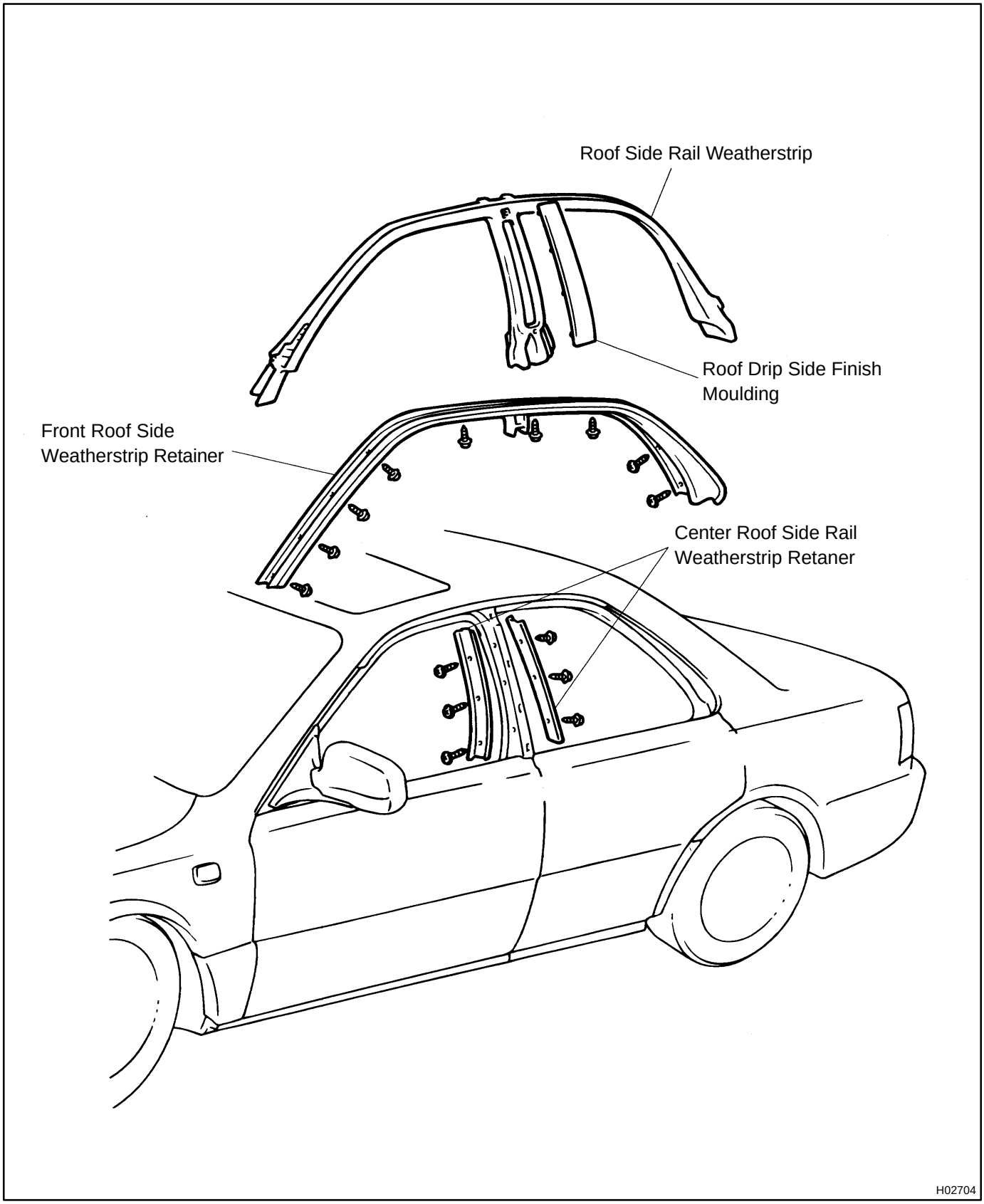
Do not apply excessive force onto the moulding, but apply steady pressure with your thumbs.

(d) Install the moulding.

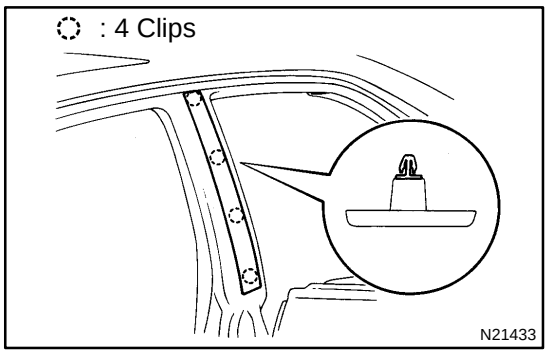
ROOF DRIP SIDE FINISH MOULDING

BO0A8–01

COMPONENTS



BO0A9–01



REMOVAL

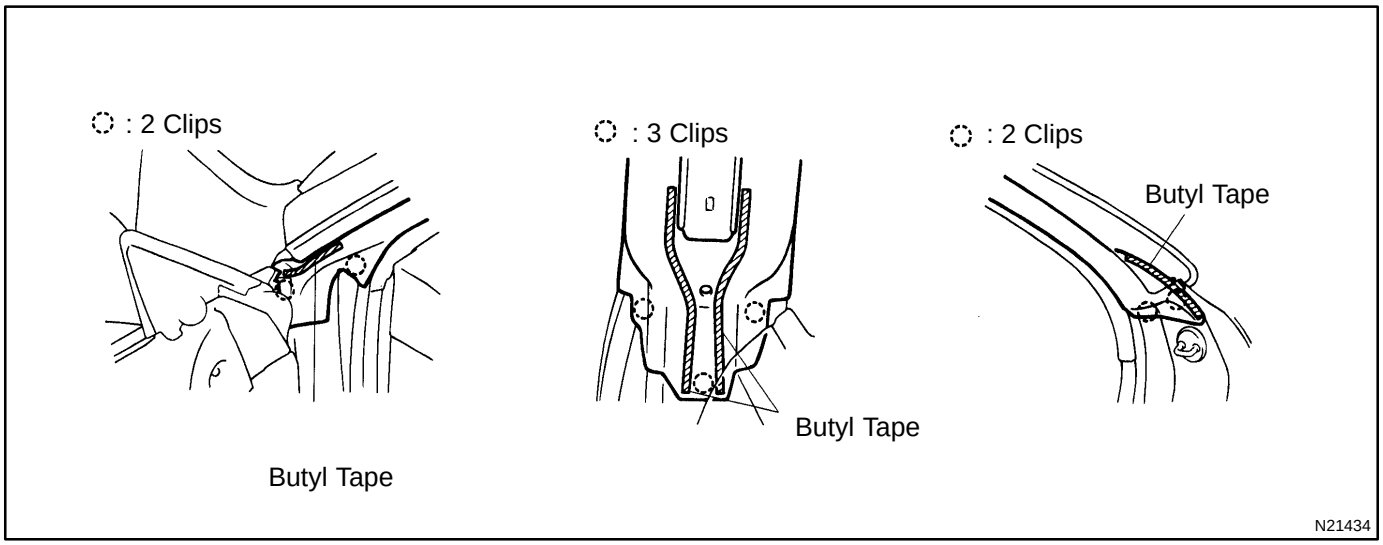
1. REMOVE ROOF DRIP SIDE FINISH MOULDING

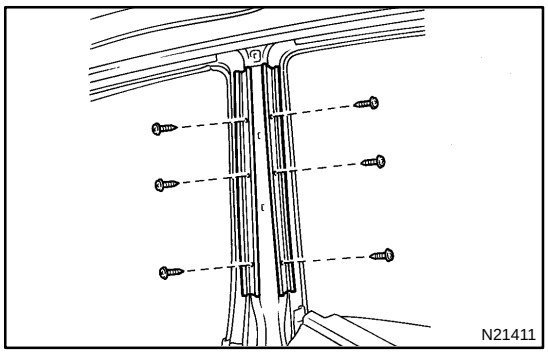
Remove the moulding.

2. REMOVE ROOF SIDE RAIL WEATHERSTRIP

(a) Using a clip remover, remove the 7 clips.

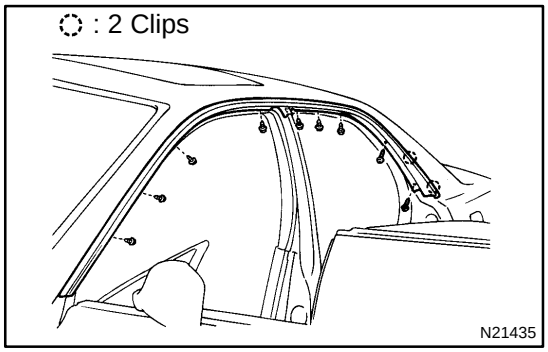
(b) Pull off the weatherstrip.





3. REMOVE CENTER ROOF SIDE RAIL WEATHERSTRIP RETAINER

Remove the 6 screws and retainers.



4. REMOVE FRONT ROOF SIDE WEATHERSTRIP RETAINER

Remove the 9 screws and retainers.

BO0AA–01

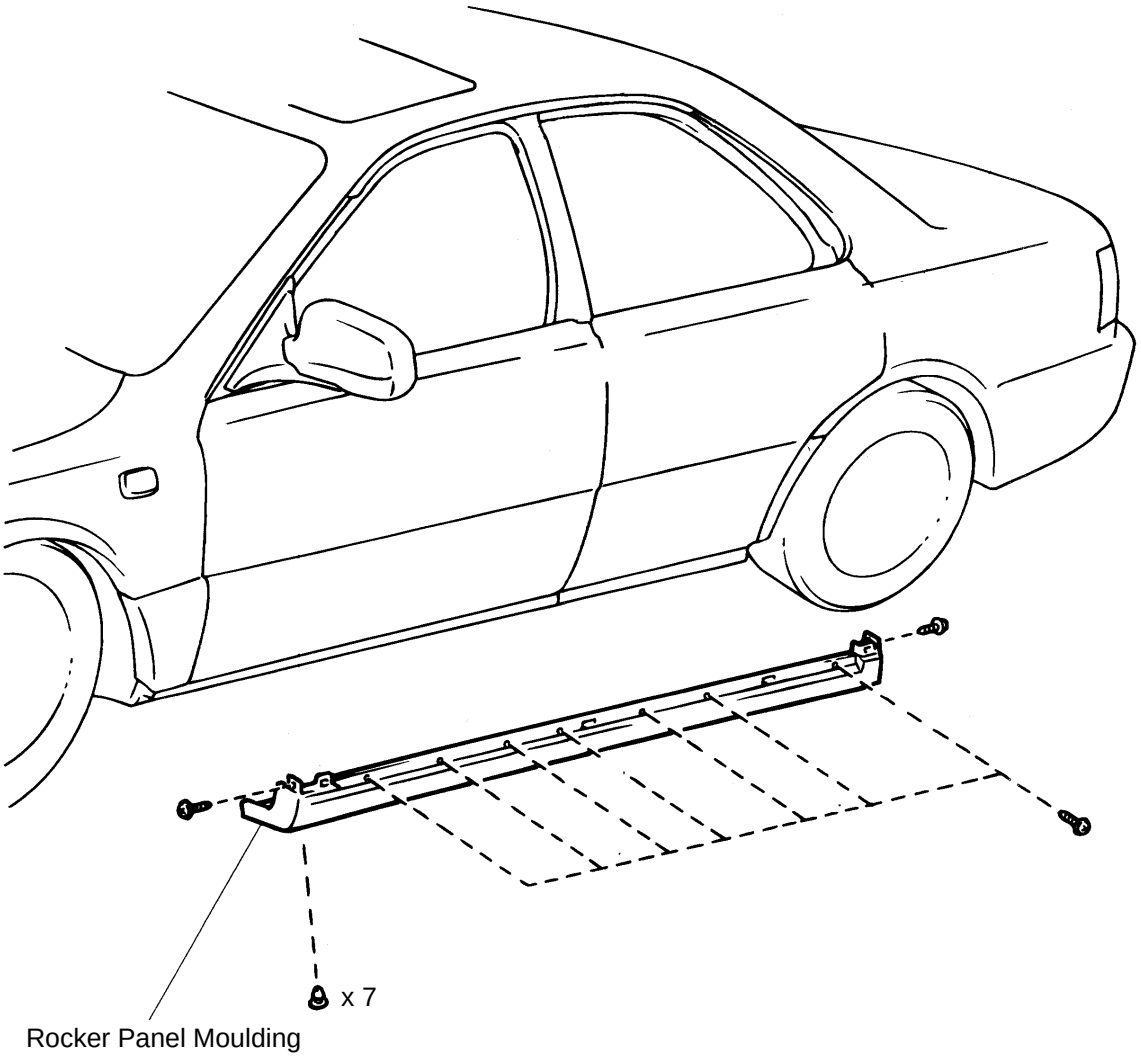
INSTALLATION

Installation is in the reverse order of removal (See page BO–54).

ROCKER PANEL MOULDING

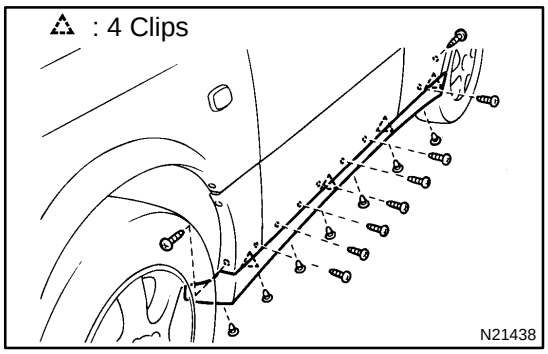
BO0AB–01

COMPONENTS



H02705

BO0AC–01



REMOVAL

REMOVE ROCKER PANEL MOULDING

(a) Remove the 9 screws and 7 clips.

(b) Using a screwdriver, remove the rocker panel moulding.

HINT:

Tape the screwdriver tip before use.

BO0AD–01

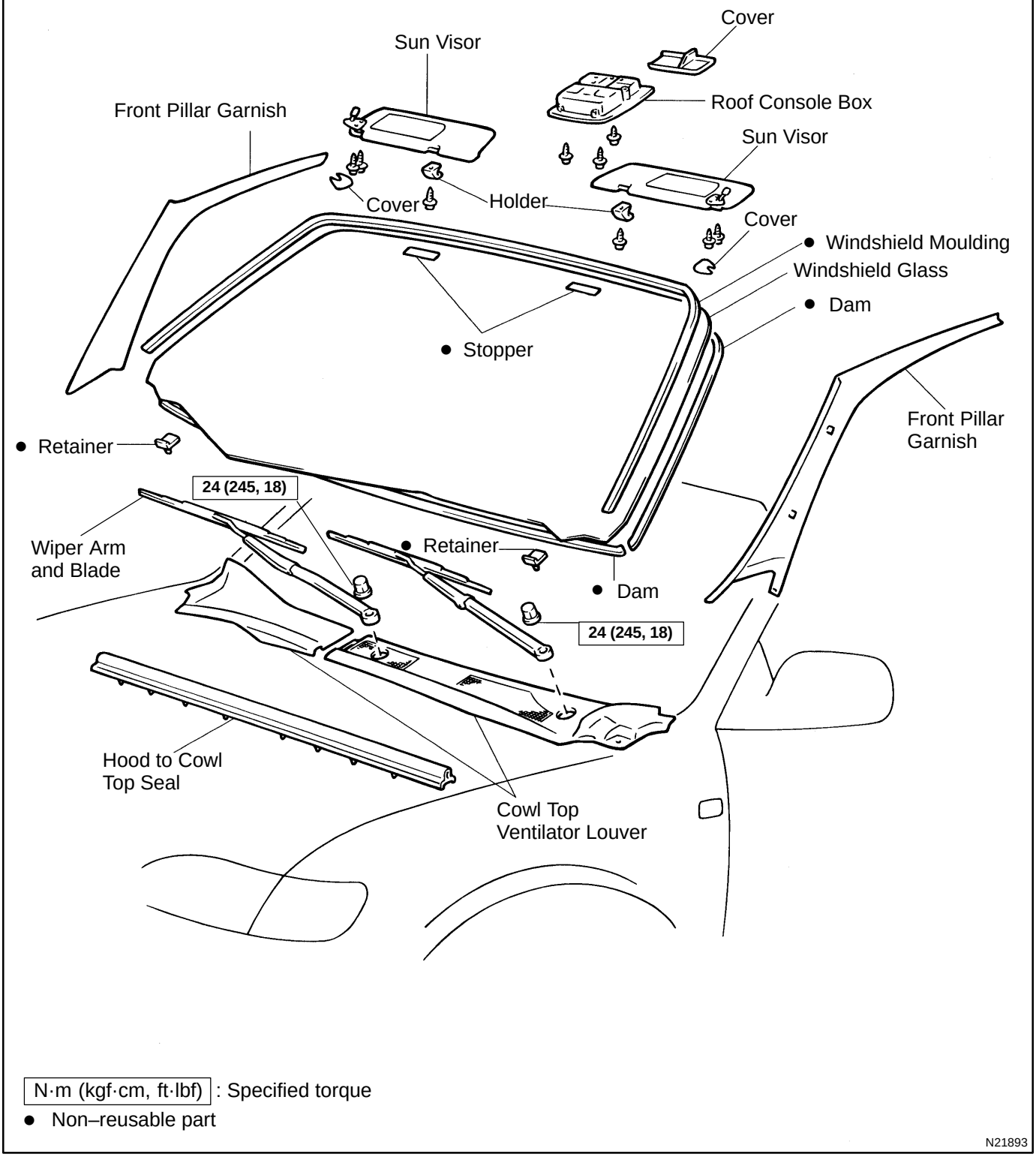
INSTALLATION

Installation is in the reverse order of removal (See page BO–57).

WINDSHIELD

COMPONENTS

BO0AE–05



N·m (kgf·cm, ft·lbf) : Specified torque

● Non–reusable part

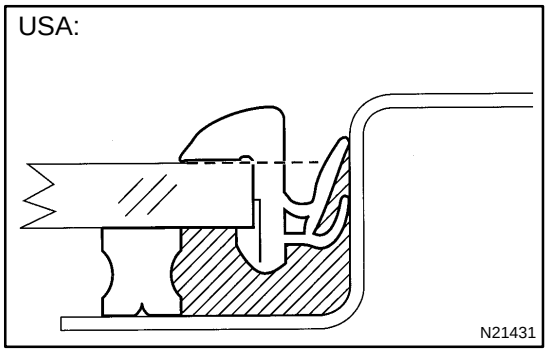
N21893

BO0AF–02

REMOVAL

1. REMOVE THESE PARTS:

(a) Sun visors and holders
(b) Front pillar garnishes
(c) Wiper arm and blades
(d) Hood to cowl top seal
(e) Cowl top ventilator louver
(f) Roof console box
(g) Front side of roof headlining

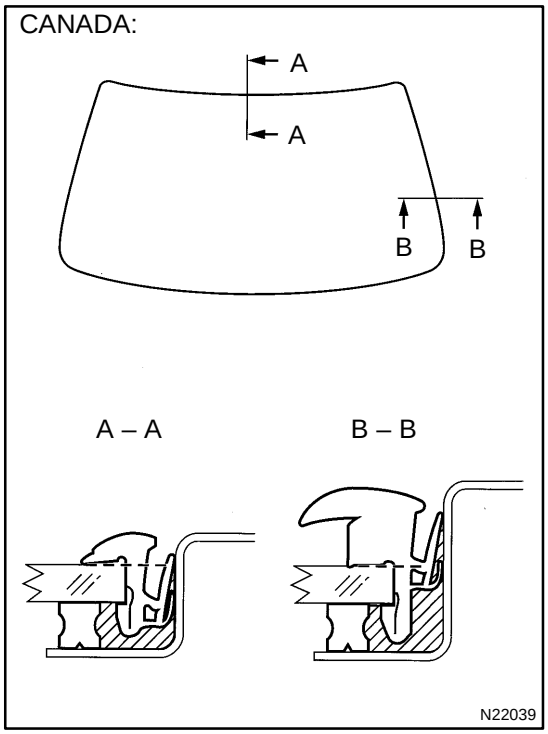


2. USA:
REMOVE WINDSHIELD MOULDING

Using a knife, cut off the moulding shown in the illustration.

NOTICE:

Do do not damage the body with the knife.

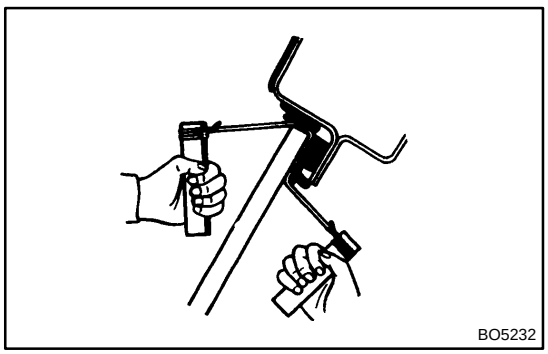


3. CANADA:
REMOVE WINDSHIELD MOULDING

Using a knife, cut off the moulding shown in the illustration.

NOTICE:

Do not damage the body with the knife.

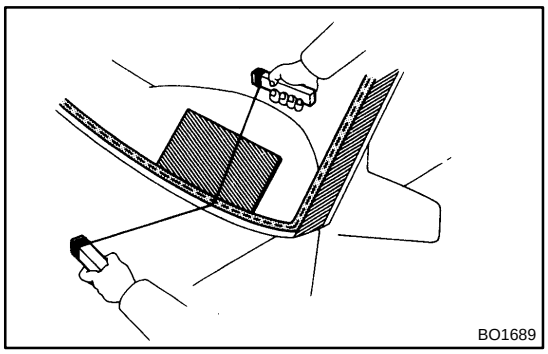


4. REMOVE WINDSHIELD GLASS

(a) Push piano wire through between the body and glass from the interior.
(b) Tie both wire ends to a wooden block or a similar object.

HINT:

Apply adhesive tape to the outer surface to keep the surface from being scratched.



NOTICE:

When separating the glass, take care not to damage the paint and interior and exterior ornaments. To prevent scratching the safety pad when removing the windshield, place a plastic sheet between the piano wire and safety pad.

(c) Cut the adhesive by pulling the piano wire around it.

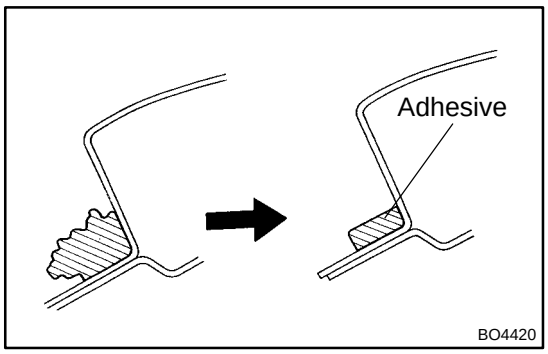
(d) Remove the glass.

NOTICE:

Leave as much of the adhesive on the body as possible when cutting off the glass.

BO0AG–02

INSTALLATION



1. CLEAN AND SHAPE CONTACT SURFACE OF BODY

(a) Using a knife, cut away any rough areas on the body.

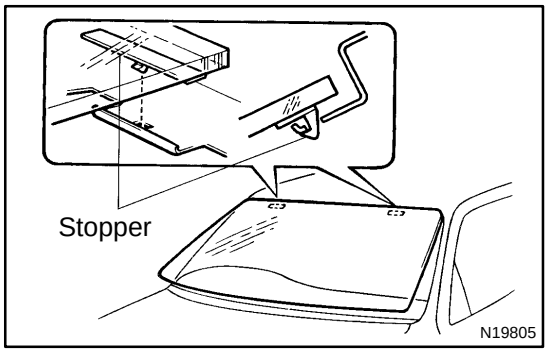
HINT:

Leave as much of the adhesive on the body as possible.

(b) Clean the cutting surface of the adhesive with a piece of shop rag saturated in a cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.



2. REPLACE STOPPER

(a) Remove the damaged stopper.

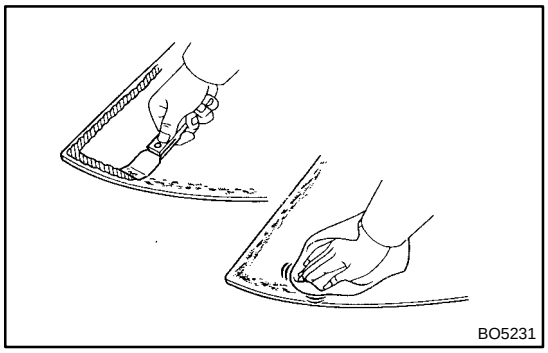
(b) Cut off the old adhesive around the stopper installation area.

NOTICE:

Be careful not to damage the glass.

(c) Clean the installation area.

(d) Install a new stopper onto the glass.



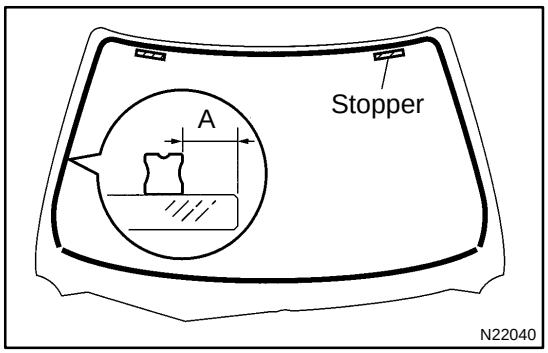
3. CLEAN REMOVED GLASS

(a) Using a scraper, remove the adhesive sticking to the glass.

(b) Clean the glass with a cleaner.

NOTICE:

Do not touch the glass after cleaning it.



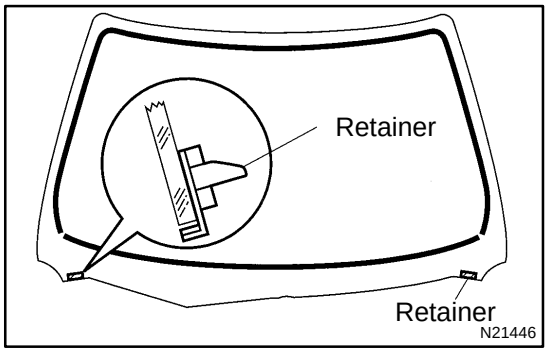
4. INSTALL DAM

Install the dam with double – stick tape as shown in the illustration.

NOTICE:

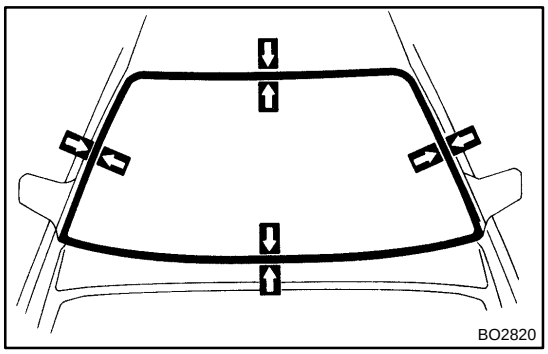
Do not touch the glass face after cleaning it.

A: 7.0 mm (0.276 in.)



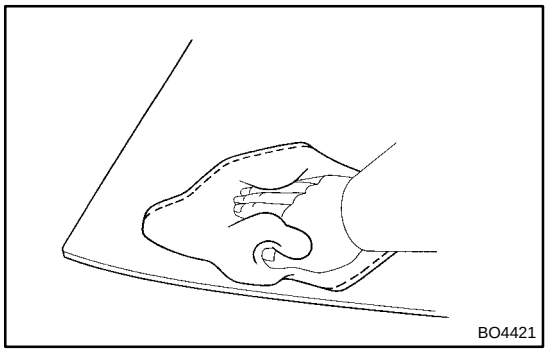
5. INSTALL RETAINER

Install the retainers as shown in the illustration.



6. POSITION GLASS

(a) Place glass in the correct position.
(b) Check that all contacting parts of the glass rim are perfectly even.
(c) Place reference marks between the glass and body.
(d) Remove the glass.

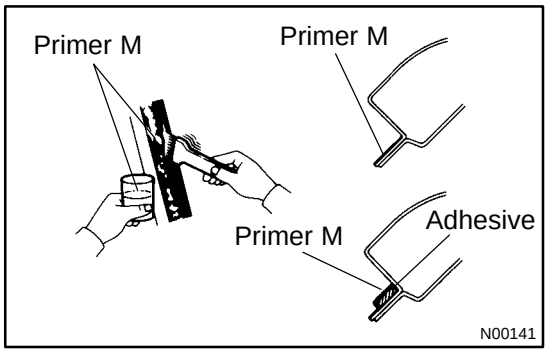


7. CLEAN CONTACT SURFACE OF GLASS

Using a cleaner, clean the contact surface which is black–colored area around the entire glass rim.

NOTICE:

Do not touch the glass face after cleaning it.

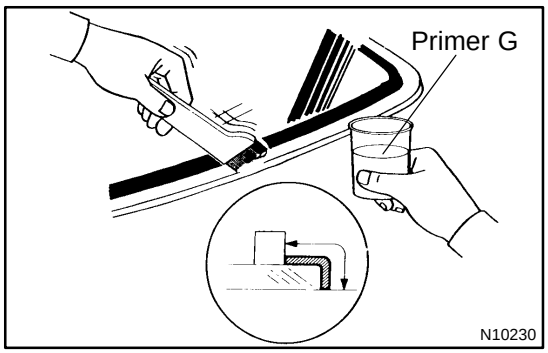


8. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat the contact surface on the body with Primer M.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not coat Primer M to the adhesive..**
- **Do not keep any of the opened Primer M for later use.**



9. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or a sponge, coat the edge of the glass and the contact surface with Primer G.
(b) Before the primer dries, wipe it off with a clean shop rag.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not keep any of the opened Primer G for later use.**

10. APPLY ADHESIVE

(a) Cut off the tip of the cartridge nozzle.

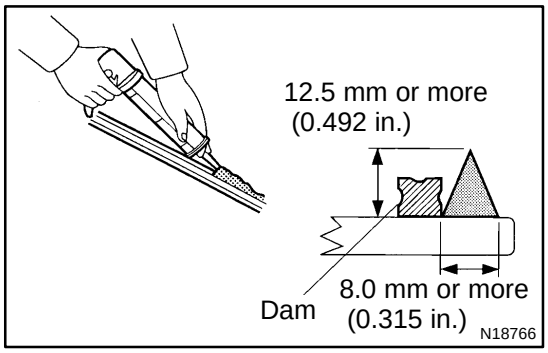
Part No.08850–00801 or equivalent

HINT:

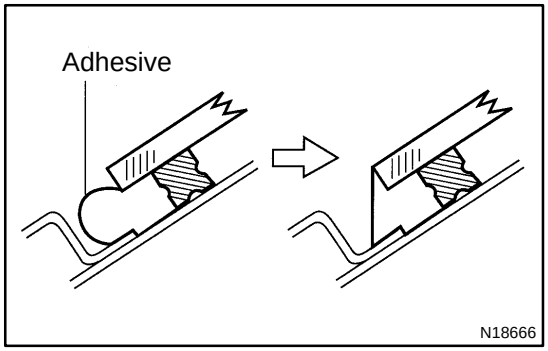
After cutting off the tip, use all adhesive within the time described in the chart below.

Temperature	Tackfree time
35 ˚C (95 ˚F)	15 minute
20 ˚C (68 ˚F)	100 minute
5 ˚C (41 ˚F)	8 hour

(b) Load the cartridge into the sealer gun.



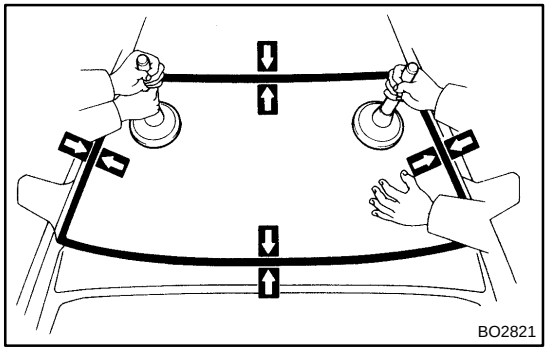
(c) Coat the glass with adhesive as shown.



11. INSTALL GLASS

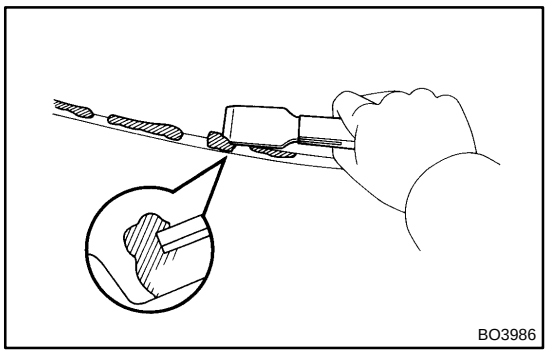
HINT:

Confirm that the dam is attached to the body panel as shown in the illustration.



(a) Position the glass so that the reference marks are lined up, and press in gently along the rim.

(b) Using a spatula, apply adhesive on the glass rim.



(c) Use a scraper to remove any excessive or protruding adhesive.

(d) Hold the glass in place securely with a protective tape or equivalent until the adhesive hardened.

NOTICE:

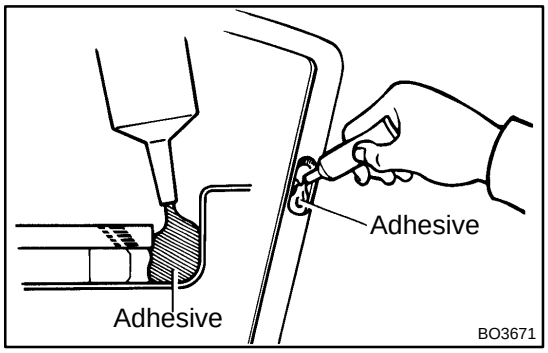
Take care not to drive the vehicle during the time described in the chart below.

Temperature	Minimum time prior to drive the vehicle
35 ˚C (95 ˚F)	1.5 hour
20 ˚C (68 ˚F)	5 hour
5 ˚C (41 ˚F)	24 hour

12. INSPECT FOR LEAKS AND REPAIR

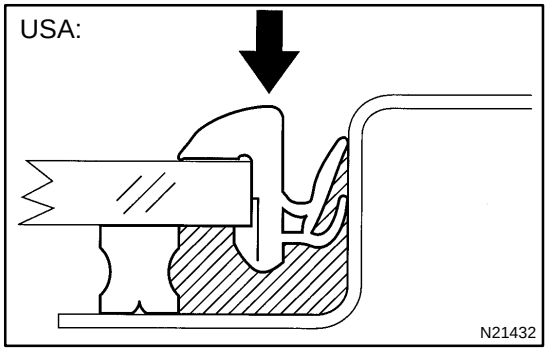
(a) Do a leak test after the hardening time has elapsed.

(b) Seal any leak with sealant.
Part No. 08833–00030 or equivalent



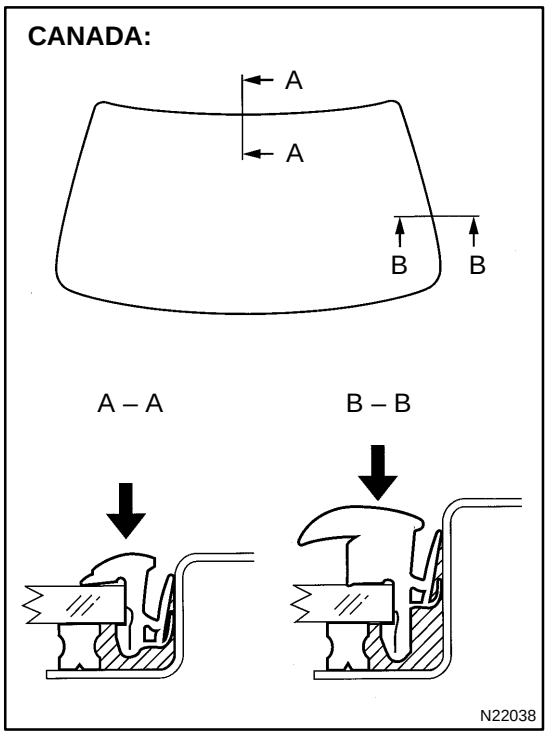
13. APPLY ADHESIVE AT MOULDING INSTALLATION AREA

Coat the glass with adhesive at the moulding installation area.
Part No. 08833–00030 or equivalent



14. USA:
INSTALL WINDSHIELD MOULDING

Place the moulding onto the body and tap it by hand.



15. CANADA:
INSTALL WINDSHIELD MOULDING

Place the moulding onto the body and tap it by hand.

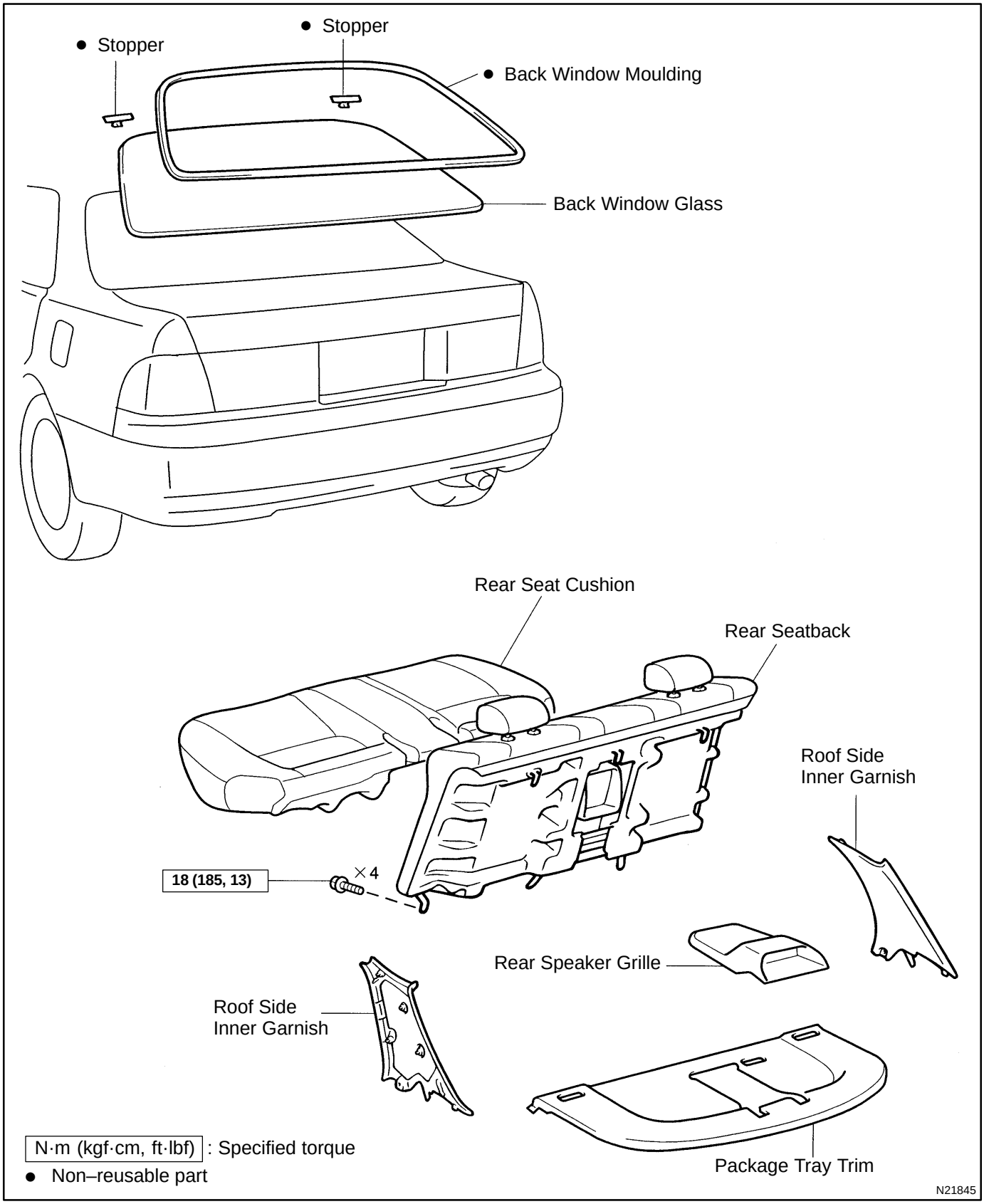
16. INSTALL THESE PARTS:

(a) Front side of roof headlining
(b) Roof console box
(c) Cowl top ventilator louver
(d) Hood to cowl top seal
(e) Wiper arm and blades
Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)
(f) Front pillar garnishes
(g) Sun visors and holders

BACK WINDOW GLASS

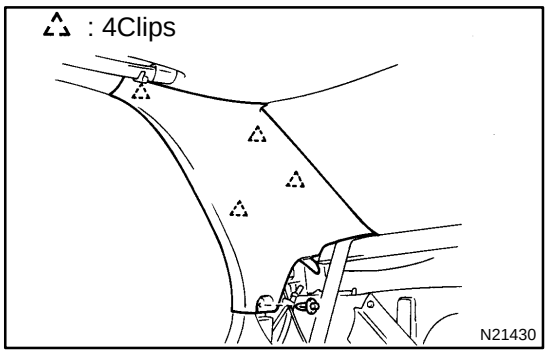
BO0AH–04

COMPONENTS



BO0AI–04

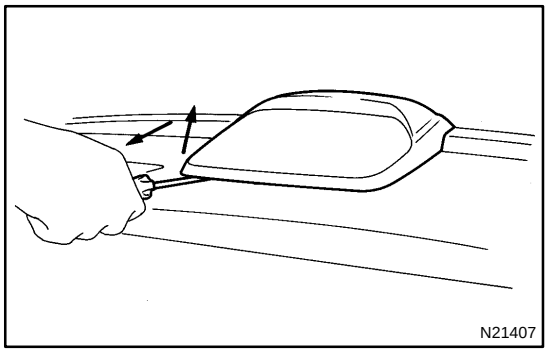
REMOVAL



1. REMOVE REAR SEAT CUSHION AND SEATBACK (See page BO–105)

2. REMOVE ROOF SIDE INNER GARNISH

Remove the clip and garnish.



3. REMOVE REAR SPEAKER GRILLE

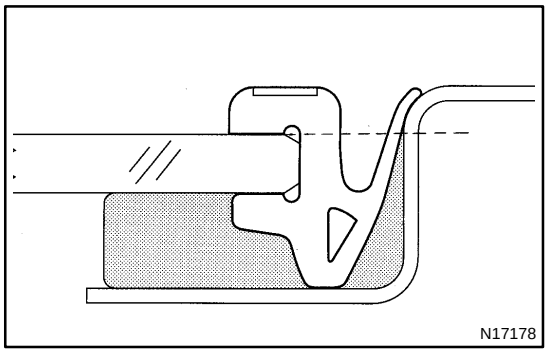
(a) Using a screwdriver, remove the rear speaker grille as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

(b) Disconnect the connector.

4. REMOVE PACKAGE TRAY TRIM



5. REMOVE BACK WINDOW MOULDING

Using a knife, cut off the moulding as shown in the illustration.

NOTICE:

Do not damage the body with the knife.

6. REMOVE BACK WINDOW GLASS

Remove the glass in the same way as windshield.

(See page BO–60)

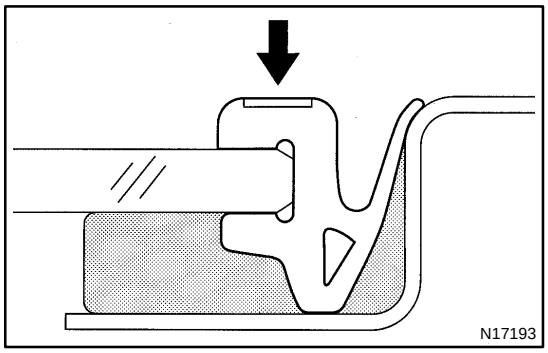
BO0AJ–04

INSTALLATION

HINT:

Refer to the installation of windshield and install the back window glass by following operations. (See page BO–62)

1. **CLEAN AND SHAPE CONTACT SURFACE OF BODY**
2. **REPLACE STOPPER**
3. **CLEAN REMOVED GLASS**
4. **POSITION GLASS**
5. **CLEAN CONTACT SURFACE OF GLASS**
6. **COAT CONTACT SURFACE OF BODY WITH PRIMER ”M”**
7. **COAT CONTACT SURFACE OF GLASS WITH PRIMER ”G”**
8. **APPLY ADHESIVE**
9. **INSTALL GLASS**
10. **INSPECT FOR LEAKS AND REPAIR**
11. **APPLY ADHESIVE AT MOULDING INSTALLATION AREA**

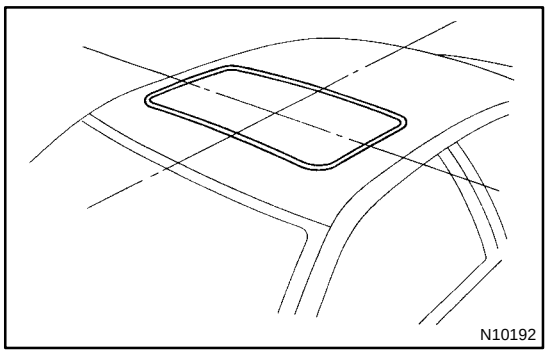


12. **INSTALL BACK WINDOW MOULDING**

Place the moulding onto the body and tap it by hand.

13. **INSTALL THESE PARTS:**

(a) Package tray trim
(b) Rear speaker grille
(c) Roof side inner garnish
(d) Rear seat cushion and seatback



SLIDING ROOF

BO0AK–01

ON–VEHICLE INSPECTION

INSPECT SLIDING ROOF GLASS ALIGNMENT

(a) Start the engine and check the operation time of the sliding roof.
Operation time:
Approx. 6 secs.

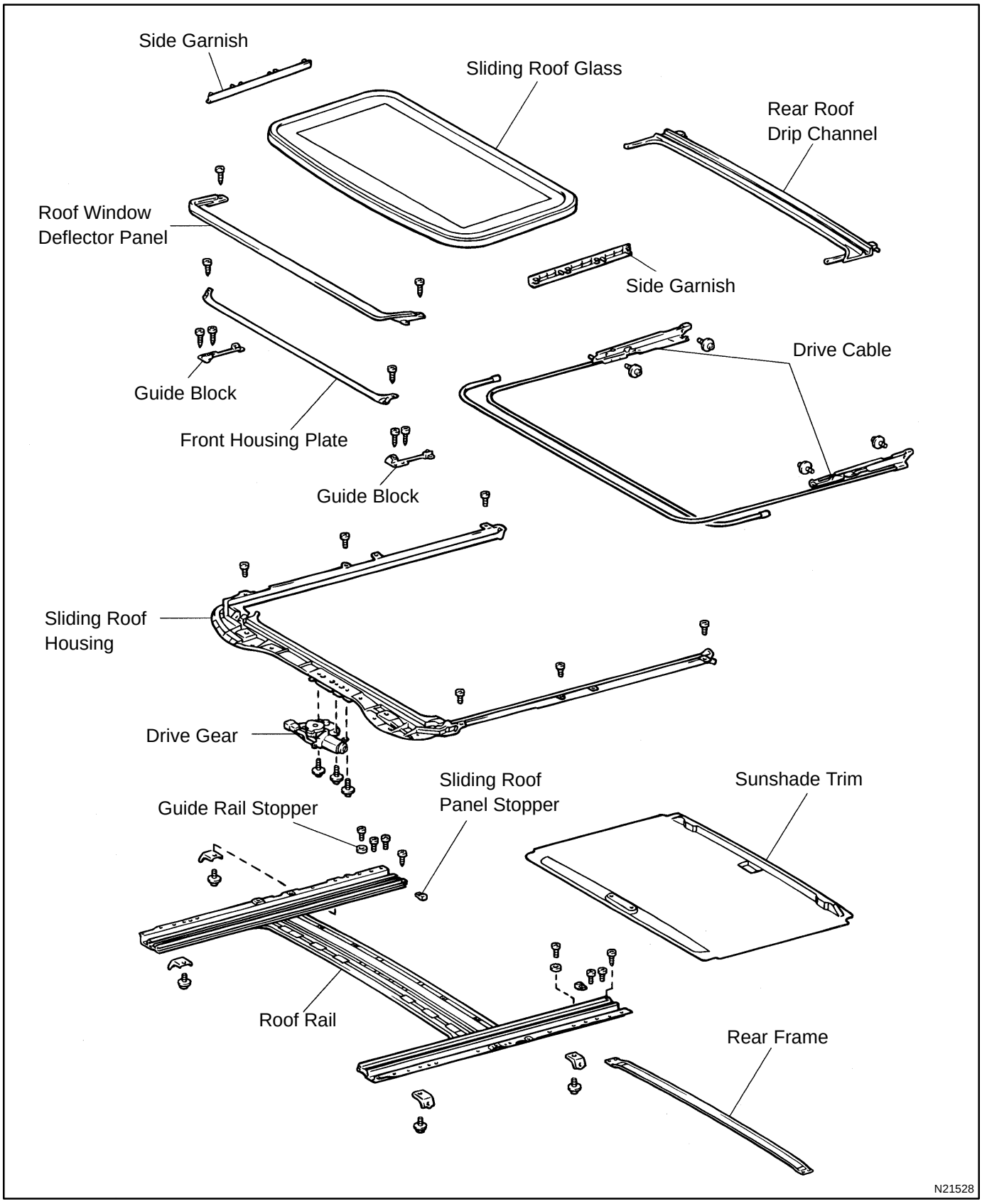
(b) Check for abnormal noise or binding during operation.

(c) With the sliding roof fully closed, check for water leakage.

(d) Check for a difference in level between the sliding roof weatherstrip and roof panel.
Except rear end:
0 ± 1.5 mm (0 ± 0.059 in.)
Rear end:
0 + 1.5 mm (0 + 0.059 in.)
0 – 1.0 mm (0 – 0.039 in.)

BO0AL–01

COMPONENTS



BO0AM–03

REMOVAL

1. REMOVE ROOF HEADLINING
(See page BO–93)

2. REMOVE SIDE GARNISH

Using a screwdriver, remove the garnishes.

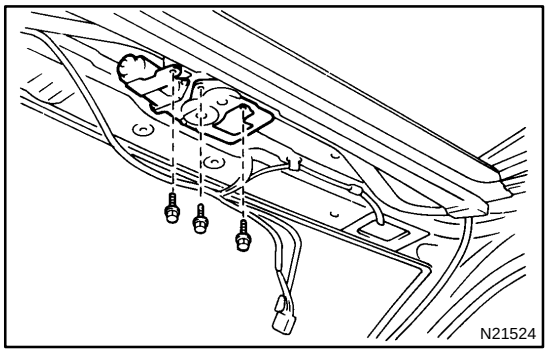
HINT:

Tape the screwdriver tip before use.

3. REMOVE SLIDING ROOF GLASS ASSEMBLY

(a) Using a torx wrench, remove the 4 screws.

(b) Pull the glass upward to remove it.



4. REMOVE DRIVE GEAR

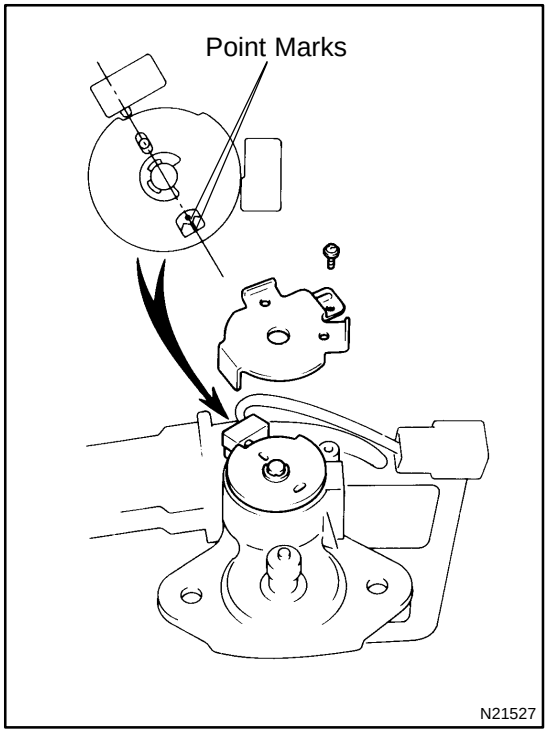
NOTICE:

Remove the drive gear with the sliding roof full closed.

(a) Disconnect the connector.

(b) Remove the 3 bolts and drive gear.

(c) Remove the screw and cam plate cover.



(d) Turn the drive gear to align the point marks as shown in the illustration.

(e) Install the cam plate cover and screw.

NOTICE:

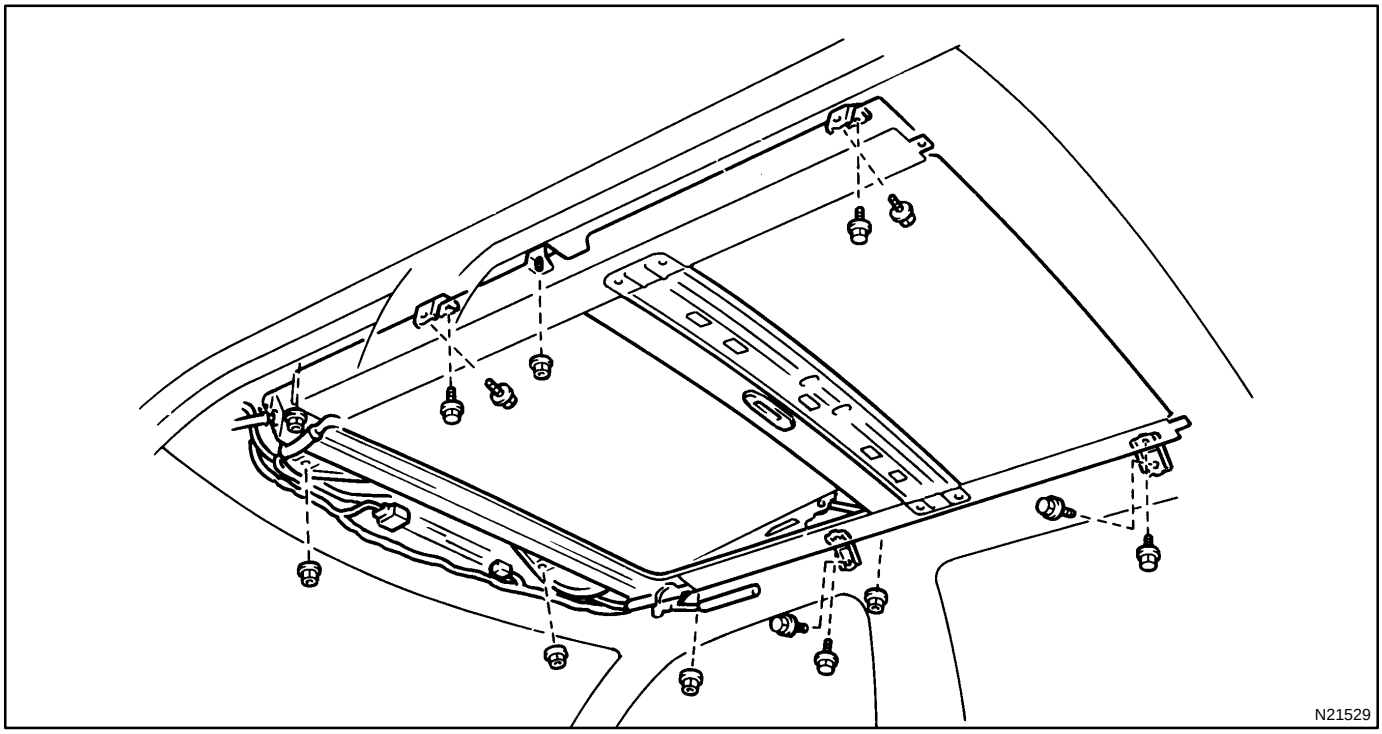
At the time of installation, please refer to the following item. If the sliding roof position and drive gear full close position not matched, the sliding roof does not operate normally.

5. REMOVE SLIDING ROOF HOUSING

(a) Disconnect the 4 drain hoses from the housing.

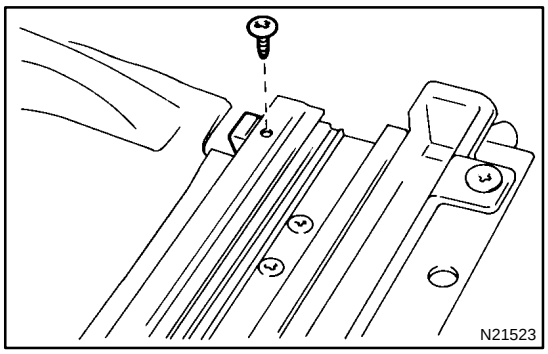
(b) Remove the 8 bolts and 4 brackets.

(c) Remove the 6 nuts, then remove the housing as shown in the illustration below.



BO0AN–01

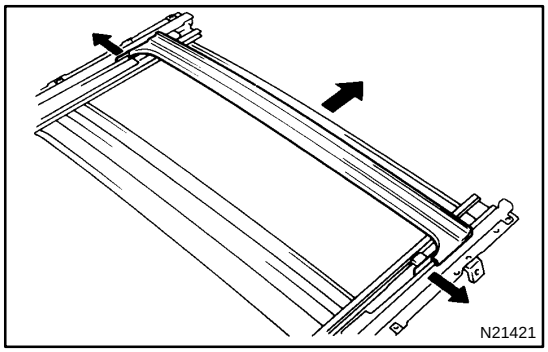
DISASSEMBLY



1. REMOVE SLIDING ROOF PANEL STOPPER

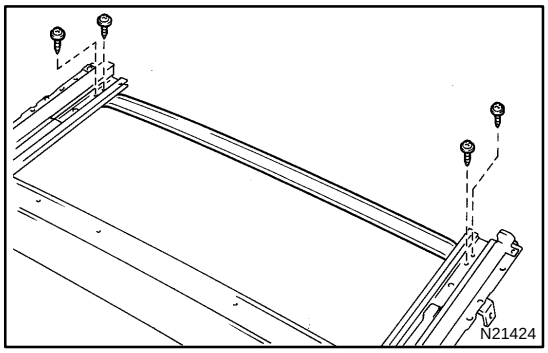
Remove the 2 screws and 2 stoppers.

2. REMOVE SUNSHADE TRIM



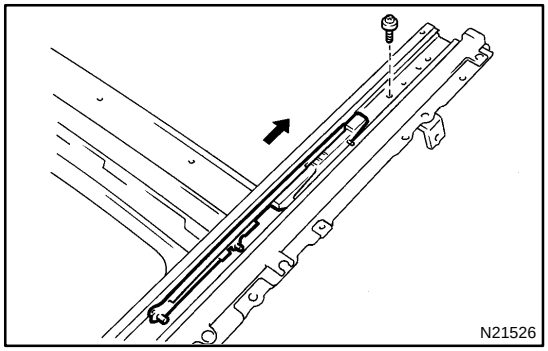
3. REMOVE REAR ROOF DRIP CHANNEL

Remove the rear roof drip channel as shown in the illustration.



4. REMOVE REAR FRAME

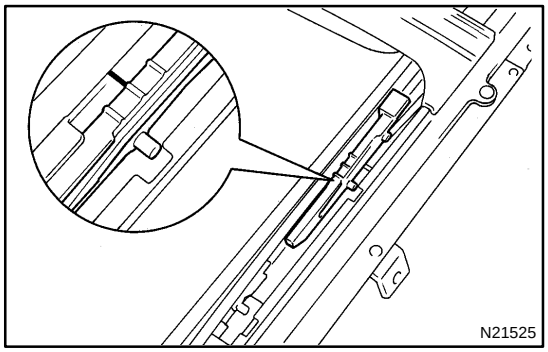
Remove the 4 screws and rear frame.



5. REMOVE DRIVE CABLE

(a) Remove the screw and guide rail stopper.

(b) Slide the drive cable rearward, then remove it.

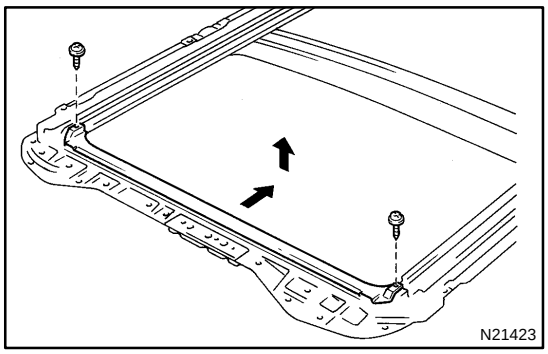


HINT:

At the time of assembly, please refer to the following items.

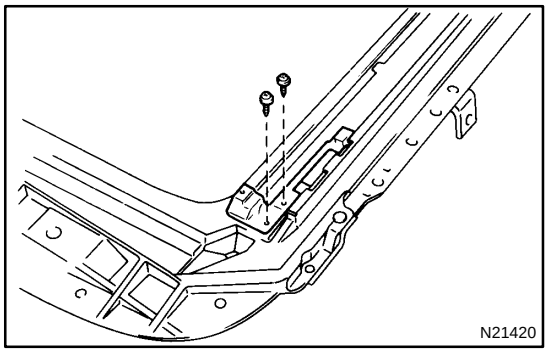
- Adjust the drive cable to a closed and tilted down position.
- Slide the cable forward or backward to align the 2 marks as shown.
- Slide the cable to the forefront with your hand.

6. REMOVE ROOF WINDOW DEFLECTOR PANEL



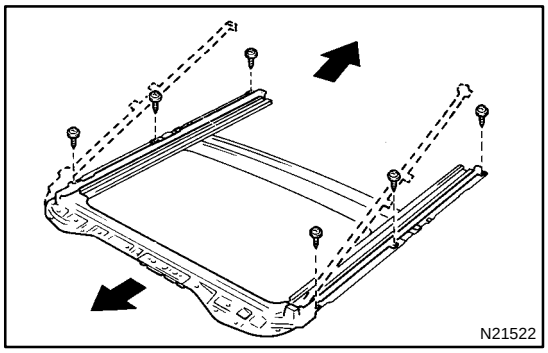
7. REMOVE FRONT HOUSING PLATE

Remove the 2 screws and plate.



8. REMOVE GUIDE BLOCK

Remove the 2 screws and guide block.

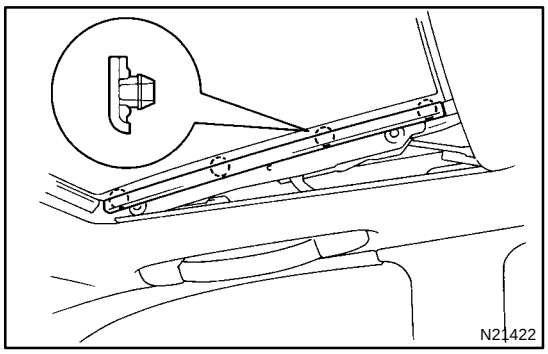


9. REMOVE SLIDING ROOF HOUSING

Remove the 6 screws and sliding roof housing.

BO0AO–01

ADJUSTMENT

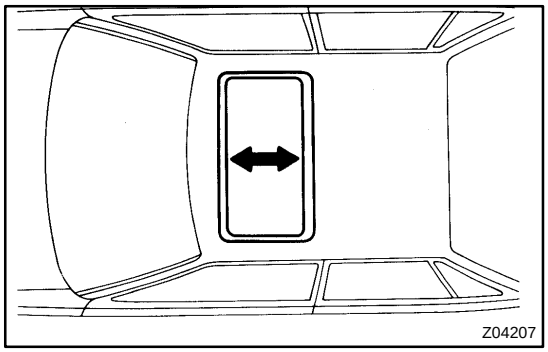


1. REMOVE SIDE GARNISH

Before making adjustments, using a screwdriver, remove the side garnishes.

HINT:

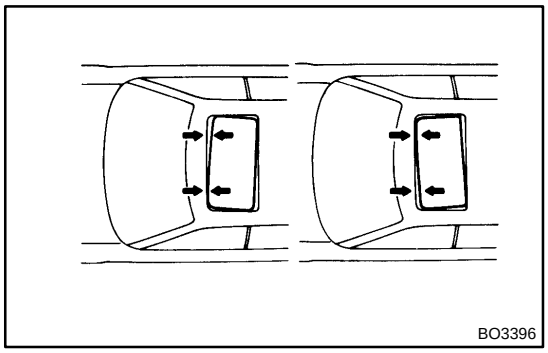
- Tape the screwdriver tip before use.
- After adjustment, reinstall the side garnishes.



2. ADJUST SLIDING ROOF GLASS FORWARD OR REARWARD

(a) Using a torx wrench, loosening the sliding roof glass installation screws.

(b) Adjust the sliding roof glass forward or rearward.

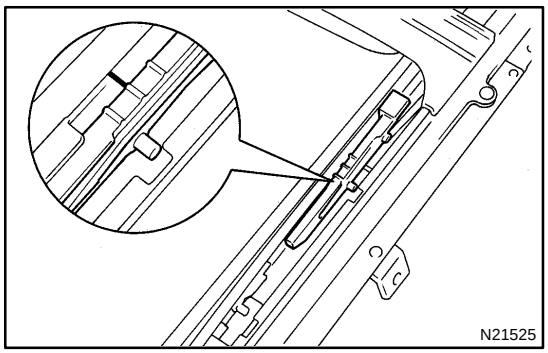


3. ADJUST SLIDING ROOF GLASS IN CLEARANCE (Difference in left and right clearance)

(a) When the front or rear alignment is not correct, remove the drive gear and sliding roof glass, then adjust the drive cable.

NOTICE:

Remove the drive gear with the sliding roof full closed.



(b) Adjust by sliding the cable forward or rearward to align the 2 marks as shown.

(c) Install the drive gear and sliding roof glass.

BO0AP–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–74).

BO0AQ–01

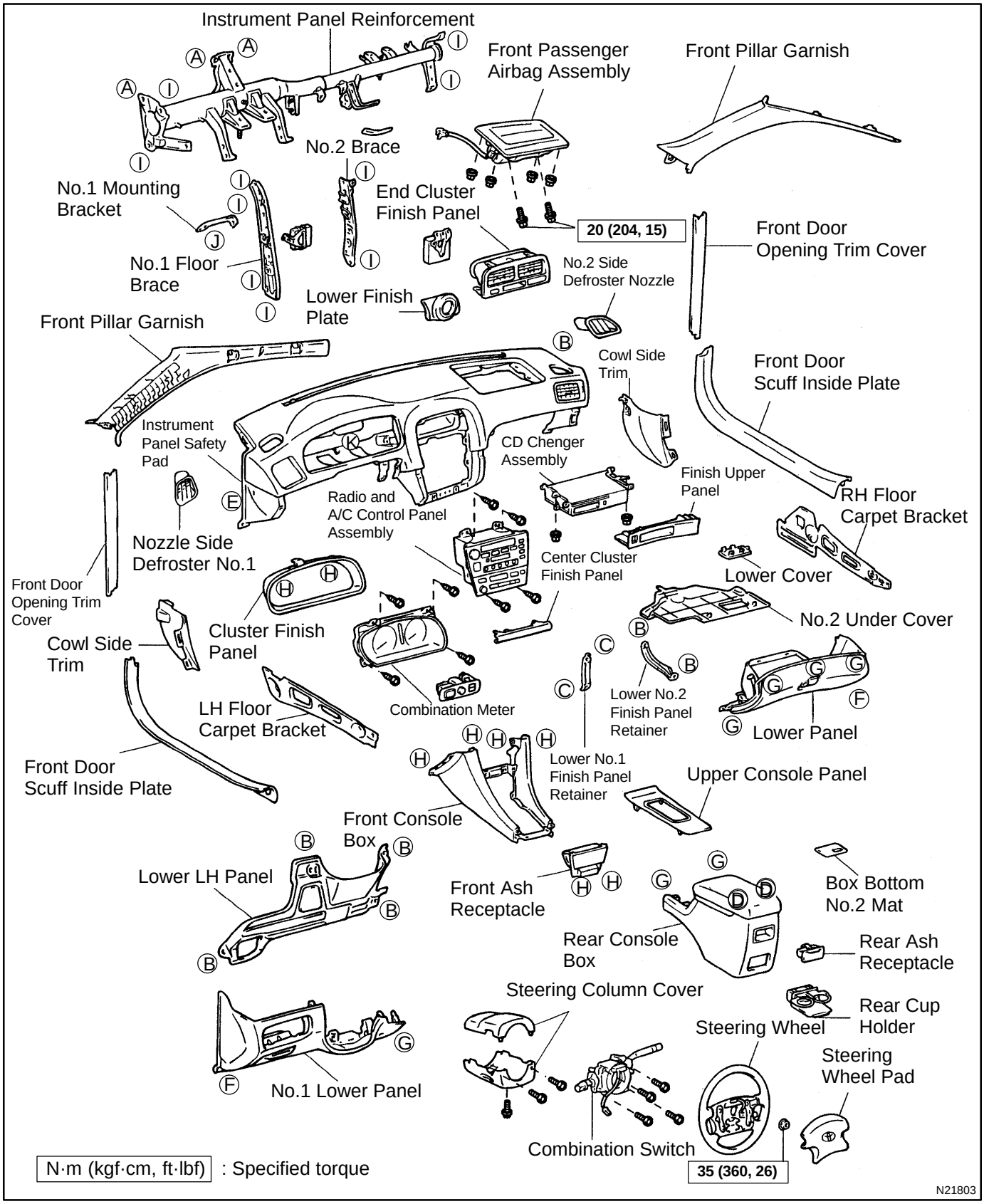
INSTALLATION

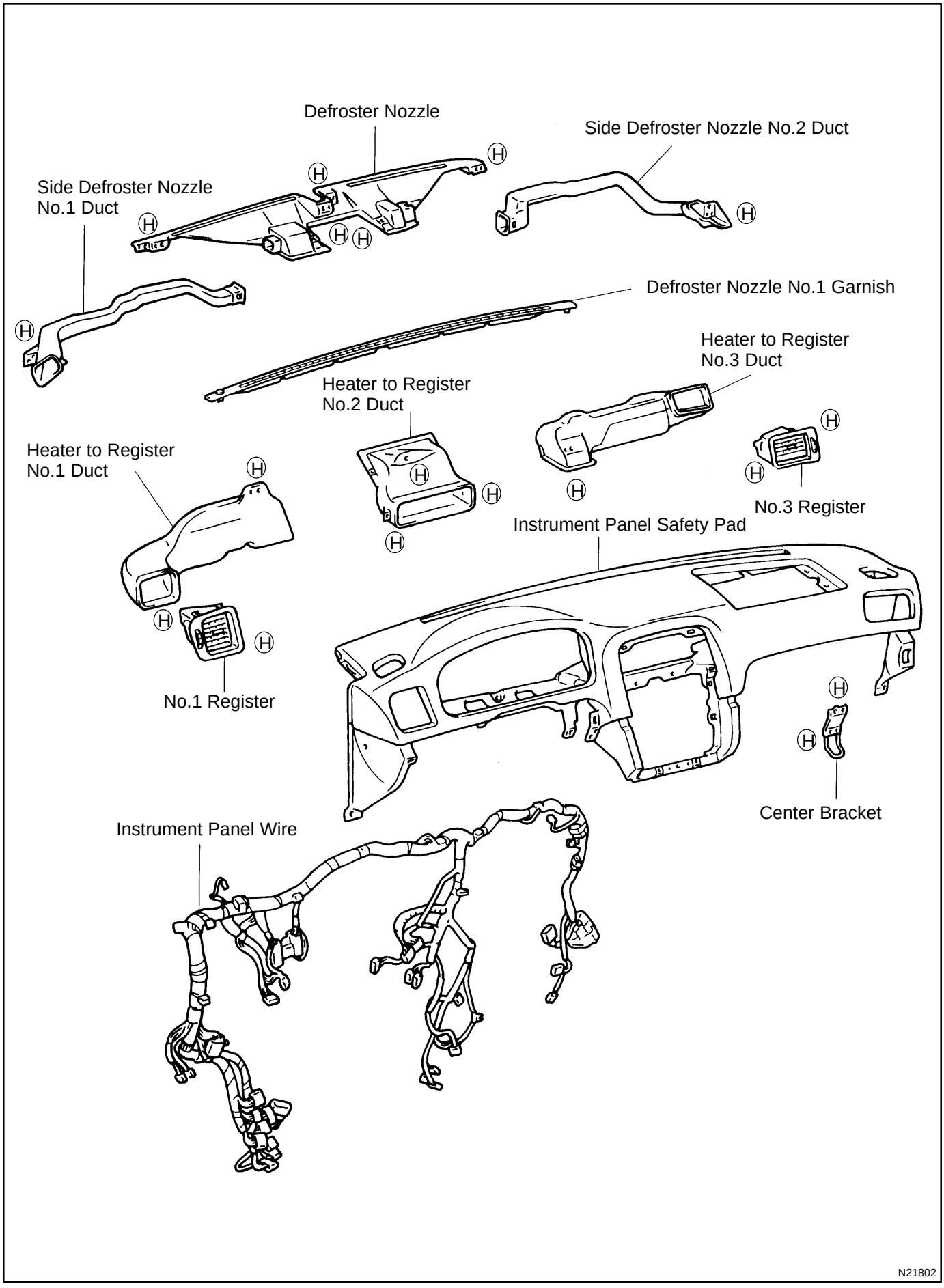
Installation is in the reverse order of removal (See page BO–72).

INSTRUMENT PANEL

COMPONENTS

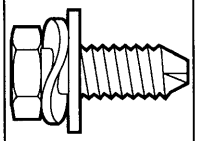
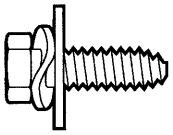
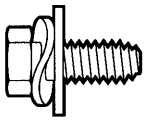
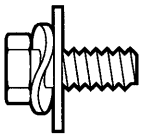
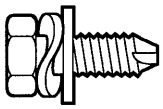
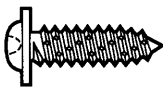
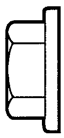
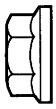
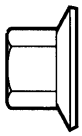
BO0AR–03




Defroster Nozzle
Side Defroster Nozzle No.2 Duct
Side Defroster Nozzle No.1 Duct
Defroster Nozzle No.1 Garnish
Heater to Register No.3 Duct
Heater to Register No.2 Duct
Heater to Register No.1 Duct
No.3 Register
Instrument Panel Safety Pad
No.1 Register
Center Bracket
Instrument Panel Wire
N21802

HINT:
Screw shapes and sizes are indicated in the table below. The codes (A – K) correspond to those indicated on the previous pages.

mm (in.)

	Shape	Size		Shape	Size		Shape	Size
Ⓐ		ø = 8 (0.31) L = 22 (0.87)	Ⓑ		ø = 6 (0.24) L = 20 (0.79)	Ⓒ		ø = 6 (0.24) L = 16 (0.63)
Ⓓ		ø = 6 (0.24) L = 16 (0.63)	Ⓔ		ø = 6 (0.24) L = 20 (0.79)	Ⓕ		ø = 6 (0.24) L = 18 (0.71)
Ⓖ		ø = 5.22 (0.2055) L = 20 (0.79)	Ⓗ		ø = 5.22 (0.2055) L = 16 (0.63)	Ⓘ		ø = 8 (0.31)
Ⓙ		ø = 6 (0.24)	Ⓚ		ø = 6 (0.24)			

V08545

BO0AS–03

REMOVAL

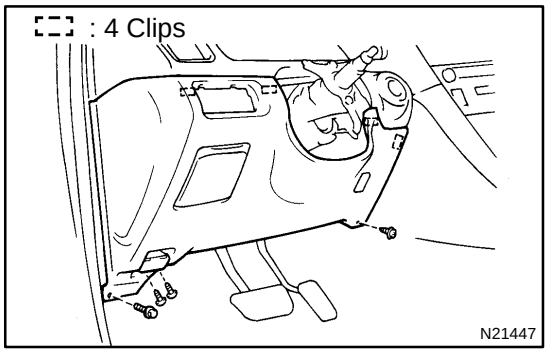
1. REMOVE THESE PARTS:

(a) Front pillar garnishes
(b) Front door scuff inside plates
(c) Front door opening trim covers
(d) Cowl side trims

2. REMOVE STEERING WHEEL
(See page SR–9)

3. REMOVE THESE PARTS:

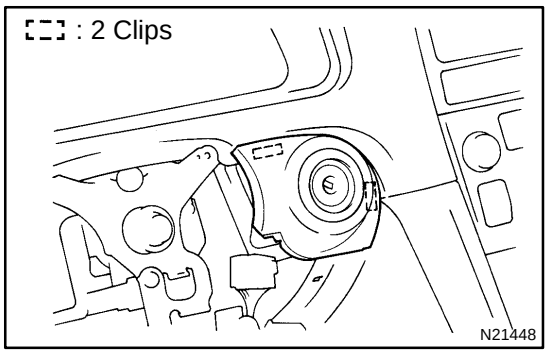
(a) Steering column cover
(b) Combination switch



4. REMOVE NO.1 LOWER PANEL

(a) Remove the 2 screws and hood release lever.
(b) Remove the bolt, screw and No.1 lower panel, then disconnect the connectors.

5. REMOVE LOWER LH PANEL

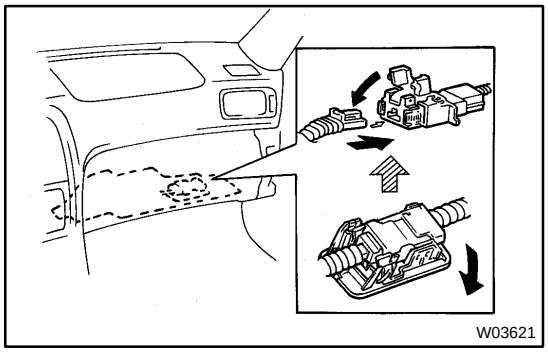


6. REMOVE LOWER FINISH PANEL

Using a screwdriver, remove the lower finish panel.

7. REMOVE THESE PARTS:

(a) Cluster finish panel
(b) Combination meter



8. REMOVE NO.2 UNDER COVER

(a) Using a screwdriver, remove the lower cover.

HINT:

Tape the screwdriver tip before use.

(b) Pull up the connector.
(c) Disconnect the passenger airbag connector.

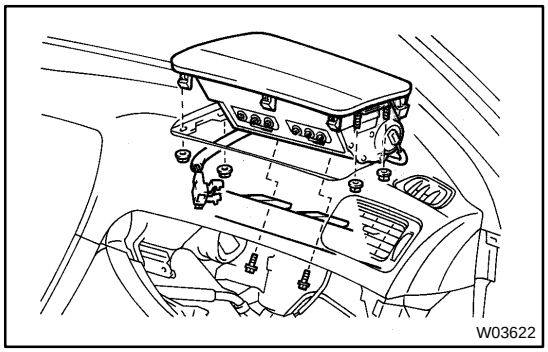
NOTICE:

When disconnecting the passenger airbag connector take care not to damage the airbag wire harness.

(d) Remove the No.2 under cover.

9. REMOVE THESE PARTS:

(a) Lower panel
(b) Finish upper panel
(c) CD changer assembly
(d) Lower No.1 finish panel retainer

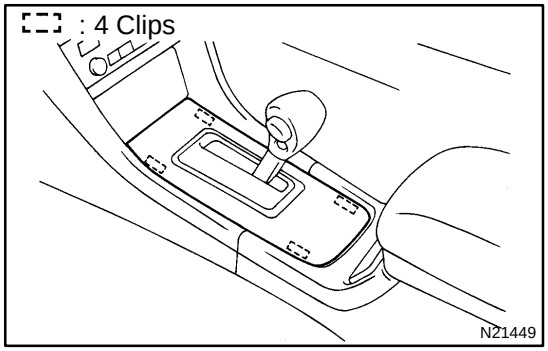


10. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY (See page RS–21)

(a) Remove the 2 bolts from the instrument panel reinforcement.
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)
(b) Remove the 4 nuts and front passenger airbag assembly.

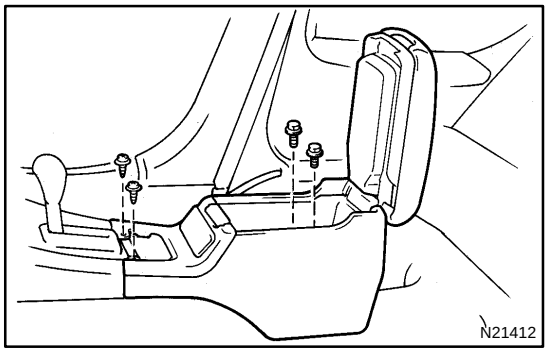
CAUTION:
Do not store the front passenger airbag assembly with the airbag deployment direction facing down. Never disassemble the front passenger airbag assembly.

NOTICE:
At the time of installation, please refer to the following item. Make sure that the front passenger airbag assembly is installed to the specified torque. When installing the instrument panel, take care that the airbag wire harness does not interfere with other parts and is not pinched between other parts.



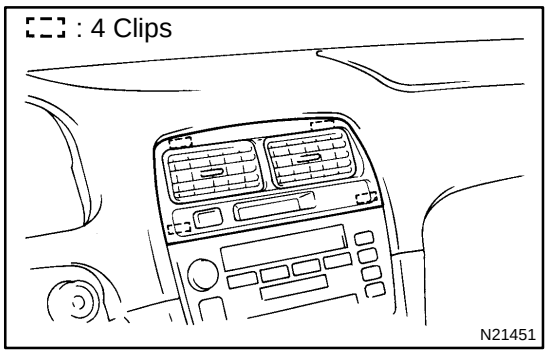
11. REMOVE UPPER CONSOLE PANEL

Using a screwdriver, remove the upper console panel.
HINT:
Tape the screwdriver tip before use.



12. REMOVE REAR CONSOLE BOX

(a) Remove the box bottom No.2 mat.
(b) Remove the 2 bolts, 2 screws and rear console box, then disconnect the connector.
(c) Remove the rear cup holder and rear ash receptacle.

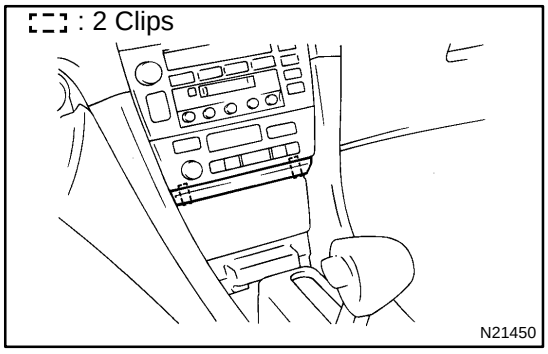


13. REMOVE END CLUSTER FINISH PANEL

Using a screwdriver, remove the panel.

HINT:

Tape the screwdriver tip before use.



14. REMOVE CENTER CLUSTER FINISH PANEL

Using a screwdriver, remove the panel, then disconnect the connectors.

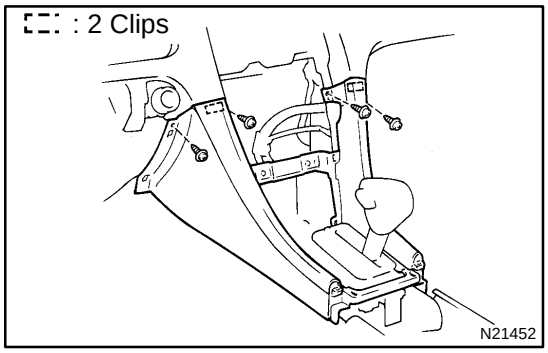
HINT:

Tape the screwdriver tip before use.

15. REMOVE THESE PARTS:

(a) Radio and A/C control panel assembly

(b) Front ash receptacle



16. REMOVE FRONT CONSOLE BOX

Remove the 4 screws and front console box.

17. REMOVE THESE PARTS:

(a) LH and RH floor carpet brackets

(b) Lower No.2 finish panel retainer

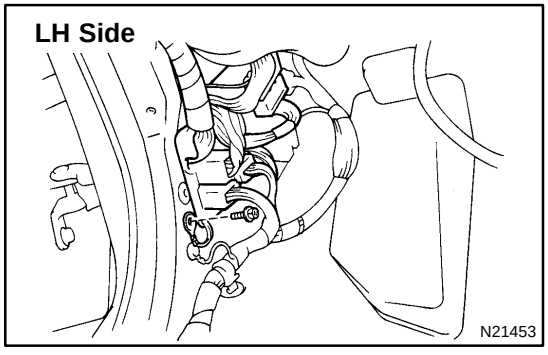
(c) Nozzle side defroster No.1

18. REMOVE INSTRUMENT PANEL SAFETY PAD

(a) Using a screwdriver, remove the No.2 side defroster nozzle.

HINT:

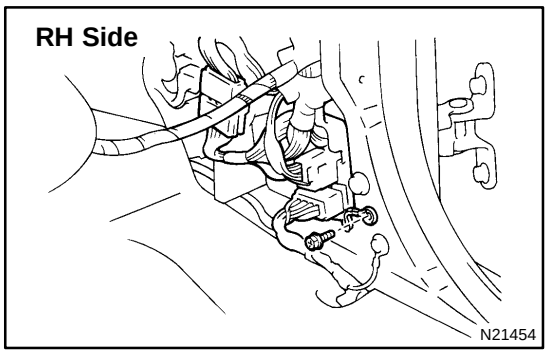
Tape the screwdriver tip before use.



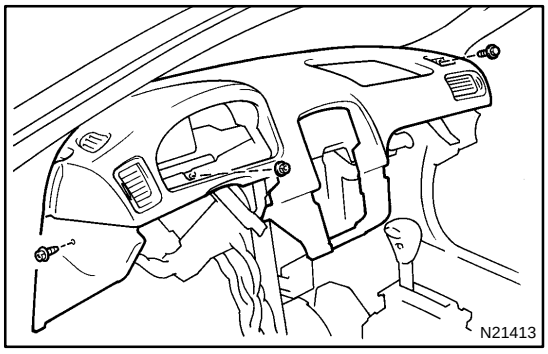
(b) Disconnect the connectors.

(c) Remove the bolt.

(d) Remove the connector holder.



(e) Disconnect the connectors.
(f) Remove the bolt.
(g) Remove the connector holder.



(h) Remove the bolt, nut, screw and safety pad.

19. REMOVE INSTRUMENT PANEL REINFORCEMENT

(a) Remove the nut and No.1 finish panel mounting bracket.
(b) Remove the 4 nuts and No.1 floor brace.
(c) Remove the 2 nuts and No.2 brace.
(d) Remove the bolt, 2 nuts and junction block.
(e) Remove the 3 bolts, 4 nuts and reinforcement.

BO0AT–01

DISASSEMBLY

1. REMOVE THESE PARTS:

(a) Defroster nozzle No.1 garnish
(b) Side defroster nozzle No.1 duct
(c) Side defroster nozzle No.2 duct
(d) Defroster nozzle
(e) Heater to register No.1 duct
(f) Heater to register No.3 duct
(g) Heater to register No.2 duct
(h) No.1 register
(i) No.3 register
(j) Center bracket

2. REMOVE INSTRUMENT PANEL WIRE

Remove the screws, clips and wire.

BO0AU–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–86).

BO0AV–01

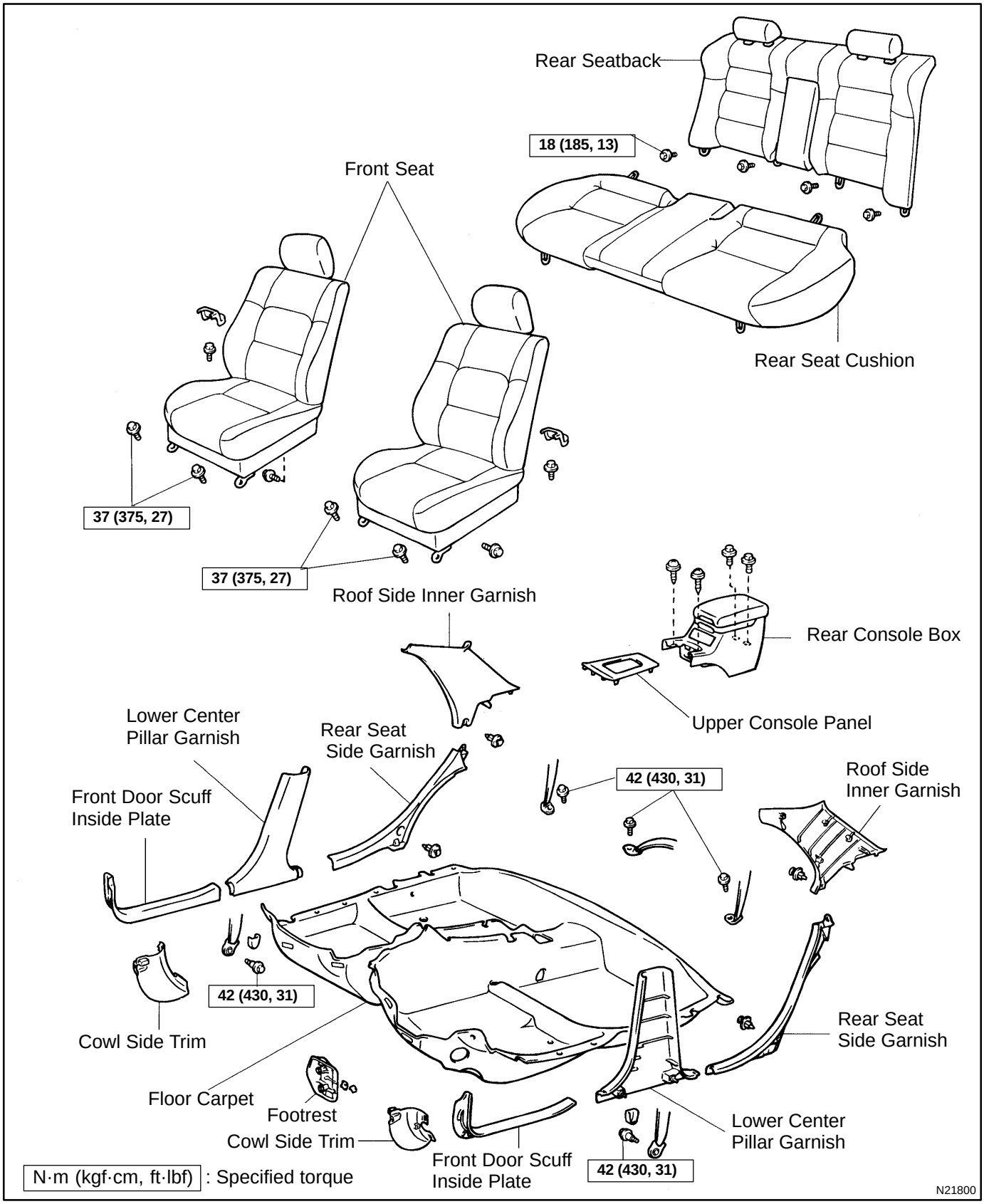
INSTALLATION

Installation is in the reverse order of removal (See page BO–82).

FLOOR CARPET

COMPONENTS

BO0AW–03

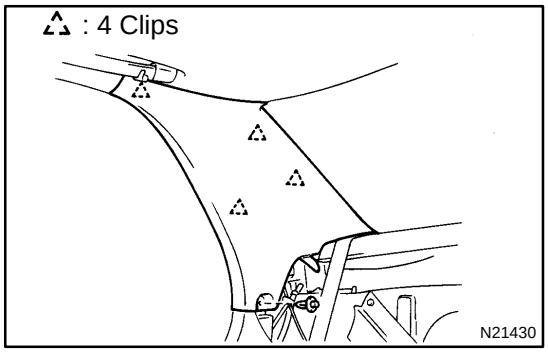


BO0AX–01

REMOVAL

1. REMOVE THESE PARTS:

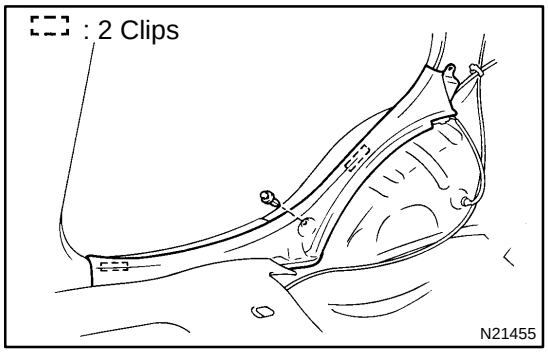
(a) Front seat
(b) Rear seat cushion
(c) Rear seat belt lower side bolts
(d) Rear seatback
(e) Front door scuff inside plate
(f) Cowl side trim
(g) Front seat belt floor anchor bolt



2. REMOVE ROOF SIDE INNER GARNISH

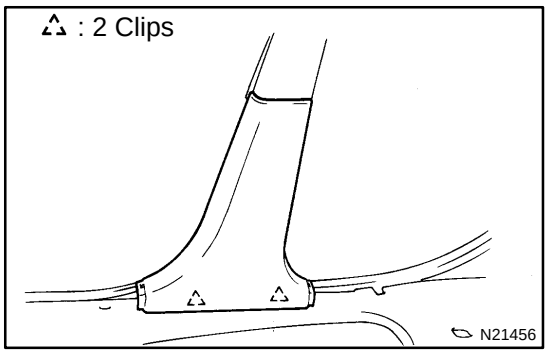
(a) Remove the clip.
(b) Using a screwdriver, pry loose and remove the garnish.

HINT:
Tape the screwdriver tip before use.



3. REMOVE REAR SEAT SIDE GARNISH

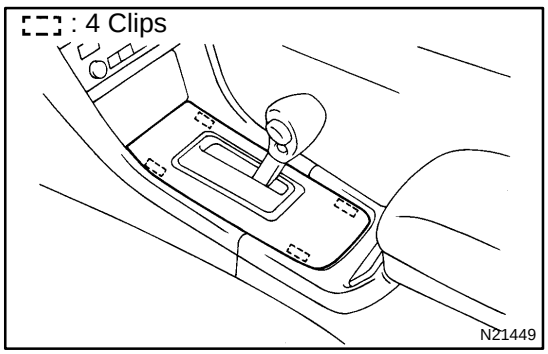
(a) Remove the clip.
(b) Pry loose and remove the garnish.



4. REMOVE LOWER CENTER PILLAR GARNISH

Using a screwdriver, pry off the garnish.

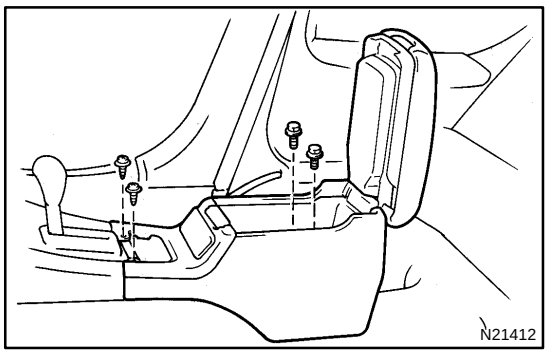
HINT:
Tape the screwdriver tip before use.



5. REMOVE UPPER CONSOLE PANEL

Using a screwdriver, remove the upper console panel.

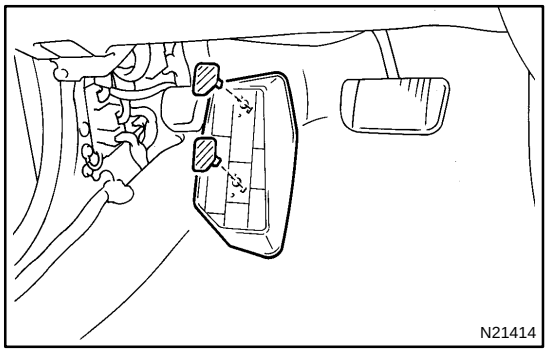
HINT:
Tape the screwdriver tip before use.



6. REMOVE REAR CONSOLE BOX

(a) Remove the box bottom No.2 mat.

(b) Remove the 2 bolts, 2 screws and rear console box.



7. REMOVE FOOTREST

(a) Using a screwdriver, remove the 2 covers.

HINT:

Tape the screwdriver tip before use.

(b) Unfasten 2 screws and remove the footrest.

8. REMOVE FLOOR CARPET

Slide the carpet backward and remove it.

BO0AY–01

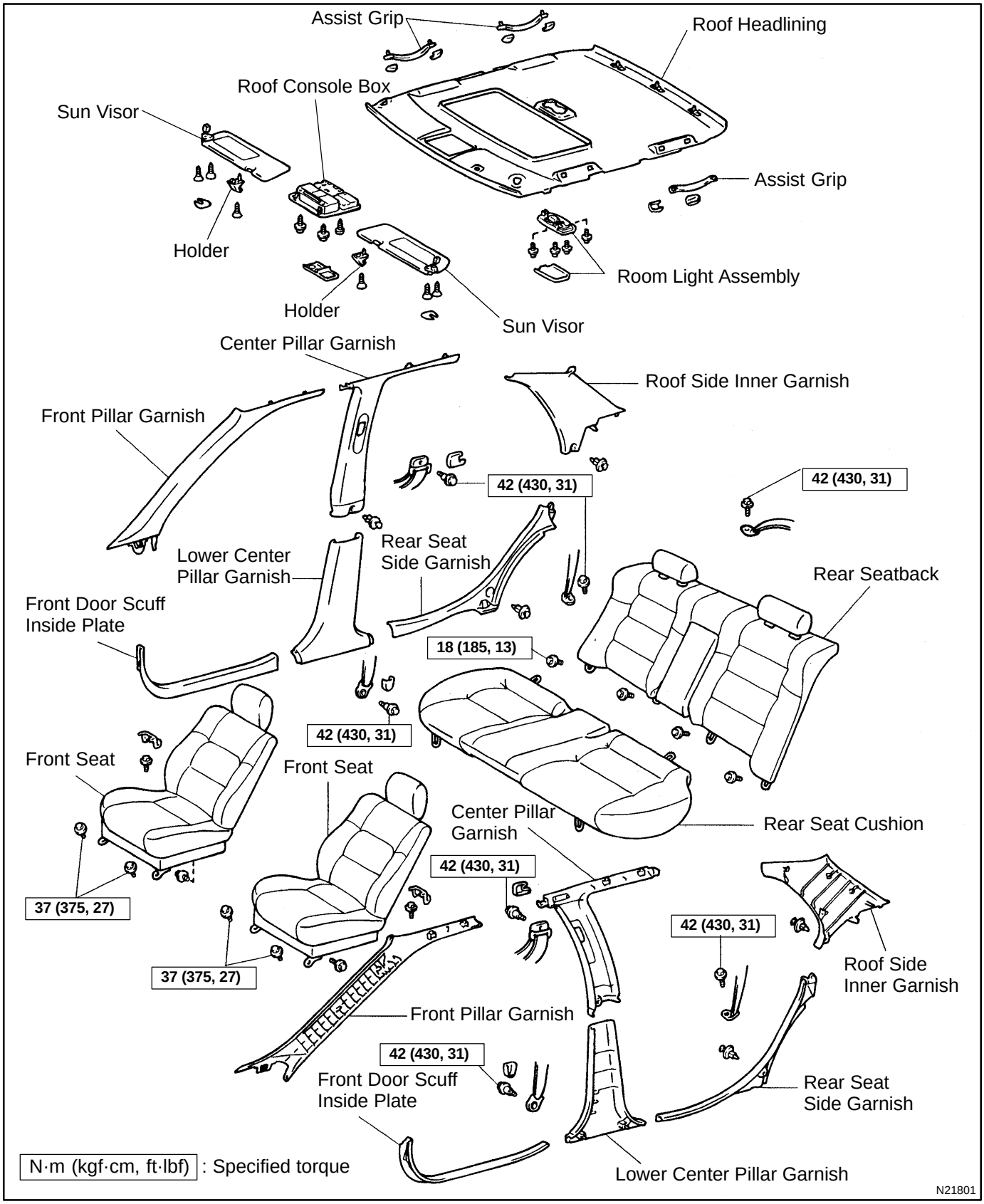
INSTALLATION

Installation is in the reverse order of removal (See page BO–90).

ROOF HEADLINING

BO0AZ–04

COMPONENTS

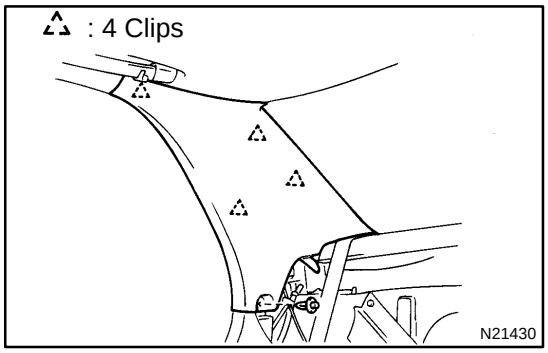


BO0B0–01

REMOVAL

1. REMOVE THESE PARTS:

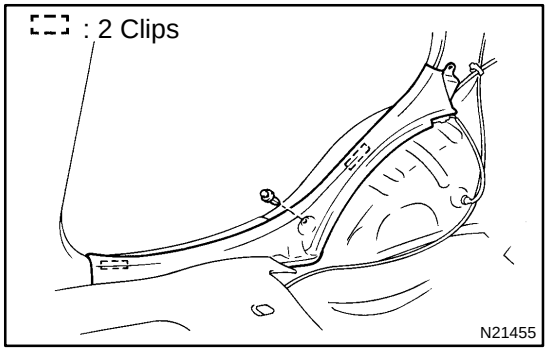
(a) Front seat
(b) Rear seat cushion
(c) Rear seat belt lower side bolts
(d) Rear seatback
(e) Front door scuff inside plate
(f) Front seat belt shoulder anchor bolts
(g) Sun visors and holders
(h) Assist grips



2. REMOVE ROOF SIDE INNER GARNISH

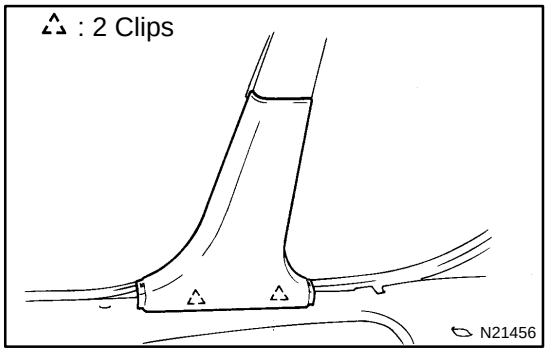
(a) Remove the clip.
(b) Using a screwdriver, pry loose and remove the garnish.

HINT:
Tape the screwdriver tip before use.



3. REMOVE REAR SEAT SIDE GARNISH

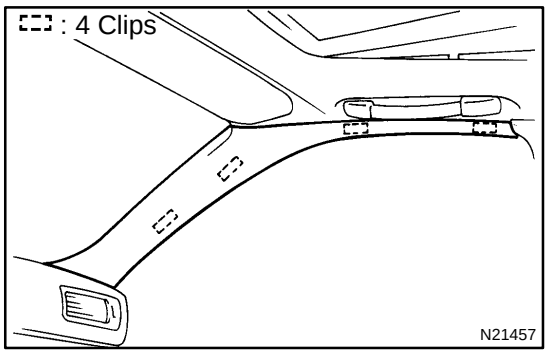
(a) Remove the clip.
(b) Pry loose and remove the garnish.



4. REMOVE LOWER CENTER PILLAR GARNISH

Using a screwdriver, pry off the garnish.

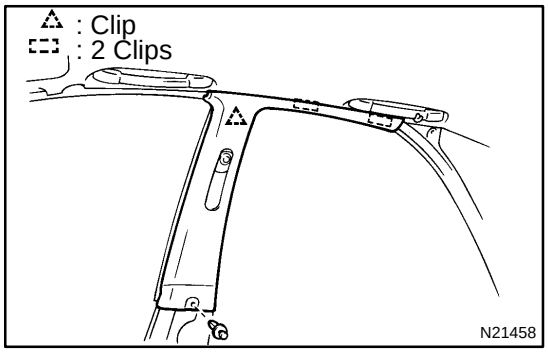
HINT:
Tape the screwdriver tip before use.



5. REMOVE FRONT PILLAR GARNISH

(a) Pry out clips by your hand.

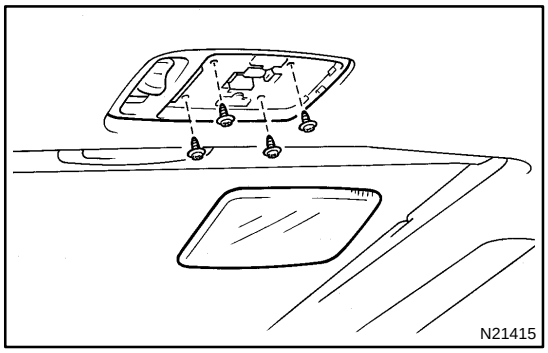
(b) Pull the garnish upward to remove it.



6. REMOVE CENTER PILLAR GARNISH

(a) Remove the clip.

(b) Pry off the garnish.



7. REMOVE ROOM LIGHT

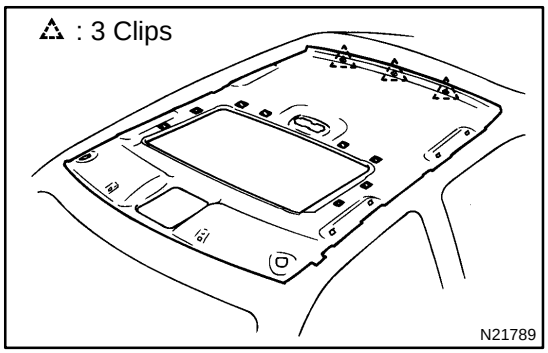
(a) Using a screwdriver, remove the room light lens.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 4 screws, then disconnect the connector.

8. REMOVE ROOF CONSOLE BOX



9. REMOVE ROOF HEADLINING

(a) Disconnect the 3 clips from the roof panel rear end.

(b) Remove the headlining.

(c) Bring out the headlining.

BO0B1–01

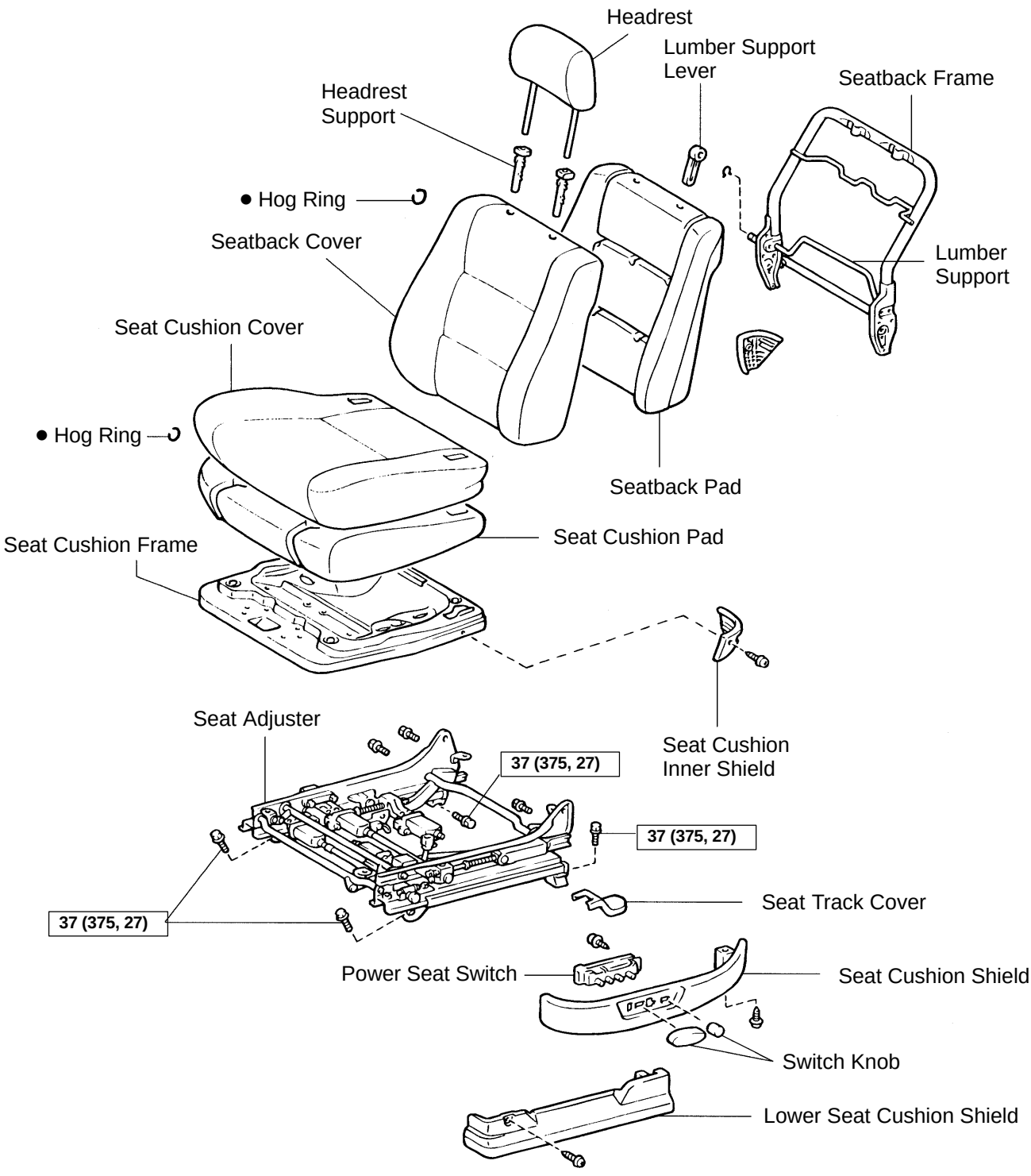
INSTALLATION

Installation is in the reverse order of removal (See page BO–94).

FRONT SEAT

COMPONENTS

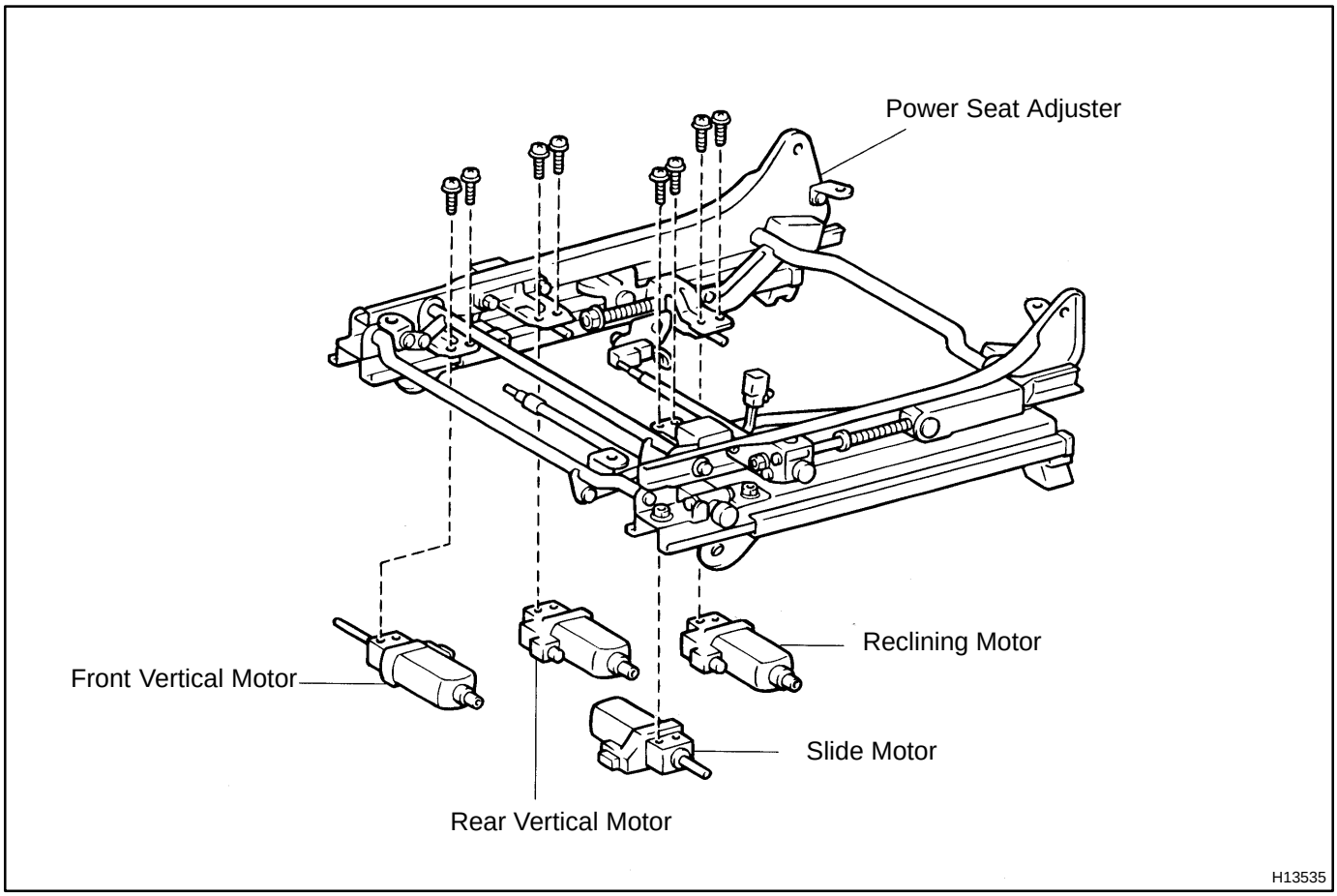
BO3E9–01



N·m (kgf·cm, ft·lbf) : Specified torque

● Non–reusable part

H13534


Power Seat Adjuster
Reclining Motor
Front Vertical Motor
Slide Motor
Rear Vertical Motor
H13535

BO0B3–01

REMOVAL

REMOVE FRONT SEAT

(a) Using a screwdriver, remove the seat track covers.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 4 bolts.

(c) Disconnect the connector.

(d) Remove the front seat.

NOTICE:

Be careful not to damage the body.

BO3EC–01

DISASSEMBLY

1. REMOVE THESE PARTS:

(a) Headrest
(b) Switch knobs
(c) Seat cushion shield
(d) Seat cushion inner shield

2. REMOVE SEATBACK ASSEMBLY

3. REMOVE SEATBACK COVER

(a) Remove the headrest supports.
(b) Remove the hog rings and seatback frame from seatback cover with pad.
(c) Remove the hog rings and seatback cover from seatback pad.

4. REMOVE LUMBER SUPPORT LEVER

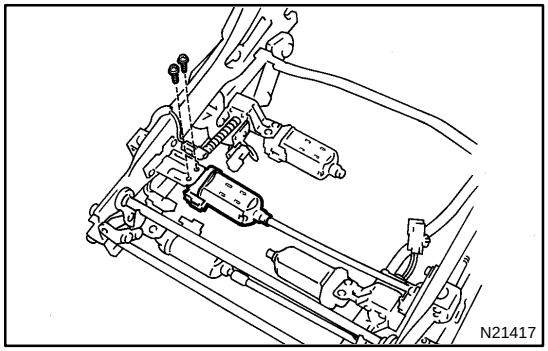
5. REMOVE SEAT CUSHION ASSEMBLY

Remove the 4 bolts and seat cushion assembly.

6. REMOVE SEAT CUSHION COVER

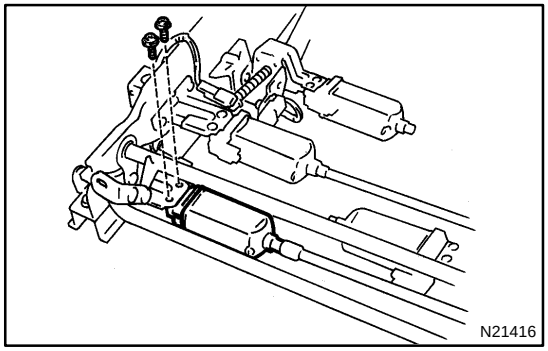
(a) Remove the hog rings, hook and seat cushion frame from seat cushion cover with pad.
(b) Remove the hog rings and seat cushion cover from the seat cushion pad.

7. REMOVE LOWER SEAT CUSHION SHIELD



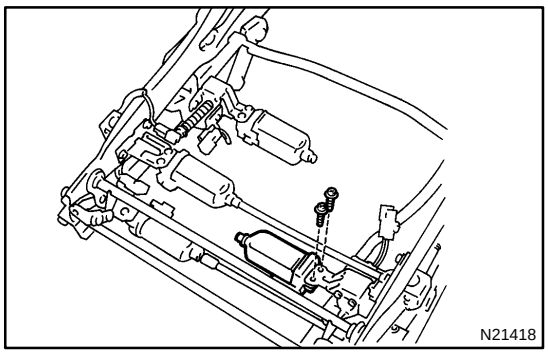
8. REMOVE REAR VERTICAL MOTOR

Remove the 2 screws and front vertical motor.



9. REMOVE FRONT VERTICAL MOTOR

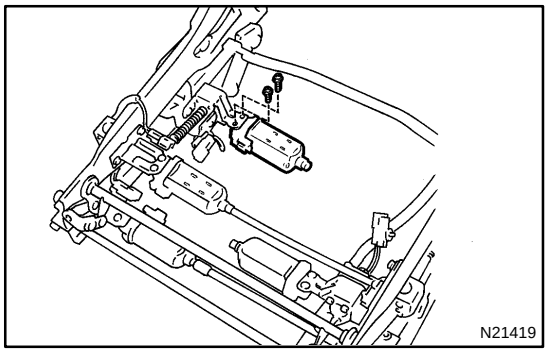
Remove the 2 screws and rear vertical motor.



10. REMOVE SLIDE MOTOR

(a) Remove the 2 screws.

(b) Disconnect the No.1 drive cable, then remove the slide motor.



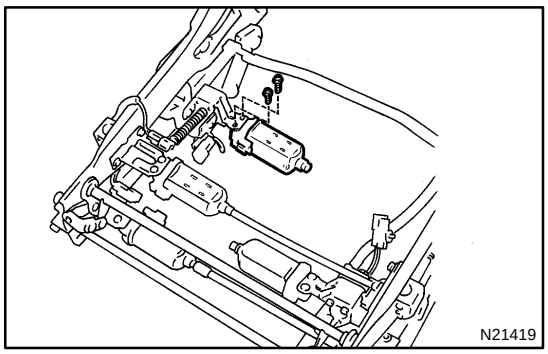
11. REMOVE RECLINING MOTOR

(a) Remove the 2 screws.

(b) Disconnect the No.2 drive cable, then remove the reclining motor.

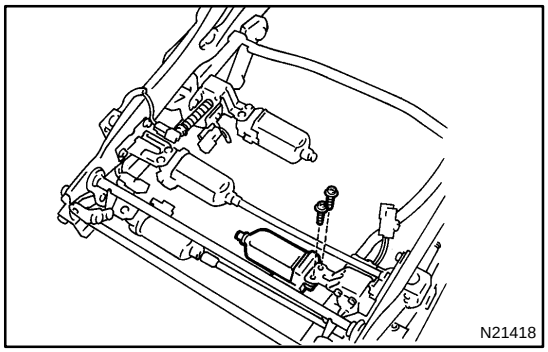
BO3EE–01

REASSEMBLY



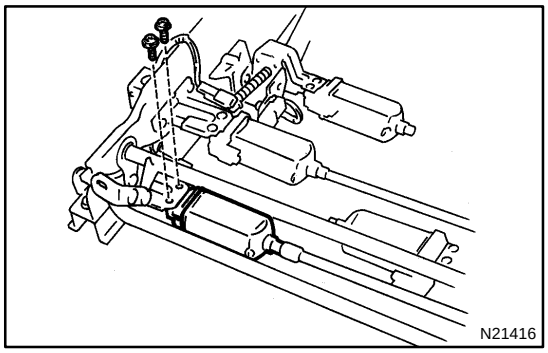
1. INSTALL RECLINING MOTOR

Connect the No.2 drive cable, then install the reclining motor with 2 screws.



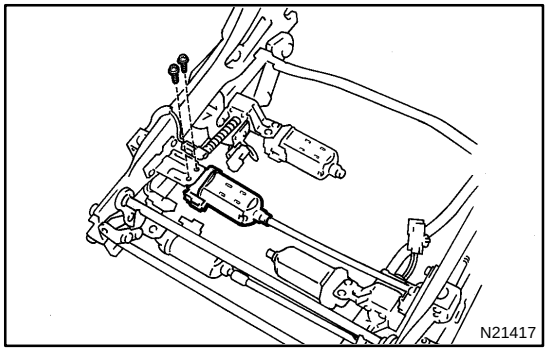
2. INSTALL SLIDE MOTOR

Connect the No.1 drive cable, then install the slide motor with 2 screws.



3. INSTALL FRONT VERTICAL MOTOR

Install the rear vertical motor with 2 screws.



4. INSTALL REAR VERTICAL MOTOR

Install the front vertical motor with 2 screws.

5. INSTALL LOWER SEAT CUSHION SHIELD

6. INSTALL SEAT CUSHION COVER

(a) Install the seat cushion cover with new hog rings to seat cushion pad.

(b) Install the seat cushion cover with pad to the seat cushion frame with new hog rings.

HINT:

Install the hog rings to prevent wrinkles as least as possible.

7. INSTALL SEAT CUSHION ASSEMBLY

Install the seat cushion assembly with 4 bolts.

8. INSTALL SEATBACK COVER

(a) Install the seatback cover with new hog rings to the seatback pad.

HINT:

Install the hog rings to prevent wrinkles as least as possible.

(b) Install the seatback cover with pad to the seatback frame with new hog rings.

HINT:

Install the hog rings to prevent wrinkles as least as possible.

(c) Install the headrest supports.

9. INSTALL SEATBACK ASSEMBLY

10. INSTALL THESE PARTS:

(a) Seat cushion inner shield

(b) Seat cushion shield

(c) Switch knobs

(d) Headrest

BO0B6–01

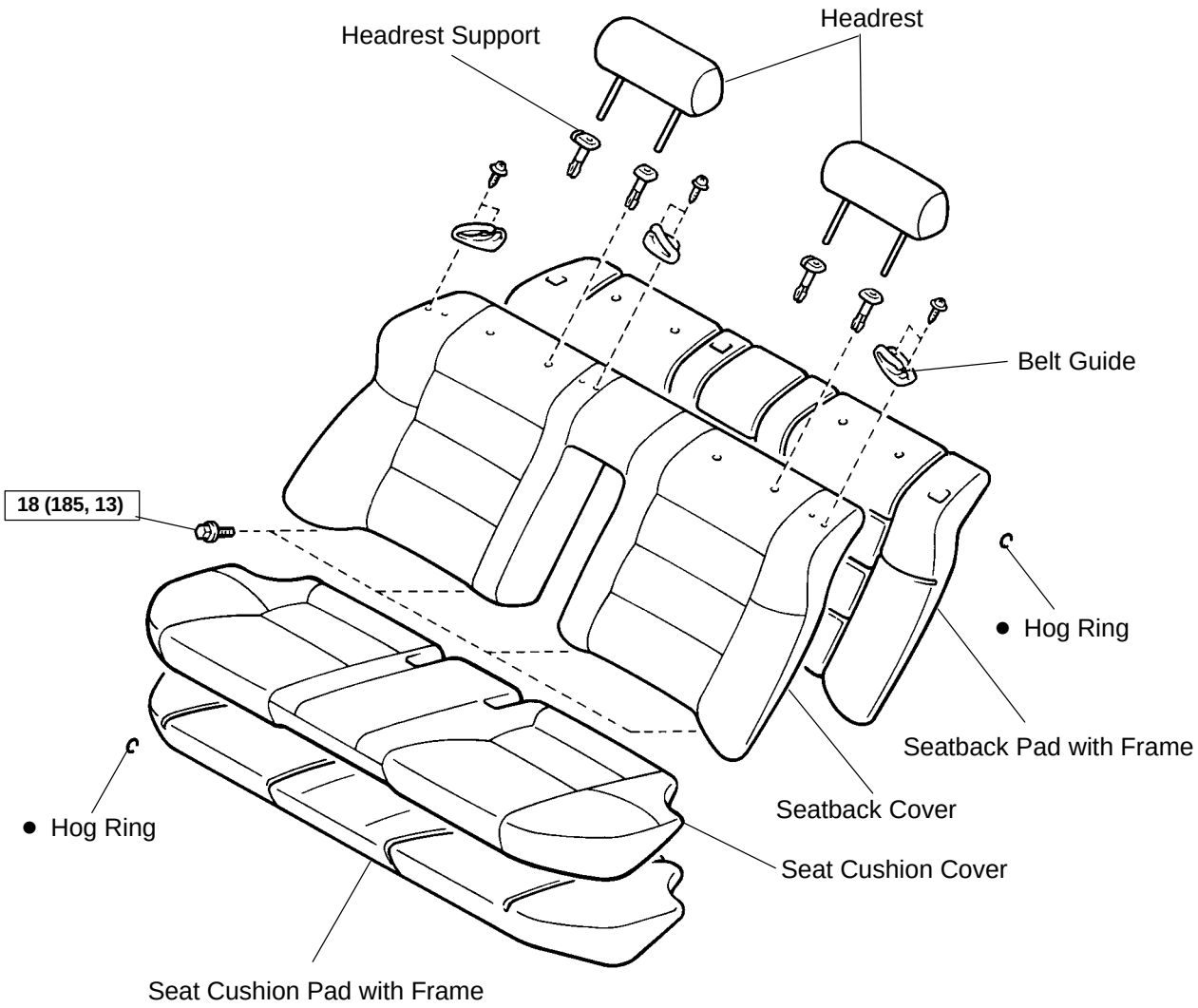
INSTALLATION

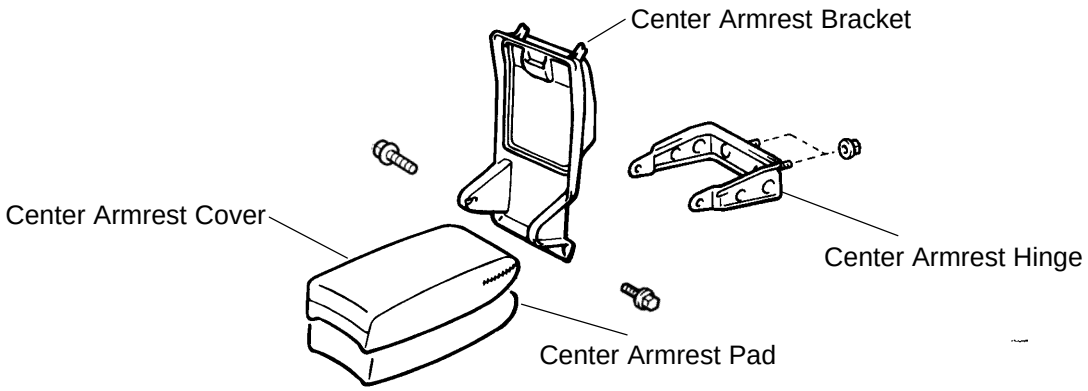
Installation is in the reverse order of removal (See page BO–99).

REAR SEAT

COMPONENTS

BO0B7–05



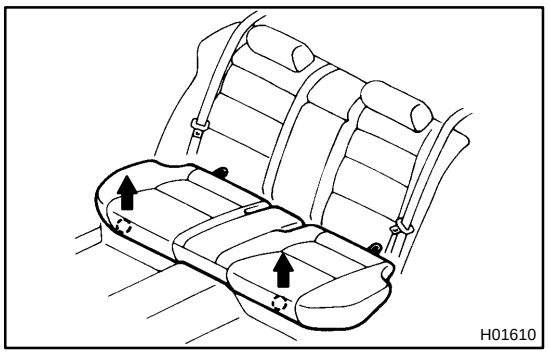


N·m (kgf·cm, ft·lbf) : Specified torque
● Non–reusable part

H01613

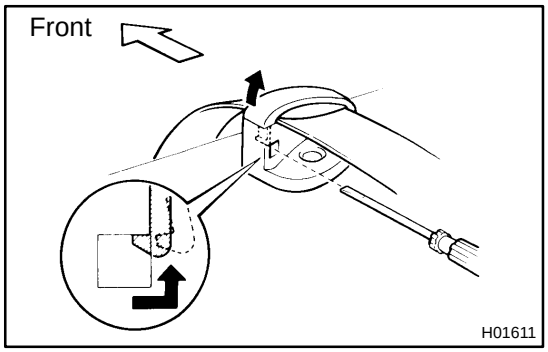
BO0B8–01

REMOVAL



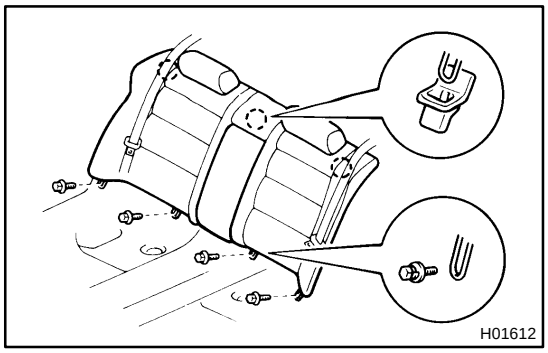
1. REMOVE SEAT CUSHION ASSEMBLY

Remove the seat cushion assembly as shown in the illustration.



2. REMOVE SEATBACK ASSEMBLY

(a) Using a screwdriver, remove the rear seat belt from the belt guide as shown in the illustration.



(b) Remove the 4 bolts, then raise the seatback assembly upward to remove the seatback assembly.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

BO0B9–01

DISASSEMBLY

1. REMOVE BELT GUIDE

Remove the 6 screws and 3 belt guides.

2. REMOVE SEATBACK COVER

(a) Remove the 2 headrests.

(b) Remove the 4 headrest supports.

(c) Remove the hog rings and seatback cover from the seatback pad.

3. REMOVE SEAT CUSHION COVER

Remove the hog rings and seat cushion cover from the seat cushion pad.

BO0BA–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO–107).

BO0BB–01

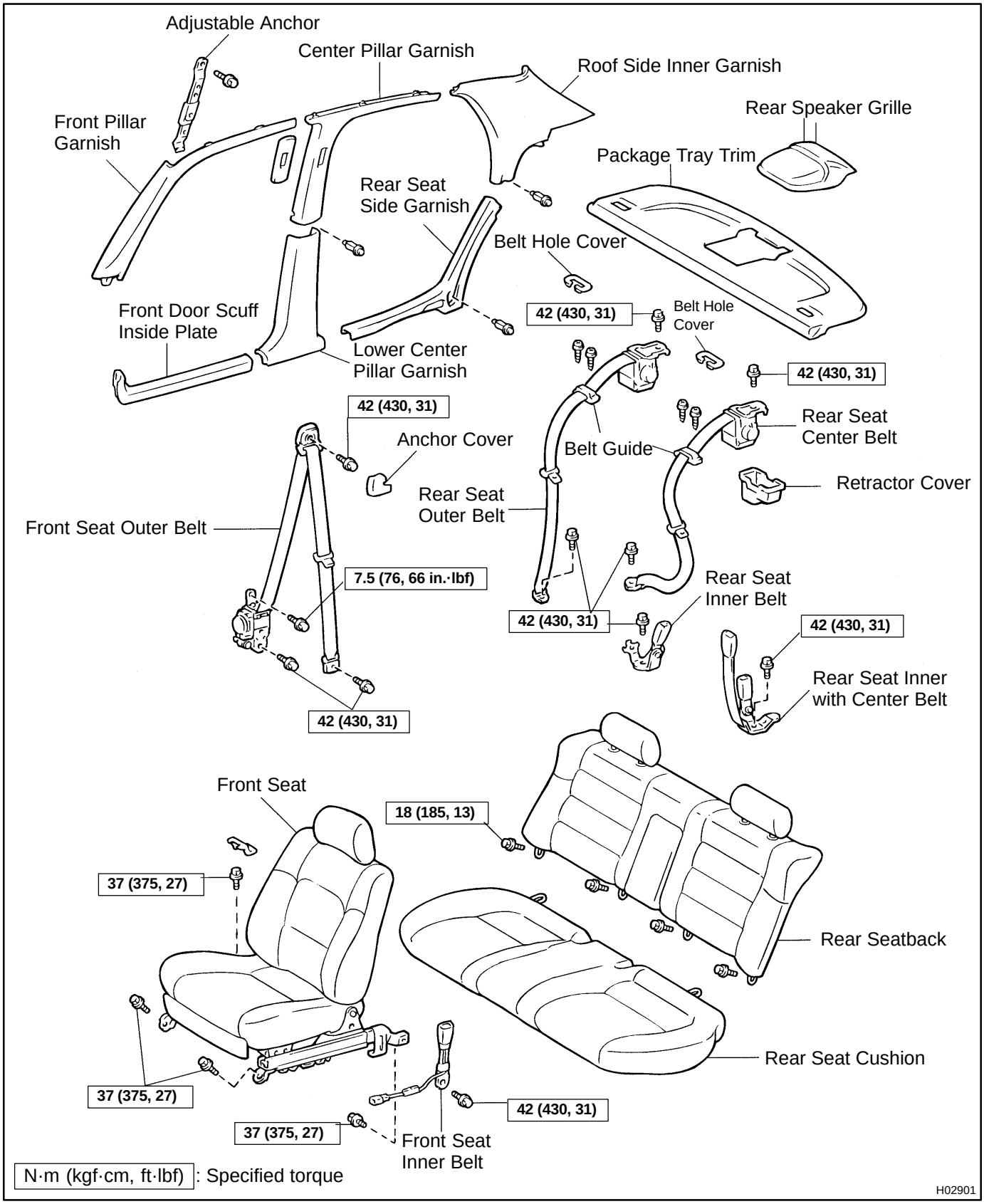
INSTALLATION

Installation is in the reverse order of removal (See page BO–106).

SEAT BELT

COMPONENTS

BO0BC–04



BO0BD–04

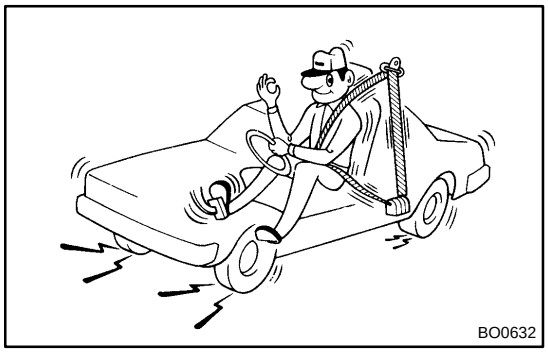
INSPECTION

CAUTION:

Replace the seat belt assembly (outer belt, inner belt, bolts, nuts or sill–bar) if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.

1. RUNNING TEST (IN SAFE AREA)

(a) Fasten the front seat belts.


BO0632

(b) Drive the car at 10 mph (16 km/h) and slam on the brakes. Check that the belt locks and cannot be extended at this time.

HINT:

Conduct this test in a safe area. If the belt does not lock, remove the belt mechanism assembly and conduct the following static check. Also, whenever installing a new belt assembly, verify the proper operation before installation.

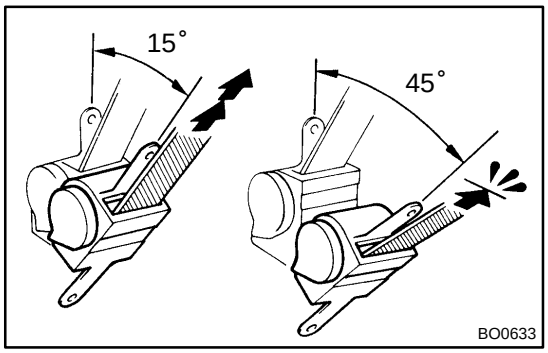
2. Driver's seat belt (ELR):

STATIC TEST

(a) Make sure that the belt locks when pulled out quickly.

(b) Remove the locking retractor assembly.

(c) Tilt the retractor slowly.



BO0633

(d) Make sure that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out over 45 degrees of tilt.

If a problem is found, replace the assembly.

3. Except driver's seat belt (ALR/ELR):

STATIC TEST

(a) Make sure that the belt locks when pulled out quickly.

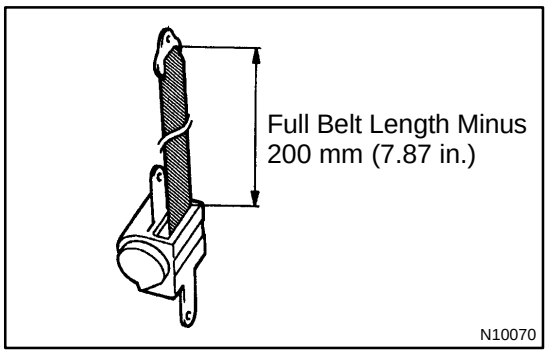
(b) Remove the locking retractor assembly.

(c) Pull out the whole belt and measure the length of the whole belt.

Then retract the belt slightly and pull it out again

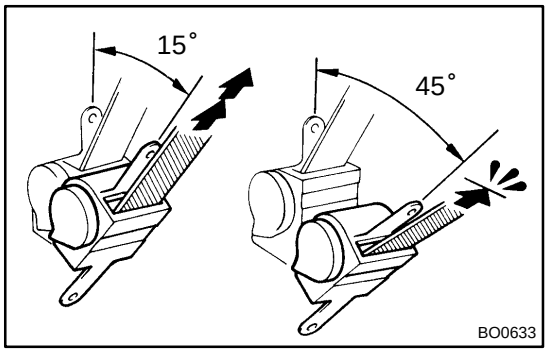
(d) Make sure that the belt cannot be extended further.

If a problem is found, replace the assembly.



(e) Retract the whole belt, then pull out the belt until 200 mm (7.87 in.) of belt remains retracted.

(f) Tilt the retractor slowly.



(g) Make sure that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out at over 45 degrees of tilt.

If a problem is found, replace the assembly.

SEAT BELT PRETENSIONER

BO3EM–01

REMOVAL

CAUTION:

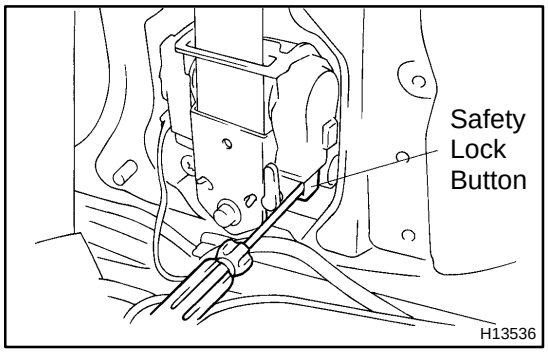
When removing the seat belt pretensioner, always place it on a flat, stable surface.

NOTICE:

- **If the seat belt pretensioner has been dropped or damaged, replace it with a new one.**
- **Never install a seat belt pretensioner which has been used in another vehicle. When replacing a seat belt pretensioner, always install a new one.**

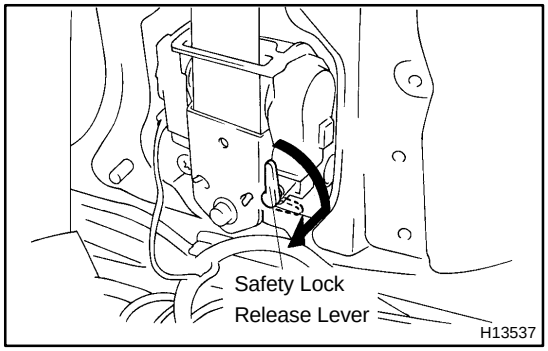
1. REMOVE THESE PARTS:

(a) Front door scuff inside plate
(b) Roof side inner garnish
(c) Rear seat side garnish
(d) Power center pillar garnish

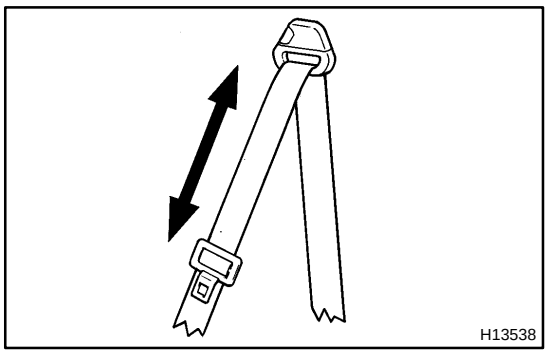


2. REMOVE FRONT SEAT OUTER BELT

(a) Look the sensor by pushing in the safety lock button with a screwdriver.



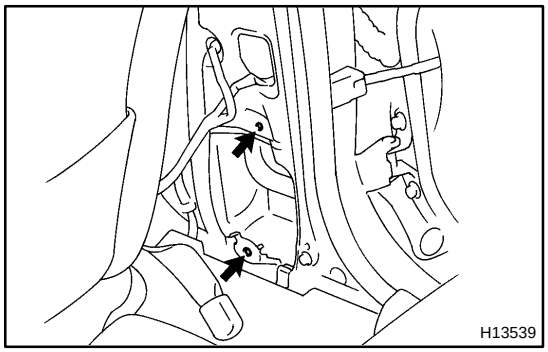
(b) Turn the safety lock release lever as shown in the illustration.
(c) Remove the 4 bolts and front seat outer belt.



INSPECTION

1. INSPECT SEAT BELT PRETENSIONER ACTIVATION

Replace the seat belt if the seat belt cannot be drawn out or does not retract.



2. INSPECT SEAT BELT PRETENSIONER MOUNT BO3EN–01

Remove the seat belt pretensioner and check for deformation of the mount. If you find any deformation, repair the mount.

BO3EP–01

DISPOSAL

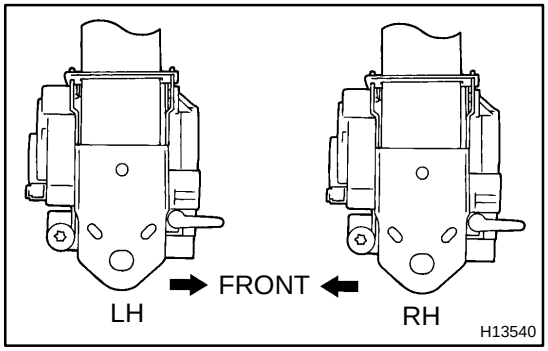
HINT:

When scrapping vehicles equipped with a pretensioner or disposing of a front seat outer belt (with seat belt pretensioner), always first activate the seat belt pretensioner in accordance with the procedure described below. If any abnormality occurs with the seat belt pretensioner operation, contact the SERVICE DEPT. of the DISTRIBUTOR.

CAUTION:

- **Never dispose of a front seat outer belt (with seat belt pretensioner) which has inactivated pretensioner.**
- **Then seat belt pretensioner produces a sizeable exploding sound when it activates, so perform the operation outdoors where it will not create a nuisance to nearby residents.**
- **Activate the seat belt pretensioner in a safe place outdoors, on a flat concrete area.**
- **After unlocking the sensor, take care not to jolt or drop the seat belt pretensioner.**
- **Use gloves and safety glasses when handling a activated seat belt pretensioner.**
- **Always stand at least 5 m (16 ft) away from the seat belt pretensioner when activating it.**
- **Then activated seat belt pretensioner is very hot, so wait 30 minutes for it cool down. Do not splash water on it at all.**
- **Put the seat belt pretensioner in a vinyl bag, seal the bag and dispose of it.**
- **Seat belt pretensioners should always be activated before disposal.**

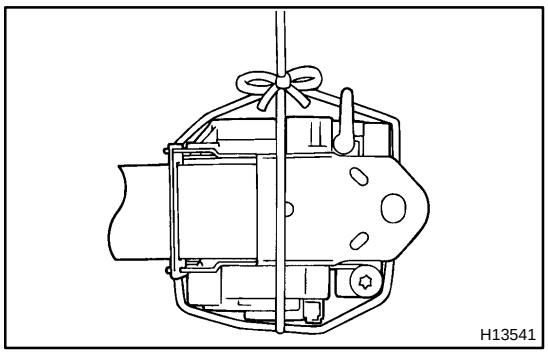
1. REMOVE FRONT SEAT OUTER BELT
(See page BO–113)



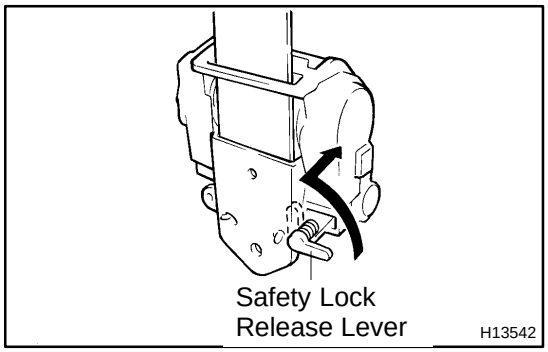
2. PREPARATION FOR ACTIVATING SEAT BELT PRETENSIONER

(a) Cut the belt off near the seat belt retractor.

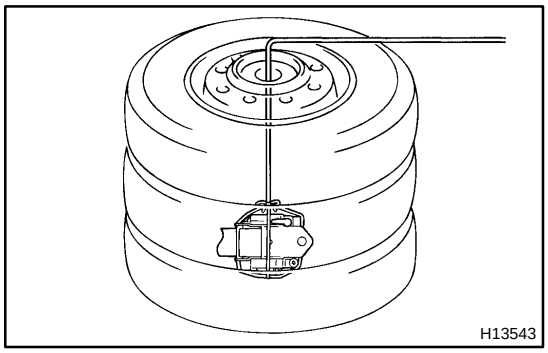
(b) Check that which side of the seat of the seat belt pretensioner is the vehicle front side.



(c) As shown in the illustration, tie the seat belt pretensioner so that the vehicle front side of the pretensioner is facing downward and that the pretensioner is horizontal.



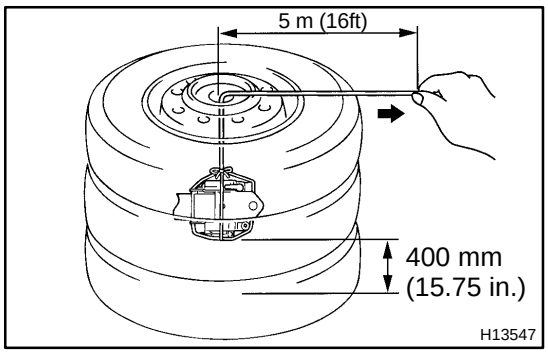
(d) Unlock the sensor by operating in he safety lock release lever as shown in the illustration.



(e) Pile 2 tires and 1 tire with wheel around the seat belt pretensioner. Pass the cord the through the wheel of the top tire.

CAUTION:

So not apply any shock to the seat belt pretensioner.

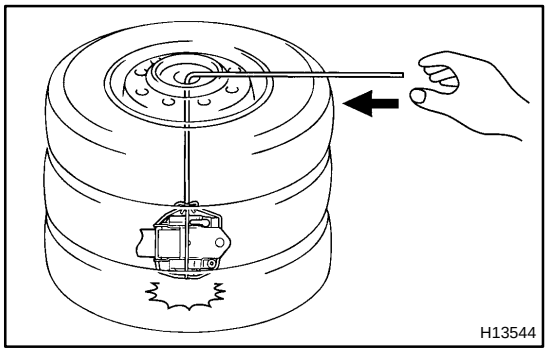


3. ACTIVE SEAT BELT PRETENSIONER

(a) Stand at least 5 m (16 ft) away from the seat belt pretensioner and pull the pretensioner 400 mm (15.75 in.) off the ground.

CAUTION:

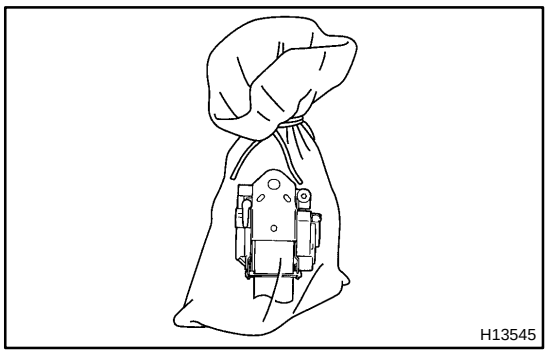
- **Before pulling the seat belt pretensioner up, check that the area around the tires is safe.**
- **Before activating the seat belt pretensioner, always warm anyone near by in a loud voice.**



(b) Release the cord and drop the seat belt pretensioner.

CAUTION:

The activated seat pelt pretensioner is very hot, so wait 30 minutes for it to cool down. Do not splash water on it at all. If the sensor lock is not fully released or if the seat belt pretensioner is not suspended horizontally, the seat belt pretensioner may not activate. If this occurs, avoid any shocks to the pretensioner, lock the sensor and do the activation precess again from the start.



4. DISPOSAL OF SEAT BELT PRETENSIONER

Put the seat belt pretensioner in a vinyl bag, seal the bag and dispose of it.

CAUTION:

- **Use gloves and safety glasses when handling a deployed seat belt pretensioner.**
- **Always wash your hands after completing disposal of the seat belt pretensioner.**

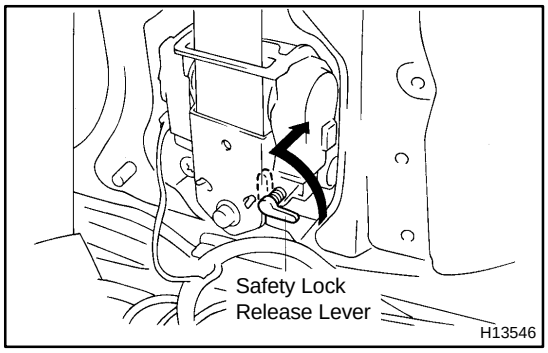
BO0BH–05

INSTALLATION

1. INSTALL FRONT SEAT OUTER BELT

(a) Install the front seat outer belt retractor
Torque:
Upper bolt: 7.5 N·m (76 kgf·cm, 66 in.·lbf)
Lower bolt: 42 N·m (430 kgf·cm, 31 ft·lbf)

(b) Install the front seat outer belt shoulder anchor and floor anchor bolts.
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)



(c) Unlock the sensor by operating in the safety lock release lever as shown in the illustration.

2. INSTALL THESE PARTS:

(a) Lower center pillar garnish
(b) Rear seat side garnish
(c) Roof side inner garnish
(d) Front door scuff inside plate

BODY ELECTRICAL SYSTEM

BE04P–01

PRECAUTION

HINT:

Take care to observe the following precautions when performing inspections or removal and replacement of body electrical related parts.

1. HEADLIGHT SYSTEM

Halogen bulbs have pressurized gas inside and require special handling. They can burst if scratched or dropped. Hold a bulb only by its plastic or metal case. Don't touch the glass part of a bulb with bare hands.

2. SRS (SUPPLEMENTAL RESTRAINT SYSTEM)

The LEXUS ES300 is equipped with an SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

3. AUDIO SYSTEM

- If the negative (–) terminal cable is disconnected from the battery, the preset AM, FM 1 and FM 2 stations stored in memory are erased, so make sure to note the stations and reset them after the negative (–) terminal cable is reconnected to the battery.
- If the negative (–) terminal cable is disconnected from the battery, the "ANTI–THEFT SYSTEM" will operate when the cable is reconnected, but the radio, tape player and CD player will not operate. Be sure to input the correct ID number so that the radio, tape player and CD player can be operated again.

4. MOBILE COMMUNICATION SYSTEM

If the vehicle is equipped with a mobile communication system, refer to precautions in the IN section.

BE04Q–09

PROBLEM SYMPTOMS TABLE

1. POWER OUTLET

Symptom	Suspect Area	See page
Electric power source cannot be taken out of the power outlet.	1. Battery 2. POWER OUTLET Fuse (Instrument Panel J/B) 3. Wire Harness	– – –

2. HEADLIGHT AND TAILLIGHT SYSTEM (USA):

Symptom	Suspect Area	See page
Headlight does not light. (Taillight is normal)	1. HEAD (LH, RH) Fuse (E/G Room J/B) 2. Headlight Control Relay (E/G Room J/B) 3. Headlight Bulbs 4. Wire Harness	– – – –
Headlight does not light. (Taillight does not light up)	1. Integration Relay (Instrument Panel J/B) 2. Light Control Switch 3. Wire Harness	BE–20 BE–27 –
Only one side light does not light.	1. HEAD (LH, RH) Fuse (E/G Room J/B) 2. Headlight Bulbs 3. Wire Harness	– – –
”Lo–Beam” does not light.	1. Light Control Switch 2. Headlight Dimmer Switch 3. Headlight Bulbs 4. Wire Harness	BE–27 BE–27 – –
”Hi–Beam” does not light.	1. Light Control Switch 2. Headlight Dimmer Switch 3. Headlight Bulbs 4. Wire Harness	BE–27 BE–27 – –
”Flash” does not light.	1. Headlight Dimmer Switch 2. Wire Harness	BE–27 –
”Auto Turn–off system” does not operate.	1. Integration Relay (Instrument Panel J/B) 2. GAUGE Fuse (Instrument Panel J/B) 3. Ignition Switch 4. Door Courtesy Switch (Driver’s) 5. Wire Harness 6. DOME Fuse (E/G Room J/B)	BE–20 – BE–20 BE–46 – –
Taillight does not light. (Headlight does not light)	1. Light Control Switch 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness	BE–27 BE–20 –
Taillight does not light. (Headlight is normal)	1. TAIL Fuse (Instrument Panel J/B) 2. Taillight Control Relay (Instrument Panel J/B) 3. Wire Harness	– BE–27 –
Only one side light does not light.	1. Bulb 2. Wire Harness	– –
Rear Combination light does not light.	1. Wire Harness 2. Light Failure Sensor 3. Bulb	– BE–92 –
”Light Auto Turn–off system” does not operate.	1. Integration Relay 2. Wire Harness 3. DOME Fuse (E/G Room J/B) 4. Door Courtesy Switch (Driver’s)	BE–20 – – BE–46

3. HEADLIGHT AND TAILLIGHT SYSTEM (CANADA):

Symptom	Suspect Area	See page
Headlight does not light. (Taillight is normal)	1. Wire Harness	–
Headlight does not light. (Taillight does not light up)	1. Wire Harness	–
Only one side light does not light.	1. Headlight Bulb 2. Wire Harness	– –
”Lo–Beam” does not light.	1. Headlight Control Relay (E/G Room J/B) 2. Light Control Switch 3. Integration Relay (Instrument Panel J/B) 4. Wire Harness 5. HEAD LO (LH, RH) Fuse (E/G Room R/B No.2) 6. Headlight Bulb	BE–27 BE–27 BE–20 – – –
”Hi–Beam” does not light.	1. DRL No.2 Fuse (E/G Room R/B No.2) 2. Daytime Running Light Relay No.2 (E/G Room R/B No.2) 3. Daytime Running Light Relay 4. Daytime Running Light Relay No.3 (E/G Room R/B No.2) 5. Daytime Running Light Relay No.4 (E/G Room R/B No.2) 6. DOME Fuse (E/G Room J/B) 7. Headlight Dimmer Switch 8. Wire Harness 9. HEAD HI (LH, RH) Fuse (E/G Room J/B) 10. Headlight Bulb	– – BE–27 BE–27 – BE–27 – BE–27 – BE–27 – – –
”Flash” does not light.	1. DRL No.2 Fuse (E/G Room R/B No.2) 2. Daytime Running Light Relay No.2 (E/G Room R/B No.2) 3. Daytime Running Light Relay 4. Daytime Running Light Relay No.3 (E/G Room R/B No.2) 5. Daytime Running Light Relay No.4 (E/G Room R/B No.2) 6. DOME Fuse (E/G Room J/B) 7. Headlight Dimmer Switch 8. Wire Harness 9. HEAD HI (LH, RH) Fuse (E/G Room J/B) 10. Headlight Bulb	– – BE–27 BE–27 – BE–27 – BE–27 – BE–27 – – –
”Auto Turn–off System” dose not operate.	1. Integration Relay (Instrument Panel J/B) 2. GAUGE Fuse (Instrument Panel J/B) 3. Ignition Switch 4. Door Courtesy Switch (Driver’s) 5. Wire Harness 6. DOME Fuse (E/G Room J/B)	BE–27 – BE–27 BE–46 – –
Headlight does not light with engine running and light control SW OFF.	1. GAUGE Fuse (Instrument Panel J/B) 2. DOME Fuse (E/G Room J/B) 3. Other Parts* 4. Daytime Running Light Relay 5. Daytime Running Light Relay No.3 (E/G Room R/B No.2) 6. Wire Harness 7. HEAD HI (LH, RH) Fuse (E/G Room J/B) 8. Headlight Bulb	– – – BE–27 – BE–27 – – –

Taillight does not light. (Headlight does not light)	1. Light Control Switch 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness	BE–27 BE–27 –
Taillight does not light. (Headlight is normal)	1. TAIL Fuse (Instrument Panel J/B) 2. Taillight Control Relay (Instrument Panel J/B) 3. Wire Harness	– BE–27 –
Only one side light does not light.	1. Bulb 2. Wire Harness	– –
Rear Combination light does not light.	1. Wire Harness 2. Light Failure Sensor 3. Bulb	– BE–92 –
”Light Auto Turn–off system” does not operate.	1. Integration Relay 2. Wire Harness 3. DOME Fuse (E/G Room J/B) 4. Door Courtesy Switch (Driver’s)	BE–27 – – BE–46

*: Parking Brake Switch and Terminal L of Generator

4. FOG LIGHT SYSTEM

Symptom	Suspect Area	See page
Fog light does not light with light control SW HEAD. (Headlight is normal)	1. FOG Fuse (Instrument Panel J/B) 2. Fog Light Relay 3. Fog Light Switch 4. Wire Harness	– BE–36 BE–36 –
Fog light does not light with light control SW HEAD. (Headlight does not light)	1. Other Parts*1 2. Wire Harness	– –
Only one light does not light.	1. Bulb 2. Wire Harness	– –

*1: Inspect Headlight System.

5. TURN SIGNAL AND HAZARD WARNING SYSTEM

Symptom	Suspect Area	See page
”Hazard” and ”Turn” do not light up.	1. Hazard Warning Switch 2. Turn Signal Flasher 3. Wire Harness	 BE–40 –
The flashing frequency is abnormal.	1. Bulb 2. Turn Signal Switch 3. Wire Harness	– BE–40 –
Hazard warning light does not light up. (Turn signal is normal)	1. HAZARD Fuse (E/G Room J/B) 2. Wire Harness	– –
Either of hazard warning lights does not light up .	1. Hazard Warning Switch 2. Wire Harness	BE–40 –
*1 Turn signal does not light up.	1. Ignition Switch 2. Turn Signal Switch 3. Wire Harness	BE–20 BE–40 –
*2 Turn signal does not light up.	1. TURN Fuse (Instrument Panel J/B) 2. Turn Signal Switch 3. Wire Harness	– BE–40 –
Turn signal does not light up in one direction.	1. Turn Signal Switch 2. Wire Harness	BE–40 –
Only one bulb does not light up.	1. Bulb 2. Wire Harness	– –

*1: Combination Meter, Wiper and Washer do not operate.

*2: Combination Meter, Wiper and Washer are normal.

6. ILLUMINATION LIGHT SYSTEM

Symptom	Suspect Area	See page
Illumination lights do not light up. (Taillight is normal)	1. PANEL Fuse (Instrument Panel J/B) 2. Wire Harness	– –
Illumination lights do not light up. (Taillight does not light)	1. Taillight Control Relay (Instrument Panel J/B) 2. Other parts* 3. Wire Harness	BE–27 – –
Illumination light with adjustable brightness do not light up.	1. Rheostat Light Control Volume 2. Wire Harness	BE–43 –
Only one light does not light up.	1. Bulb 2. Wire Harness	– –
Brightness does not chang when rheostat volume is trutned. (ALL)	1. Rheostat Light Control Volume 2. Wire Harness	BE–43 –
Brightness does not chang when rheostat volume is trutned. (Only Combination Meter)	1. Combination Meter Assembly 2. Wire Harness	BE–58 –
Glove box does not light up.	1. Glove Box Light Switch 2. Bulb 3. Wire Harness	BE–43 – –

*: Inspect Taillight System.

7. INTERIOR LIGHT SYSTEM

Symptom	Suspect Area	See page
Only one interior light does not light up.	1. Bulb 2. Wire Harness	– –
Interior lights do not light up (ALL).	1. DOME Fuse (E/G Room J/B) 2. Wire Harness	– –
”Illuminated Entry System” does not operate.	1. Integration Relay (Instrument Panel J/B) 2. Door Courtesy Switch 3. Wire Harness	– BE–46 –
Interior light does not light up.	1. Bulb 2. Interior Light Switch 3. Wire Harness	– BE–46 –
Front personal light does not light up.	1. Bulb 2. Personal Light Switch 3. Wire Harness	– BE–46 –
Vanity light does not light up.	1. Bulb 2. Vanity Light 3. Wire Harness	– BE–46 –
Luggage compartment light does not light up.	1. Bulb 2. Luggage Compartment Door Courtesy Switch 3. Wire Harness	– BE–46 –
Courtesy light does not light up.	1. Bulb 2. Door Courtesy Switch 3. Wire Harness	– BE–46 –

8. STOP LIGHT SYSTEM

Symptom	Suspect Area	See page
Stop light does not light up.	1. STOP Fuse (Instrument Panel J/B) 2. Stop Light Switch 3. Light Failure Sensor 4. Wire Harness	– BE–51 BE–51 –
Stop light always lights up.	1. Stop Light Switch 2. Wire Harness	BE–51 –

Only one light always lights up.	1. Wire Harness	–
Only one light does not light.	1. Bulb 2. Wire Harness	– –

9. WIPER AND WASHER SYSTEM

Symptom	Suspect Area	See page
Wiper and washers do not operate.	1. WIPER Fuse (Instrument Panel J/B) 2. Wiper Switch 3. Wire Harness	– BE–54 –
Wipers do not operate in LO or HI.	1. Wiper Switch 2. Wiper Motor 3. Wire Harness	BE–54 BE–54 –
Wipers do not operate in INT.	1. Wiper Switch 2. Wiper Motor 3. Wire Harness	BE–54 BE–54 –
Washer motor does not operate.	1. Washer Switch 2. Washer Motor 3.Wire Harness	BE–54 BE–54 –
Wiper do not operate when washer switch is ON.	1. Washer Motor 2. Wire Harness	BE–54 –
Washer fluid does not operate.	1. Washer Hose and Nozzle	–
●At wiper switch HI position, the wiper blade is in contact with the body. ●When the wiper switch is OFF, the wiper blade does not retract or the retract position is wrong.	1. Wiper Switch* 2. Wire Harness	BE–54 – – – –

*: Inspect wiper arm and blade set position.

10. DEFOGGER SYSTEM

Symptom	Suspect Area	See page
All defogger systems do not operate.	1. DEFOG Fuse (Instrument Panel J/B) 2. HEATER Fuse (Instrument Panel J/B) 3. Defogger Relay (Instrument Panel J/B) 4. Defogger Switch 5. Wire Harness	– – BE–106 BE–106 –
Rear window defogger does not operate.	1. Defogger Wire 2. Choke Coil 3. Wire Harness	– – –
Mirror defogger does not operate.	1. MIRROR–HEATER Fuse (Instrument Panel J/B) 2. Mirror Defogger 3. Wire Harness	– BE–106 –

11. POWER WINDOW CONTROL SYSTEM

Symptom	Suspect Area	See page
*1 Power window does not operate.	1. Integration Relay (Instrument Panel J/B) 2. Wire Harness	BE–20 –
*2 Power window does not operate.	1. POWER Fuse (Instrument Panel J/B) 2. Integration Relay (Instrument Panel J/B) 3. Power Main Relay (Instrument Panel J/B) 4. Power Window Master Switch 5. Wire Harness	– BE–20 BE–110 BE–110 –
*2 ”One Touch Power Window System” does not operate.	1. Power Window Master Switch	BE–110

Only one window glass does not move.	1. Power Window Master Switch 2. Power Window Switch 3. Power Window Motor 4. Wire Harness	BE–110 BE–110 BE–110 –
”Window Lock System” does not operate.	1. Power Window Master Switch	BE–110
”Window Lock Illumination” does not lightup.	1. Power Window Master Switch	BE–110
Key–off power window does not operate.	1. GAUGE Fuse (Instrument Panel J/B) 2. Integration Relay (Instrument Panel J/B) 3. Ignition Switch 4. Door Courtesy Switch 5. Wire Harness	– BE–20 BE–20 BE–46 –

*1: Door Lock does not operate.
*2: Door Lock is normal.

12. POWER DOOR LOCK CONTROL SYSTEM

Symptom	Suspect Area	See page
”Door lock system” does not operate at all.	1. ECU–IG Fuse (Instrument Panel J/B) 3. DOOR Fuse (Instrument Panel J/B) 4. Integration Relay (Instrument Panel J/B) 5. Wire Harness	– – BE–20 –
Door lock system does not operate by manual switch.	1. Power Window Master Switch 2. Door Lock Control Switch 3. Integration Relay (Instrument Panel J/B) 4. Wire Harness	BE–110 BE–119 BE–20 –
Door lock system does not operate by door key.	1. Door Key Lock and Unlock Switch 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness 4. Door Lock Link Disconnected	BE–119 BE–20 – –
Fault in 2–Operation unlock function of Driver’s side door key lock and unlock switch.	1. Door Key Lock and Unlock Switch 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness	BE–119 BE–20 –
Fault in key confine prevention operate.	1. Integration Relay (Instrument Panel J/B) 2. Key Unlock Warning Switch 3. Door Courtesy Switch 4. Wire Harness	BE–20 BE–20 BE–46 –
Only one door lock does not operation.	1. Door Lock Motor 2. Wire Harness	BE–119 –

13. SLIDING ROOF SYSTEM

Symptom	Suspect Area	See page
*1 Sliding roof system does not operate.	1. Power Main Relay (Instrument Panel J/B) 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness	BE–110 BE–20 –
*2 Sliding roof system does not operate.	1. POWER Fuse (Instrument Panel J/B) 2. Integration Relay (Instrument Panel J/B) 3. Sliding Roof Switch 4. Sliding Roof Control Relay 5. Sliding Roof Motor 6. Wire Harness	– BE–20 BE–125 BE–125 BE–125 –

Sliding roof system operates abnormally.	1. Sliding Roof Control Relay 2. Limit Switch 3. Sliding Roof Switch	BE–125 BE–125 BE–125
Sliding roof system stops operation half way.	1. Sliding Roof Control Relay 2. Limit Switch 3. Sliding Roof Switch 4. Sliding Roof Motor (Stones or foreign material trapped in motor assembly)	BE–125 BE–125 BE–125 BE–125 –

*1: Door Lock does not operate.
*2: Door Lock is normal.

14. POWER SEAT CONTROL SYSTEM

Symptom	Suspect Area	See page
Power seat does not operate. (Power door lock system does not operate)	1. Wire Harness 2. POWER Fuse (Instrument Panel J/B)	– –
Power seat does not operate. (Power door lock system is normal)	1. Wire Harness 2. Power Seat Switch (D,P)	– BE–129
Driver's seat does not operate.	1. Power seat Switch (D) 2. Wire Harness	BE–129 –
Passenger's seat does not operate.	1. Power Seat Switch (P) 2. Wire Harness	BE–129 –
"Slide operation" does not operate.	1. Power Seat Switch (D,P) 2. Wire Harness 3. Slide Motor (D,P)	BE–129 – BE–129
"Front vertical operation" does not operate.	1. Power Seat Switch (D,P) 2. Wire Harness 3. Front Vertical Motor (D,P)	BE–129 – BE–129
"Rear Vertical operation" does not operate.	1. Power Seat Switch (D,P) 2. Wire Harness 3. Rear Vertical Motor (D,P)	BE–129 – BE–129
"Reclining operation" does not operate.	1. Power Seat Switch (D,P) 2. Wire Harness 3. Reclining Motor (D,P)	BE–129 – BE–129

(D): Driver's Seat
(P): Passenger's Seat

15. POWER MIRROR CONTROL SYSTEM

Symptom	Suspect Area	See page
Mirror does not operate.	1. CIG Fuse (Instrument Panel J/B) 2. Mirror Switch 3. Mirror Motor 4. Wire Harness	– BE–134 BE–134 –
Mirror operates abnormally.	1. Mirror Switch 2. Mirror Motor 3. Wire Harness	BE–134 BE–134 –

16. SEAT HEATER SYSTEM

Symptom	Suspect Area	See page
Seat heaters do not operate. (Driver's and Passenger's)	1. SEAT–HEATER Fuse (Instrument Panel J/B) 2. Wire Harness	– –
Driver's seat heater does not operate.	1. Seat Heater Switch (Driver's) 2. Seat Heater (Driver's) 3. Wire Harness	BE–137 BE–137 –

Passenger's seat heater does not operate.	1. Seat Heater Switch (Passenger's) 2. Seat Heater (Passenger's) 3. Wire Harness	BE–137 BE–137 –
Seat heater temperature is too high.	1. Seat Heater	BE–137

17. FUEL LID OPENER SYSTEM

Symptom	Suspect Area	See page
Fuel lid opener system does not operate.	1. DOOR Fuse (Instrument Panel J/B) 2. Fuel Lid Opener Switch 3. Fuel Lid Opener Solenoid 4. Wire Harness	– BE–140 BE–140 –

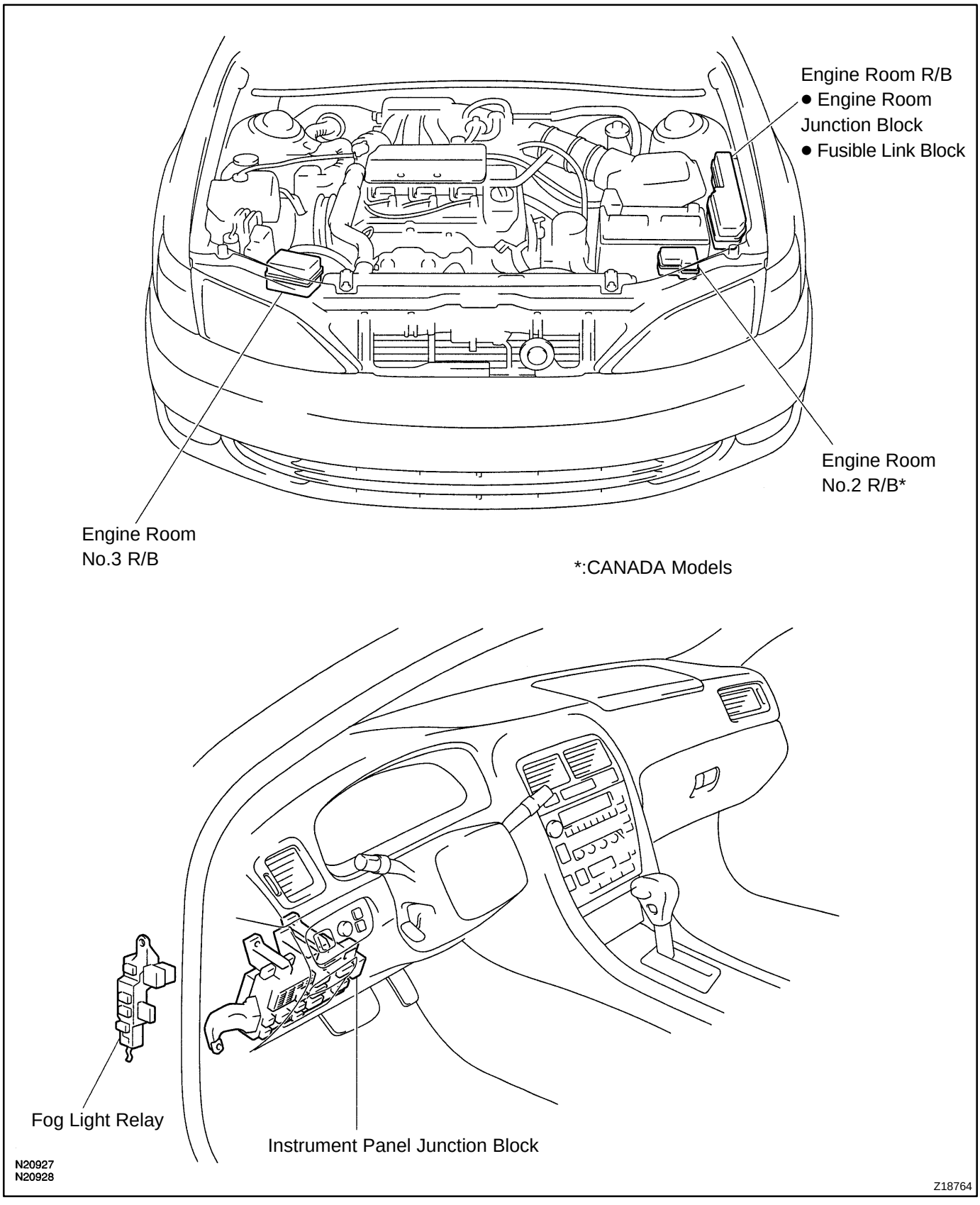
18. HORN SYSTEM

Symptom	Suspect Area	See page
Horn system does not operate.	1. HORN Fuse (E/G Room J/B) 2. Horn Relay (E/G Room J/B) 3. Horn Switch 4. Horn 5. Wire Harness	– BE–172 BE–172 BE–172 –
Horn blows all the time.	1. Horn Relay (E/G Room J/B) 2. Horn Switch 3. Wire Harness	BE–172 BE–172 –
One horn operates but the other horn does not operate.	1. Horn 2. Wire Harness	BE–172 –
Horns operate abnormally.	1. Horn Relay (E/G Room J/B) 2. Horn 3. Wire Harness	BE–172 BE–172 –

POWER SOURCE

LOCATION

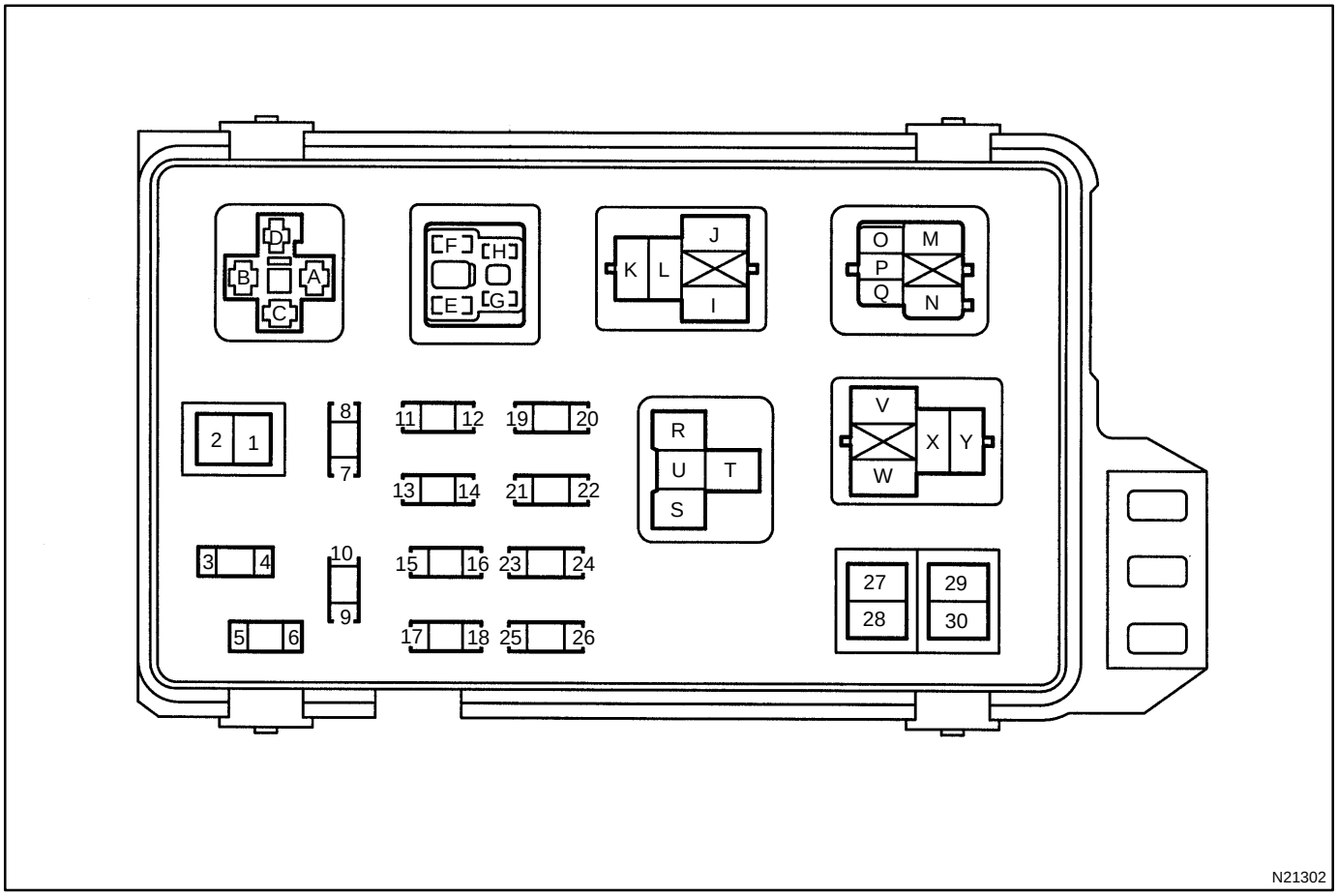
BE04R–01



BE04S–01

INSPECTION

1. INSPECT ENGINE ROOM JUNCTION BLOCK CIRCUIT



(a) Remove the fuse from the junction block and inspect the connector on junction block side.

Fuse	Tester connection	Condition	Specified condition
MAIN	1 – Ground	Constant	Battery positive voltage
DOME	4 – Ground	Constant	Battery positive voltage
ECU–B	6 – Ground	Constant	Battery positive voltage
RADIO No.1	7 – Ground	Ignition switch turned to ACC or ON	Battery positive voltage
SHORT PIN	9 – Ground	Constant	Battery positive voltage
HAZARD	11 – Ground	Constant	Battery positive voltage
AM2	13 – Ground	Constant	Battery positive voltage
TEL	15 – Ground	Constant	Battery positive voltage
HEAD (LH)	17 – Ground	Constant	Battery positive voltage
ALT–S	19 – Ground	Constant	Battery positive voltage
HEAD (RH)	21 – Ground	Constant	Battery positive voltage
EFI	23 – Ground	Constant	Battery positive voltage
HORN	25 – Ground	Constant	Battery positive voltage
RDI	28 – Ground	Constant	Battery positive voltage
CDS	30 – Ground	Constant	Battery positive voltage

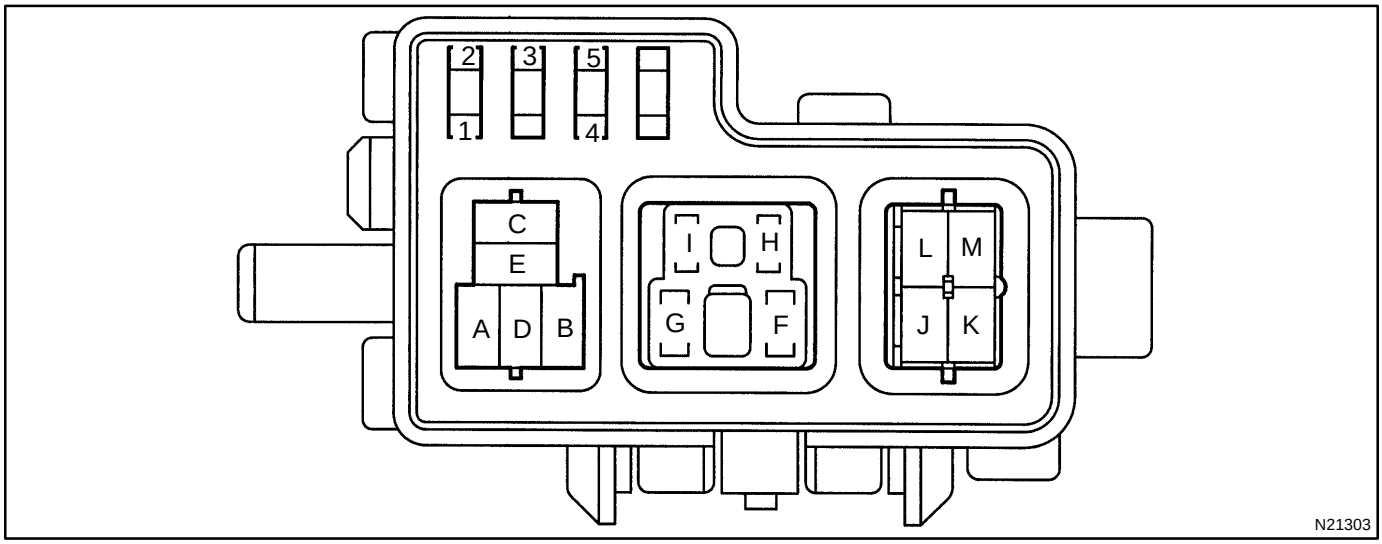
If the circuit is not as specified, inspect the circuits connected to other parts.

(b) Remove the relay from the junction block and inspect the connector on junction block side.

Relay	Tester connection	Condition	Specified condition
ST	C – Ground	Constant	Battery positive voltage
HEAD	E – Ground	Constant	Battery positive voltage
HEAD	H – Ground	Constant	Battery positive voltage
EFI	J – Ground	Constant	Continuity
ENGINE MAIN	M – Ground	Constant	Battery positive voltage
ENGINE MAIN	Q – Ground	Ignition switch turned to ON	Battery positive voltage
FAN No.1	U – Ground	Constant	Battery positive voltage
HORN	V – Ground	Constant	Battery positive voltage
HORN	Y – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

2. CANADA Models Only:
INSPECT ENGINE ROOM No.2 RELAY BLOCK CIRCUIT



(a) Remove the fuse from the relay block and inspect the connector on relay block side.

Fuse	Tester connection	Condition	Specified condition
H – LP RH (LO)	2 – Ground	Constant	Battery positive voltage
H – LP LH (LO)	3 – Ground	Constant	Battery positive voltage
DRL No.2	5 – Ground	Constant	Battery positive voltage

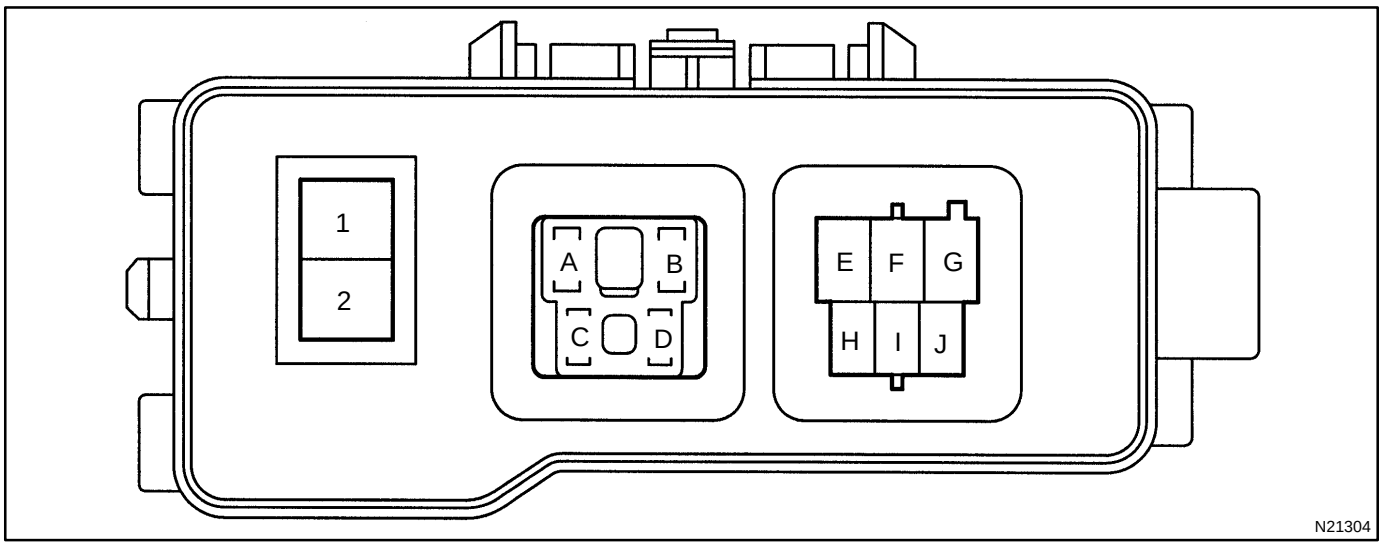
If the circuit is not as specified, inspect the circuits connected to other parts.

(b) Remove the relay from the relay block and inspect the connector on relay block side.

Relay	Tester connection	Condition	Specified condition
DRL No.3	D – Ground	Constant	Continuity
DRL No.3	A – Ground	Constant	Battery positive voltage
DRL No.3	E – Ground	Constant	Battery positive voltage
DRL No.4	H – Ground	Constant	Battery positive voltage
DRL No.4	I – Ground	Constant	Battery positive voltage
DIM	J – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

3. INSPECT ENGINE ROOM No.3 RELAY BLOCK CIRCUIT



(a) Remove the fuse from the relay block and inspect the connector on relay block side.

Fuse	Tester connection	Condition	Specified condition
ABS	2 – Ground	Constant	Battery positive voltage

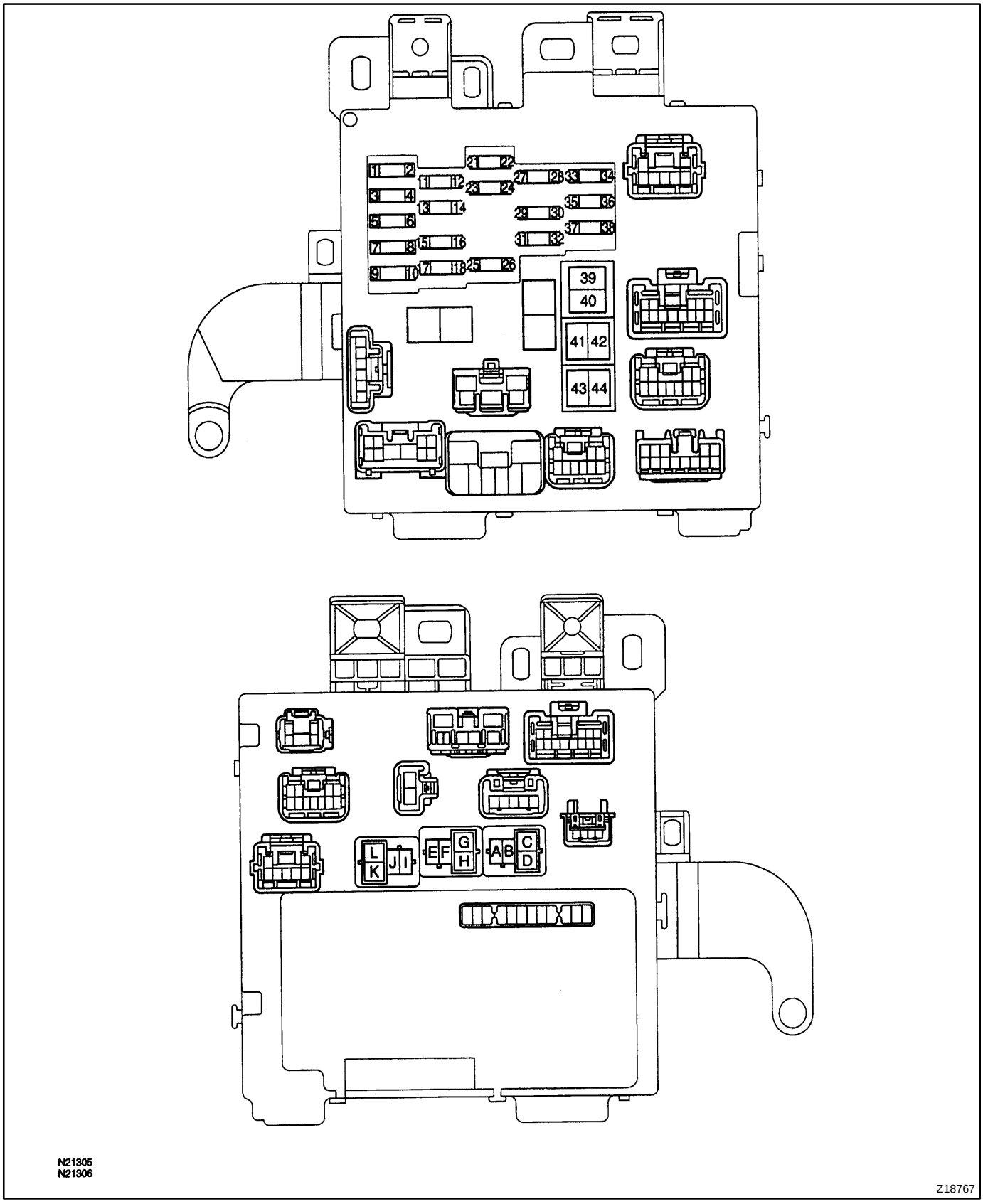
If the circuit is not as specified, inspect the circuits connected to other parts.

(b) Remove the relay from the relay block and inspect the connector on relay block side.

Relay	Tester connection	Condition	Specified condition
ABS SOL	F – Ground	Constant	Continuity
ABS SOL	E – Ground	Constant	Battery positive voltage
ABS MTR	G – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

4. INSPECT INSTRUMENT PANEL JUNCTION BLOCK CIRCUIT



(a) Remove the fuse from the instrument panel junction block and inspect the connector on instrument panel junction block side.

Fuse	Tester connection	Condition	Specified condition
S – HTR	2 – Ground	Ignition switch turned to ON	Battery positive voltage
HEATER	3 – Ground	Ignition switch turned to ON	Battery positive voltage
GAUGE	6 – Ground	Ignition switch turned to ON	Battery positive voltage
WIPER	7 – Ground	Ignition switch turned to ON	Battery positive voltage
M – HTR	10 – Ground	Ignition switch turned to ON	Battery positive voltage
ECU – IG	11 – Ground	Ignition switch turned to ON	Battery positive voltage
IGN	14 – Ground	Ignition switch turned to ON	Battery positive voltage
STOP	16 – Ground	Constant	Battery positive voltage
TAIL	18 – Ground	Light control switch turned to TAIL or HEAD and Engine running	Battery positive voltage
PWR	22 – Ground	Ignition switch turned to ON	Battery positive voltage
OBD – 2	24 – Ground	Constant	Battery positive voltage
FOG	26 – Ground	Constant	Battery positive voltage
ST	28 – Ground	Constant	Battery positive voltage
DOOR	29 – Ground	Constant	Battery positive voltage
PANEL	31 – Ground	Constant	Battery positive voltage
TURN	33 – Ground	Ignition switch turned to ON	Battery positive voltage
RAD/2	35 – Ground	Ignition switch turned to ACC or ON	Battery positive voltage
CIG	38 – Ground	Ignition switch turned to ACC or ON	Battery positive voltage
DEF	39 – Ground	Constant	Battery positive voltage
POWER	41 – Ground	Constant	Battery positive voltage
AM1	44 – Ground	Constant	Battery positive voltage

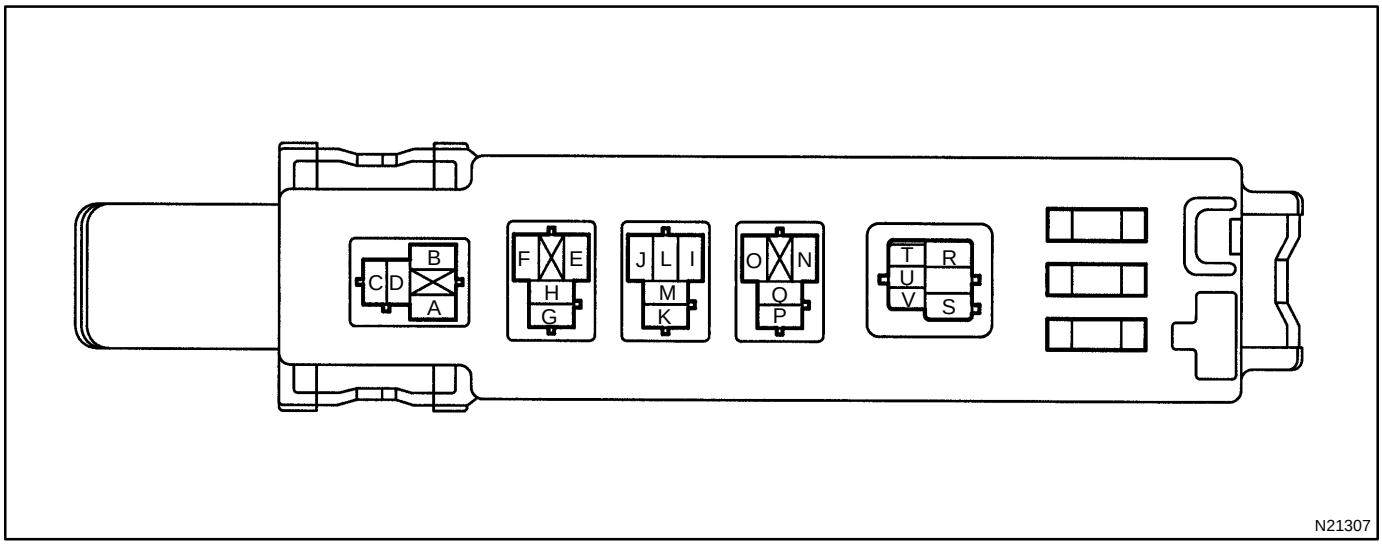
If the circuit is not as specified, inspect the circuits connected to other parts.

(b) Remove the relay from the junction block and inspect inspect the connector on junction block side.

Relay	Tester connection	Condition	Specified condition
Taillight	B – Ground	Constant	Battery positive voltage
Taillight	D – Ground	Constant	Battery positive voltage
Defogger	F – Ground	Constant	Battery positive voltage
Defogger	G – Ground	Defogger switch ON	Battery positive voltage
Power Main	J – Ground	Constant	Battery positive voltage
Power Main	K – Ground	Constant	Continuity

If the circuit is not as specified, inspect the circuits connected to other parts.

5. INSPECT INSIDE ENGINE ROOM JUNCTION BLOCK CIRCUIT

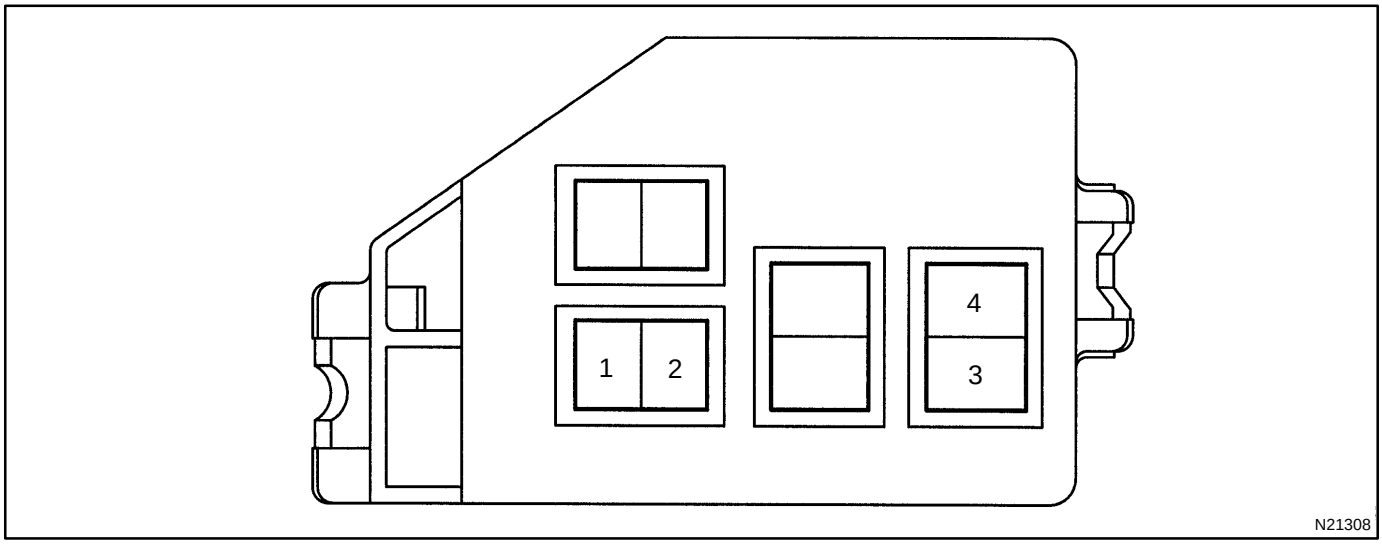


Remove the relay from the relay block and inspect the connector on relay block side.

Relay	Tester connection	Condition	Specified condition
MG/CLT	C – Ground	Constant	Continuity
MG/CLT	D – Ground	Ignition switch turned to ON	Battery positive voltage
C/OPN	G – Ground	Constant	Continuity
FAN No.2	L – Ground	Constant	Continuity
FAN No.2	J – Ground	Ignition switch turned to ON	Battery positive voltage
FAN No.2	K – Ground	Constant	Battery positive voltage
FAN No.3	P – Ground	Constant	Battery positive voltage
HEATER	U – Ground	Constant	Continuity
HEATER	R – Ground	Ignition switch turned to ON	Battery positive voltage
HEATER	V – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

6. INSPECT FUSIBLE LINK BLOCK CIRCUIT



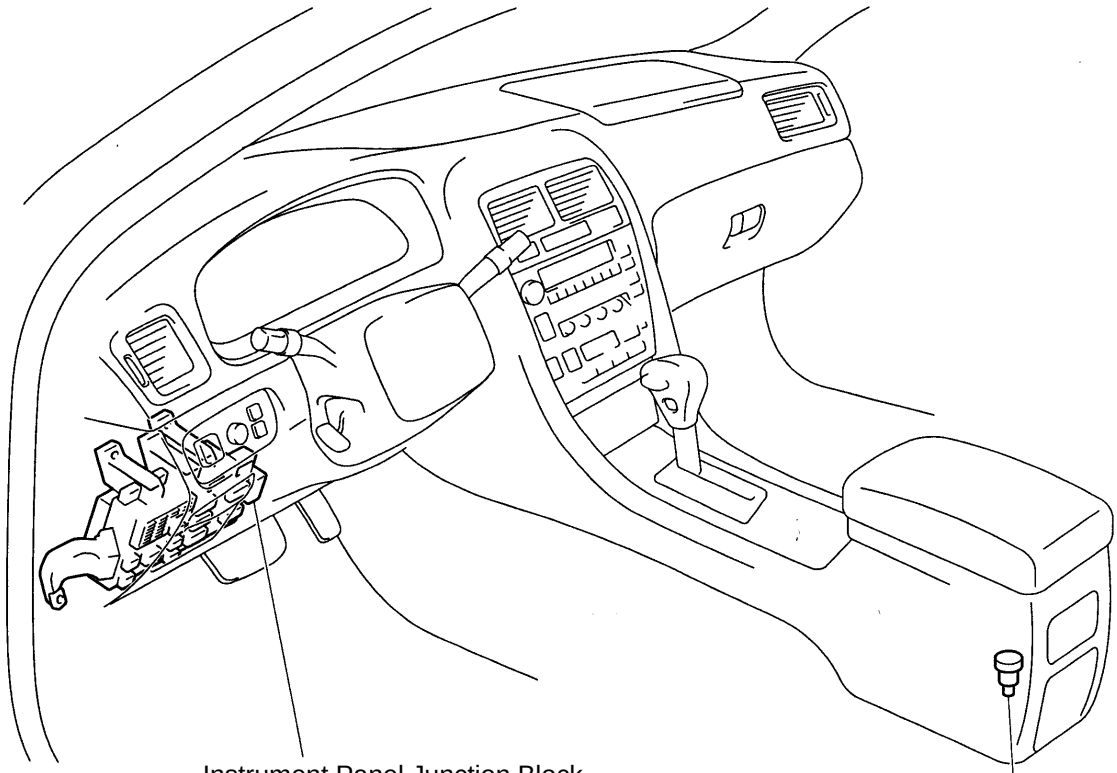
Remove the fuse from the junction block and inspect the connector on junction block side.

Fuse	Tester connection	Condition	Specified condition
HTR	1 – Ground	Ignition switch turned to ON	Battery positive voltage
ALT	4 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

POWER OUTLET
LOCATION

BE04T–01

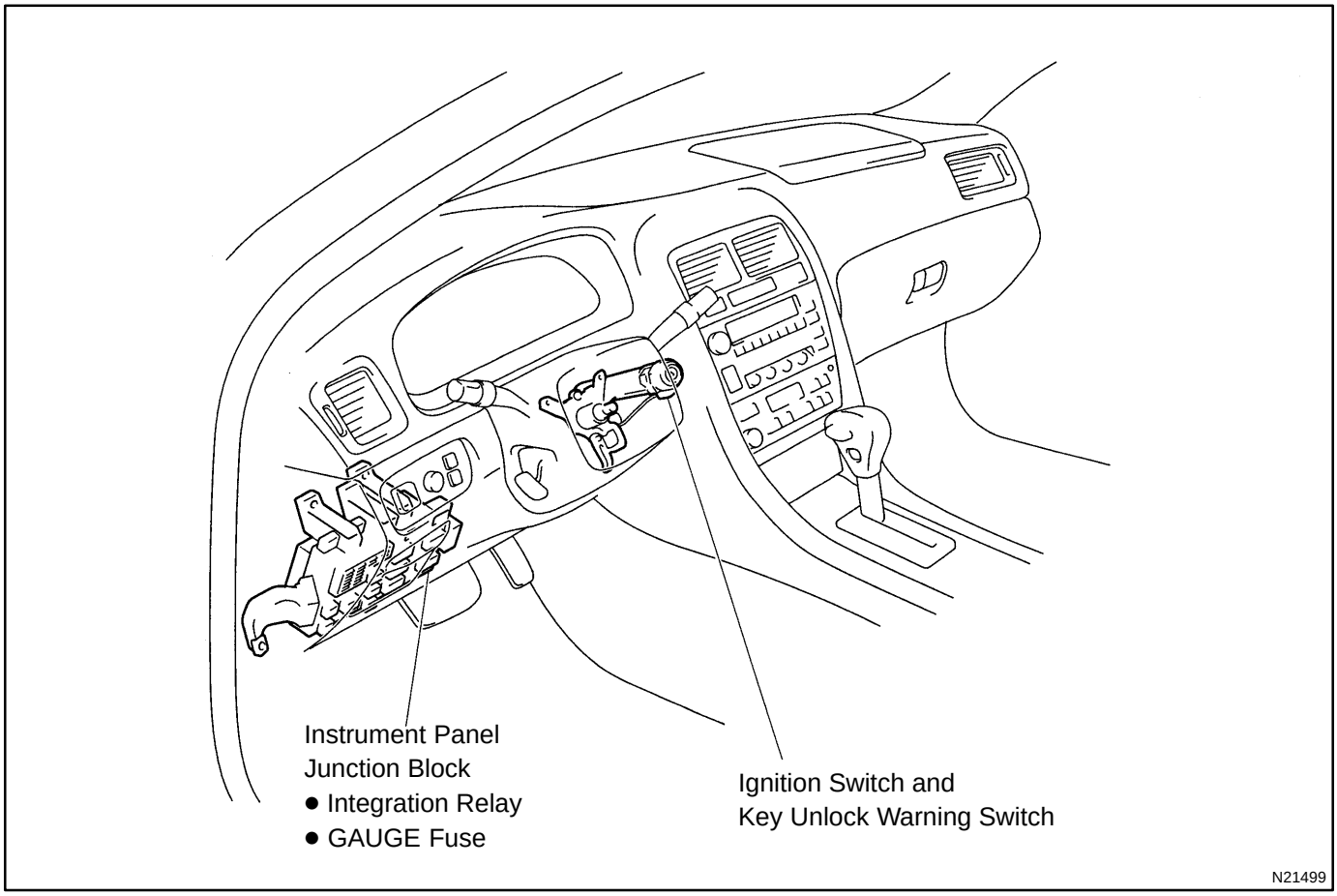


N21557

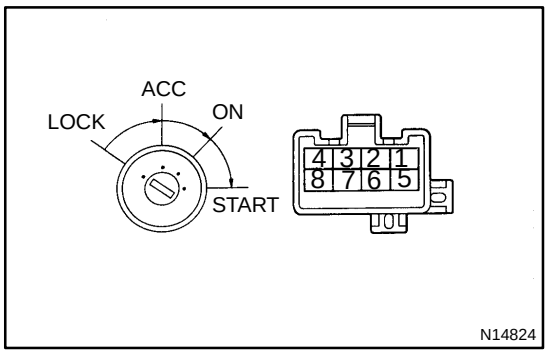
IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH

BE04U–01

LOCATION



BE04V–01

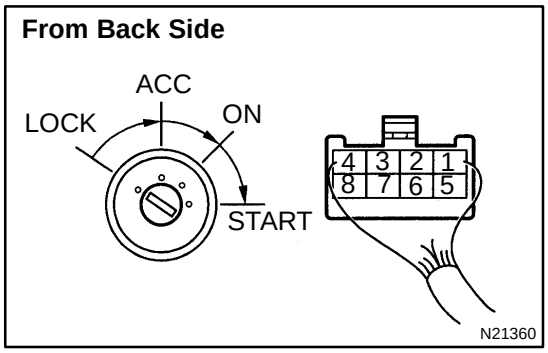


INSPECTION

1. INSPECT IGNITION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	–	No continuity
ACC	2 – 3	Continuity
ON	2 – 3 – 4 6 – 7	Continuity
START	1 – 2 – 4 6 – 7 – 8	Continuity

If continuity is not as specified, replace the switch.

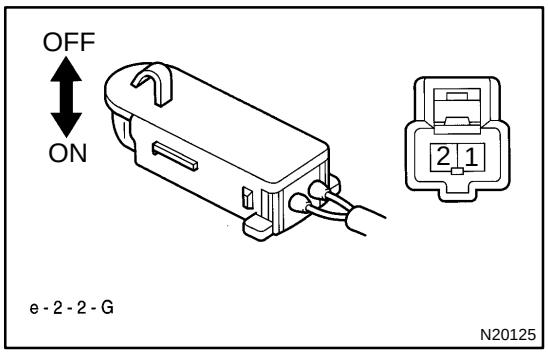


2. INSPECT IGNITION SWITCH CIRCUIT

Connect the switch connector and inspect the connector on the wire harness side from the back side.

Tester connection	Condition	Specified condition
1– Ground	Ignition switch START	Battery positive voltage
2 – Ground	Constant	Battery positive voltage
3 – Ground	Ignition switch ACC or ON	Battery positive voltage
4 – Ground	Ignition switch ON	Battery positive voltage
6 – Ground	Ignition switch ON	Battery positive voltage
7 – Ground	Constant	Battery positive voltage
8– Ground	Ignition switch START	Battery positive voltage

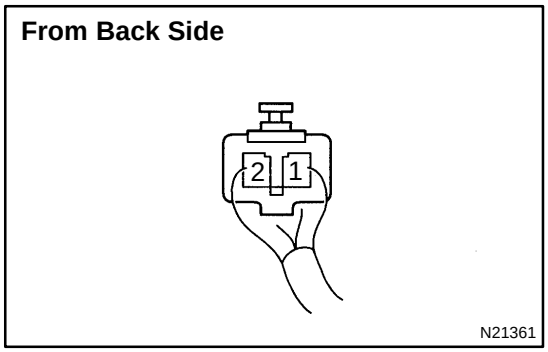
If circuit is not as specified, inspect the switch and circuits connected to other parts.



3. INSPECT KEY UNLOCK WARNING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Key removed)	–	No continuity
ON (Key set)	1 – 2	Continuity

If continuity is not as specified, replace the switch.

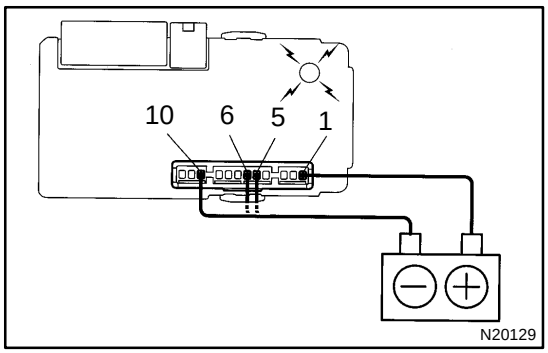


4. INSPECT KEY UNLOCK WARNING SWITCH CIRCUIT

Connect the switch connector and inspect the connector on the wire harness side from the back side.

Tester connection	Condition	Specified condition
2– Ground	Ignition key removed	No continuity
2– Ground	Ignition key set	Continuity
1– Ground	Constant	Continuity

If circuit is not as specified, inspect the switch and circuits connected to other parts.

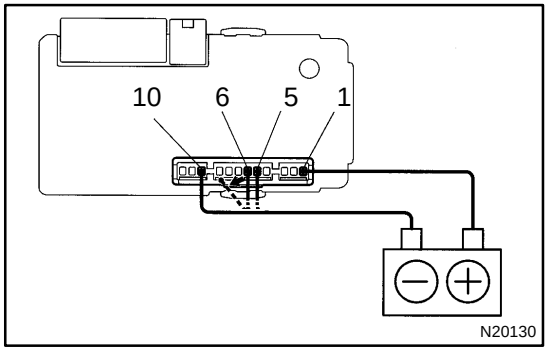


5. Key Unlock Warning System: INSPECT INTEGRATION RELAY OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1.

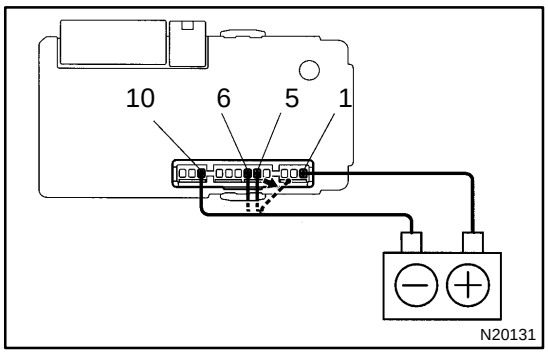
(b) Connect the negative (–) lead from the battery to terminals 5, 6 and 10.

(c) Check the buzzer sounds.



(d) Disconnect the negative (–) lead from the battery to terminal 6.

(e) Check that the buzzer stops sounding.

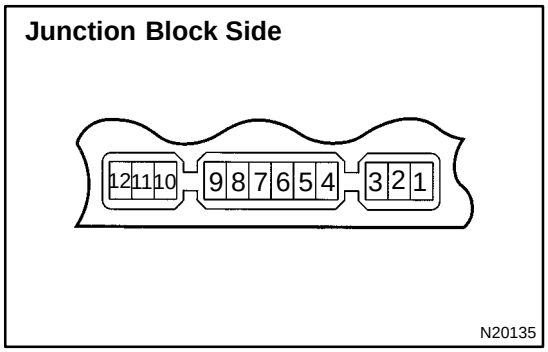


(f) Connect the negative (–) lead from the battery to terminal 6.

(g) Disconnect the negative (–) lead from the battery to terminal 5.

(h) Check that the buzzer stops sounding.

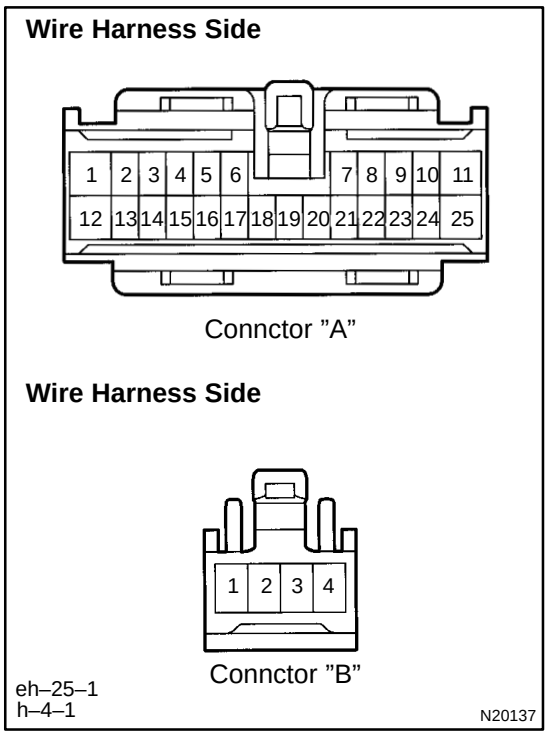
If operation is not as specified, replace the relay.



6. INSPECT INTEGRATION RELAY CIRCUIT

(a) Remove the relay from the junction block No.1 and inspect the connector on the junction block side.

Tester connection	Condition	Specified condition
2 – Ground	All door courtesy switches OFF (Door closed)	No continuity
2 – Ground	One of the door courtesy switches ON (Door opened)	Continuity
4 – Ground	Door courtesy switches except that of the driver's door OFF (Door closed)	No continuity
4 – Ground	One of the door courtesy switches except that of the driver's door ON (Door opened)	Continuity
3 – Ground	Door outside handle switch OFF	No continuity
3 – Ground	Door outside handle switch ON	Continuity
5 – Ground	Key unlock warning switch OFF	No continuity
5 – Ground	Key unlock warning switch ON	Continuity
6 – Ground	Driver's door courtesy switch OFF (Door closed)	No continuity
6 – Ground	Driver's door courtesy switch ON (Door opened)	Continuity
8 – Ground	Buckle switch OFF (Seat belt unfastened)	No continuity
8 – Ground	Buckle switch ON (Seat belt fastened)	Continuity
10 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage
7 – Ground 9 – Ground	Ignition switch LOCK or ACC	No voltage
7 – Ground 9 – Ground	Ignition switch ON	Battery positive voltage
11 – Ground	Ignition switch LOCK	No voltage
11 – Ground	Ignition switch ACC or ON	Battery positive voltage



(b) Disconnect the connector from the integration relay and inspect the connectors on the wire harness side.

Tester connection	Condition	Specified condition
A3 – Ground	Constant	Continuity
A5 – Ground	Driver’s door unlock detection switch OFF (Door closed)	No continuity
A5 – Ground	Driver’s door unlock detection switch ON (Door opened)	Continuity
A6 – Ground	Passenger’s door courtesy switch OFF (Door closed)	No continuity
A6 – Ground	Passenger’s door courtesy switch ON (Door opened)	Continuity
A7 – Ground	Passenger’s door unlock detection switch OFF (Door closed)	No continuity
A7 – Ground	Passenger’s door unlock detection switch ON (Door opened)	Continuity
A9 – Ground	Rear door unlock detection switch OFF (Door closed)	No continuity
A9 – Ground	Rear door unlock detection switch ON (Door opened)	Continuity
A11 – A12 A12 – A25	Constant	Continuity
A16 – Ground	Door lock manual switch OFF or UNLOCK	No continuity
A16 – Ground	Door lock manual switch LOCK	Continuity
A17 – Ground	Door lock manual switch OFF or LOCK	No continuity
A17 – Ground	Door lock manual switch UNLOCK	Continuity
A18 – Ground	Driver’s and passenger’s door key lock and unlock switch OFF or UNLOCK	No continuity
A18 – Ground	Driver’s or passenger’s door key lock and unlock switch LOCK	Continuity

Tester connection	Condition	Specified condition
A19 – Ground	Driver's door key lock and unlock switch OFF or LOCK	No continuity
A19 – Ground	Driver's door key lock and unlock switch UNLOCK	Continuity
A20 – Ground	Passenger's door key lock and unlock switch OFF or LOCK	No continuity
A20 – Ground	Passenger's door key lock and unlock switch UNLOCK	Continuity
A1 – Ground	Constant	Battery positive voltage
B1 – Ground	Light control switch OFF	No voltage
B1 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
B4 – Ground	Light control switch OFF or TAIL	No voltage
B4 – Ground	Light control switch HEAD	Battery positive voltage
B2 – Ground B3 – Ground	Constant	Battery positive voltage

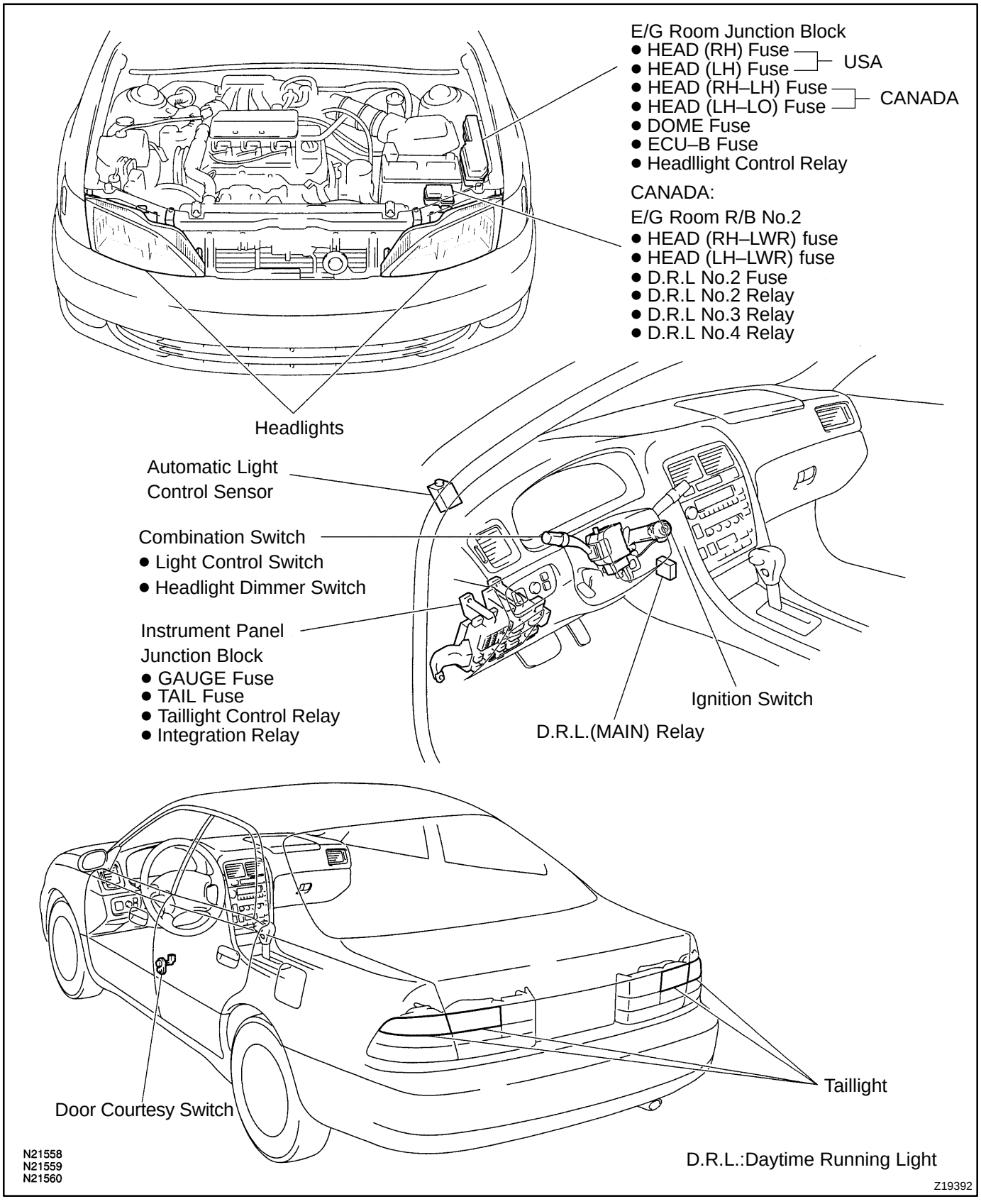
If the circuit is as specified, try replacing the relay with a new one.

If the circuit is not as specified, inspect the circuits connected to other parts.

HEADLIGHT AND TAILLIGHT SYSTEM

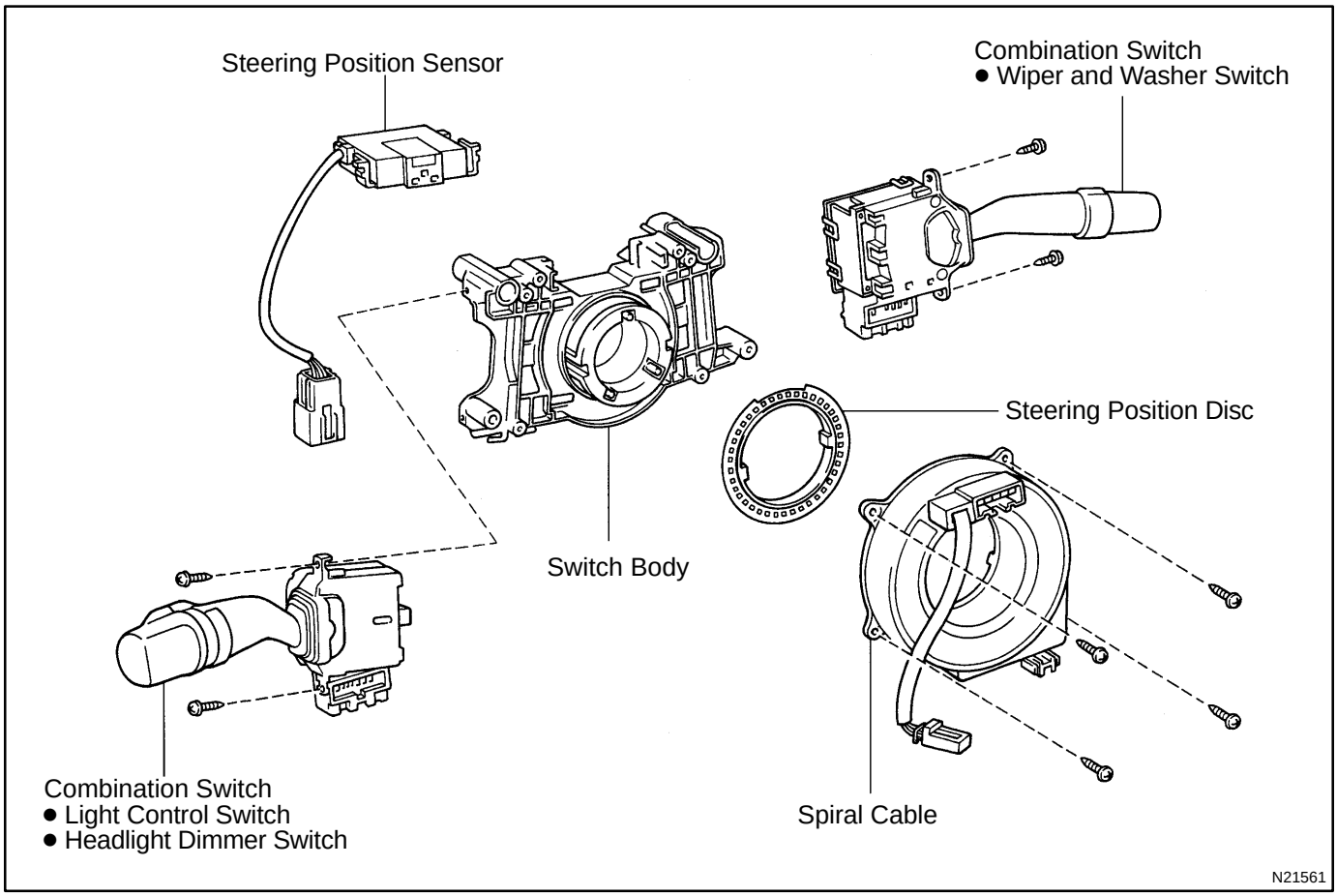
BE04W–01

LOCATION



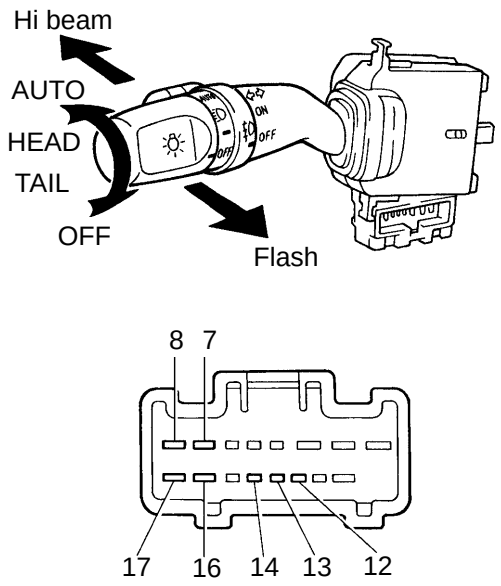
BE04X–01

COMPONENTS



BE04Y–02

INSPECTION



1. INSPECT LIGHT CONTROL SWITCH CONTINUITY

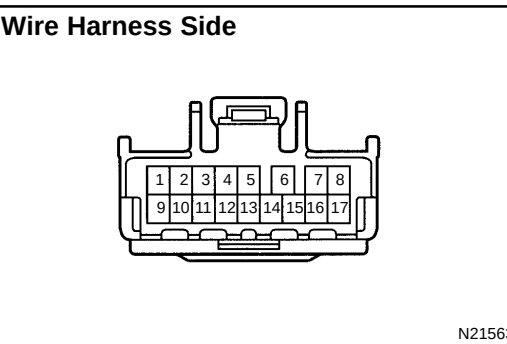
Switch position	Tester connection	Specified condition
OFF	–	No continuity
TAIL	14 – 16	Continuity
HEAD	13 – 14 – 16	Continuity
AUTO	12 – 16	Continuity

If continuity is not as specified, replace the switch.

2. INSPECT HEADLIGHT DIMMER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Low beam	16 – 17	Continuity
High beam	7 – 16	Continuity
Flash	7 – 8 – 16	Continuity

If continuity is not as specified, replace the switch.



3. INSPECT COMBINATION SWITCH CIRCUIT

Connect the wire harness side connector to the combination switch and inspect wire harness side connector from the back side.

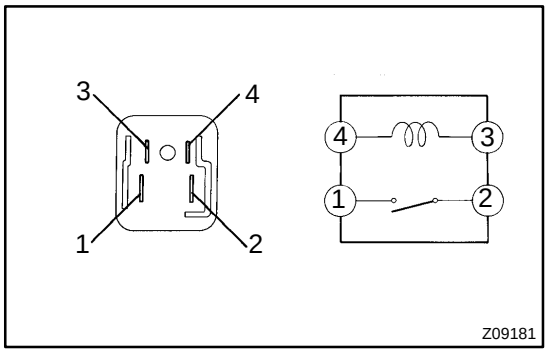
Light Control Switch:

Tester connection	Condition	Specified condition
16 – Ground	Constant	Continuity
12 – Ground	Light control switch OFF, TAIL or HEAD	No voltage
12 – Ground	Light control switch AUTO	Battery positive voltage
13 – Ground	Light control switch OFF or TAIL	No voltage
13 – Ground	Light control switch HEAD	Battery positive voltage
14 – Ground	Light control switch OFF	No voltage
14 – Ground	Light control switch TAIL or HEAD	Battery positive voltage

Headlight Dimmer Switch:

Tester connection	Condition	Specified condition
7 – Ground	Headlight dimmer switch Low Beam	No voltage
7 – Ground	Headlight dimmer switch High Beam or Flash	Battery positive voltage
8 – Ground	Headlight dimmer switch Low Beam or High Beam	No voltage
8 – Ground	Headlight dimmer switch Flash	Battery positive voltage
17– Ground	Headlight dimmer switch High Beam or Flash	No voltage
17– Ground	Headlight dimmer switch Low Beam	Battery positive voltage

If the circuit is not as specified, inspect the circuit connected to other parts.

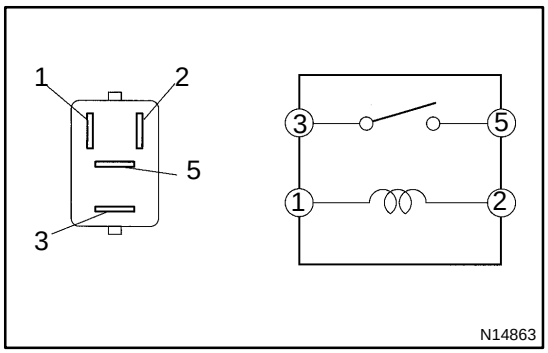


4. INSPECT HEADLIGHT CONTROL RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	3 – 4	Continuity
Apply B+ between terminals 3 and 4.	1 – 2	Continuity

If continuity is not as specified, replace the relay.

5. INSPECT HEADLIGHT CONTROL RELAY CIRCUIT (See page BE–11)

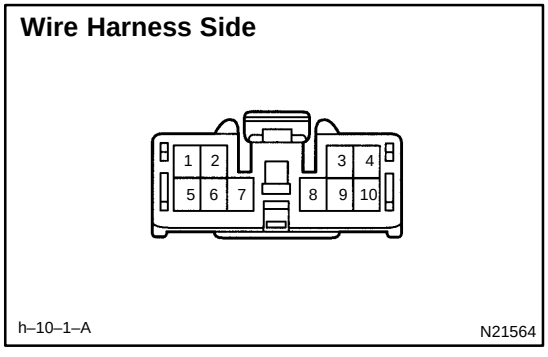


6. INSPECT TAILLIGHT CONTROL RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

7. INSPECT TAILLIGHT CONTROL RELAY CIRCUIT (See page BE–27)

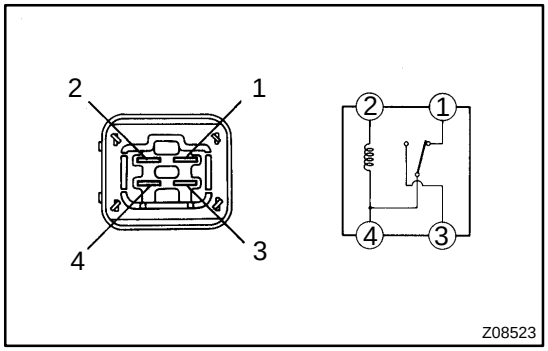


8. INSPECT DAYTIME RUNNING LIGHT RELAY CIRCUIT

Disconnect the connector from the relay and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Light control switch position OFF or TAIL	No continuity
2 – Ground	Light control switch position HEAD	Continuity
4 – Ground	Parking brake switch position OFF (Parking brake lever released)	No continuity
4 – Ground	Parking brake switch position ON (Parking brake lever pulled up)	Continuity
6 – Ground	Constant	Continuity
8 – Ground	Headlight dimmer switch position Low beam	No continuity
8 – Ground	Headlight dimmer switch position High beam or Flash	Continuity
10 – Ground	Brake fluid level warning switch position OFF	No continuity
10 – Ground	Brake fluid level warning switch position ON	Continuity
1 – Ground	Ignition switch position LOCK or ACC	No voltage
1 – Ground	Ignition switch position ON or START	Battery positive voltage
5 – Ground	Engine Stop	No voltage
5 – Ground	Engine Running	Battery positive voltage
7 – Ground	Constant	Battery positive voltage
9 – Ground	Constant	Battery positive voltage

If circuit is as specified, try replacing the relay with a new one.
If circuit is not as specified, inspect the circuits connected to other parts.

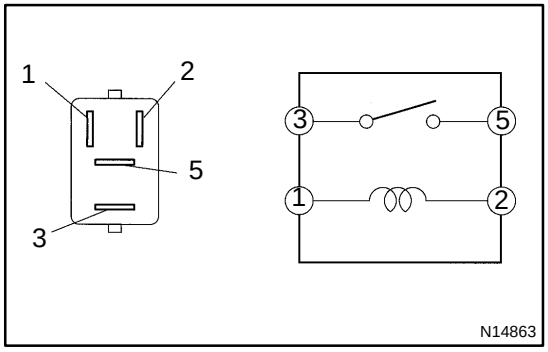


9. INSPECT HEADLIGHT DIMMER RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 4, 2 – 4	Continuity
Apply B+ between terminals 2 and 4.	3 – 4	Continuity

If continuity is not as specified, replace the relay.

10. INSPECT HEADLIGHT DIMMER RELAY CIRCUIT (See page BE–11)

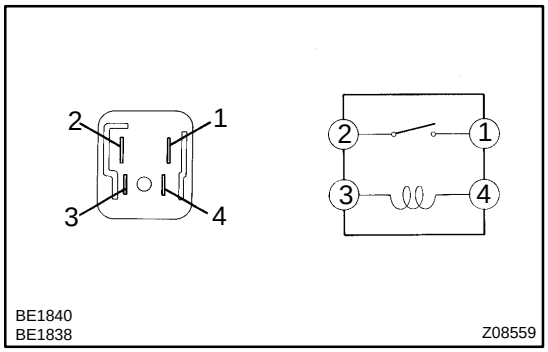


11. INSPECT DAYTIME RUNNING LIGHT NO.3 RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

12. INSPECT DAYTIME RUNNING LIGHT NO.3 RELAY CIRCUIT
(See page BE–11)



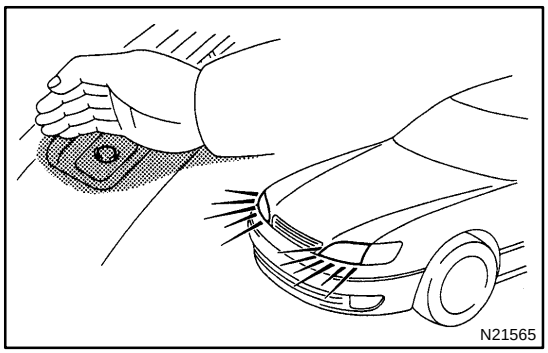
13. INSPECT DAYTIME RUNNING LIGHT NO.4 RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	3 – 4	Continuity
Apply B+ between terminals 3 and 4.	1 – 2	Continuity

If continuity is not as specified, replace the relay.

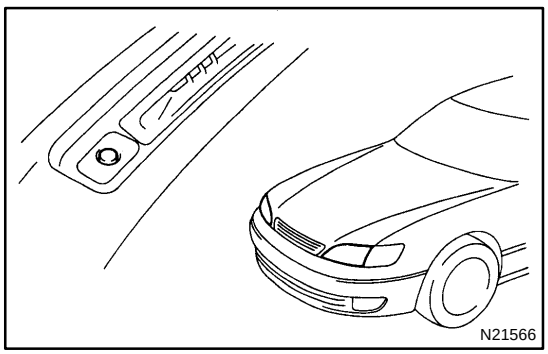
14. INSPECT DAYTIME RUNNING LIGHT NO.4 RELAY CIRCUIT
(See page BE–11)

15. INSPECT LIGHT AUTO TURN OFF SYSTEM
(See Integration relay circuit on page BE–20)



16. Auto ON:
INSPECT AUTOMATIC LIGHT CONTROL

(a) Turn the ignition switch ON.
(b) Turn the light control switch to AUTO.
(c) Gradually cover the top of the sensor.
(d) Verify that the accessory lights and the headlights turn ON.



17. Auto OFF:
INSPECT AUTOMATIC LIGHT CONTROL

(a) Gradually expose the sensor.
(b) Verify that the headlights and the accessory lights turn OFF.

18. INSPECT LIGHT–OFF CONDITION

(a) Turn the ignition switch ON.

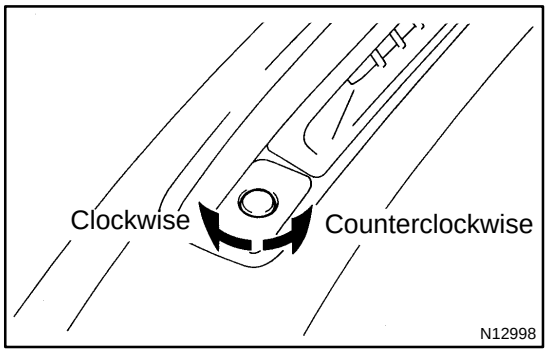
(b) Gradually cover the top of the sensor.
Lights auto ON:

(c) Verify that the lights will go out when light control switch position is OFF or the area surrounding the sensor gets bright or open the driver's door while the ignition switch is OFF.

19. INSPECT LIGHTS–ON CONDITION

(a) Open the driver's door while the ignition switch is OFF.

(b) Turn the light control switch to AUTO leaving the door open and cover the top of the sensor, and verify that the lights go on when the ignition switch is turned ON.

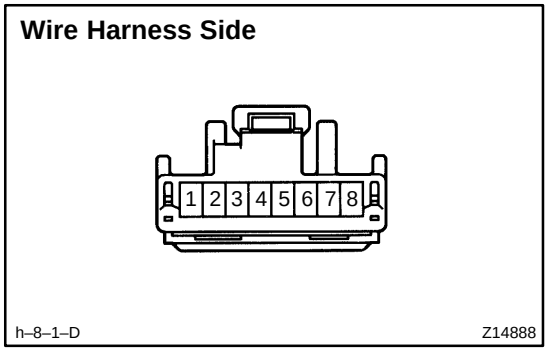


20. ADJUST AUTOMATIC LIGHT CONTROL SENSOR

(a) Adjustment of the light control is performed by turning the sensitivity knob on the sensor.

(b) This will determine at what light condition the automatic control will take place.

- If response is too quick, turn the knob counterclockwise.
- If response is too slow, turn the knob clockwise.



**21. Connector disconnected:
INSPECT SENSOR CIRCUIT**

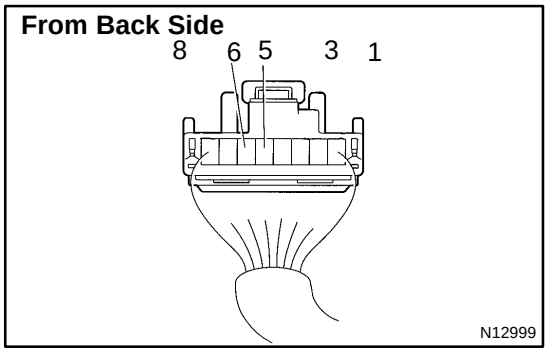
Disconnect the connector from the sensor and inspect the connector on the wire harness side, as shown in the chart.

Tester connection	Condition	Specified condition
3 – Ground	Door courtesy switch OFF	No continuity
3 – Ground	Door courtesy switch ON	Continuity
5 – Ground	Light control switch OFF, TAIL or AUTO	No continuity
5 – Ground	Light control switch HEAD	Continuity
6 – Ground	Light control switch OFF, TAIL or HEAD	No continuity
6 – Ground	Light control switch AUTO	Continuity
7 – Ground	Light Control Switch OFF or AUTO	No continuity
7 – Ground	Light Control Switch TAIL or HEAD	Continuity

Tester connection	Condition	Specified condition
1 – Ground	Ignition switch position LOCK or ACC	No voltage
1 – Ground	Ignition switch position ON	Battery positive voltage
2 – Ground	Constant	Battery positive voltage

If circuit is as specified, perform the inspection on the following page.

If the circuit is not as specified, inspect the circuit connected to other parts.



22. Connector connected:
INSPECT SENSOR CIRCUIT

Connect the wire harness side connector to the sensor and inspect wire harness side connector from the back side.

HINT:

- Ignition switch ON.
- Light control switch AUTO.
- Vehicle's surroundings are bright.

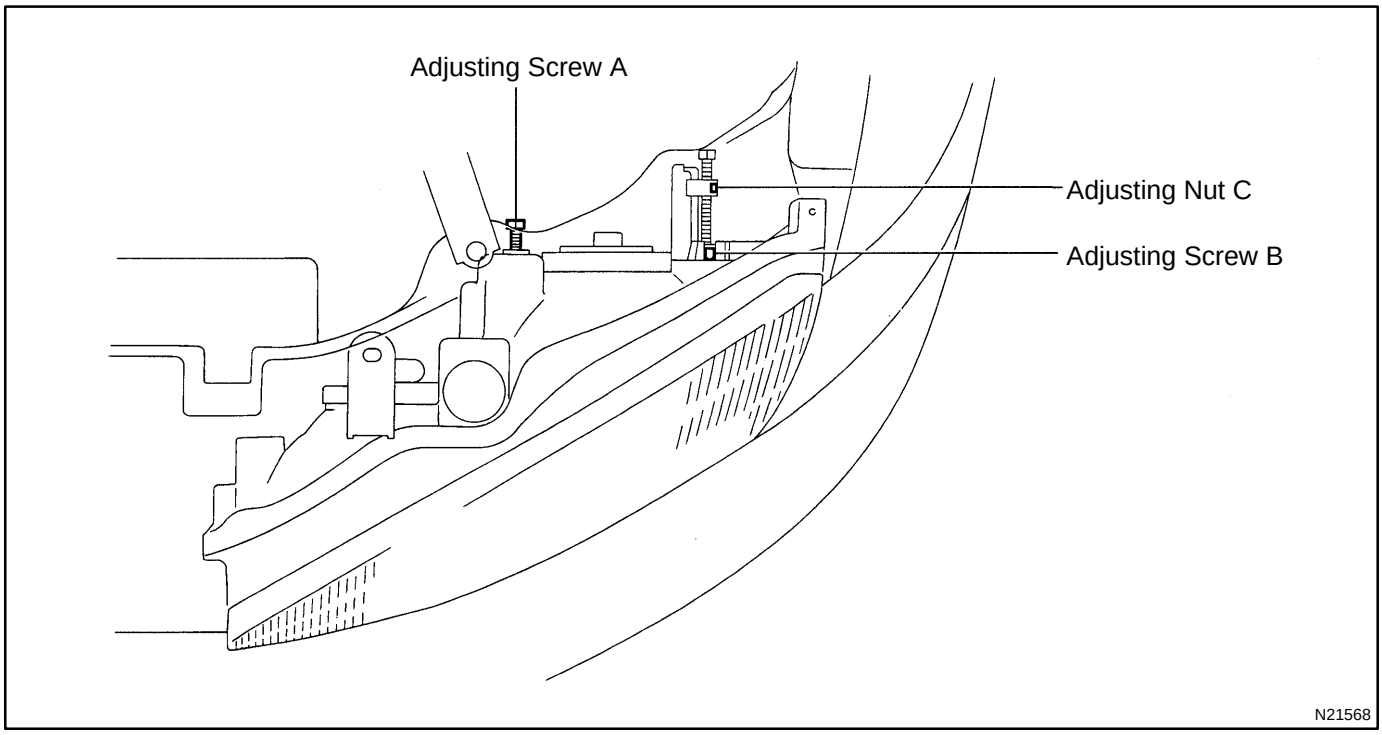
Tester connection	Condition	Specified condition
1 – Ground	Ignition switch position ON	10 V or more
1 – Ground	Ignition switch position OFF	1 V or less
3 – Ground	Door courtesy switch ON	1 V or less
3 – Ground	Door courtesy switch OFF	9 V or more
5 – Ground	Vehicle's surroundings are dark	1.8 V or less
5 – Ground	Dimmer switch position Flash	0.3 V or less
6 – Ground	Vehicle's surroundings are dark	1.5 V or less
8 – Ground	Vehicle is under the direct sun light. (Sensor is not covered)	3.7 V or more
8 – Ground	Vehicle's surroundings are dim. (Sensor is covered and taillights are ON)	1.32 ~ 2.32 V
8 – Ground	Vehicle's surroundings are dark. (Sensor is covered and headlights are ON)	0.42 V

If circuit is as specified, try replacing the sensor with a new one.

If the circuit is not as specified, inspect the circuit connected to other parts.

BE04Z–02

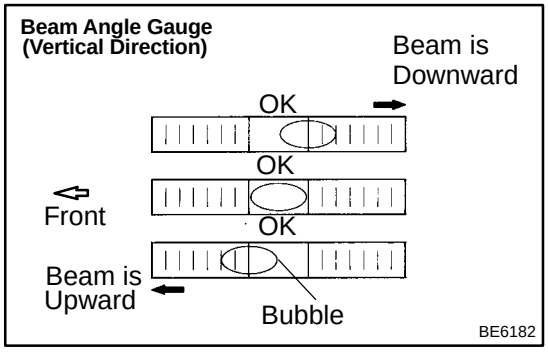
ADJUSTMENT



1. ADJUSTING HEADLIGHT AIM ONLY

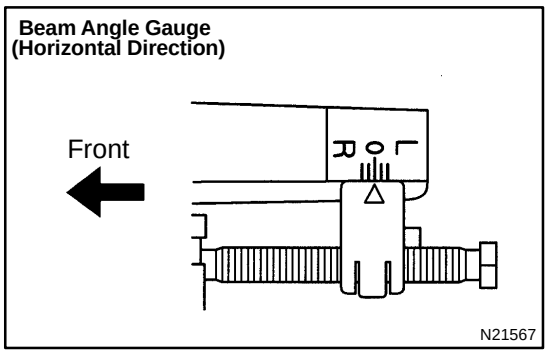
(a) Put the vehicle in below conditions.

- Make sure the body around the headlight is not deformed.
- Park the vehicle on a level spot.
- The driver gets into the driver's seat and puts the vehicle in a state ready for driving (with a full tank).
- Bounce the vehicle several times.



(b) Adjust the headlight in vertical direction.

If the bubble is outside the acceptable range of the beam angle gauge, adjust it using adjusting screw A.



(c) Adjust the headlight in horizontal direction.

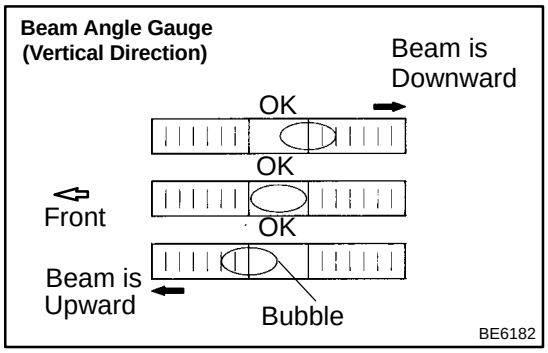
If the ”0” moves away from the mark beyond the acceptable range, adjust the ”0” back to the mark using adjusting screw B.

2. REPLACING HEADLIGHT

(a) Replace the headlight.

(b) Put the vehicle in below conditions.

- Make sure the body around the headlight is not deformed.
- Park the vehicle on a level spot.
- The driver gets into the driver’s seat and puts the vehicle in a state ready for driving (with a full tank).
- Bounce the vehicle several times.



(c) Adjust the headlight in vertical direction.

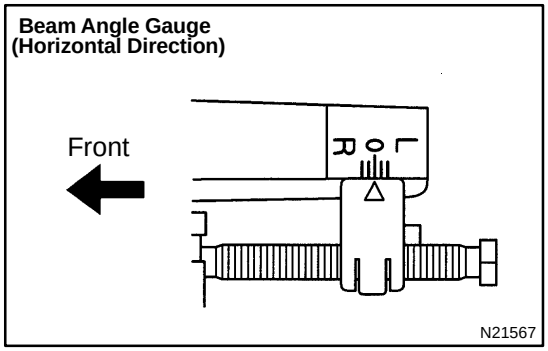
(1) Using adjusting screw A, adjust the headlight aim to within the specifications.

(2) Make sure that the gauge bubble is within the acceptable range.

HINT:

If the gauge bubble is outside the acceptable range, check that the vehecle is parked on a level place.

Readjust the headlight aim after parking the vehicle on a level place.



(d) Adjust the headlight in horizontal direction.

(1) Using adjusting screw B, adjust the headlight aim to within the specifications.

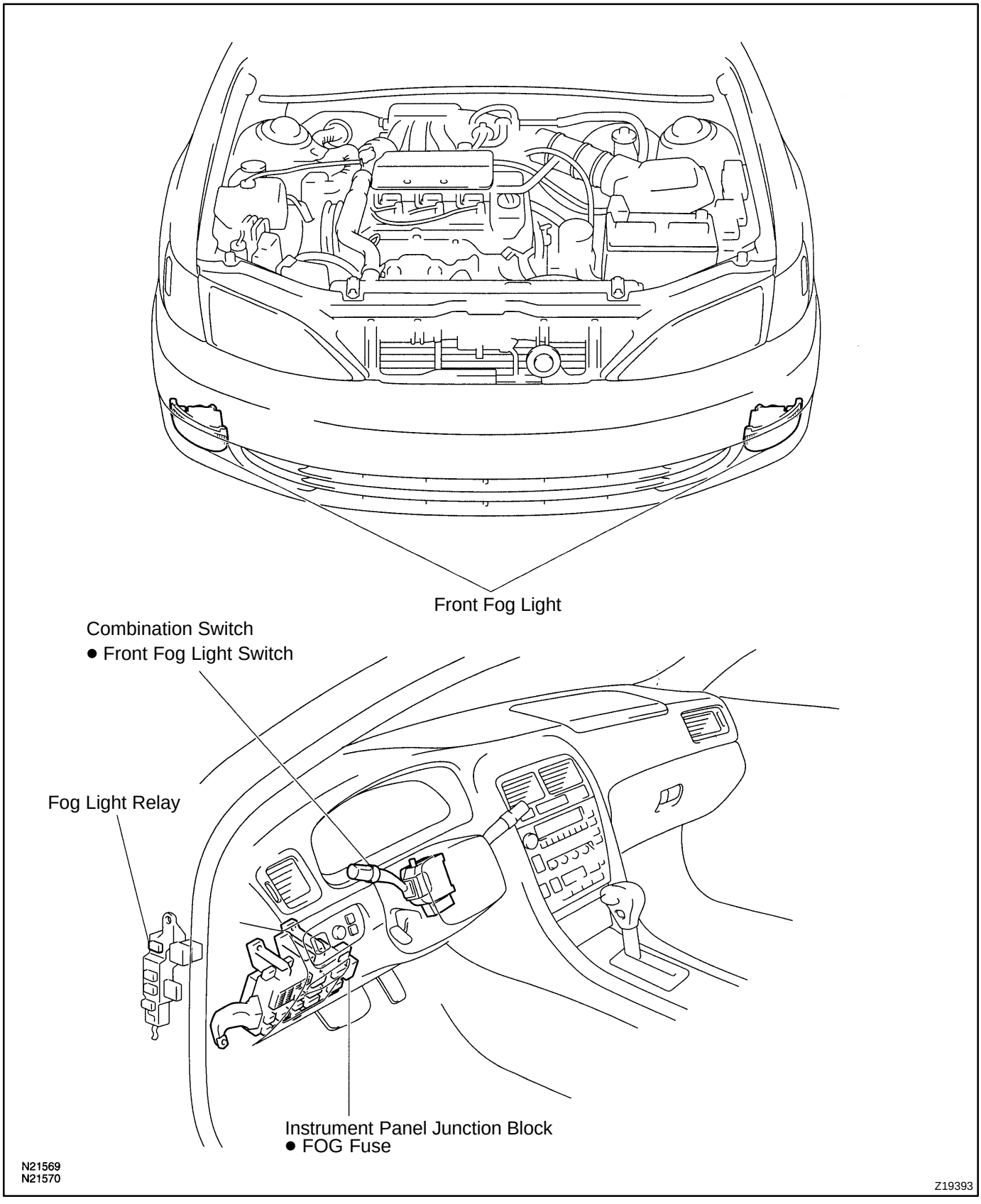
(2) Using adjusting nut C, adjust the ”0” back to the mark.

3. ADJUST SPIRAL CABLE

(See page SR–16)

FOG LIGHT SYSTEM
LOCATION

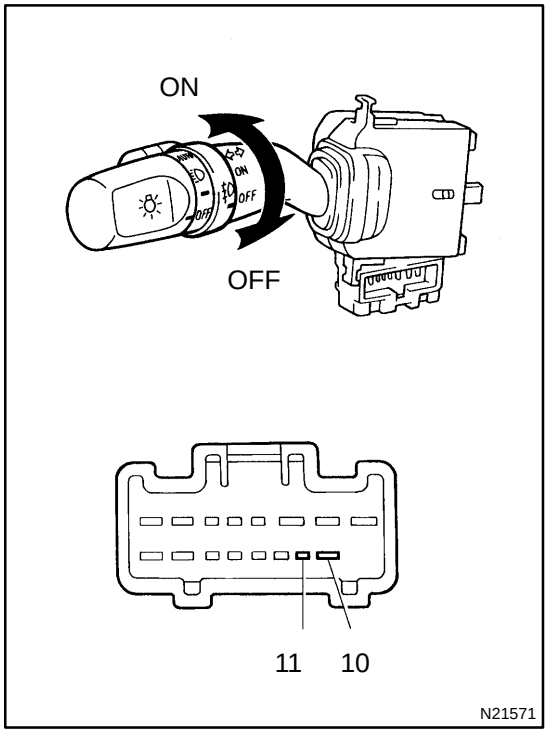
BE050–01



BE051–01

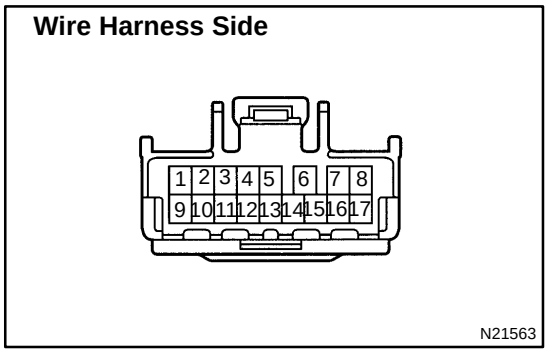
INSPECTION

1. INSPECT FOG LIGHT SWITCH CONTINUITY



Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	10 – 11	Continuity

If continuity is not as specified, replace the switch.

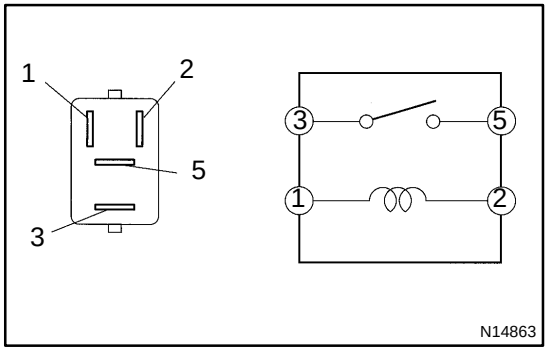


2. INSPECT COMBINATION SWITCH CIRCUIT

Connect the wire harness side connector to the combination switch and inspect wire harness side connector from the back side.

Tester connection	Condition	Specified condition
10– Ground	Headlight dimmer switch High Beam or Flash	No continuity
10– Ground	Headlight dimmer switch Low Beam	Continuity
11 – Ground	Light control switch OFF or TAIL	No voltage
11 – Ground	Light control switch HEAD	Battery positive voltage

If the circuit is not as specified, inspect the circuit connected to other parts.



3. INSPECT FOG LIGHT RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

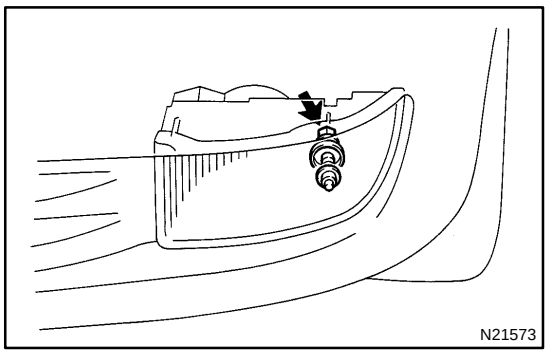
4. INSPECT FOG LIGHT RELAY CIRCUIT

Remove the relay from the driver's side relay block and inspect the connector on relay block side.

Tester connection	Condition	Specified condition
3 – Ground	Constant	Continuity
1 – Ground	Light control switch HEAD	Battery positive voltage
5 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuit connected to other parts.

BE052–01



ADJUSTMENT

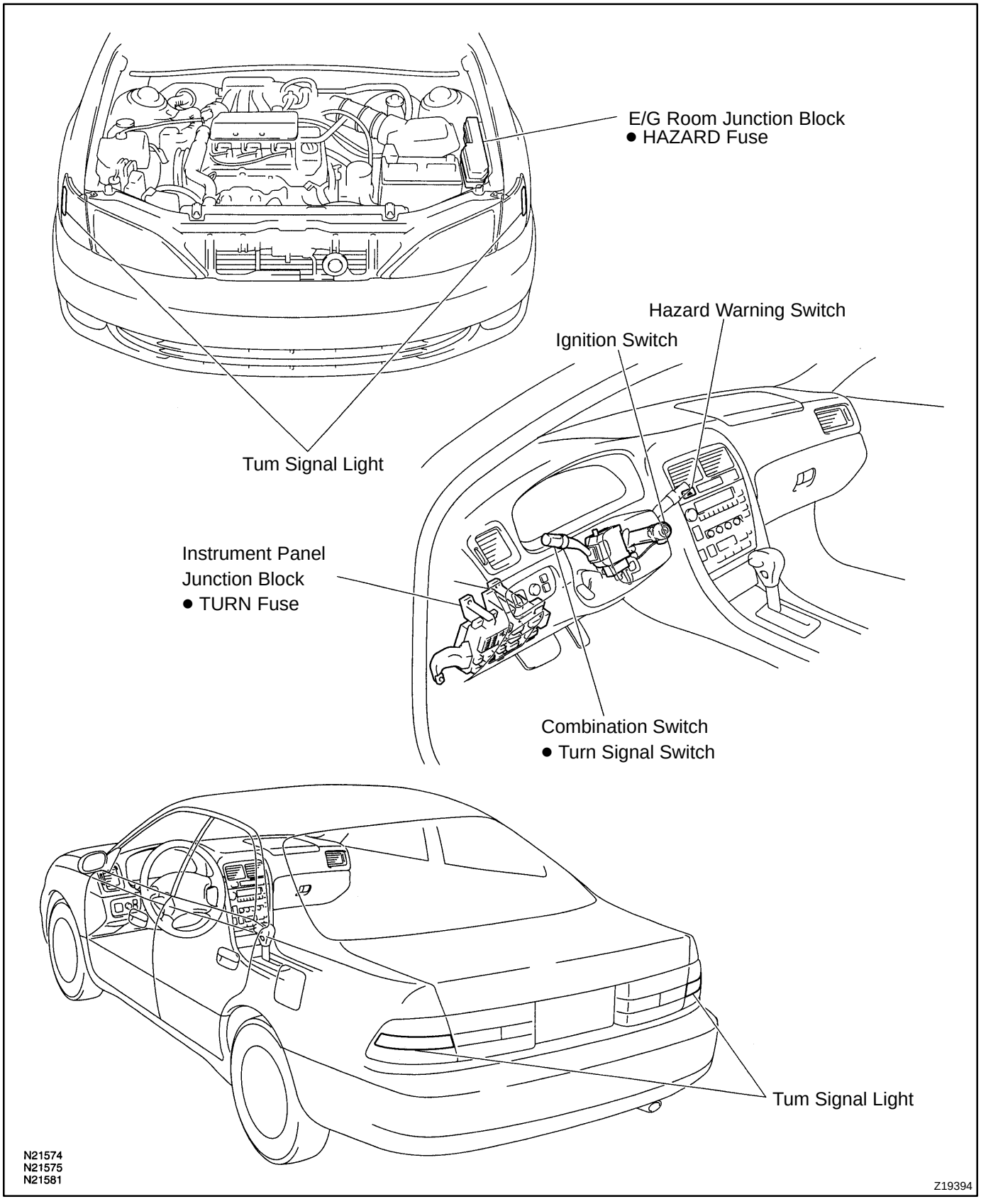
ADJUST FOG LIGHT AIM

A–bolt: Vertical Direction

TURN SIGNAL AND HAZARD WARNING SYSTEM

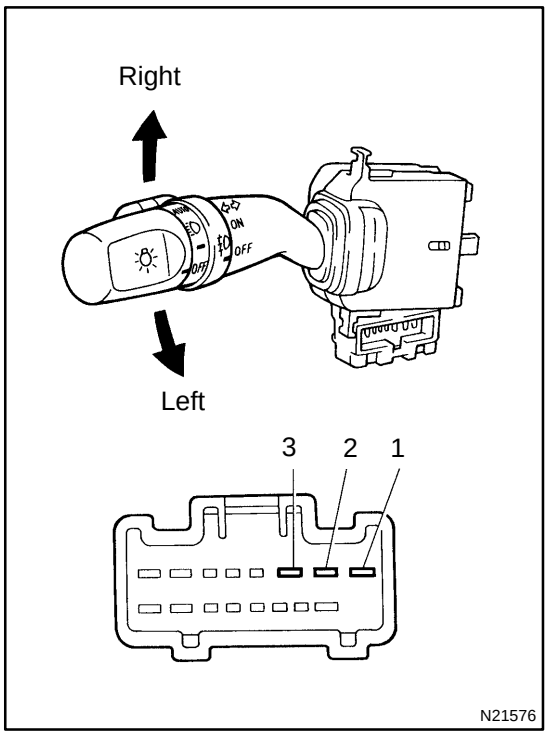
BE053–01

LOCATION



BE054–01

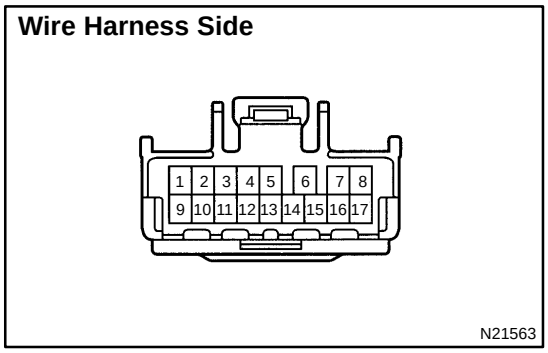
INSPECTION



1. INSPECT TURN SIGNAL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Left turn	1 – 2	Continuity
Neutral	–	No continuity
Right turn	2 – 3	Continuity

If continuity is not as specified, replace the switch.



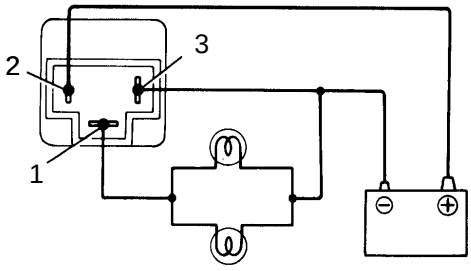
2. INSPECT COMBINATION SWITCH CIRCUIT

Connect the wire harness side connector to the combination switch and inspect wire harness side connector from the back side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	*Continuity
3 – Ground	Constant	*Continuity
2 – Ground	Ignition switch ON and turn signal switch position Neutral	No voltage
2 – Ground	Hazard warning switch ON	Battery positive voltage
2 – Ground	Ignition switch ON and turn signal switch position Left or Right	Battery positive voltage

*There is resistance because this circuit is grounded through the bulb.

If the circuit is not as specified, inspect the circuit connected to other parts.



Turn Signal Light Bulbs(21W)

BE1843

3. INSPECT TURN SIGNAL FLASHER OPERATION

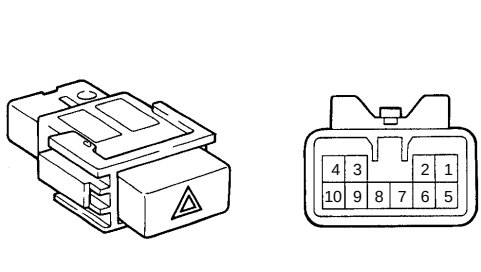
(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3.

(b) Connect the 2 turn signal light bulbs in parallel to each other to terminals 1 and 3, check that the bulbs flash.

HINT:

The turn signal lights should flash 60 to 120 times per minute. If one of the front or rear turn signal lights has an open circuit, the number of flashes will be more than 140 per minute.

If operation is not as specified, replace the flasher.



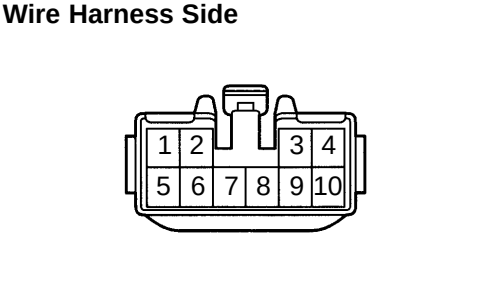
e–10–2

N21578

4. INSPECT HAZARD WARNING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch OFF	5 – 7	Continuity
Switch ON	1 – 2 – 3 – 4 5 – 6	Continuity
Illumination circuit	8 – 9	Continuity

If continuity is not as specified, replace the switch.



e–10–1

N21579

5. INSPECT HAZARD WARNING SWITCH CIRCUIT

Disconnect the switch connector and inspect the connection on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	*2Continuity
2 – Ground	Constant	*2Continuity
*19 – Ground	Constant	Continuity
6 – Ground	Constant	Battery positive voltage
7 – Ground	Ignition switch position LOCK or ACC	No voltage
7 – Ground	Ignition switch position ON	Battery positive voltage
*18 – Ground	Light control switch position OFF	No voltage
*18 – Ground	Light control switch position TAIL or HEAD	Battery positive voltage

*1: Illumination

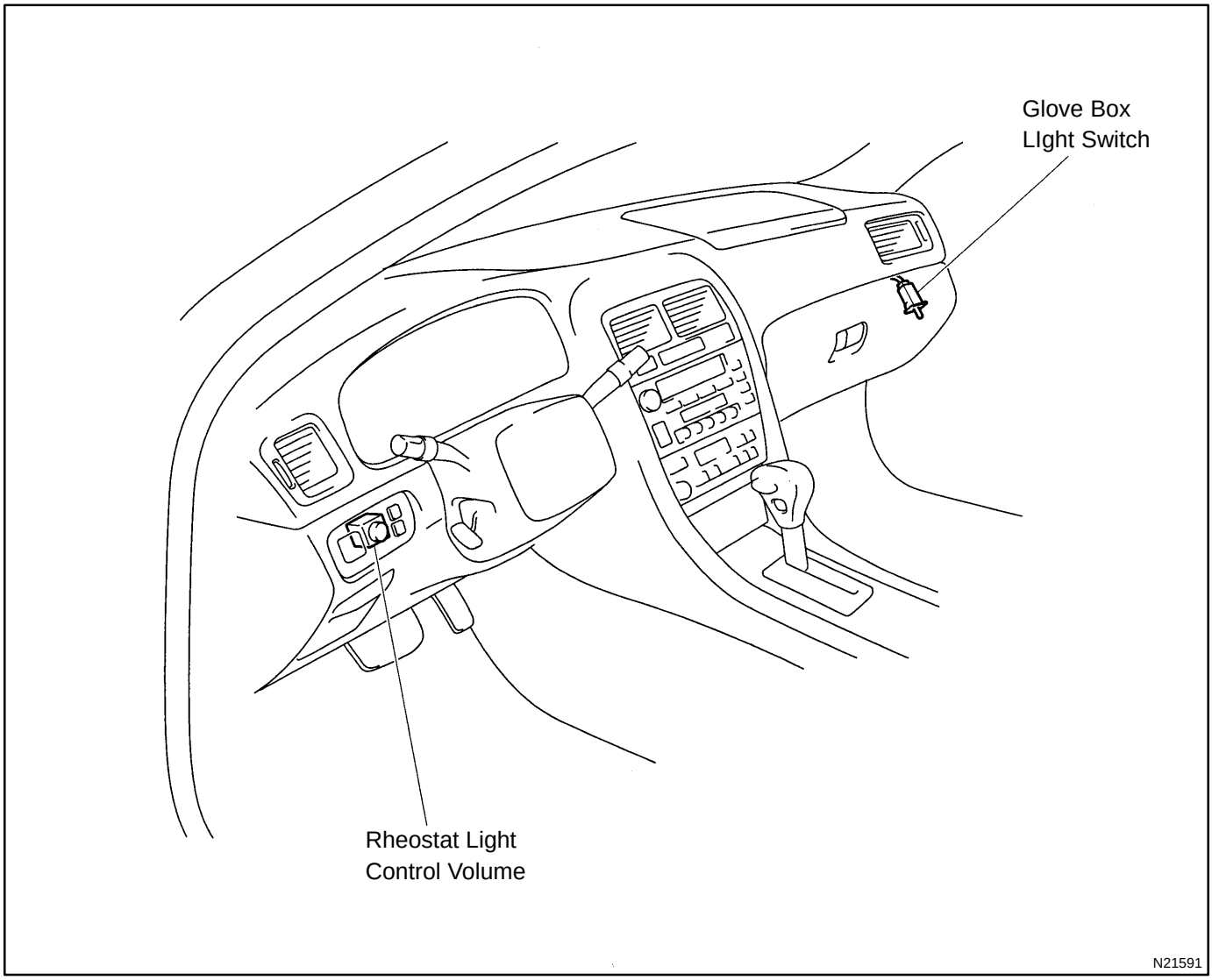
*2: There is resistance because this circuit is grounded through the bulb.

If the circuit is not as specified, inspect the circuits connected to other parts.

ILLUMINATION LIGHT SYSTEM

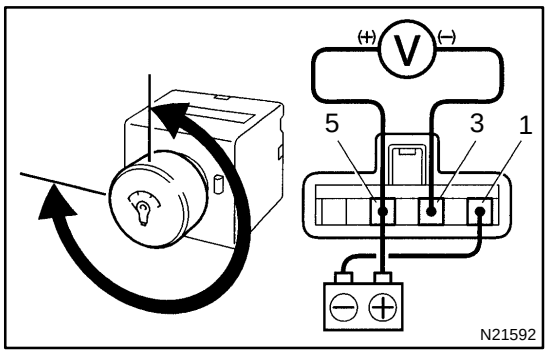
LOCATION

BE055–01



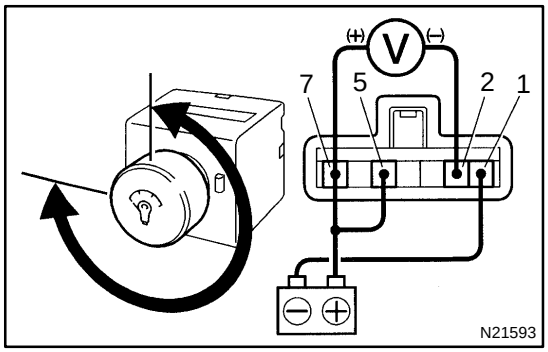
BE056–01

INSPECTION



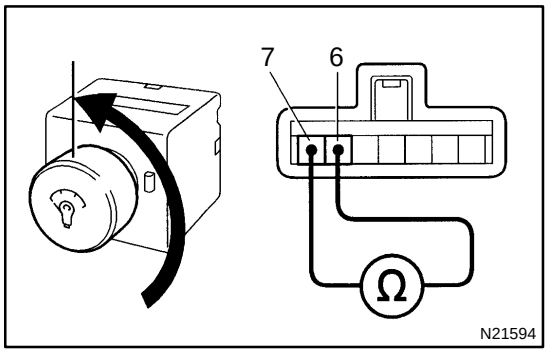
1. Combination Meter Adjustment:
INSPECT RHEOSTAT LIGHT CONTROL VOLUME

(a) Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 1.
(b) Connect the positive (+) lead from the voltmeter to terminal 5 and negative (–) lead to terminal 3.
(c) Turn the rheostat knob and check that the voltage changes.



2. Illumination Adjustment:
INSPECT RHEOSTAT LIGHT CONTROL VOLUME

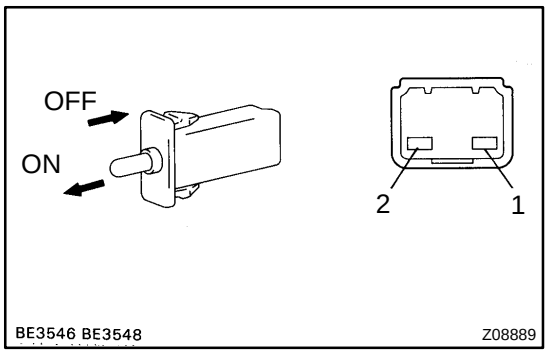
(a) Connect the positive (+) lead from the battery to terminal 5 and 7 and negative (–) lead to terminal 1.
(b) Connect the positive (+) lead from the voltmeter to terminal 7 and negative (–) lead to terminal 2.
(c) Turn the rheostat knob and check that the voltage changes.



3. Tail Cancel:
INSPECT RHEOSTAT LIGHT CONTROL VOLUME

(a) Connect the ohmmeter to terminals 6 and 7.
(b) Turn the rheostat knob fully clockwise and check that current flow stops.

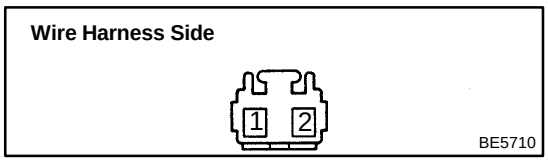
If switch is not as specified, replace the volume.



4. INSPECT GLOVE BOX LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Closed)	–	No continuity
ON (Opened)	1 – 2	Continuity

If continuity is not as specified, replace the relay.



5. INSPECT GLOVE BOX LIGHT SWITCH CIRCUIT

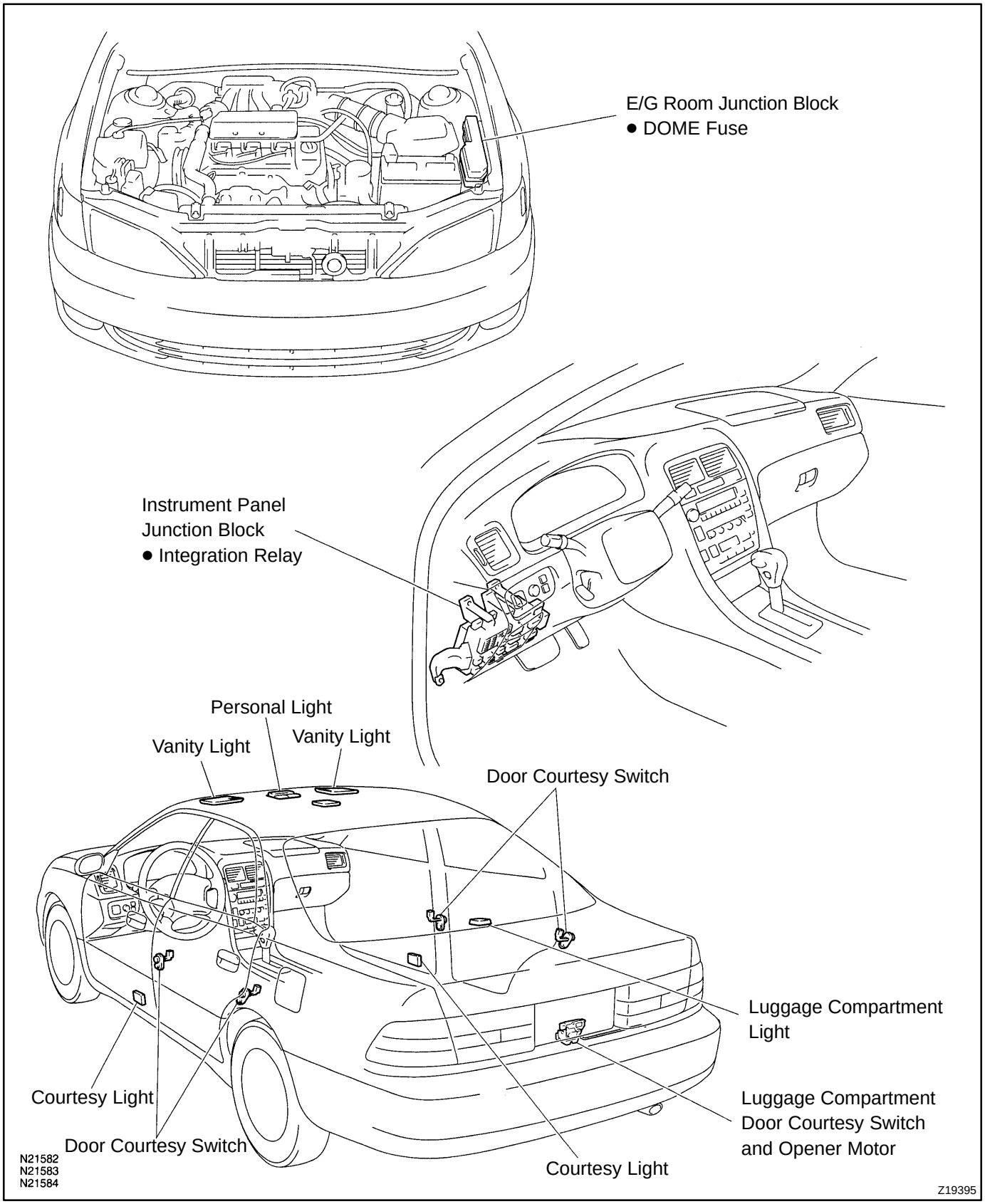
Disconnect the connector fromt the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Light control switch position OFF	No voltage
1 – Ground	Light control switch position TAIL or HEAD	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

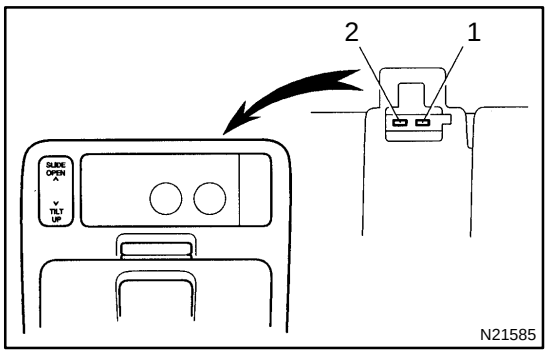
INTERIOR LIGHT SYSTEM
LOCATION

BE057–01



BE058–03

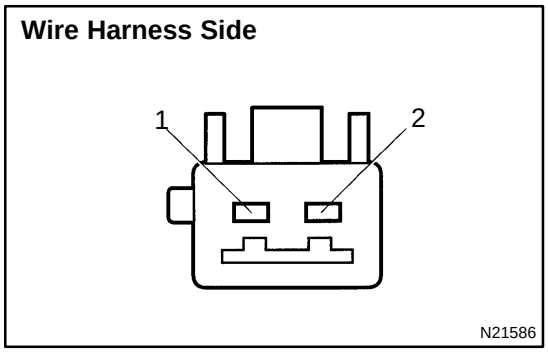
INSPECTION



1. INSPECT PERSONAL LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	1 – 2	Continuity

If continuity is not as specified, replace the light assembly or bulb.

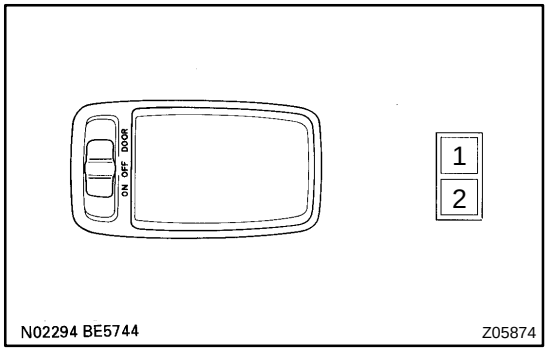


2. INSPECT PERSONAL LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage

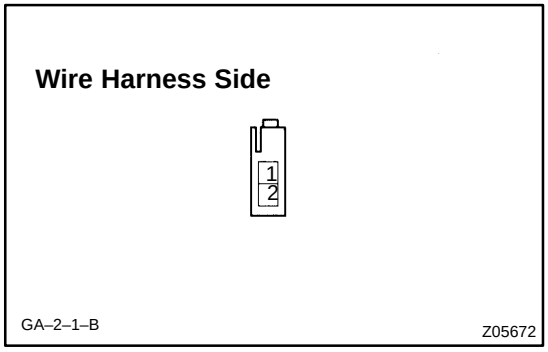
If the circuit is as specified, inspect power source or wire harness.



3. INSPECT INTERIOR LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
DOOR	2 – Switch body	Continuity
OFF	–	No continuity
ON	1 – 2	Continuity

If continuity is not as specified, replace the light assembly or bulb.

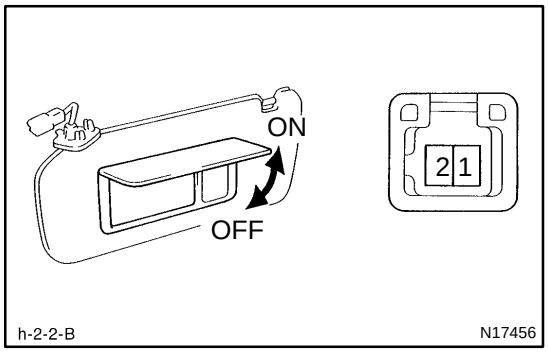


4. INSPECT INTERIOR LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Battery positive voltage

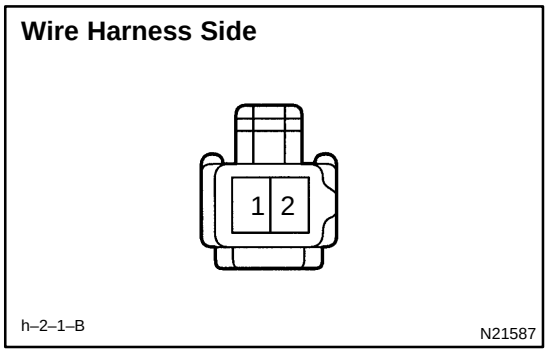
If the circuit is not as specified, inspect power source or wire harness.



5. INSPECT VANITY LIGHT CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Closed)	–	No continuity
ON (Opened)	1 – 2	Continuity

If continuity is not as specified, replace the bulb or vanity light.

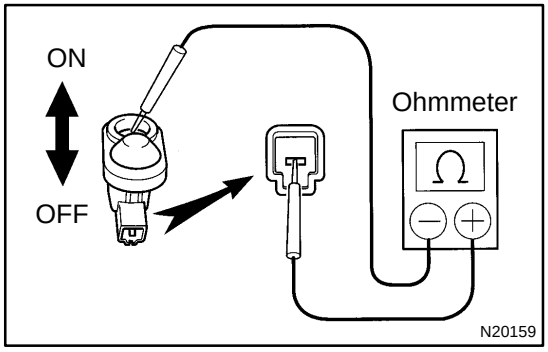


6. INSPECT VANITY LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect power source or wire harness.

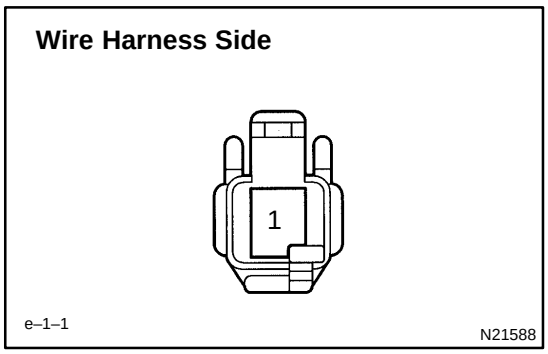


7. INSPECT DOOR COURTESY SWITCH CONTINUITY

(a) Check that continuity exists between terminals and the switch body with the switch ON (switch pin released: opened door).

(b) Check that no continuity exists between terminals and the switch body with the switch OFF (switch pin pushed in: closed doors).

If operation is not as specified, replace the switch.

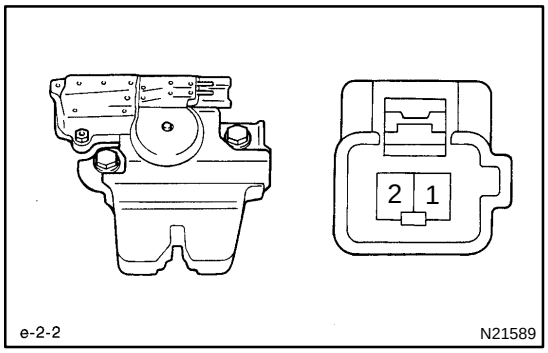


8. INSPECT DOOR COURTESY SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Battery positive voltage

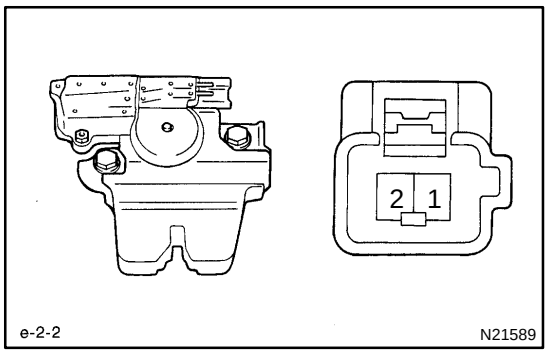
If the circuit is not as specified, inspect power source or wire harness.



9. INSPECT LUGGAGE COMPARTMENT DOOR COURTESY SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch OFF	–	No continuity
Switch ON	2 – Body Ground	Continuity

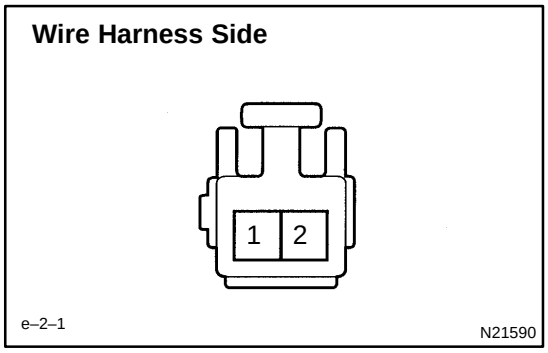
If continuity is not as specified, replace the switch and motor.



10. INSPECT LUGGAGE COMPARTMENT DOOR OPENER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to body ground, check that the motor operates.

If operation is not as specified, replace the switch and motor.



11. INSPECT LUGGAGE COMPARTMENT DOOR COURTESY SWITCH AND OPENER MOTOR CIRCUIT

Disconnect the connector from the switch and opener motor, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Luggage compartment door opener switch OFF	No voltage
1 – Ground	Luggage compartment door opener switch ON	Battery positive voltage
2 – Ground	Constant	Battery positive voltage

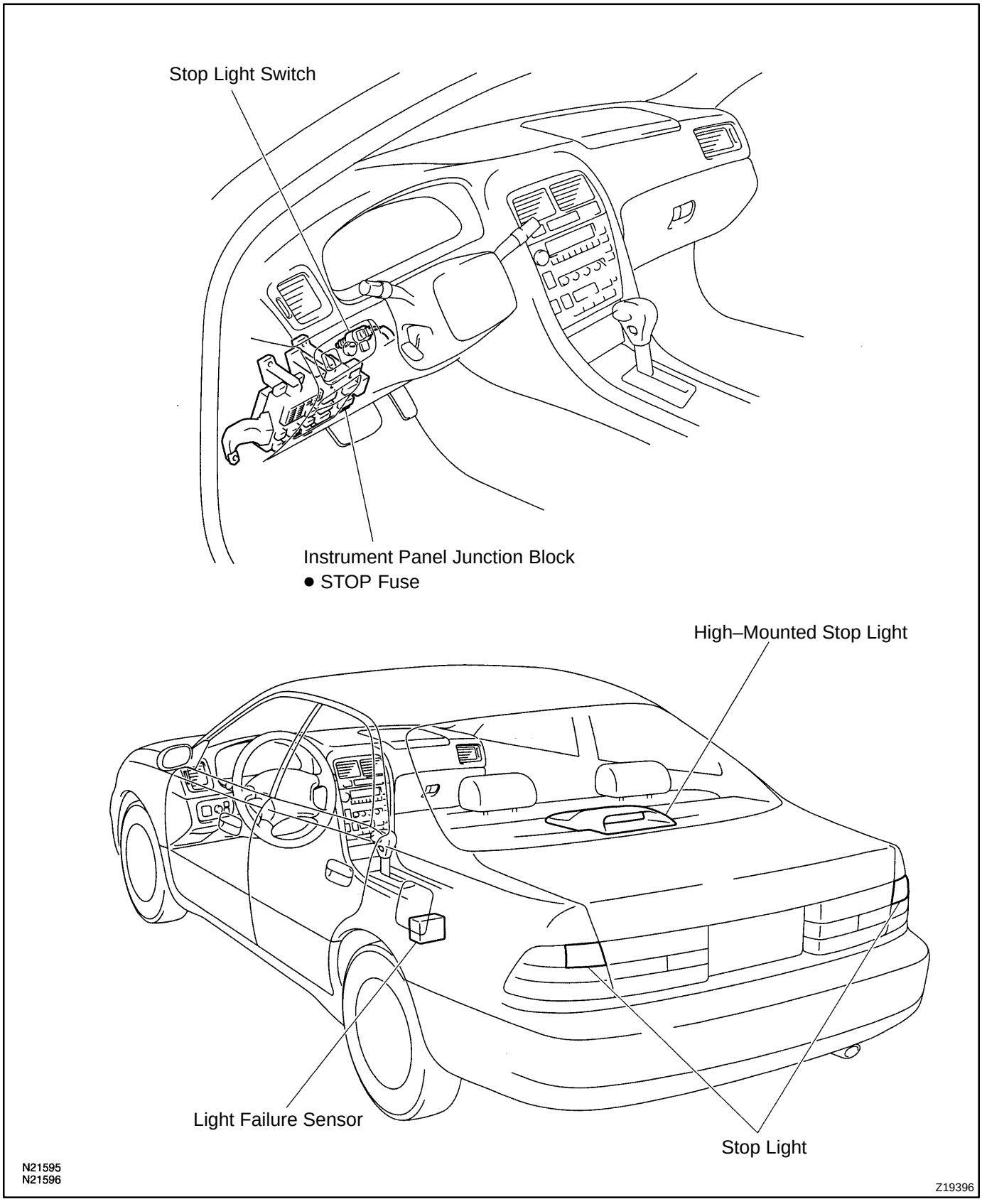
If the circuit is not as specified, inspect power source or wire harness.

12. INSPECT ILLUMINATED ENTRY SYSTEM
(See integration relay circuit on page BE–20)

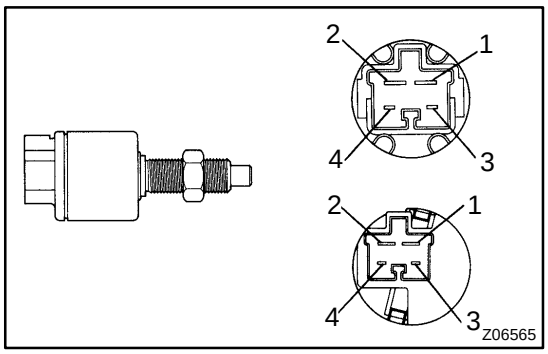
STOP LIGHT SYSTEM

LOCATION

BE059–01



BE05A–01

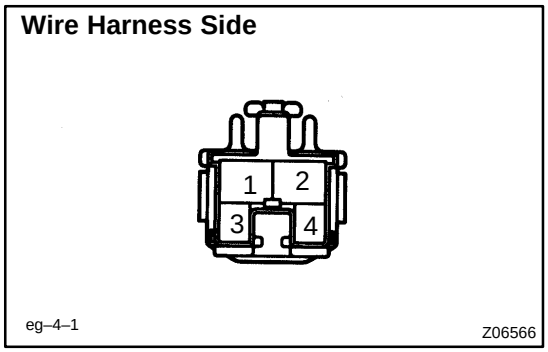


INSPECTION

1. INSPECT STOP LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch pin free	1 – 2	Continuity
Switch pin pushed in	3 – 4	Continuity

If continuity is not as specified, replace the switch.

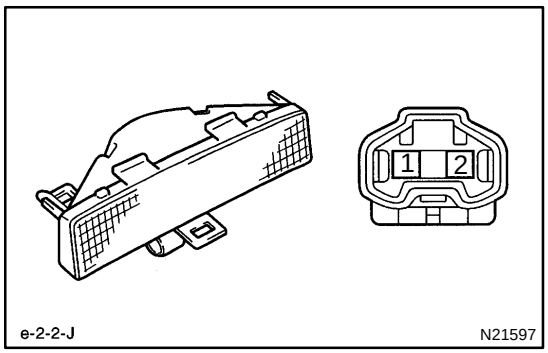


2. INSPECT STOP LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Battery positive voltage

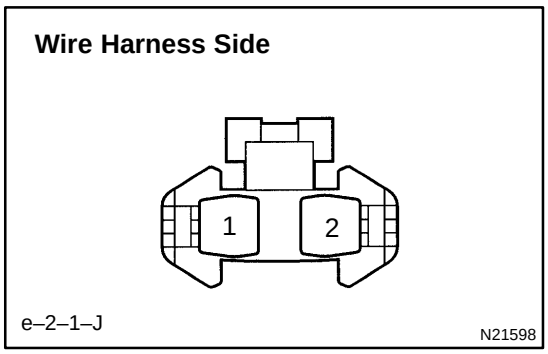
If circuit is not as specified, inspect the power source or wire harness.



3. INSPECT HIGH–MOUNTED STOP LIGHT ASSEMBLY CONTINUITY

Using the ohmmeter, check that continuity exists between terminals.

If continuity is not as specified, replace the bulb or light assembly.

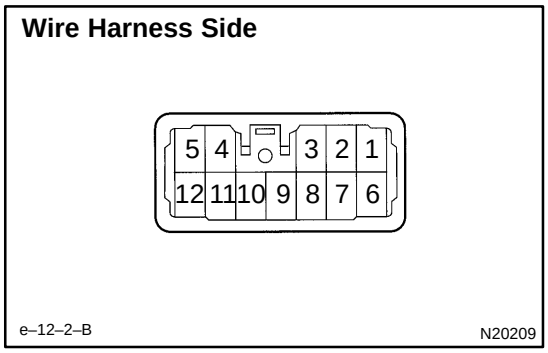


4. INSPECT HIGH–MOUNTED STOP LIGHT ASSEMBLY CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the power source or wire harness.



5. INSPECT LIGHT FAILURE SENSOR CIRCUIT

Disconnect the connector from the sensor and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity*
2 – Ground	Constant	Continuity*
9 – Ground	Constant	Continuity*
11 – Ground	Constant	Continuity
3 – Ground	Light control switch OFF	No voltage
3 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
4 – Ground	Ignition switch LOCK or ACC	No voltage
4 – Ground	Ignition switch ON	Battery positive voltage
7 – Ground	Stop light switch OFF	No voltage
7 – Ground	Stop light switch ON	Battery positive voltage
8 – Ground	Ignition switch LOCK or ACC	No voltage
8 – Ground	Ignition switch ON	Battery positive voltage

*: There is resistance because this circuit is grounded through the bulb.

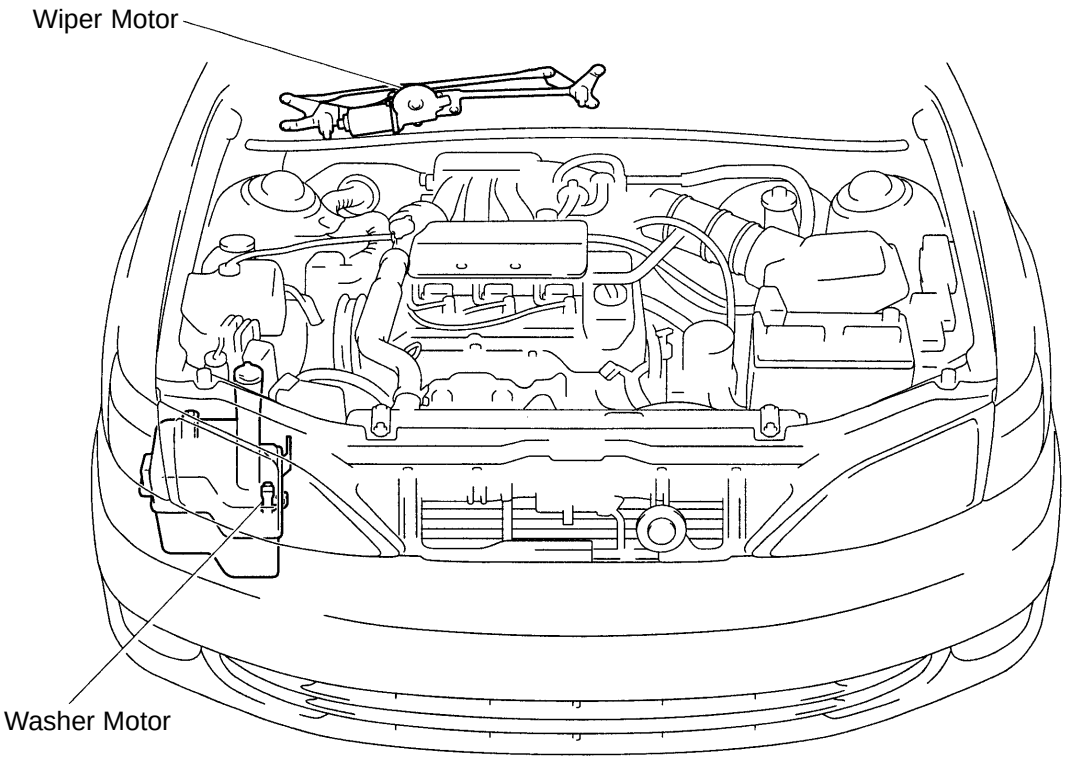
If the circuit is as specified, replace the sensor.

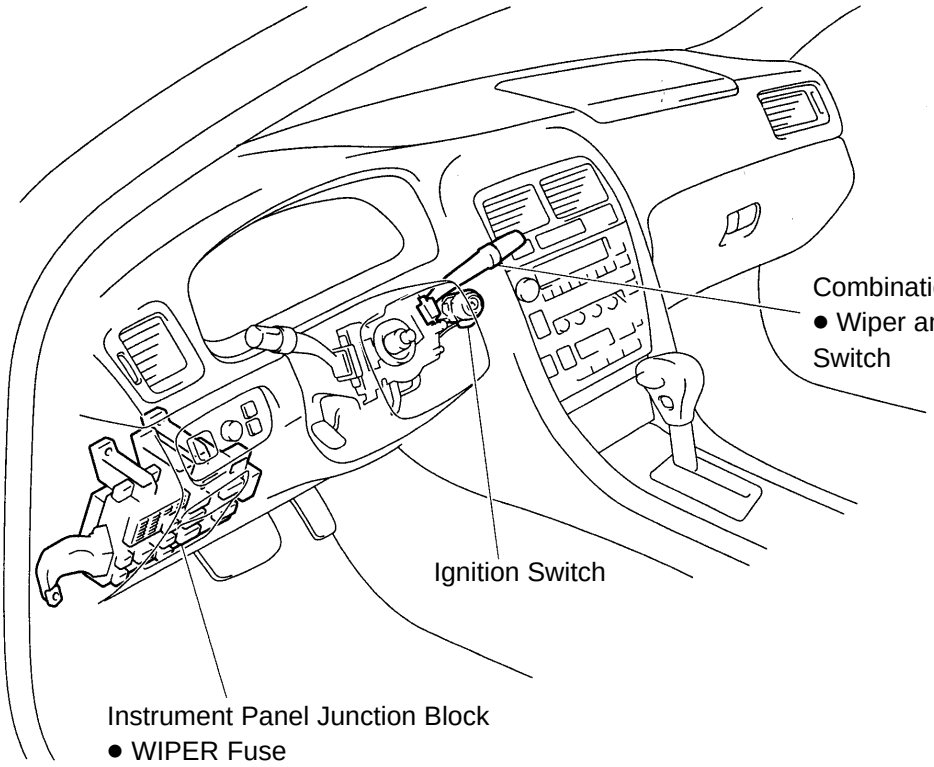
If the circuit is not as specified, inspect the circuits connected to other parts.

WIPER AND WASHER SYSTEM

LOCATION

BE05B–01



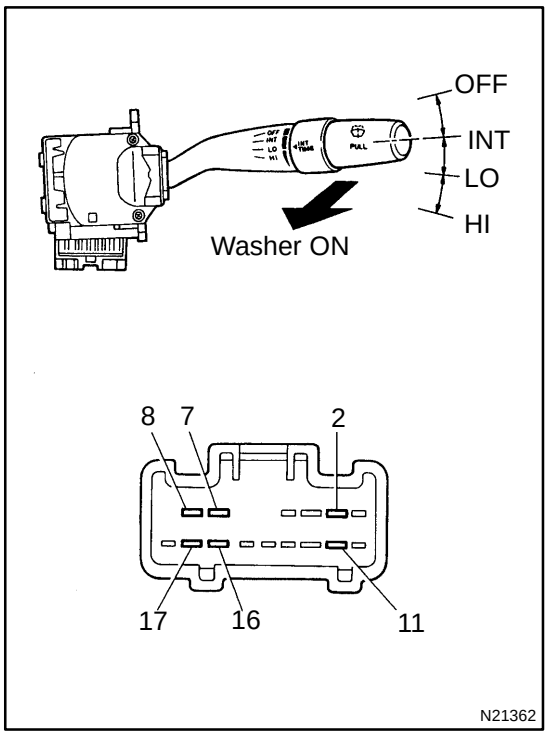


N21500
N21501

Z19354

BE05C–03

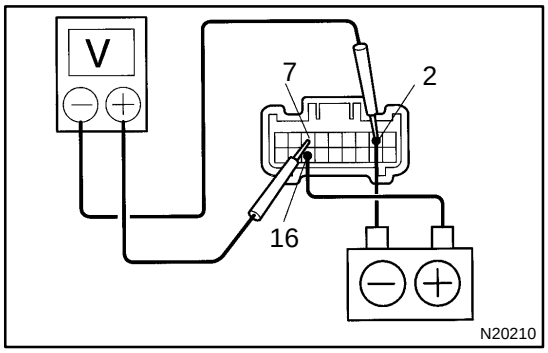
INSPECTION



1. INSPECT FRONT WIPER AND WASHER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	7 – 16	Continuity
INT	7 – 16	Continuity
LO	7 – 17	Continuity
HI	8 – 17	Continuity
Washer ON	2 – 11	Continuity

If continuity is not as specified, replace the switch.



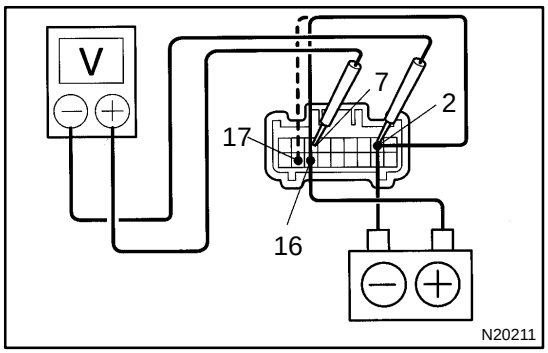
2. INSPECT INTERMITTENT OPERATION

(a) Turn the wiper switch to INT position.

(b) Turn the intermittent time control switch to FAST position.

(c) Connect the positive (+) lead from the battery to terminal 16 and the negative (–) lead to terminal 2.

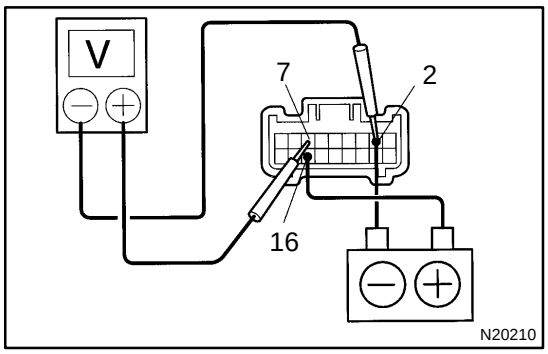
(d) Connect the positive (+) lead from the voltmeter to terminal 7 and the negative (–) lead to terminal 2, check that the meter needle indicates battery positive voltage.



(e) After connecting terminal 16 to terminal 17, connect it to terminal 2, check the voltage rises from 0 volt to battery positive voltage within the time, as shown in the table.

INT time control switch position	Voltage
FAST	Approx. 2 sec. → Battery positive voltage / 0 V
SLOW	10.7 ± 5 sec. → Battery positive voltage / 0 V
Non variable type	3.3 ± 1 sec. → Battery positive voltage / 0 V

If operation is not as specified, replace the wiper and washer switch.

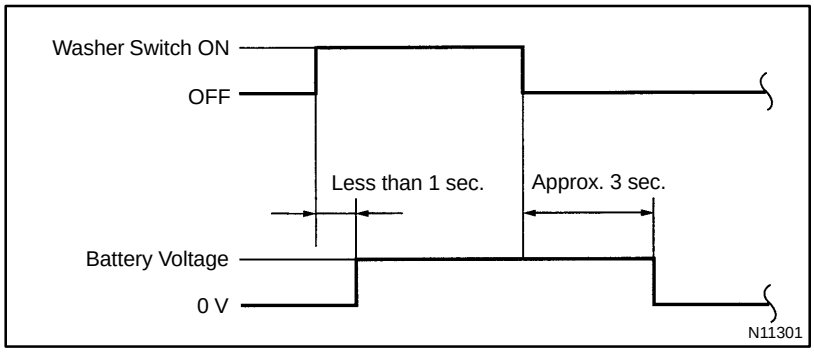


3. INSPECT WASHER LINKED OPERATION

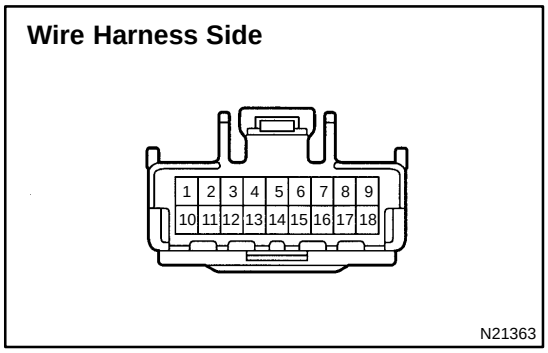
(a) Connect the positive (+) lead from the battery to terminal 16 and the negative (–) lead to terminal 2.

(b) Connect the positive (+) lead from the voltmeter to terminal 7 and the negative (–) lead to terminal 2.

(c) Push in the washer switch, and check that the voltage changes as shown in the table below.



If operation is not as specified, replace the wiper and washer switch.

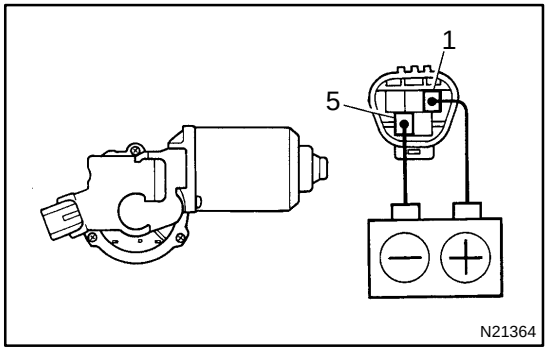


4. INSPECT WIPER SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
11 – Ground	Ignition switch LOCK or ACC	No voltage
11 – Ground	Ignition switch ON	Battery positive voltage

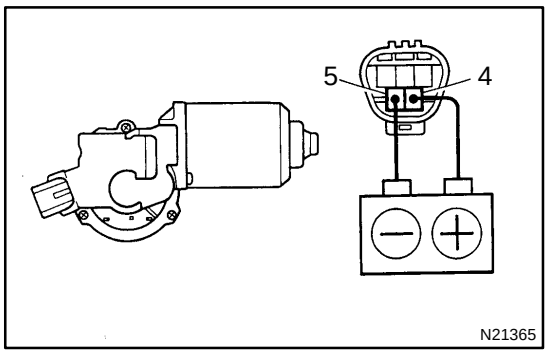
If circuit is not as specified, inspect the circuits connected to other parts.



5. Low Speed: INSPECT FRONT WIPER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 5, check that the motor operates at low speed.

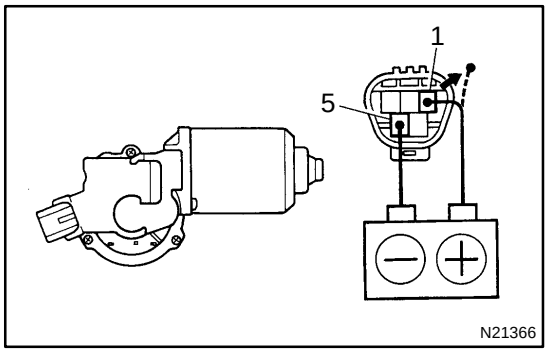
If operation is not as specified, replace the motor.



6. High Speed:
INSPECT FRONT WIPER MOTOR OPERATION

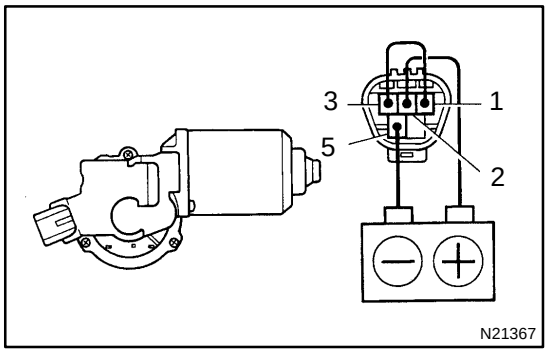
Connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to terminal 5, check that the motor operates at high speed.

If operation is not as specified, replace the motor.



7. Stopping at Stop Position:
INSPECT FRONT WIPER MOTOR OPERATION

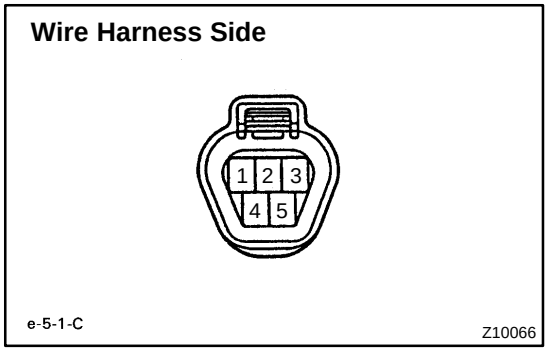
(a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting positive (+) lead from terminal 1.



(b) Connect terminals 1 and 3.

(c) Connect the positive (+) lead from the battery to terminal 2 and negative (–) lead to terminal 5, check that the motor stops running at the stop position after the motor operates again.

If operation is not as specified, replace the motor.

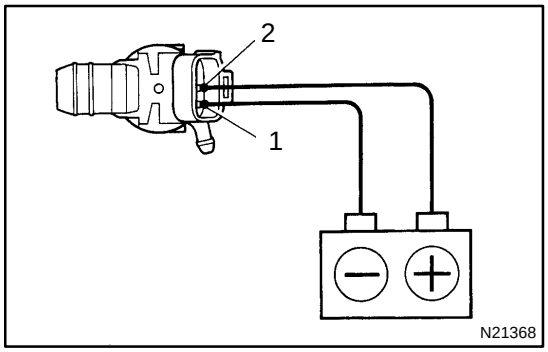


8. INSPECT WIPER MOTOR CIRCUIT

Disconnect the connector from the motor and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
5 – Ground	Constant	Continuity
1 – Ground	* Wiper switch OFF or INT, HIGH	No voltage
1 – Ground	* Wiper switch LOW	Battery positive voltage
2 – Ground	Ignition switch LOCK or ACC	No voltage
2 – Ground	Ignition switch ON	Battery positive voltage
4 – Ground	* Wiper switch OFF or INT, LOW	No voltage
4 – Ground	* Wiper switch HIGH	Battery positive voltage

*: Turn ignition switch ON
If circuit is not as specified, inspect the circuits connected to other parts.



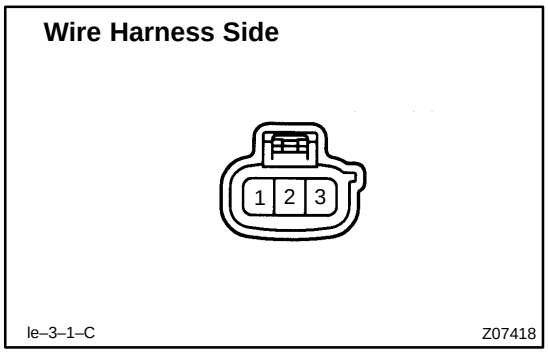
9. INSPECT WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the motor operates.

NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



10. INSPECT WASHER MOTOR CIRCUIT

Disconnect the connector from the washer motor and inspect the connector on harness side.

Tester connection	Condition	Specified condition
1 – Ground	Washer switch OFF (released)	No continuity
1 – Ground	Washer switch ON (pushed in)	Continuity
2 – Ground	Ignition switch LOCK or ACC	No voltage
2 – Ground	Ignition switch ON	Battery positive voltage

If circuit is not as specified, inspect wire harness, power source or wiper switch.

COMBINATION METER

BE05D–03

TROUBLESHOOTING

PRECAUTIONS

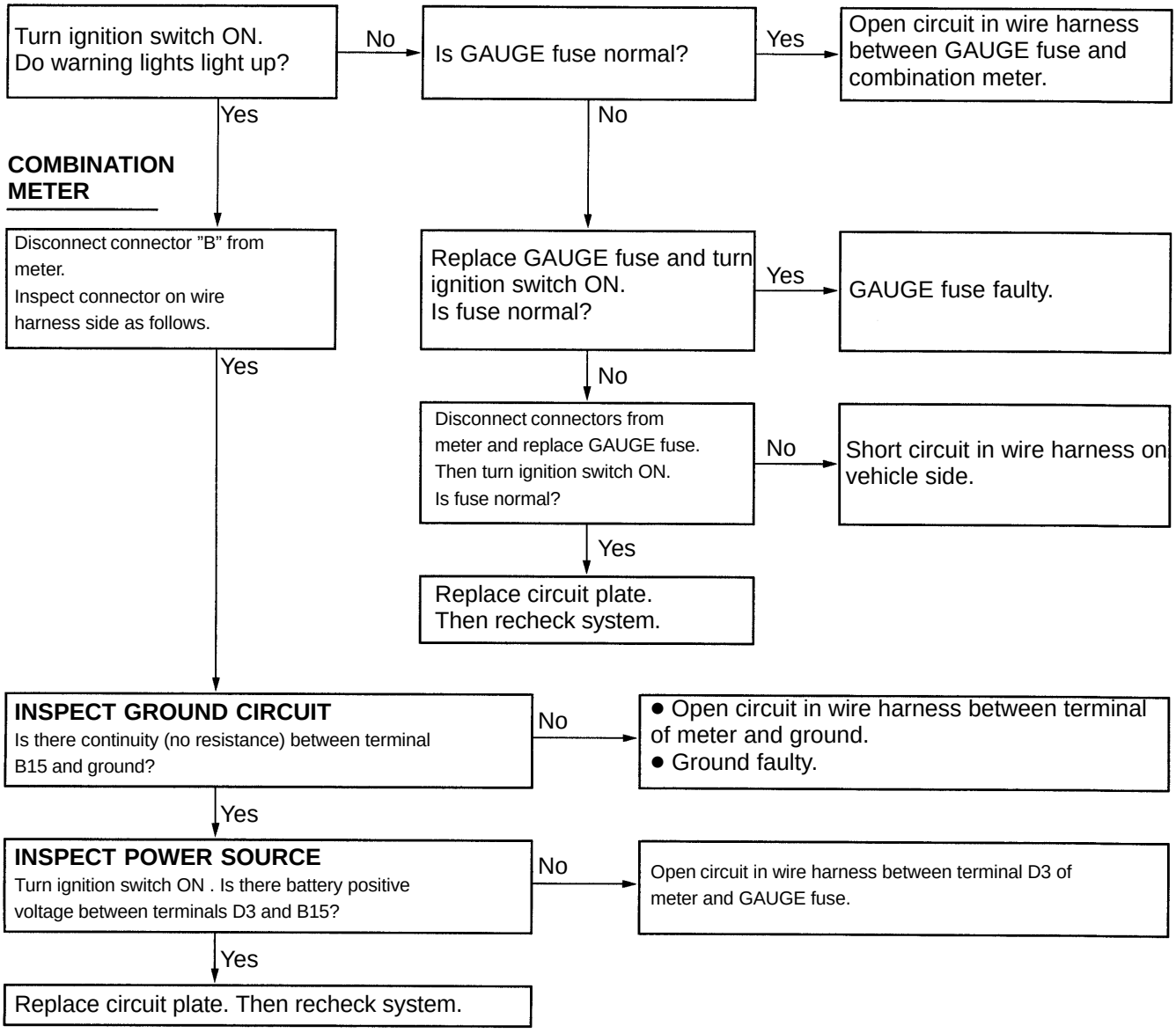
(a) When checking voltage, resistance, etc., use a high impedance type tester (It is impossible to use a simple tester).
(b) When the ignition switch is turned to START, all meters will go out but this is normal.
(c) When replacing the internal mechanism (computer parts) of the meter, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement parts (spare parts).
(d) Do not disconnect the battery while the engine is running as this would cause an instant reverse charge, resulting in damage to the components.
(e) Always disconnect the battery terminals before pulling apart connectors or terminals.
(f) To prevent damage, handle meters with care.

Trouble		Refer to
All Meters, Gauges, and Illuminations	No display at all.	1
	The four indicator needles do not light up.	Replace combination meter computer.
	One indicator needle does not light up.	2
	The character plate is not illuminated at one or two locations.	3
	Brightness does not change even when light control switch is operated (OFF↔TAIL).	4
	Brightness does not change even when rheostat volume is turned.	5
	Remains dimmed when the light control switch is turned OFF.	Replace combination meter computer.
	Does not go out while starter running.	6
Speedometer	Speedometer does not operate while driving.	7
	Vehicle speed signal (4P) faulty.	8
Tachometer	Tachometer does not operate while engine running.	9
Fuel Gauge	Does not operate or operation is abnormal.	10
Fuel Level Warning	Warning light does not light up or always lights up.	11
Engine Coolant Temperature Gauge	Does not operate or operation is abnormal.	12
Low Oil Pressure warning	Abnormal operation or warning light does not light up.	13
Brake Warning	Abnormal operation or warning light does not light up.	14
Rear Lights Warning	Abnormal operation or warning light does not light up.	15
Open Door Warning	Abnormal operation or warning light does not light up.	16
Engine Oil Level Warning	Abnormal operation or warning light does not light up.	17
Seat Belt Warning Chime	Abnormal operation or chime does not operate.	BE–92
Seat Belt Warning	Abnormal operation or warning light does not light up.	18

Trouble		Refer to
Turn Signal Indicator	Abnormal operation or Indicator does not light up.	19
O/D OFF Indicator	Abnormal operation or Indicator does not light up.	20
Shift Position Indicator	Abnormal operation or Indicator does not light up.	21
Malfunction Indicator	Abnormal operation or warning light does not light up	22
ABS Warning	Abnormal operation or warning light does not light up.	23
CRUISE Indicator	Abnormal operation or Indicator does not light up.	24
SRS Warning	Abnormal operation or warning light does not light up.	25
Discharge Warning	Abnormal operation or warning light does not light up.	26
High Beam Indicator	Abnormal operation or Indicator does not light up.	27
Window Washer Warning	Abnormal operation or warning light does not light up.	28
Taillight Indicator	Abnormal operation or Indicator does not light up.	29
Headlight Indicator	Abnormal operation or Indicator does not light up.	30

1	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**No display at all.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08429

2	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**One indicator needle does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Is LED OK?
- No → Replace the LED. Then recheck system.
- Yes ↓

Disconnect connector "B" from meter.
Inspect connector on wire harness side as follows

INSPECT GROUND CIRCUIT
Is there continuity (no resistance) between terminal B15 and ground?
- No → ● Open circuit in wire harness between terminal of meter and ground. ● Ground faulty.
- Yes ↓

INSPECT POWER SOURCE
Turn ignition switch ON . Is there battery positive voltage between terminals D3 and B15?
- No → Open circuit in wire harness between terminal D3 of meter and GAUGE fuse.
- Yes ↓

Replace circuit plate. Then recheck system.

3	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**The character plate is illuminated on one side.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Is bulb OK?
- No → Replace the LED. Then recheck system.
- Yes ↓

Disconnect connector "B" from meter.
Inspect connector on wire harness side as follows.

INSPECT GROUND CIRCUIT
Is there continuity (no resistance) between terminal B15 and ground?
- No → ● Open circuit in wire harness between terminal D3 of meter and ground. ● Ground faulty.
- Yes ↓

INSPECT POWER SOURCE
Turn ignition switch ON . Is there battery positive voltage between terminals D3 and B15?
- No → Open circuit in wire harness between terminal D3 of meter and GAUGE fuse.
- Yes ↓

Replace circuit plate. Then recheck system.

V08430

4	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**Brightness does not change even when light control switch is operated. (OFF↔TAIL)**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

COMBINATION METER

Disconnect connector "B" from meter.
Inspect connector on wire harness side as follows.

INSPECT TAILLIGHT SIGNAL CIRCUIT
Does voltage change between terminal B8 and ground as follows?

Condition		Voltage
Light control switch position	OFF	No voltage
	TAIL or HEAD	Battery positive voltage

No → Taillight signal circuit faulty on vehicle side. Inspect illumination light system.

Yes

Replace circuit plate. Then recheck system.

5	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**Brightness does not change even when rheostat volume is turned.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

RHEOSTAT LIGHT CONTROL VOLUME

INSPECT RHEOSTAT LIGHT CONTROL VOLUME
(See page BE–)
Is operation normal?

No → Replace rheostat light control volume. Then recheck system.

Yes

COMBINATION METER

Connect connector to rheostat volume.
Disconnect connector "D" from meter.
Inspect connector on wire harness side as follows.

Turn ignition switch ON. Does voltage change evenly between terminal D1 and D2 when rheostat knob is turned?

No → Wire harness faulty between terminal D1 of meter and terminal D2 of rheostat volume and rheostat light control.

Yes

Replace circuit plate. Then recheck system.

V08431

6	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**Does not go out while starter running.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connector ”B” from meter.
Inspect connector on wire harness side as follows.

↓

Turn ignition switch START.
Is there battery positive voltage between terminal and ground or B16?

No → Wire harness faulty between terminal B16 of Meter and ST fuse.

↓ Yes

Replace circuit plate. Then recheck system.

7	**SPEEDOMETER**	**Speedometer does not operate while driving**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

INSPECT ODOMETER OPERATION
Does odometer operate while driving?

Yes → **INSPECT TRIP METER OPERATION**
Does trip meter operate while driving?

Yes → Replace speedometer. Then recheck system.

No → Go to step 7–A

↓ No

COMBINATION METER

Disconnect connector ”C” from meter.
Inspect connector on wire harness side as follows.

↓

Jack up the vehicle.
Turn ignition switch ON. Rotate propeller shaft.
Does the voltage between terminals C9 and C10 change (approx. 0V to 11V or more) per revolution of propeller shaft?

Yes → Replace circuit plate. Then recheck system.

↓ No

CONTINUED ON NEXT PAGE

V08432

8	**SPEEDOMETER**	**Vehicle speed signal (4P) faulty**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

INSPECT ODOMETER OPERATION
Does odometer operate while driving?
No → See chart 18.
Yes ↓

COMBINATION METER

Remove meter with connector connected.
Inspect connector "C" from back side as follows.

Jack up the vehicle. Turn ignition switch ON.
Rotate propeller shaft. Does the voltage between terminals C10 and ground change (approx. 0V to 5V or more) per revolution of propeller shaft?
No → Replace circuit plate. Then recheck system.
Yes ↓

Wire harness between terminal C10 of meter and*ECU faulty.

- ECM
- Suspension ECU
- Power Steering ECU
- ABS and TRAC ECU
- Cruise Control ECU

9	**TACHOMETER**	**Tachometer dose not operate while engine running.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connectors "A" and "C" from meter.
Inspect connector on wire harness side as follows.

* : An electrical tester availble to measure frrequency is necessary for this inspection.
REFERENCE : TOYOTA ELECTRICAL TESTER (09082–00050)

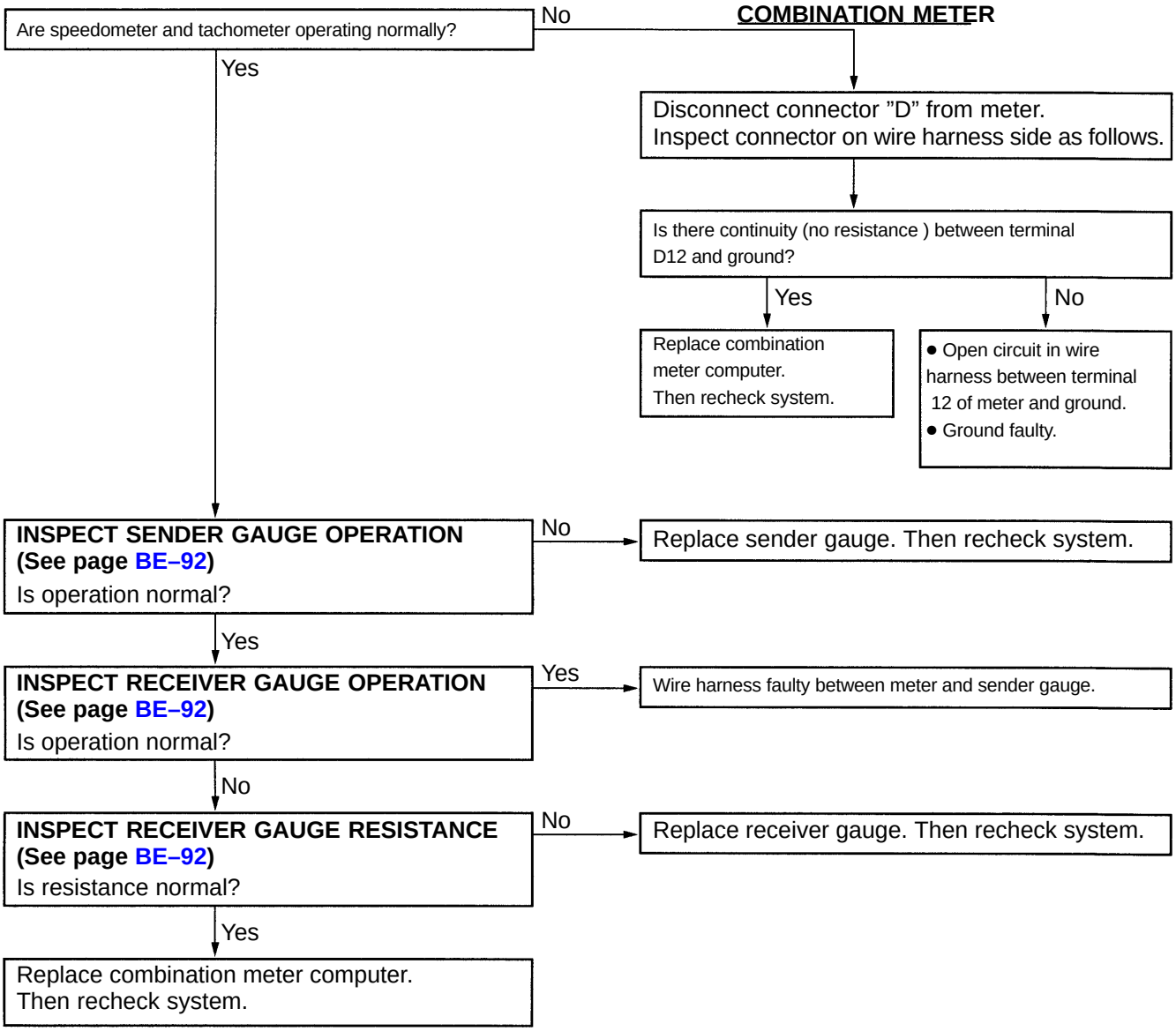
*** INSPECT TACHOMETER CIRCUIT**
With engine running, does voltage between terminals A13 and C10 fluctuate?
No → Wire harness faulty between terminal A13 of meter and igniter.
Yes ↓

Replace circuit plate. Then recheck system.

V08433

10	FUEL GAUGE	**Does not operate or operation is abnormal.**

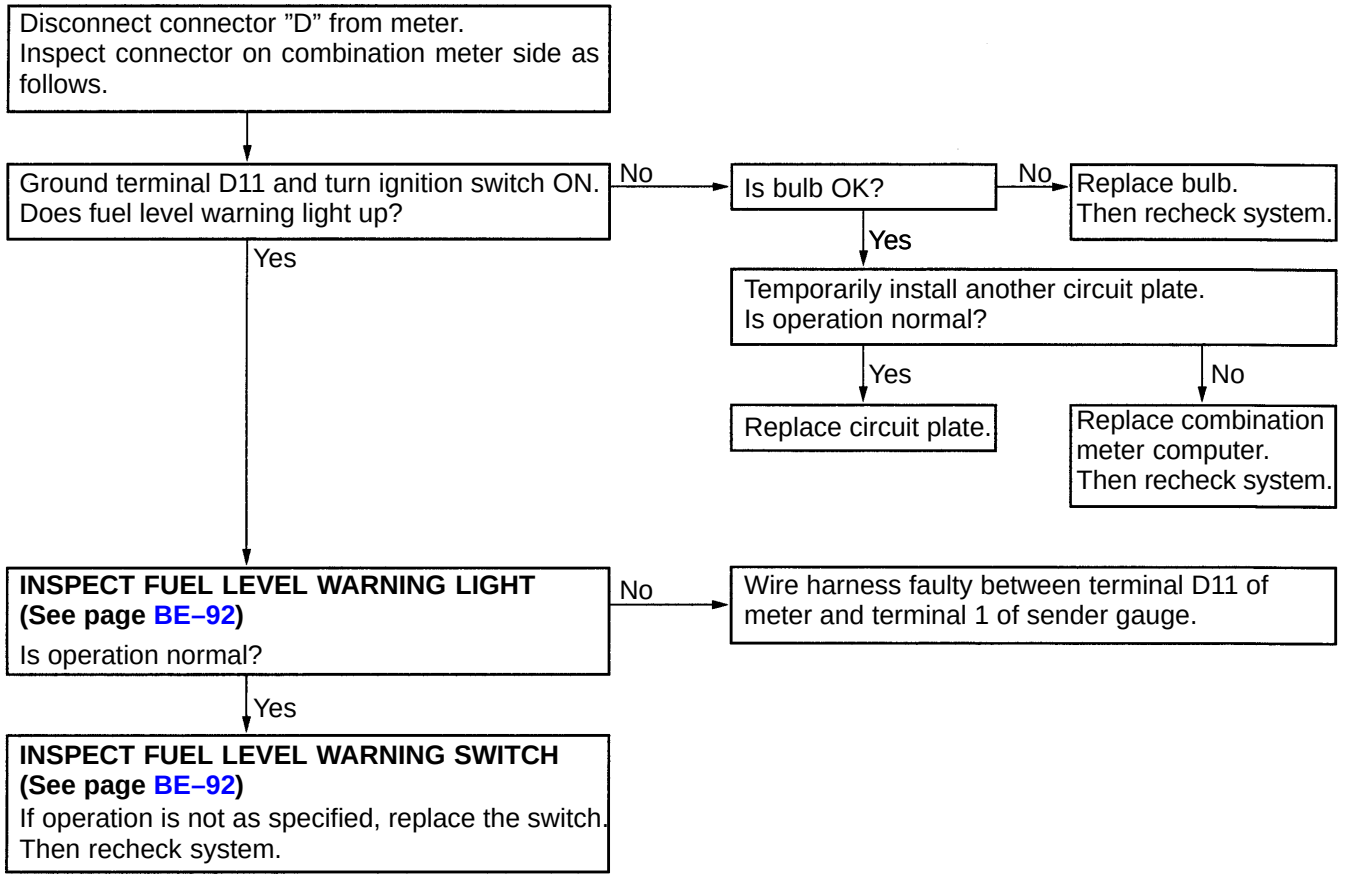
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08434

11	FUEL LEVEL WARNING	**Warning light does not light up or always lights up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



12	**ENGINE COOLANT TEMPERATURE GAUGE**	**Does not operate or operation is abnormal.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

INSPECT SENDER GAUGE GROUND CONDITION
Is there continuity (no resistance) between gauge body and engine block?
- No → Sender gauge ground condition faulty.
- Yes ↓

INSPECT RECEIVER GAUGE OPERATION (See page BE–92)
Is operation normal?
- Yes → Replace sender gauge. Then recheck system.
- No ↓

COMBINATION METER

Disconnect connector "A" from meter.
Inspect connector on wire harness side. ↓

Is there continuity between terminal A1 and ground?
- No → Wire harness faulty between terminal A1 of meter and ground.
- Yes ↓

Is there continuity between terminal A3 and ground?
- No → Wire harness faulty between terminal A3 of meter and sender gauge.
- Yes ↓

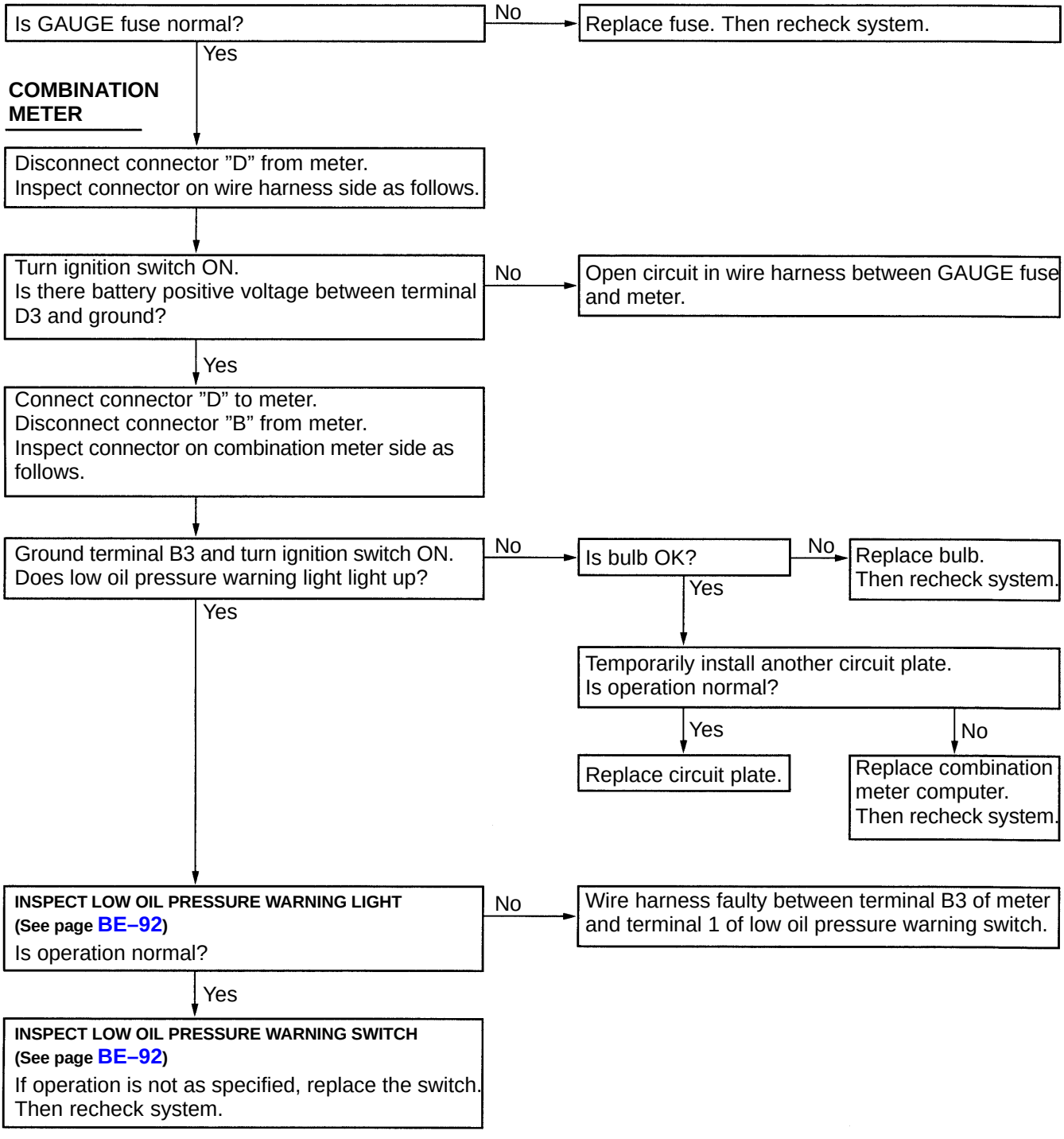
INSPECT RECEIVER GAUGE RESISTANCE (See page BE–92)
Is resistance normal?
- No → Replace receiver gauge. Then recheck system.
- Yes ↓

Replace combination meter computer.
Then recheck system.

V08436

13	LOW OIL PRESSURE WARNING	Abnormal operation or warning light does not light up.

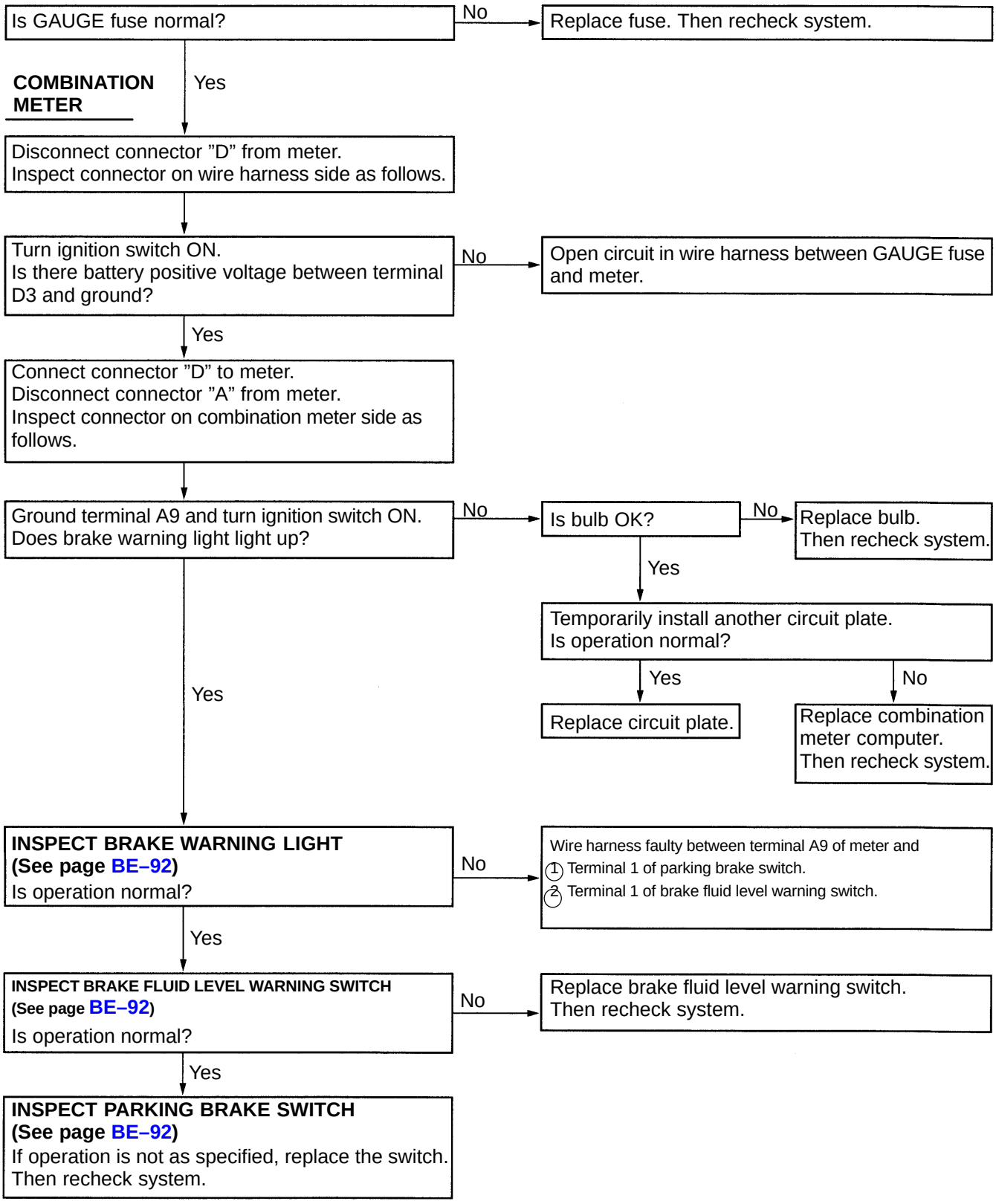
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08437

14	**BRAKE WARNING**	**Abnormal operation or warning light does not light up.**

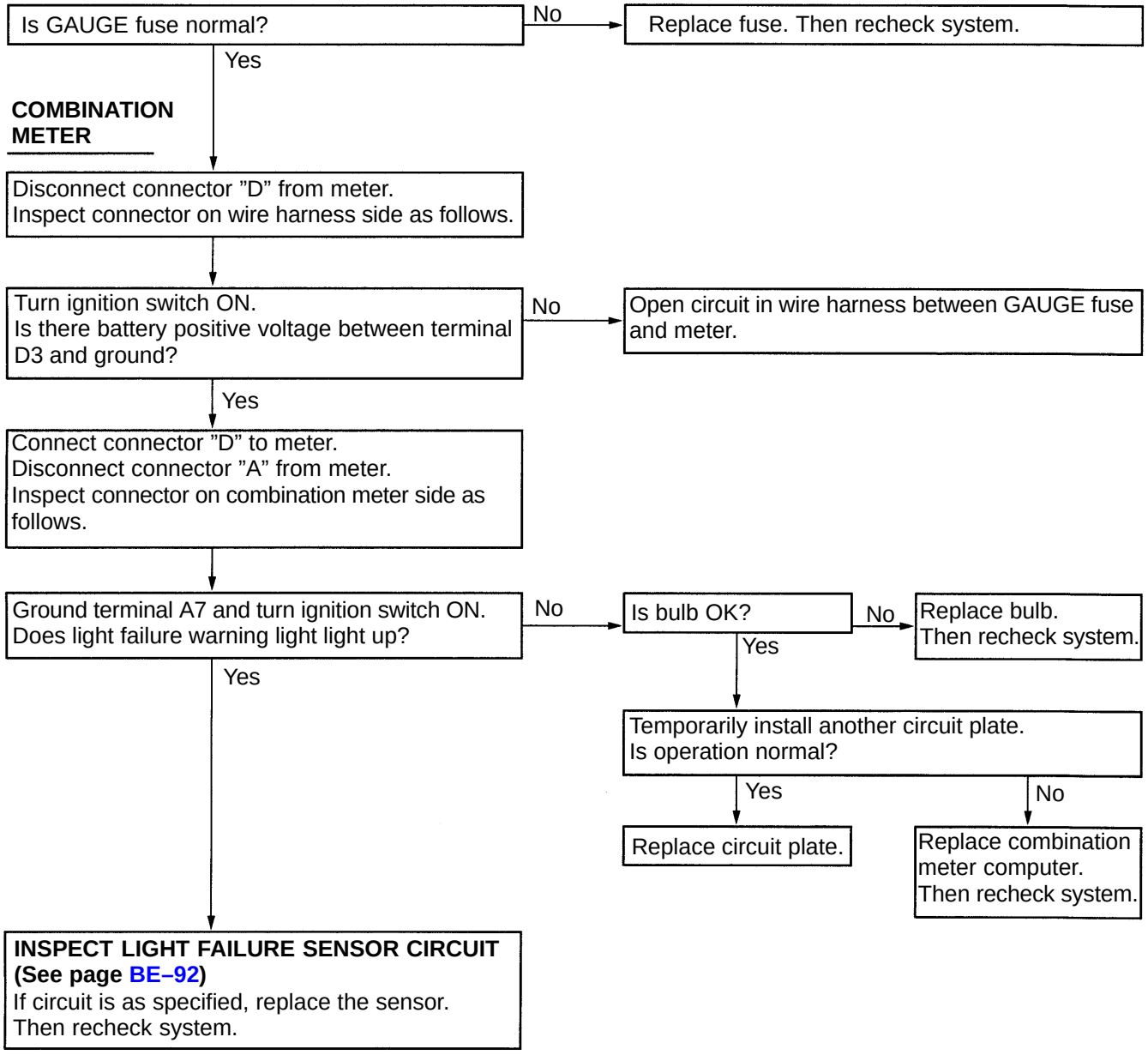
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08438

15	**REAR LIGHTS WARNING**	**Abnormal operation or warning light does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08439

16	**OPEN DOOR WARNING**	**Abnormal operation or warning light does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Is DOME fuse normal?
- No → Replace fuse. Then recheck system.
- Yes ↓

COMBINATION METER

Disconnect connector "C" from meter.
Inspect connector on wire harness side as follows.

Is there battery positive voltage between terminal C6 and ground?
- No → Open circuit in wire harness between GAUGE fuse and meter.
- Yes ↓

Connect connector "C" to meter.
Disconnect connector "C" from meter.
Inspect connector on combination meter side as follows.

Ground terminal C6.
Does open door warning light light up?
- No → Is bulb OK?
  - No → Replace bulb. Then recheck system.
  - Yes ↓ Temporarily install another circuit plate. Is operation normal?
    - Yes → Replace circuit plate.
    - No → Replace combination meter computer. Then recheck system.
- Yes ↓

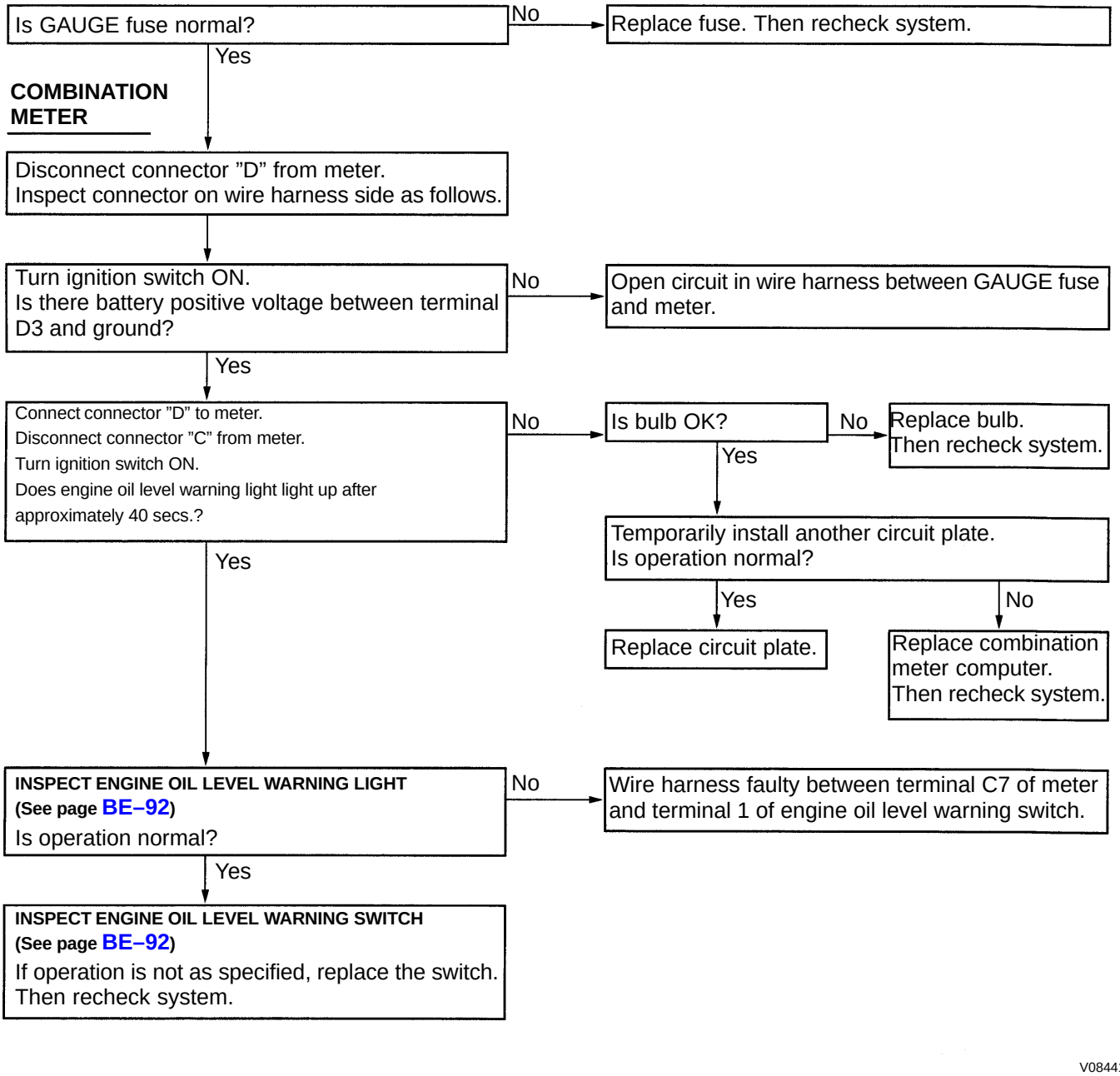
INSPECT OPEN DOOR WARNING LIGHT (See page BE–92)
Is operation normal?
- No → Wire harness faulty between terminal C6 of meter and terminal 1 of door courtesy switch.
- Yes ↓

INSPECT DOOR COURTESY SWITCH (See page BE–92)
If operation is not as specified, replace the switch. Then recheck system.

V08440

17	ENGINE OIL LEVEL WARNING	Abnormal operation or warning light does not light up.

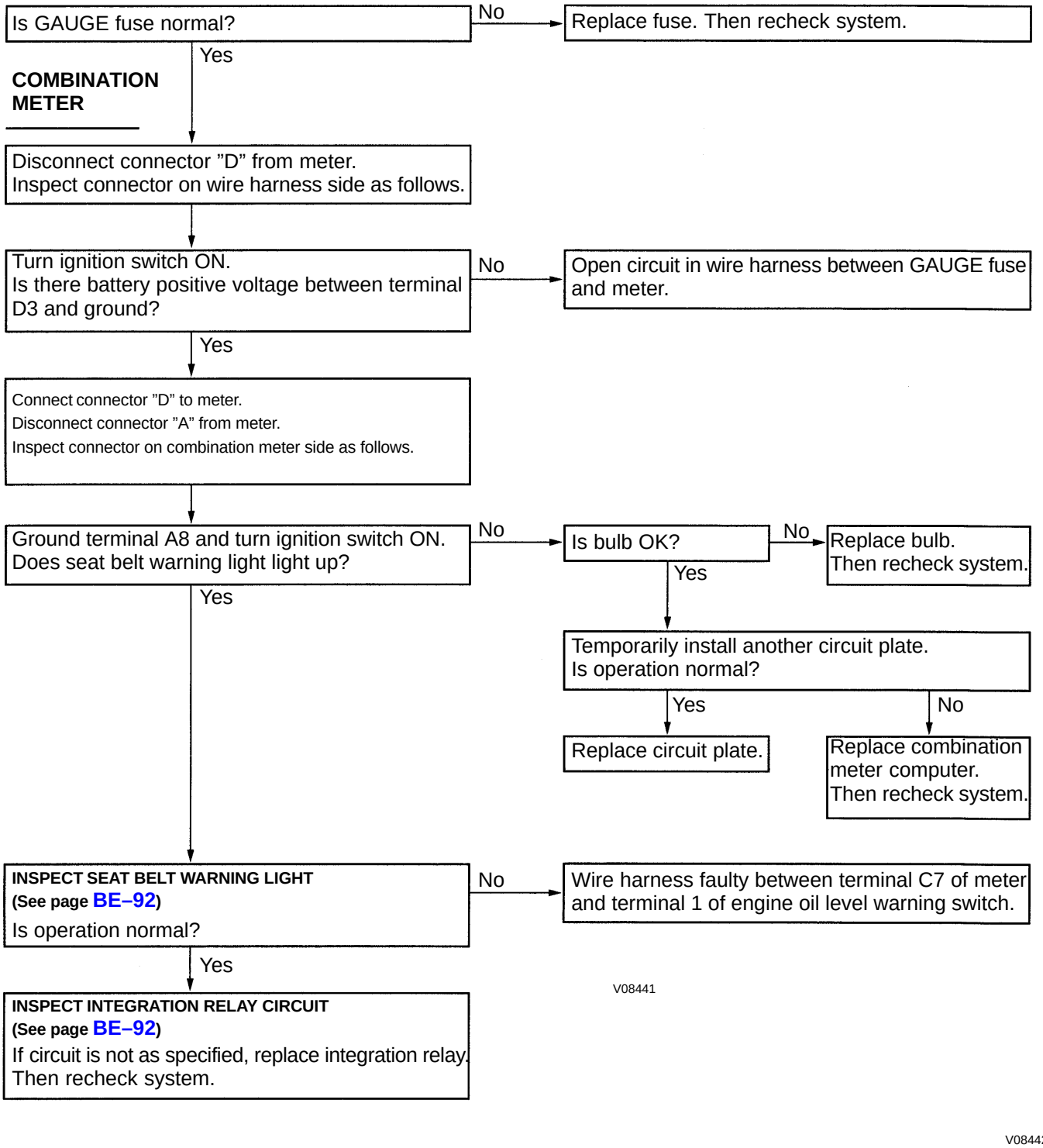
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08441

18	SEAT BELT WARNING	Abnormal operation or warning light does not light up.

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08442

19	**TURN SIGNAL INDICATOR**	**Abnormal operation or warning light does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connector "D" from meter.
Inspect connector on wire harness side as follows.

↓

Turn ignition switch ON.
Is there battery positive voltage between terminals xx and ground with the turn signal lever to left and right?

Turn signal to	Left	Right
Terminal xx	B11	B13

No → Turn signal indicator signal circuit faulty. Inspect the turn signal and hazard warning light system.

Yes ↓

Is bulb OK?

No → Replace the bulb. Then recheck system.

Yes ↓

Replace circuit plate. Then recheck system.

V08443

20	**TRAC OFF INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Inspect connector on wire harness side as follows.

Yes ↓

Ground terminal D6 and turn ignition switch ON.
Does TRAC OFF indicator light up?

No → Inspect the wire harness between terminal D6 of meter and ABS & TRAC ECU or inspect ABS & TRAC ECU.

Yes ↓

Is bulb OK?

No → Replace the bulb. Then recheck system.

Yes ↓

Replace circuit plate. Then recheck system.

No → Replace power source unit.

21	**O/D OFF INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connector "B" from meter.
Inspect connector on combination meter side as follows.

↓

Ground terminal B5 and turn ignition switch ON.
Does O/D OFF indicator light up?

Yes → O/D OFF indicator signal circuit faulty.

↓ No

Is bulb OK?

No → Replace the bulb.

↓ Yes

Replace circuit plate. Then recheck system.

22	**SHIFT POSITION INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connector "D" from meter.
Inspect connector on wire harness side as follows.

↓

Turn ignition switch ON.
Is there battery positive voltage between terminals XX and ground with turn shift lever to P through L

Shift to	P	R	N	D	2	L
Terminal XX	B12	B14	C1	C2	B10	B9

No → Shift position indicator signal circuit faulty.

↓ Yes

Is bulb OK?

No → Replace the bulb. Then recheck system.

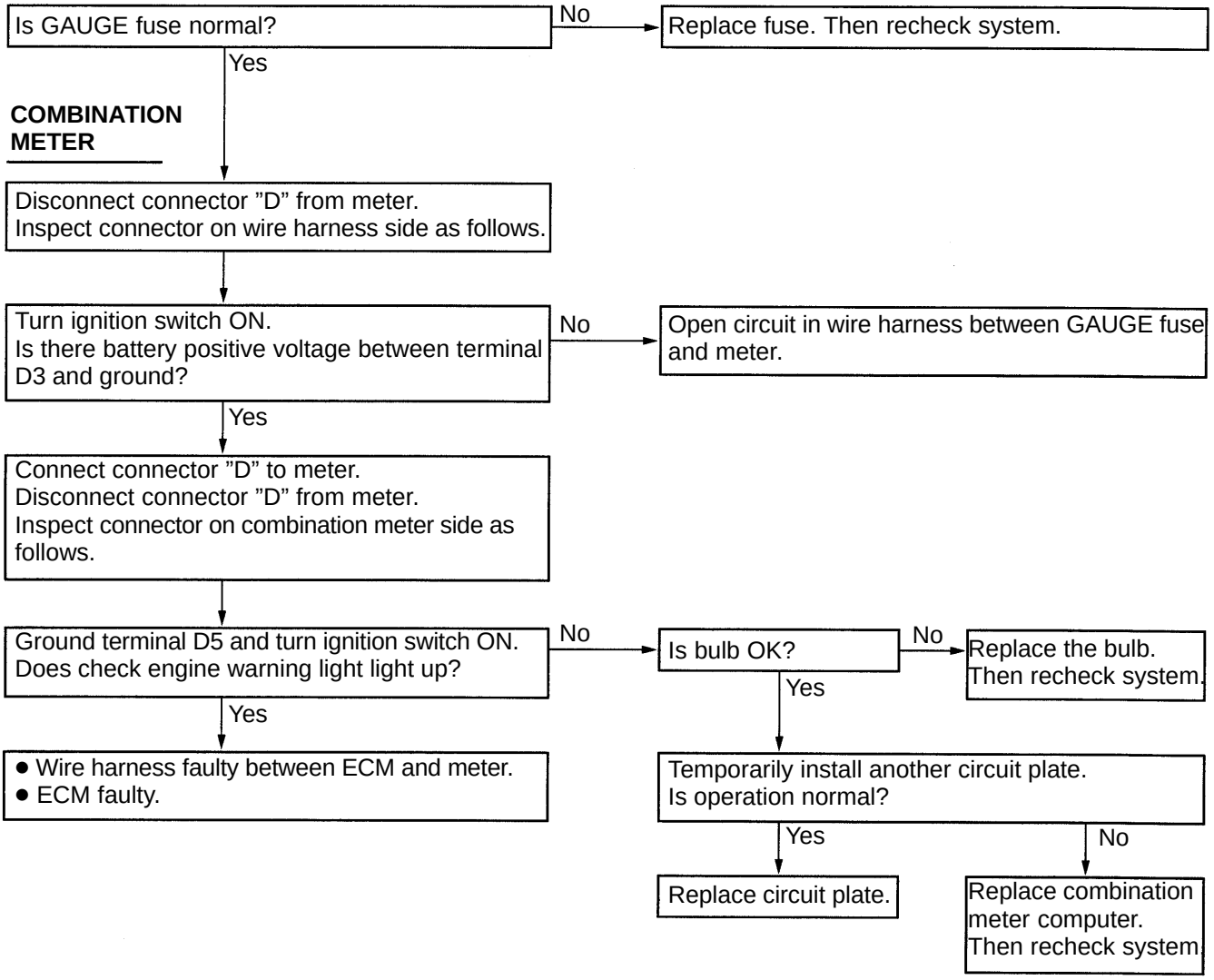
↓ Yes

Replace circuit plate. Then recheck system.

V08444

23	MALFUNCTION WARNING	**Abnormal operation or warning light does not light up.**

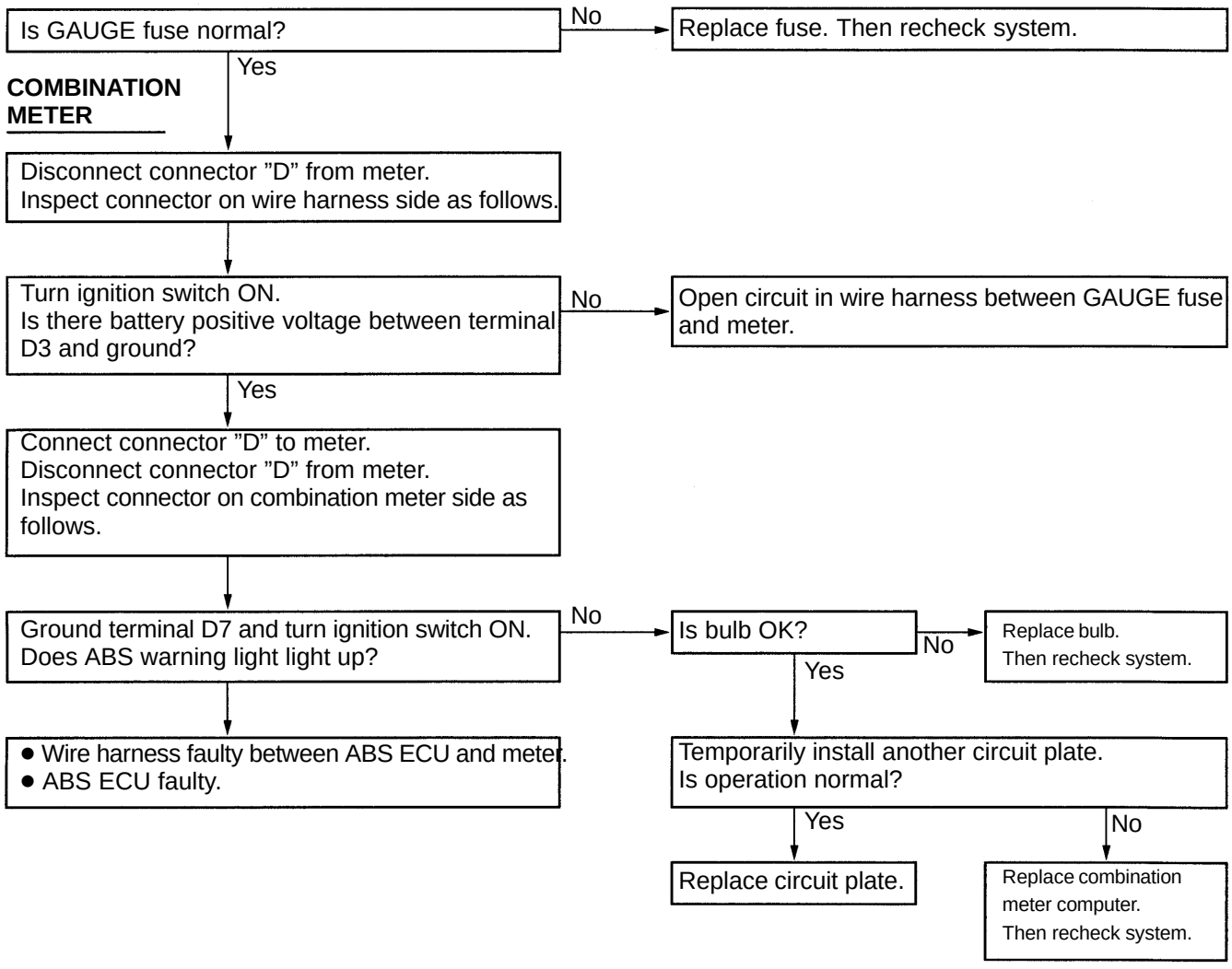
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08445

24	**ABS WARNING**	**Abnormal operation or warning light does not light up.**

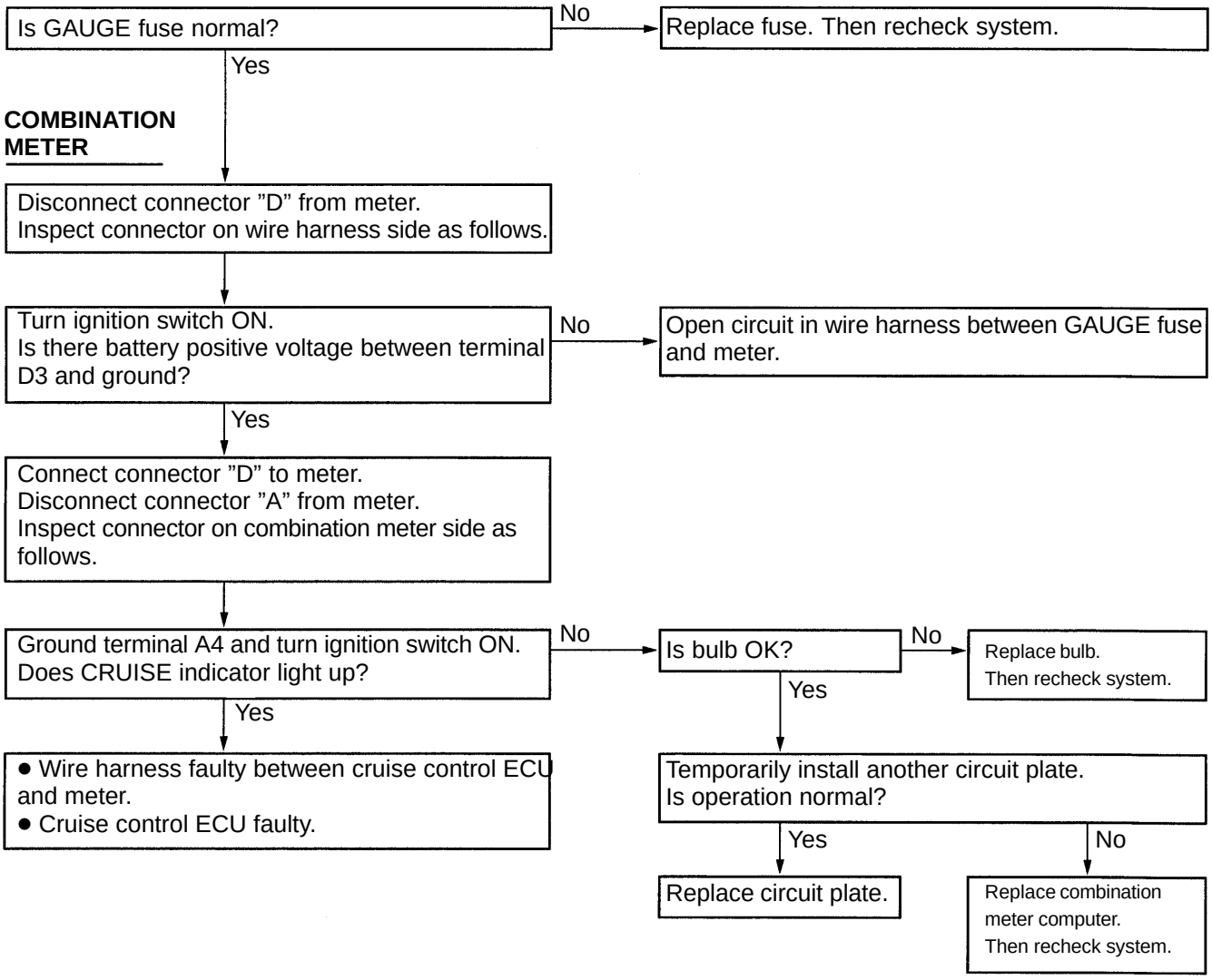
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08446

25	**CRUISE INDICATOR**	**Abnormal operation or indicator does not light up.**

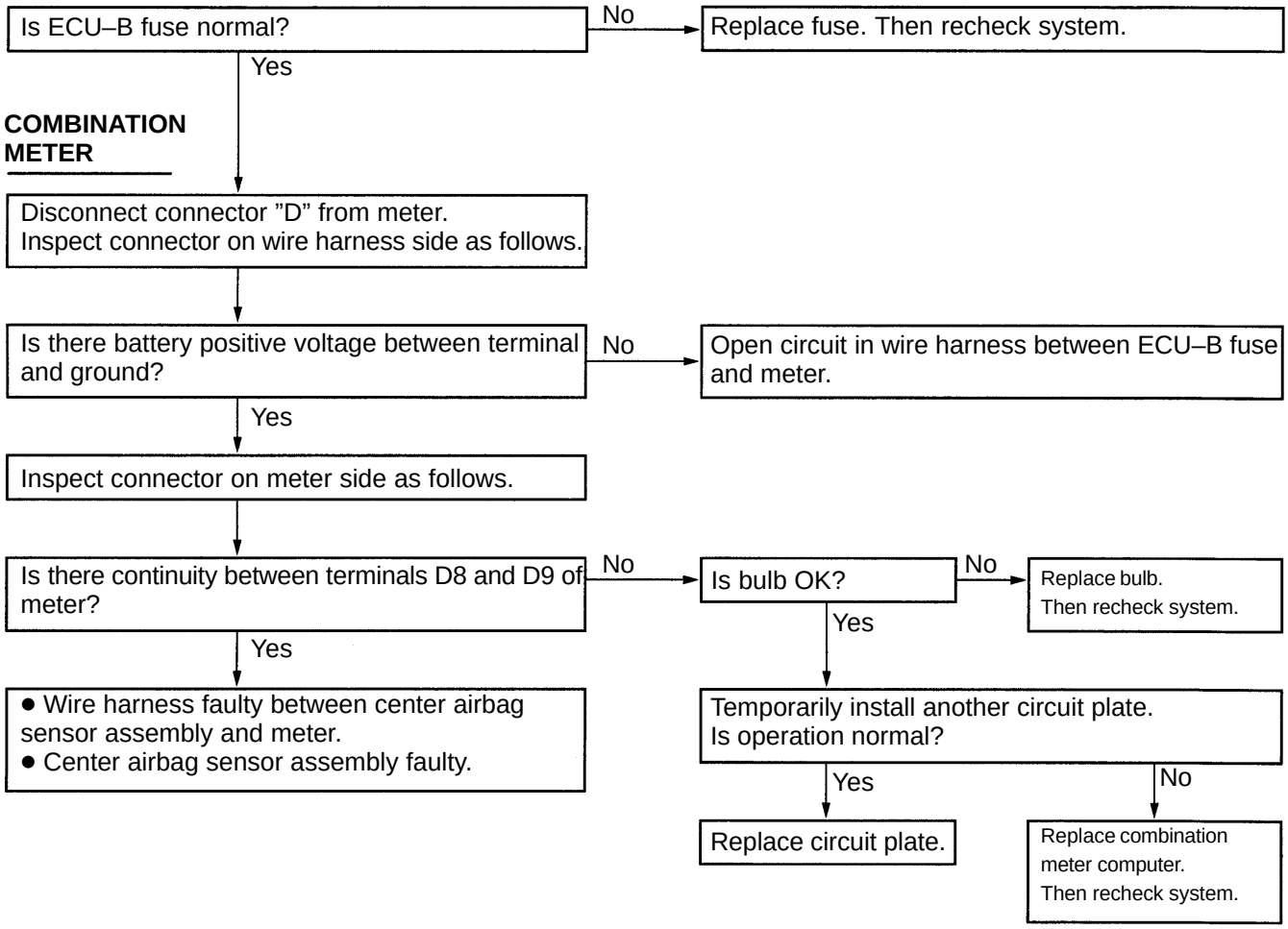
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08447

26	SRS WARNING	**Abnormal operation or warning light does not light up.**

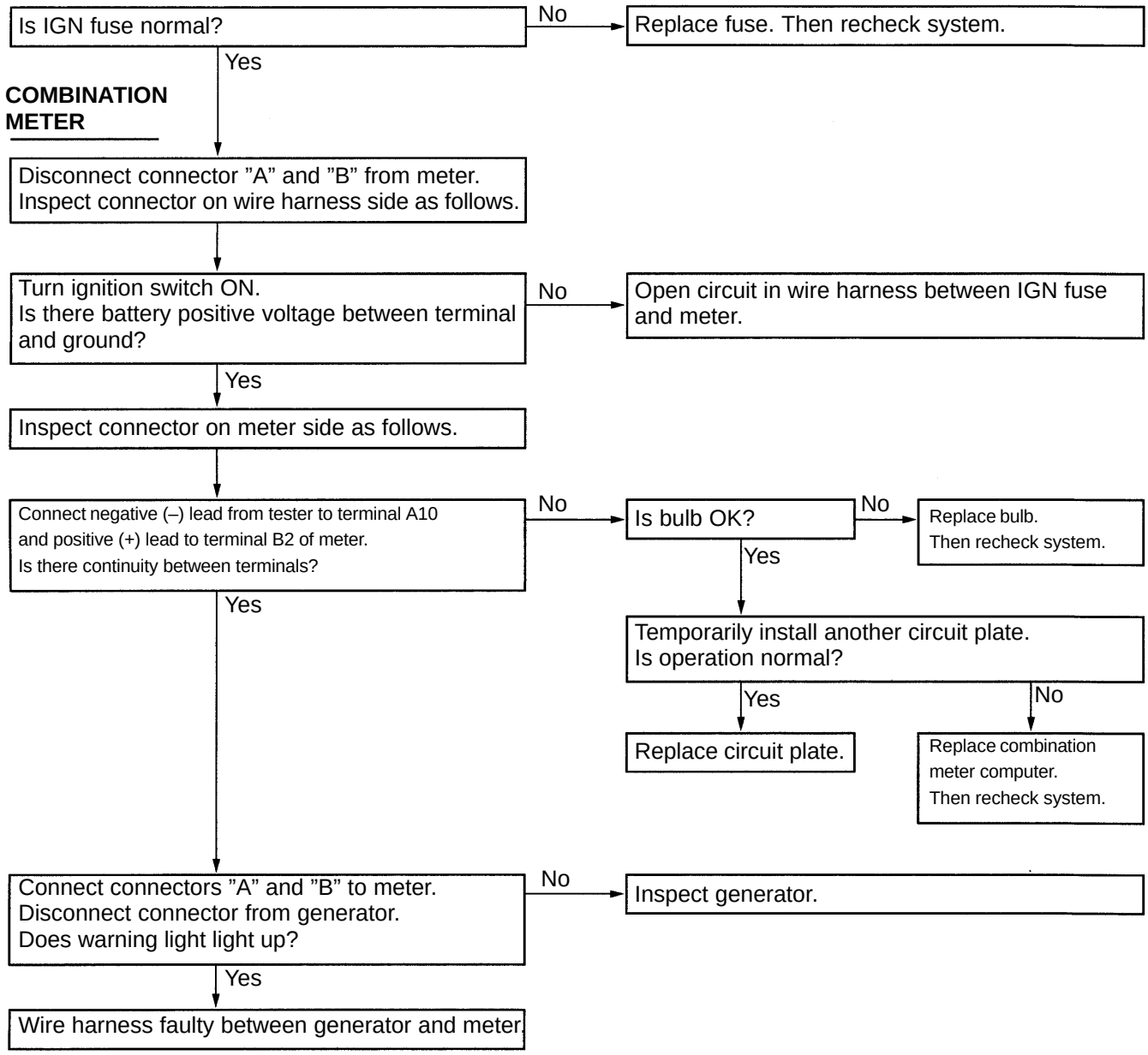
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08448

27	**DISCHARGE WARNING**	**Abnormal operation or warning light does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

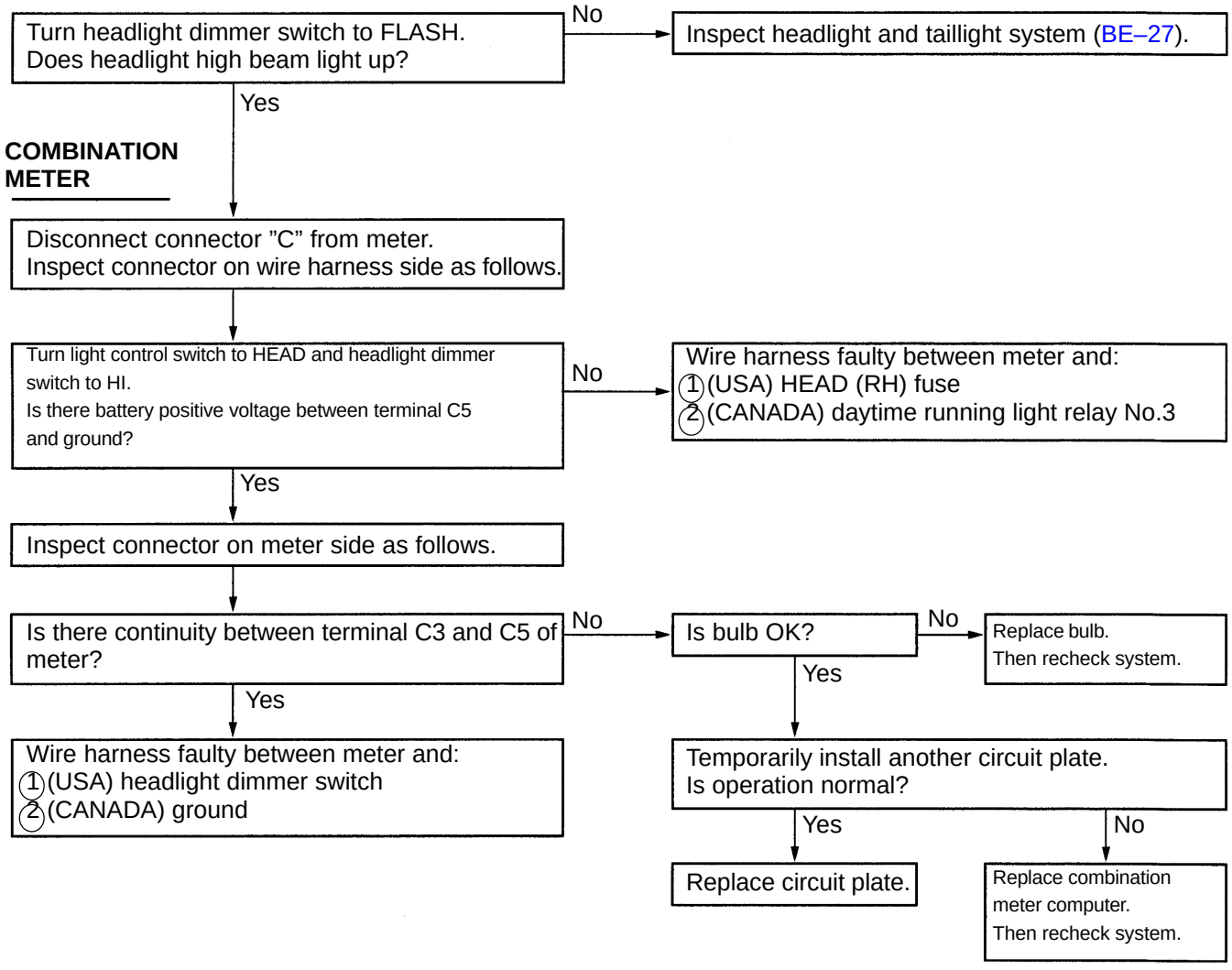


V08449

28	**HIGH BEAM INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

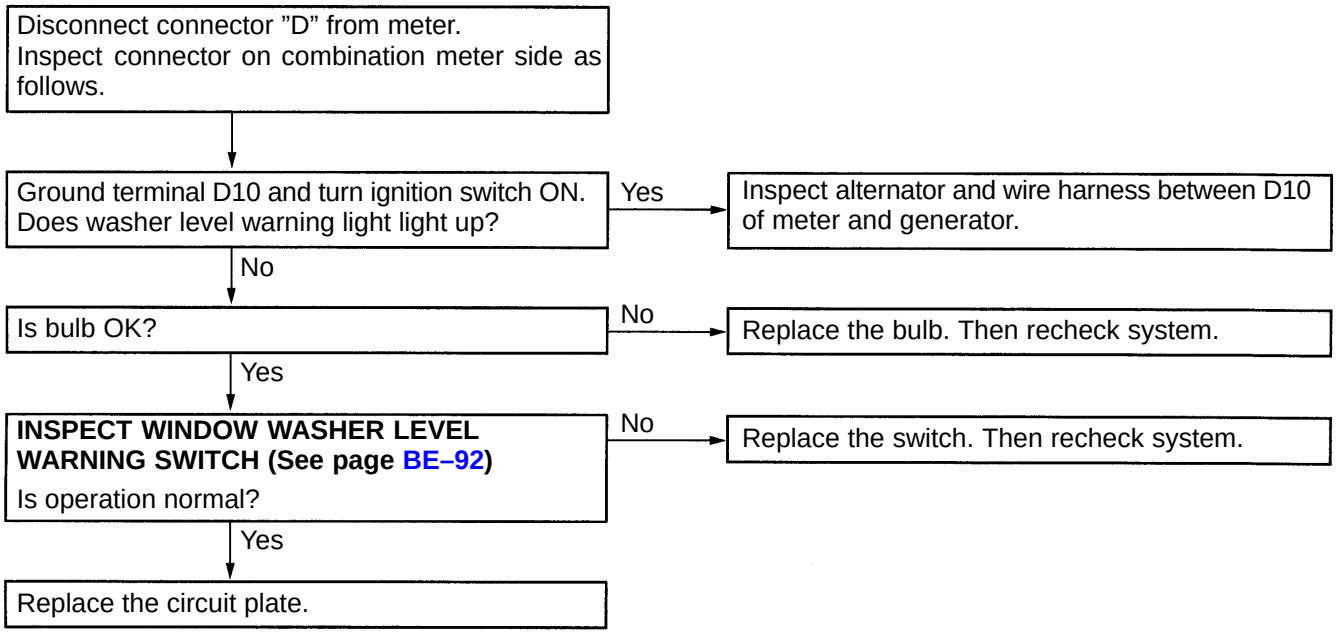
COMBINATION METER



V08450

29	**WINDOW WASHER LEVEL WARNING SWITCH**	**Abnormal operation or indicator does not light up.**

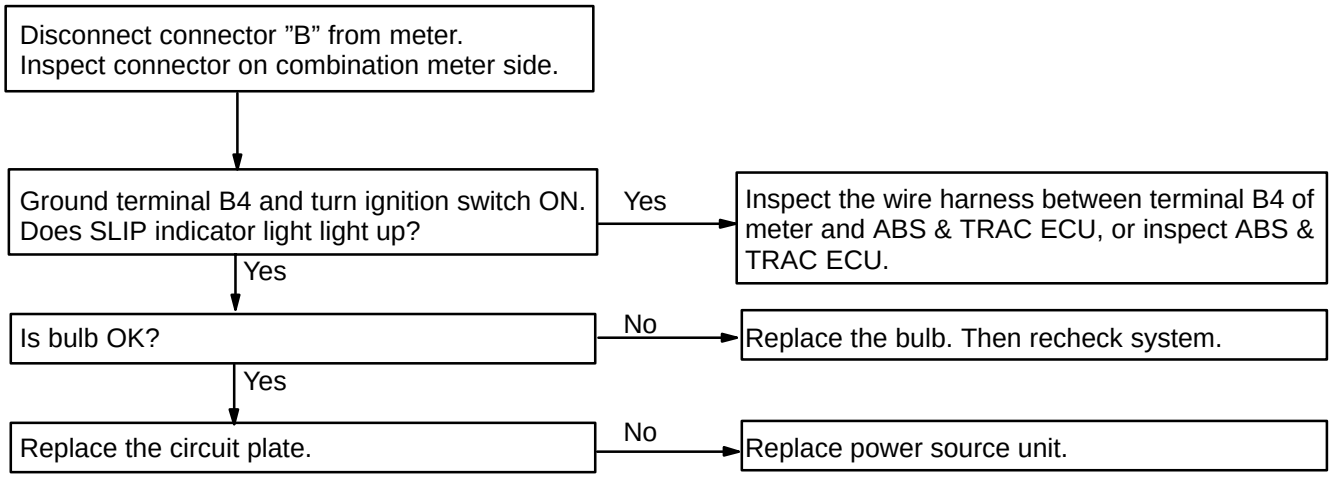
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08451

30	**SLIP INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



31	TAILLIGHT INDICATOR	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Turn the light control switch to TAIL.
Does taillight light up?

No → Inspect headlight and taillight system.
(See page BE–27).

Yes

COMBINATION METER

Disconnect connectors "C" from meter.
Inspect connector on wire harness side as follows.

Is there battery positive voltage (0 V ↔ battery positive voltage) between following terminals with light control switch TAIL?
- C5 and ground.

No → Wire harness faulty between meter and:
- Light control switch.
- Taillight Relay, Panel Relay (CANADA)

Yes

Connect connectors "B" to meter.
Disconnect connector "B" from meter.
Inspect connector on combination meter side as follows.

Ground terminal B7 and turn the light control switch to TAIL. Does taillight indicator light up?

No → Is bulb OK?

No → Replace bulb.
Then recheck system.

Yes → Temporarily install another circuit plate.
Is operation normal?

Yes → Replace circuit plate.

No → Replace combination meter computer.
Then recheck system.

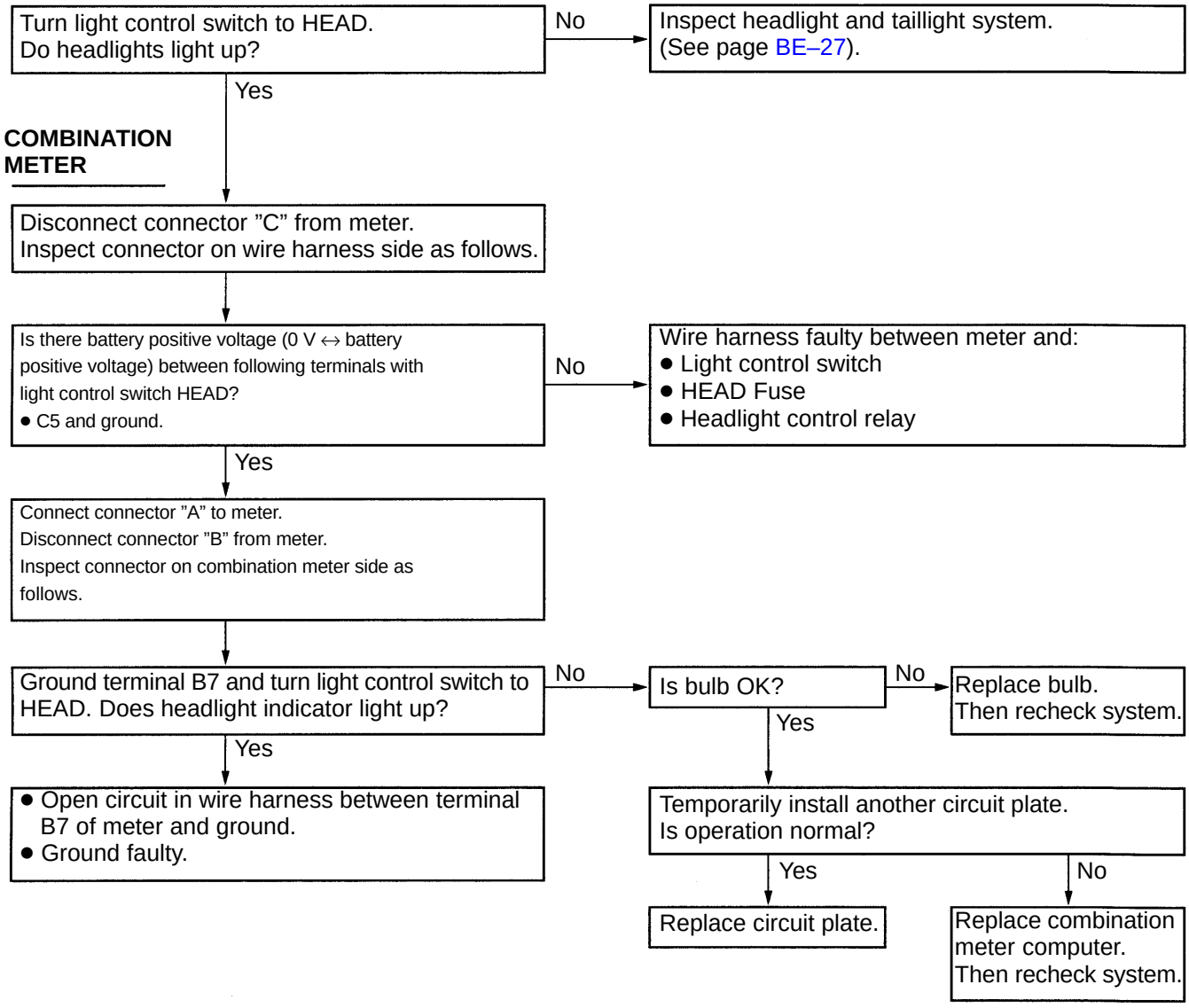
Yes

- Open circuit in wire harness between terminal B7 of meter and ground.
- Ground faulty.

V08452

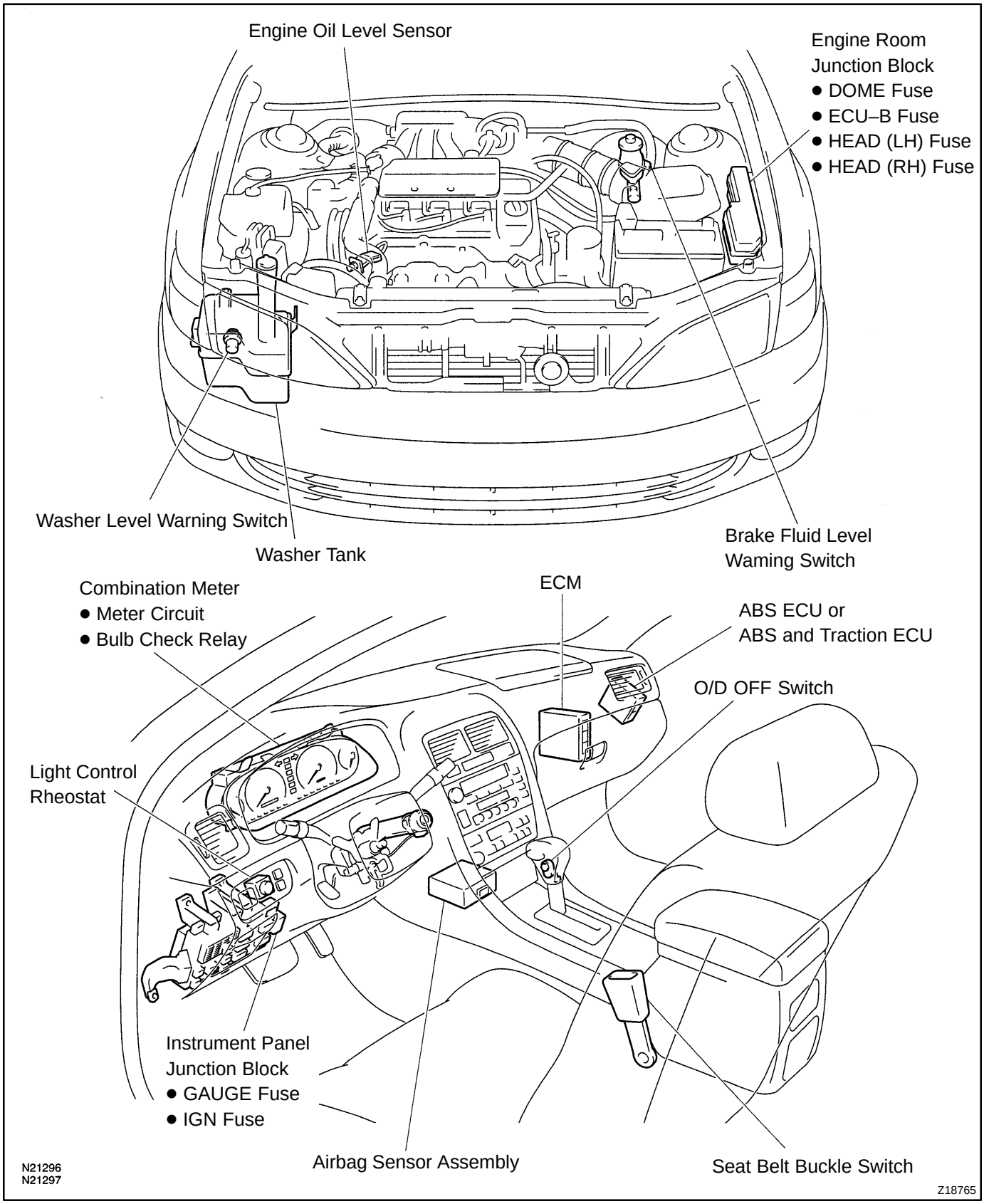
32	HEADLIGHT INDICATOR	Abnormal operation or indicator does not light up.

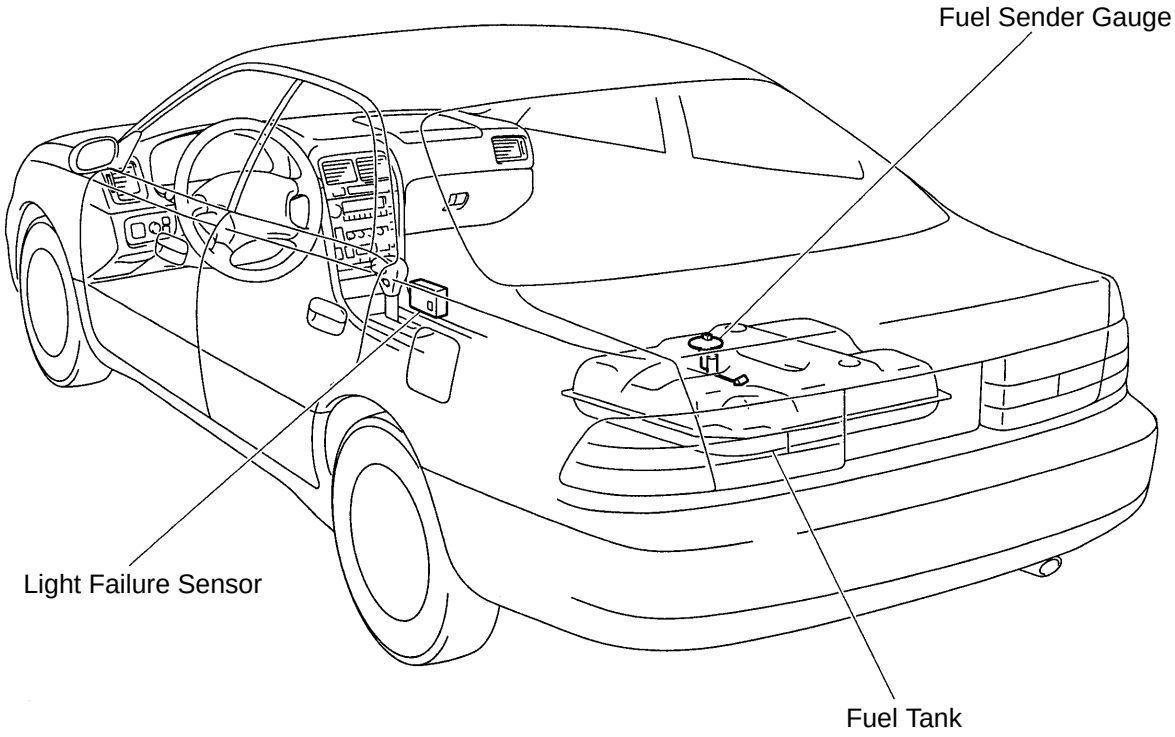
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

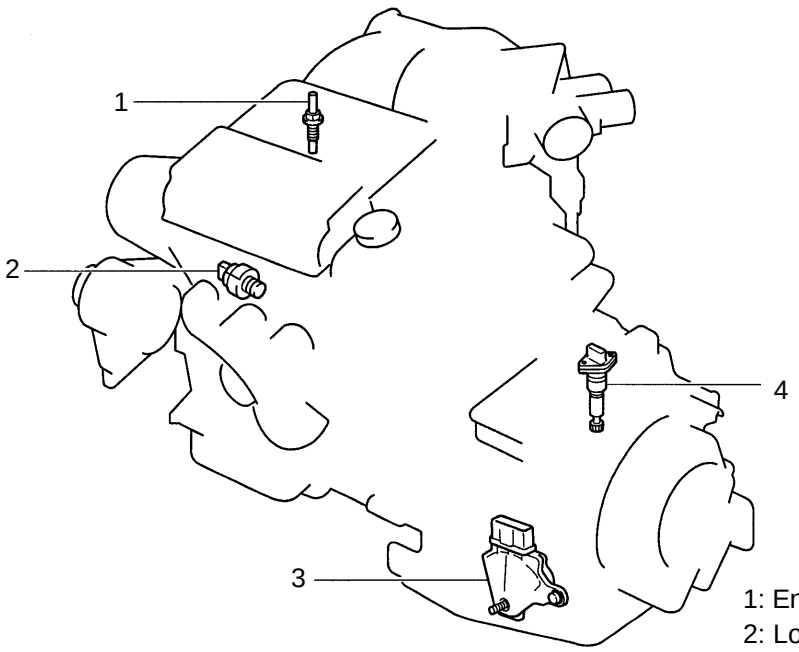


V08453

LOCATION


Engine Oil Level Sensor
Engine Room
Junction Block
● DOME Fuse
● ECU–B Fuse
● HEAD (LH) Fuse
● HEAD (RH) Fuse
Washer Level Warning Switch
Washer Tank
Brake Fluid Level
Waming Switch
Combination Meter
● Meter Circuit
● Bulb Check Relay
ECM
ABS ECU or
ABS and Traction ECU
O/D OFF Switch
Light Control
Rheostat
Instrument Panel
Junction Block
● GAUGE Fuse
● IGN Fuse
Airbag Sensor Assembly
Seat Belt Buckle Switch
N21296
N21297
Z18765





1: Engine Coolant Temperature Sender Gauge
2: Low Oil Pressure Switch
3: Park/Neutral Position Switch
4: Vehicle Speed Sensor

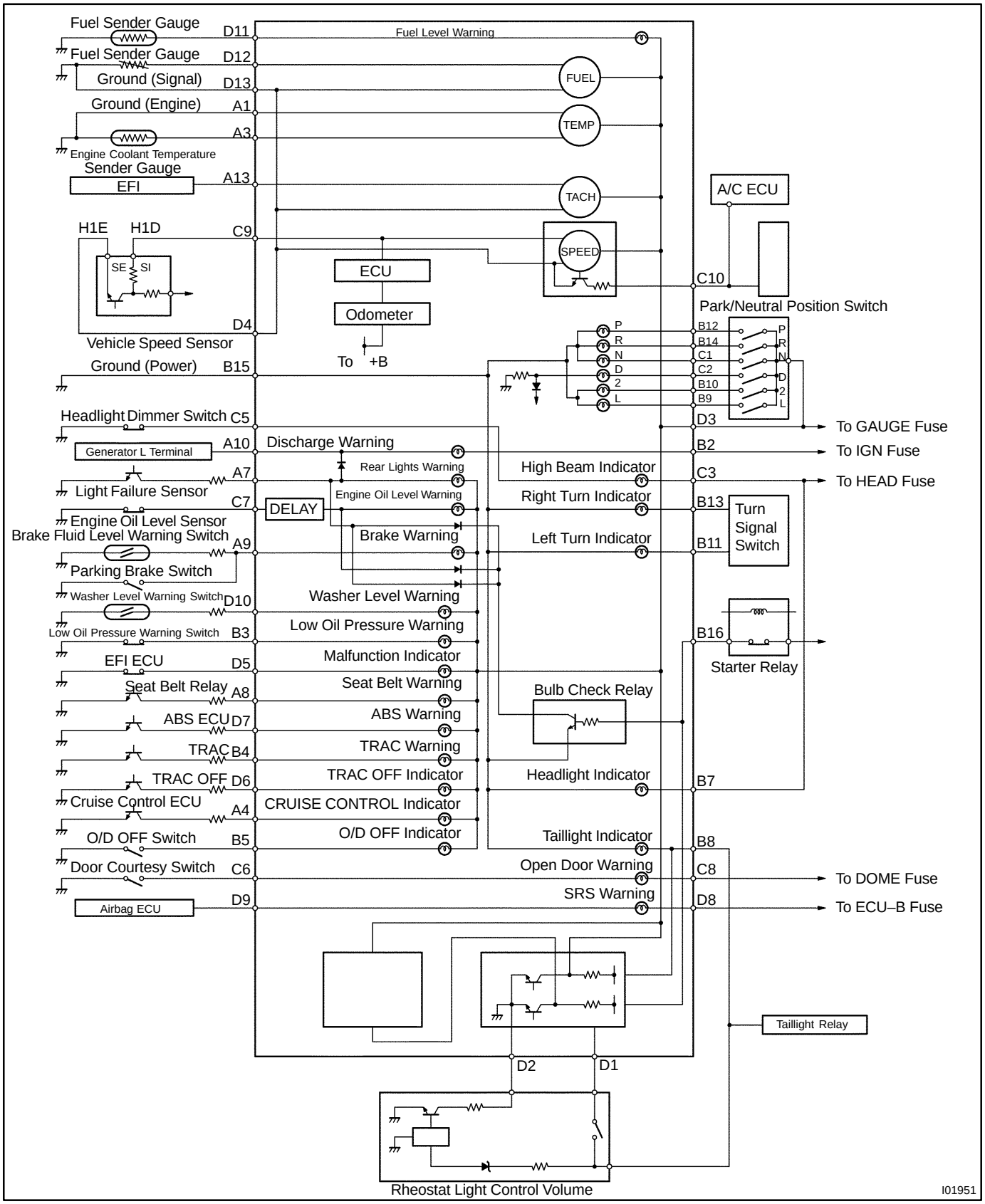
N21298
N21299

Z18766

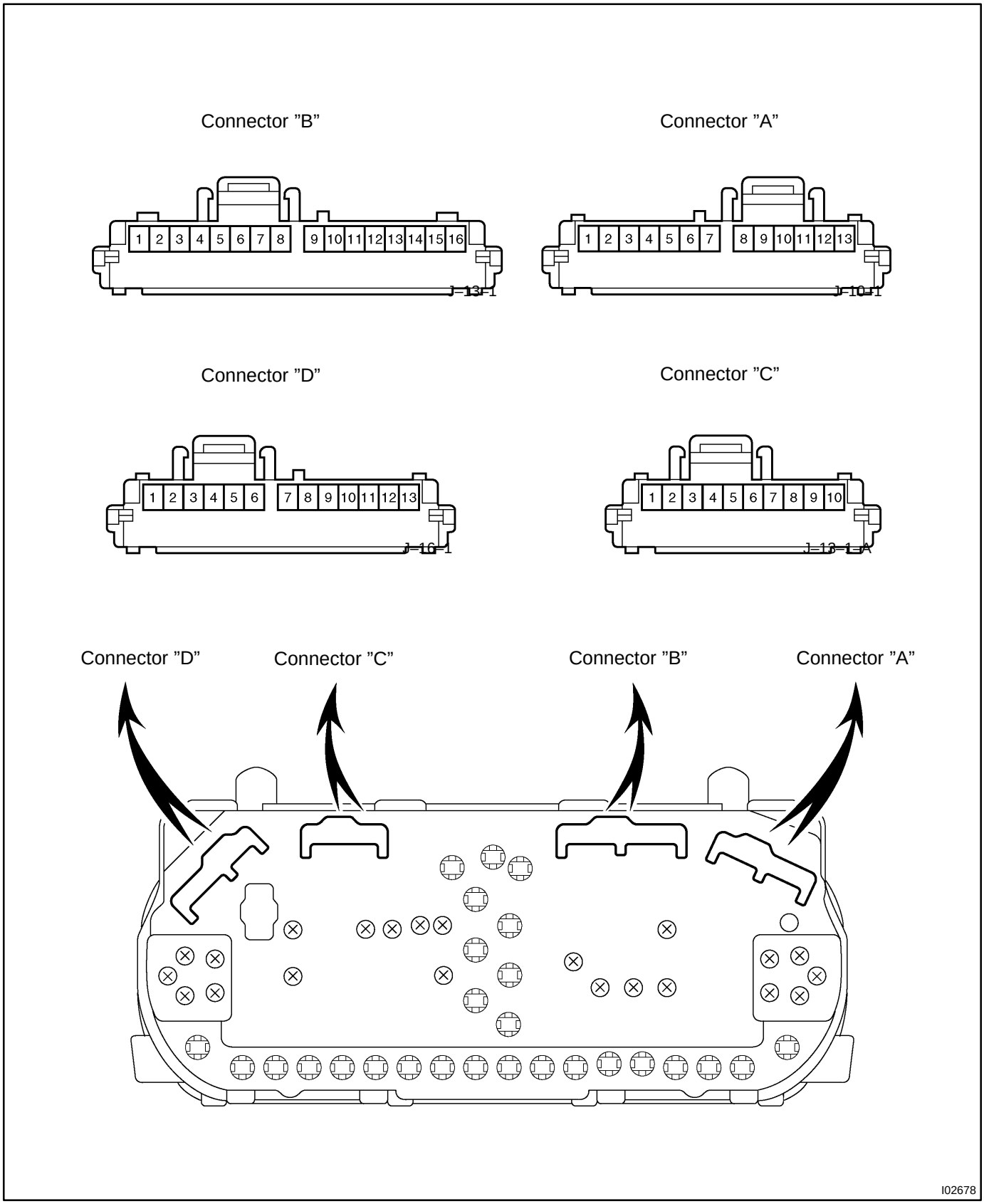
BE05F–05

CIRCUIT

1. WIRING DIAGRAM

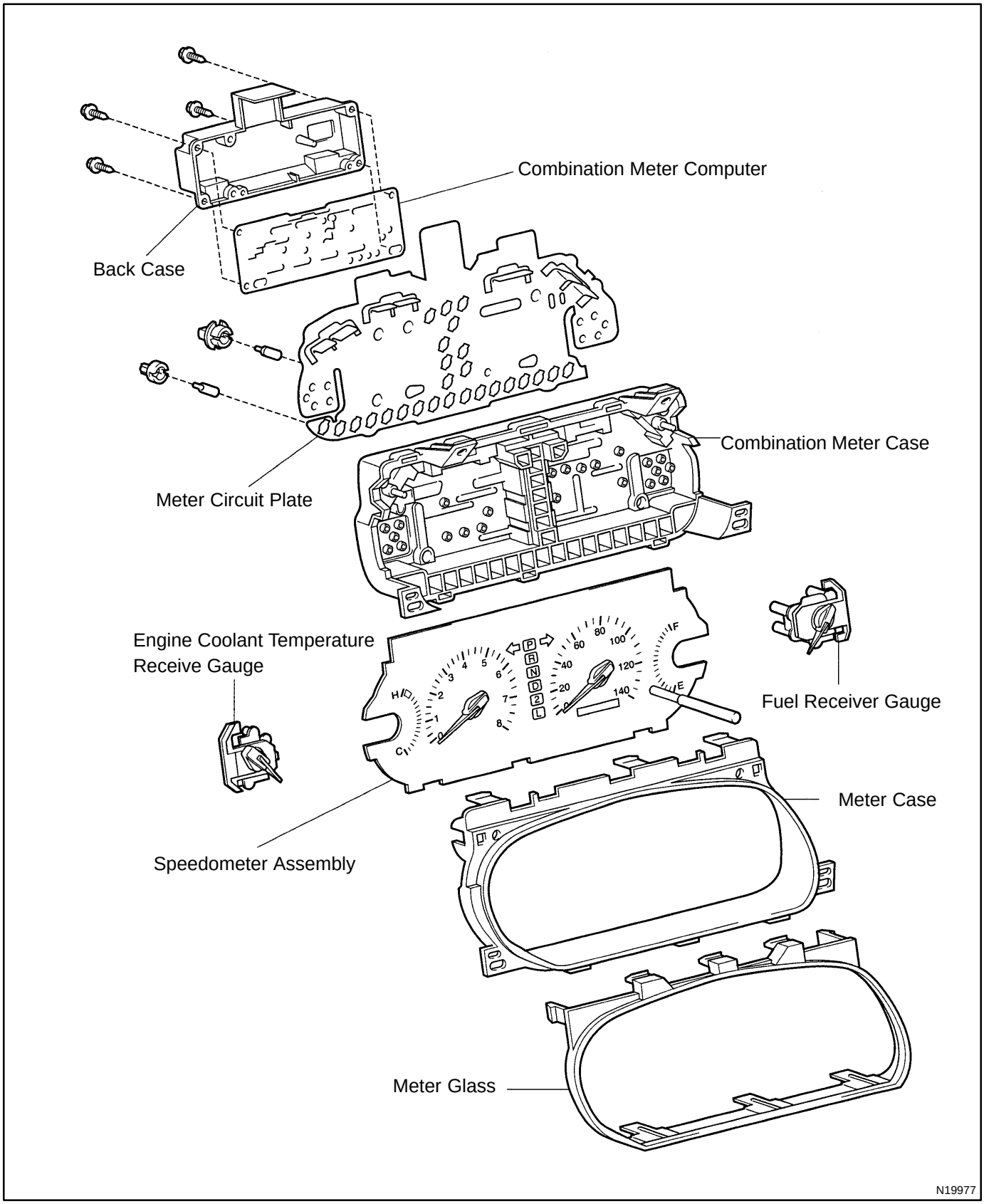


2. CONNECTOR DIAGRAMS



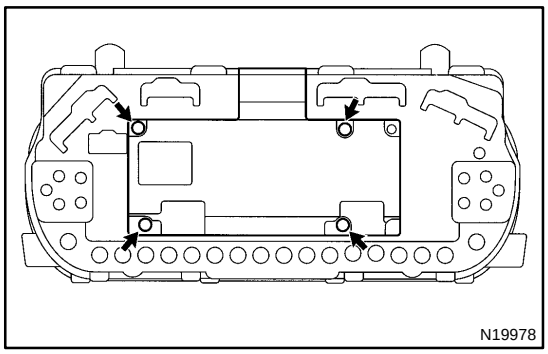
BE05G–01

COMPONENTS



BE05H–01

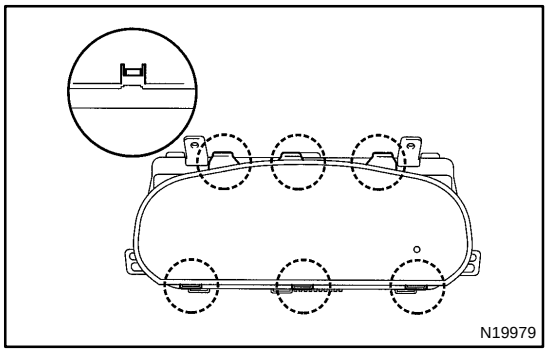
DISASSEMBLY



1. REMOVE BACK COVER

(a) Remove the 4 screws.

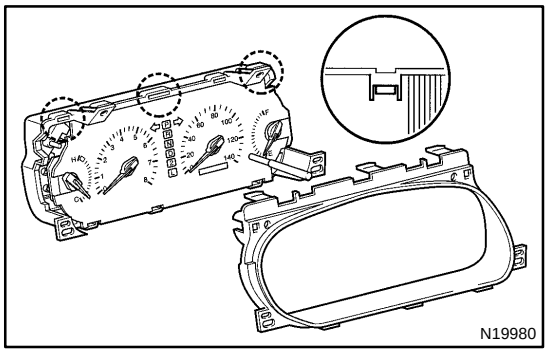
(b) Remove the back cover from the meter case.



2. REMOVE METER GLASS

(a) Remove the 6 claws.

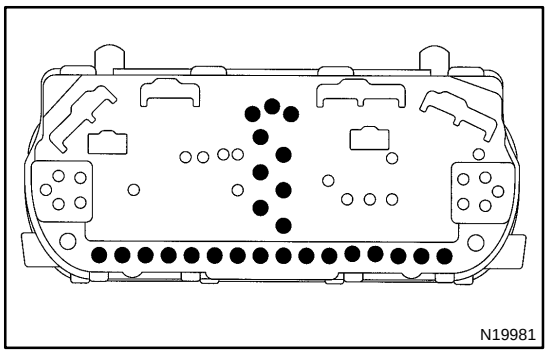
(b) Remove the meter glass from the meter case.



3. REMOVE METER PLATE

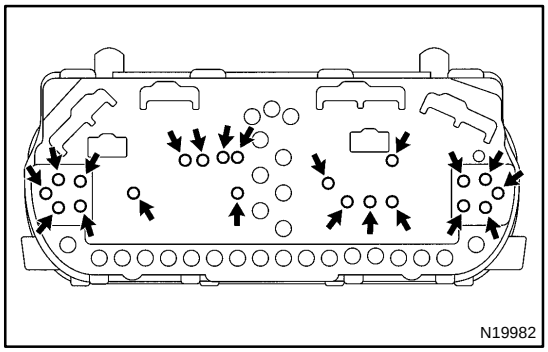
(a) Remove the 3 claws.

(b) Remove the meter plate from the meter case.



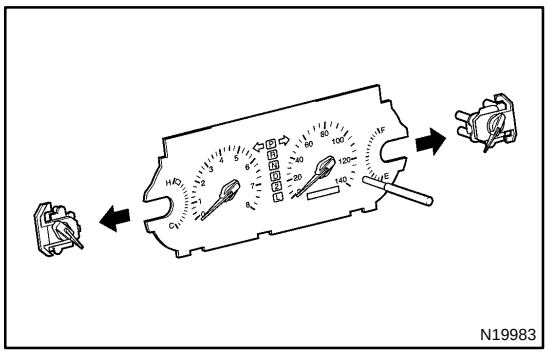
4. REMOVE METER CIRCUIT PLATE

(a) Remove the 27 bulbs.



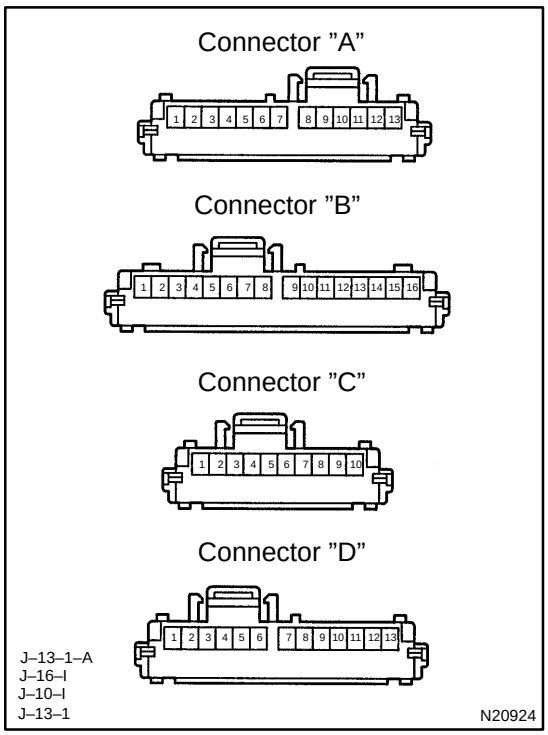
(b) Remove the 22 screws.

(c) Remove the meter circuit plate from the meter case.



5. **REMOVE SPEEDOMETER ASSEMBLY**
6. **REMOVE FUEL GAUGE**
7. **REMOVE ENGINE COOLANT TEMPERATURE GAUGE**

BE05I–03



INSPECTION

1. INSPECT COMBINATION METER WIRING CIRCUIT

Disconnect the connector ”A”, connector ”B”, connector ”C” and connector ”D” from the combination meter and inspect the connectors on the wire harness side.

Park/Neutral Position Switch:

Tester connection	Condition	Specified condition
B12 – Ground	Ignition switch ON and shift lever position ”P”	Battery positive voltage
B14 – Ground	Ignition switch ON and shift lever position ”R”	Battery positive voltage
C1 – Ground	Ignition switch ON and shift lever position ”N”	Battery positive voltage
C2 – Ground	Ignition switch ON and shift lever position ”D”	Battery positive voltage
B10 – Ground	Ignition switch ON and shift lever position ”2”	Battery positive voltage
B9 – Ground	Ignition switch ON and shift lever position ”L”	Battery positive voltage

Turn Signal Switch and Hazard Warning Switch:

Tester connection	Condition	Specified condition
B13 – Ground	Hazard warning switch ON	Battery positive voltage ↔ 0V
B13 – Ground	Ignition switch ON and turn signal switch to ”Right”	Battery positive voltage ↔ 0V
B11 – Ground	Hazard warning switch ON	Battery positive voltage ↔ 0V
B11 – Ground	Ignition switch ON and turn signal switch to ”Left”	Battery positive voltage ↔ 0V

Headlight:

Tester connection	Condition	Specified condition
C3 – C5	Light control switch ”HEAD” (Dimmer switch ”LO”)	No voltage
C3 – C5	Light control switch ”HEAD” (Dimmer switch ”HI” or ”Flash”)	Battery positive voltage

GAUGE Fuse:

Tester connection	Condition	Specified condition
D3 – Ground	Ignition switch position ACC, START	No voltage
D3 – Ground	Ignition switch position ON	Battery positive voltage

IGN Fuse:

Tester connection	Condition	Specified condition
B2 – Ground	*2 Ignition switch position LOCK, ACC, START	No voltage
B2 – Ground	*2 Ignition switch position ON	Battery positive voltage

Fuel Sender Gauge:

Tester connection	Condition	Specified condition
D12 – D13	Float position Full, Approx. 91.1 mm (3.587 in.)	Approx. 4.6V
D12 – D13	Float position 1/2, Approx. 34.2 mm (1.346 in.)	Approx. 2.4V
D12 – D13	Float position Empty, Approx. 30.8 mm (1.213 in.)	Approx. 0.3V
D11 – D12	Ignition switch ON	Approx. 5V

Ground (Signal):

Tester connection	Condition	Specified condition
D13 – Ground	Constant	Continuity

Ground (Engine):

Tester connection	Condition	Specified condition
A1 – Ground	Constant	Continuity

Ground (Power):

Tester connection	Condition	Specified condition
B15 – Ground	Constant	Continuity

Generator ”L” Terminal:

Tester connection	Condition	Specified condition
A10 – Ground	Engine stop	Continuity
A10 – Ground	Engine running	Battery positive voltage

Engine Oil Level Warning Switch:

Tester connection	Condition	Specified condition
C7 – Ground	Oil temperature above approx. 55 ˚C (131 ˚F) and switch position OFF (float down)	No continuity
C7 – Ground	Oil temperature below approx. 55 ˚C (131 ˚F)	Continuity
C7 – Ground	Oil temperature above approx. 55 ˚C (131 ˚F) and switch position ON (float up)	Continuity

DOME fuse:

Tester connection	Condition	Specified condition
C8 – Ground	Constant	Battery positive voltage

Rheostat Light Control:

Tester connection	Condition	Specified condition
D1 – Ground	Light control switch TAIL or HEAD and turn rheostat volume knob.	Voltage changes no voltage or voltage fluctuates

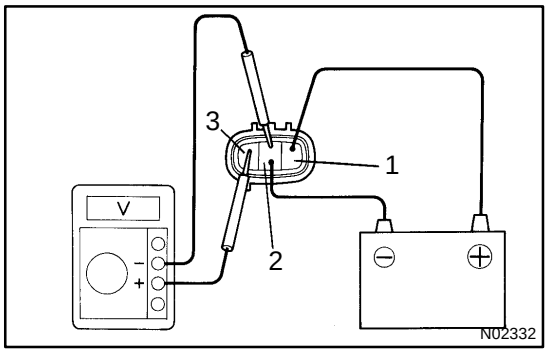
*2 Shift lever position is ”N” or ”P” position.

If circuit is not as specified, refer to BE–60 wiring diagram and inspect the circuit connected to other parts.

2. INSPECT SPEEDOMETER ON–VEHICLE

Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.
HINT:
Tire wear and tire over or under inflation will increase the indication error.
If error is excessive, replace the speedometer.

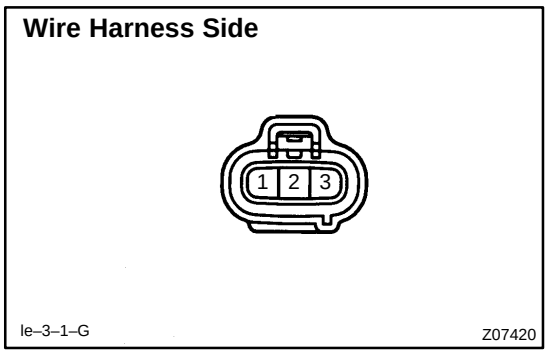
USA (mph)		CANADA (km/h)	
Standard indication	Allowable range	Standard indication	Allowable range
20	18 – 24	20	17 – 24
40	38 – 44	40	38 – 46
60	56 – 66	60	57.5 – 67
80	78 – 88	80	77 – 88
100	98 – 110	100	96 – 109
120	118 – 132	120	115 – 130
		140	134 – 151.5
		160	153 – 173



3. INSPECT VEHICLE SPEED SENSOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2.
(b) Connect the positive (+) lead from the tester to terminal 3 and the negative (–) lead to terminal 2.
(c) Rotate the shaft.
(d) Check that there is voltage change from approx. 0 V to 11 V or more between terminals 2 and 3.

HINT:
The voltage change should be performed 4 times for every revolution of the speed sensor shaft.
If operation is not as specified, replace the sensor.



4. INSPECT VEHICLE SPEED SENSOR CIRCUIT

Disconnect the connector from sensor and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
1 – Ground	Ignition switch LOCK or ACC	No voltage
1 – Ground	Ignition switch ON	Battery positive voltage

If circuit is not as specified, inspect power source or wire harness.

5. INSPECT TACHOMETER ON–VEHICLE

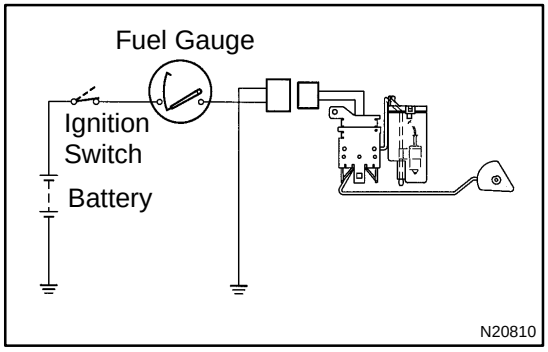
(a) Connect a tune–up test tachometer, and start the engine.

NOTICE:

- **Reversing the connection of the tachometer will damage the transistors and diodes inside.**
- **When removing or installing the tachometer, be careful not to drop or subject it to heavy shocks.**

(b) Compare the tester and tachometer readings.
DC 13.5 V 25 ˚C at (77˚F)

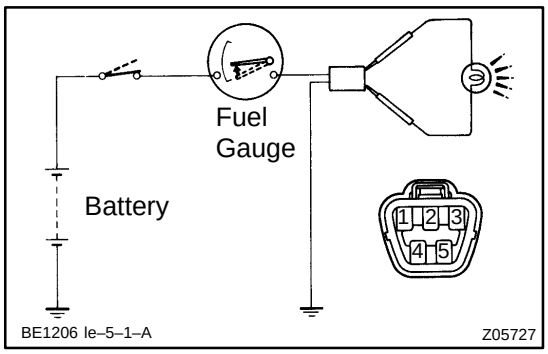
Standard indication	Allowable range
700	630 – 770
1,000	900 – 1,100
2,000	1,850 – 2,150
3,000	2,800 – 3,200
4,000	3,800 – 4,200
5,000	4,800 – 5,200
6,000	5,750 – 6,250
7,000	6,700 – 7,300



6. INSPECT FUEL RECEIVER GAUGE OPERATION

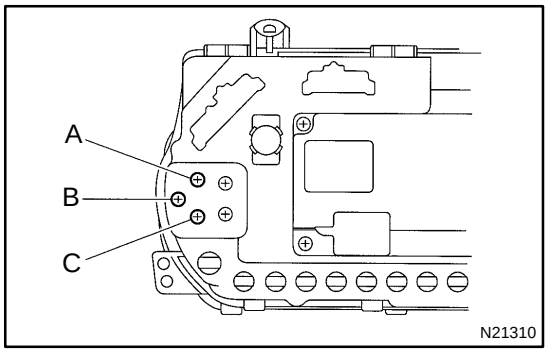
(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON, check that the receiver gauge needle indicates EMPTY.



(c) Connect terminals 2 and 3 on the wire harness side connector through a 3.4–W test bulb.
(d) Turn the ignition switch ON, check that the bulb lights up and the receiver gauge needle moves toward ”E” side.

HINT:
Because of the silicon oil in the gauge, it will take a short time for needle to stabilize.
If operation is not as specified, inspect the receiver gauge resistance.

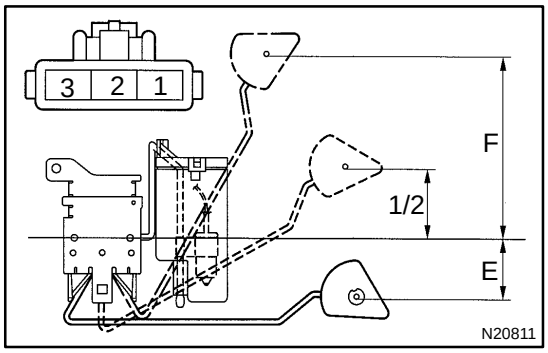


7. INSPECT FUEL RECEIVER GAUGE RESISTANCE

Measure the resistance between terminals.

Tester connection	Resistance (Ω)
A – B	Approx. 270.8
A – C	Approx. 91.3
B – C	Approx. 179.5

If resistance value is not as specified, replace the receiver gauge.

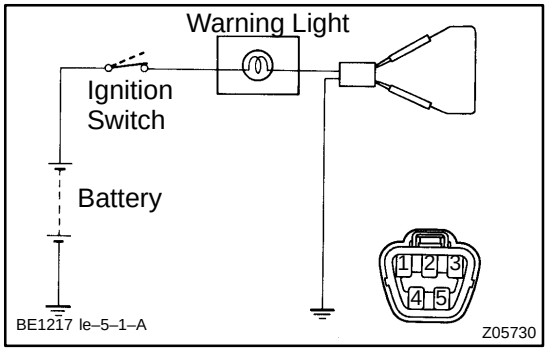


8. INSPECT FUEL SENDER GAUGE RESISTANCE

Measure the resistance between terminals 2 and 3 for each float position.

Float position mm (in.)	Resistance (Ω)
F: Approx. 91.1 (3.587)	Approx. 3.0
1/2: Approx. 34.2 (1.346)	Approx. 31.7
E: Approx. 30.8 (1.213)	Approx. 110.0

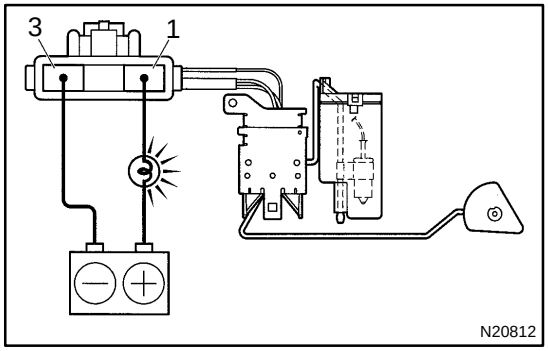
If resistance value is not as specified, replace the sender gauge.



9. INSPECT FUEL LEVEL WARNING LIGHT

(a) Disconnect the connector from the sender gauge.
(b) Connect terminals 1 and 3 on the wire harness side connector.
(c) Turn the ignition switch ON, check that the warning light lights up.

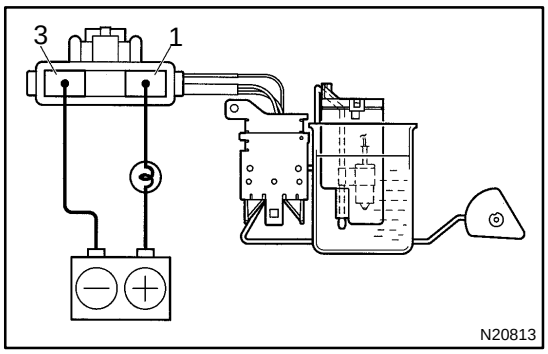
If the warning light does not light up, test the bulb or inspect wire harness.



10. INSPECT FUEL LEVEL WARNING SWITCH

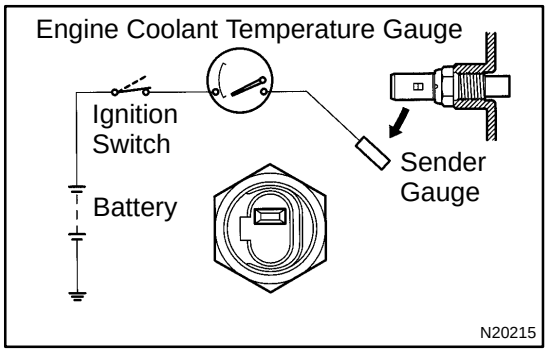
(a) Apply battery positive voltage between terminals 1 and 3 through a 3.4–W test bulb, check that the bulb lights up.

HINT:
It takes a short time for the bulb to light up.



(b) Submerge the switch in fuel, check that the bulb goes out.

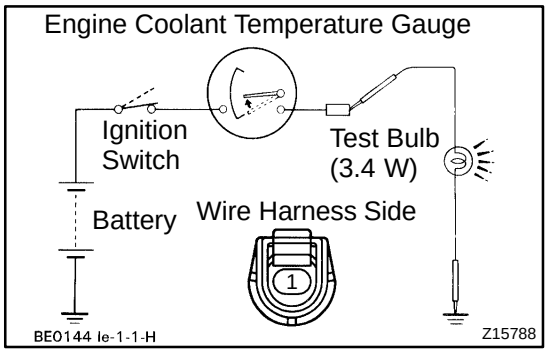
If operation is not as specified, replace the sender gauge.



11. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE OPERATION

(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON and check that the receiver gauge needle indicates COOL.



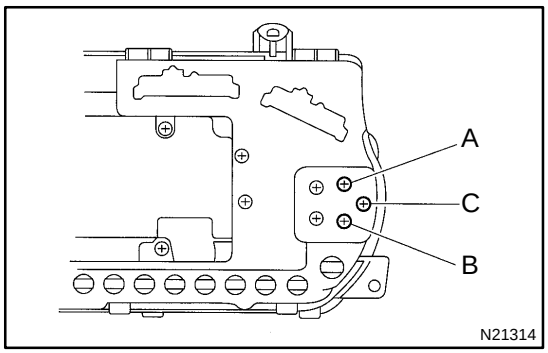
(c) Ground terminal on the wire harness side connector through a 3.4–W test bulb.

(d) Turn the ignition switch ON, and check that the bulb lights up and the receiver gauge needle moves to the hot side.

If operation is as specified, replace the sender gauge.

Then recheck the system.

If operation is not as specified, measure the receiver gauge resistance.



12. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE RESISTANCE

Measure the resistance between terminals.

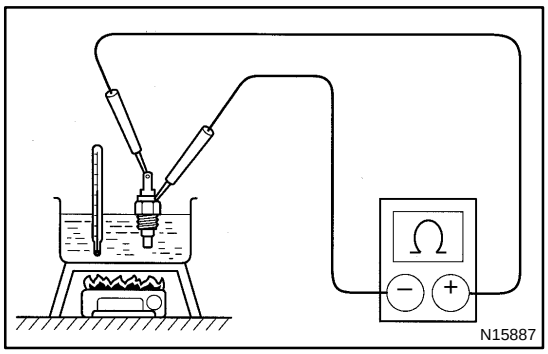
Tester connection	Resistance (Ω)
A – B	Approx. 54.0
A – C	Approx. 175.7
B – C	Approx. 229.7

HINT:

Connect the test leads so that the current from the ohmmeter can flow according to the above order.

This circuit includes the diode.

If resistance value is not as specified, replace the receiver gauge.

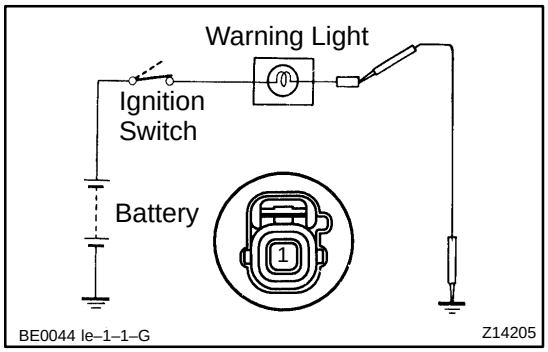


13. INSPECT ENGINE COOLANT TEMPERATURE SENDER GAUGE RESISTANCE

Measure the resistance between the terminal and gauge body.

Temperature ˚C(˚F)	Resistance (Ω)
50 (122.0)	160 – 240
120 (248.0)	17.1 – 21.2

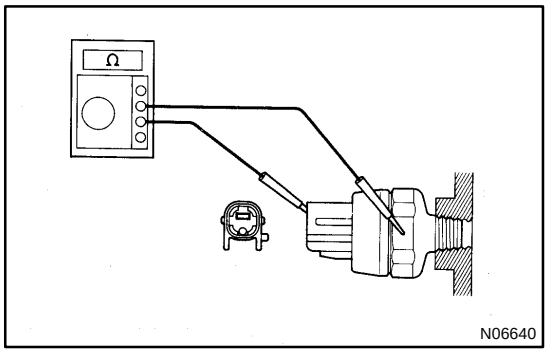
If resistance value is not as specified, replace the engine coolant temperature sender gauge.



14. INSPECT LOW OIL PRESSURE WARNING LIGHT

(a) Disconnect the connector from the warning switch and ground terminal on the wire harness side connector.
(b) Turn the ignition switch ON and check that the warning light lights up.

If the warning light does not light up, test the bulb.

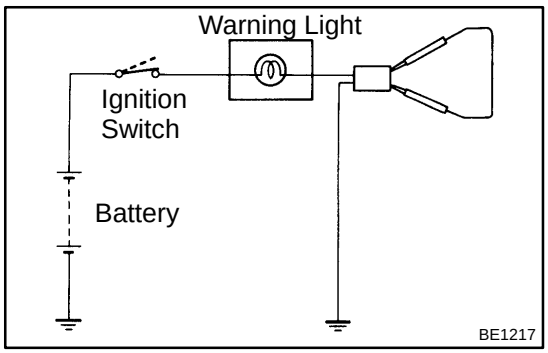


15. INSPECT LOW OIL PRESSURE SWITCH

(a) Disconnect the connector from the switch.
(b) Check that continuity exists between terminal and ground with the engine stopped.
(c) Check that no continuity exists between terminal and ground with the engine running.

HINT:

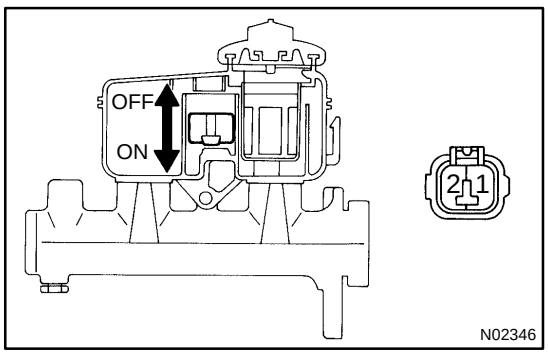
Oil pressure should be over 24.5 kPa (0.25 kgf/cm^2, 3.55 psi).
If operation is not as specified, replace the switch.



16. INSPECT BRAKE SYSTEM WARNING LIGHT

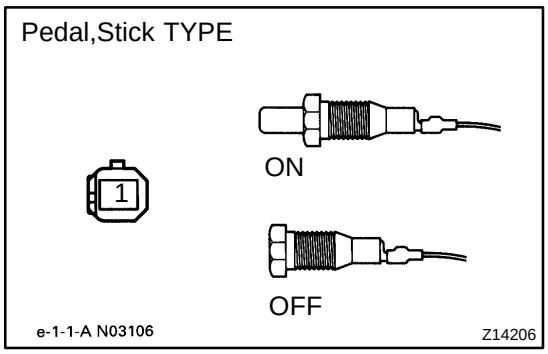
(a) Disconnect the connector from the brake fluid warning switch.
(b) Release the parking brake pedal.
(c) Connect the terminals on the wire harness side of the level warning switch connector.
(d) Start the engine, check that the warning light lights up.

If the warning light does not light up, test the bulb or wire harness.



17. INSPECT BRAKE FLUID LEVEL WARNING SWITCH

(a) Remove the reservoir tank cap and strainer.
(b) Disconnect the connector.
(c) Check that no continuity exists between the terminals with the switch OFF (float up).
(d) Use syphon, etc. to take fluid out of the reservoir tank.
(e) Check that continuity exists between the terminals with the switch ON (float down)



(f) Pour the fluid back in the reservoir tank.

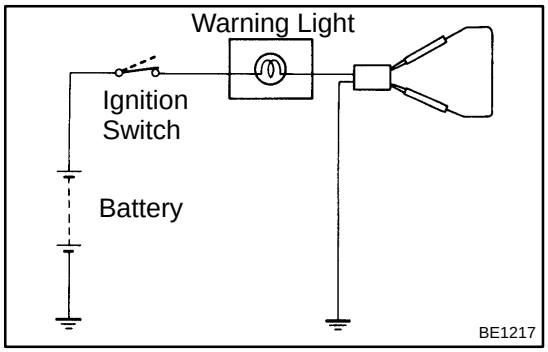
If operation is not as specified, replace the switch.

18. INSPECT PARKING BRAKE SWITCH

(a) Check that continuity exists between the terminal and switch body with the switch ON (switch pin released).

(b) Check that no continuity exists between the terminal and switch body with the switch OFF (switch pin pushed in).

If operation is not as specified, replace the switch or inspect ground point.



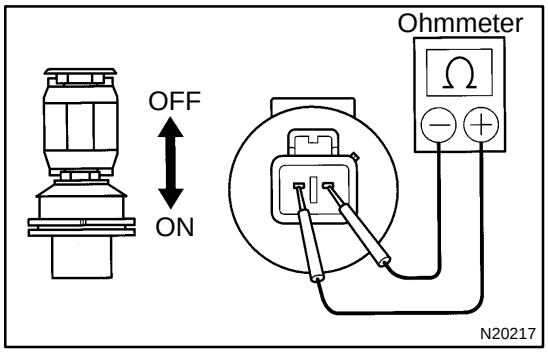
19. INSPECT WASHER LEVEL WARNING LIGHT

(a) Disconnect the connectors from the level warning switch and parking brake switch.

(b) Connect terminals on the wire harness side connector of the level warning switch connector.

(c) Remove the GAUGE fuse and turn the ignition switch ON, and check that the warning light comes on.

If the warning light does not light up, test the bulb.

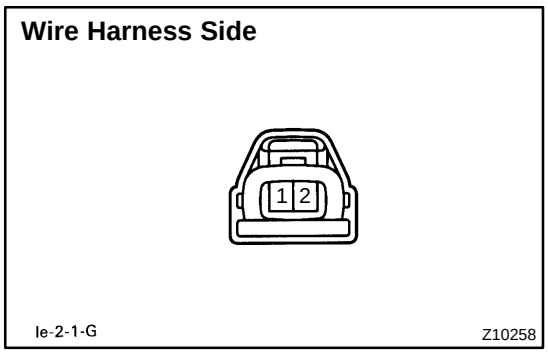


20. INSPECT WASHER LEVEL WARNING SWITCH

(a) Check that no continuity exists between terminals with the switch OFF (float up).

(b) Check that continuity exists between terminals with the switch ON (float down).

If operation is not as specified, replace the switch.

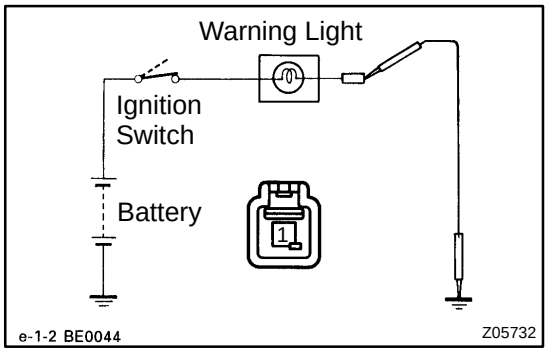


21. INSPECT WINDOW WASHER LEVEL WARNING SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

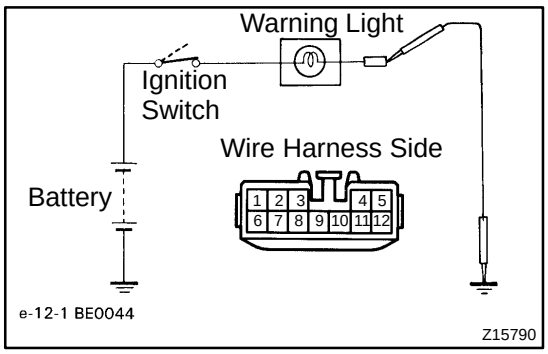
If continuity is not as specified, inspect the wire harness or ground point.



22. INSPECT OPEN DOOR WARNING LIGHT

Disconnect the connector from the door courtesy switch and ground terminal 1 on the wire harness side, and check that the warning light lights up.

If the warning light does not light up, inspect the bulb or wire harness.

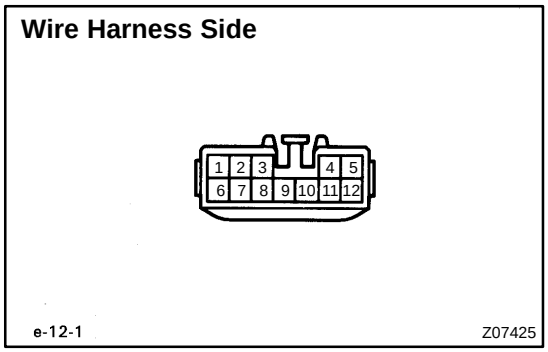


23. INSPECT WARNING LIGHT

(a) Disconnect the connector from the light failure sensor and ground terminal 4 on the wire harness side connector.

(b) Start the engine, check that the warning light lights up.

If the warning light does not light up, test the bulb or inspect wire harness.



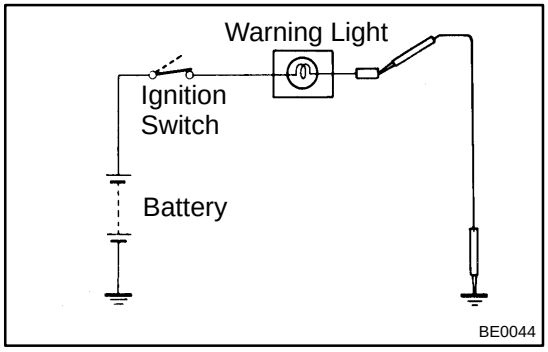
24. INSPECT LIGHT FAILURE SENSOR CIRCUIT

Disconnect the connector from the sensor and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity*
2 – Ground	Constant	Continuity*
9 – Ground	Constant	Continuity*
10 – Ground	Constant	Continuity*
11 – Ground	Constant	Continuity*
12 – Ground	Constant	Continuity*
3 – Ground	Light control switch OFF	No voltage
3 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
4.8 – Ground	Ignition switch LOCK or ACC	No voltage
4.8 – Ground	Ignition switch ON	Battery positive voltage
7 – Ground	Stop light switch OFF	No voltage
7 – Ground	Stop light switch ON	Battery positive voltage

*: There is resistance because this circuit is grounded through the bulb.

If the circuit is as specified, replace the sensor. If the circuit is not as specified, inspect the circuits connected to other parts.



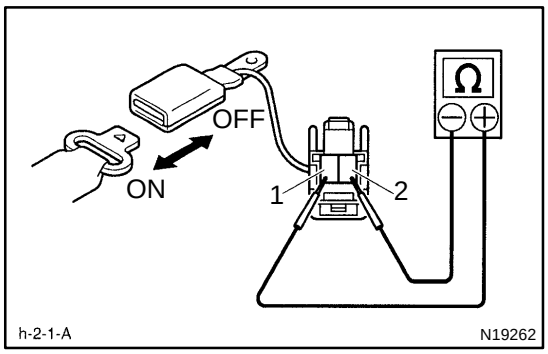
25. INSPECT SEAT BELT WARNING LIGHT

(a) Remove the integration relay from the instrument panel junction block.

(b) Ground terminal 2 on the integration relay with the connectors still connected.

(c) Turn the ignition switch ON and check that the warning light lights up.

If the warning light does not light up, inspect the bulb or wire harness.

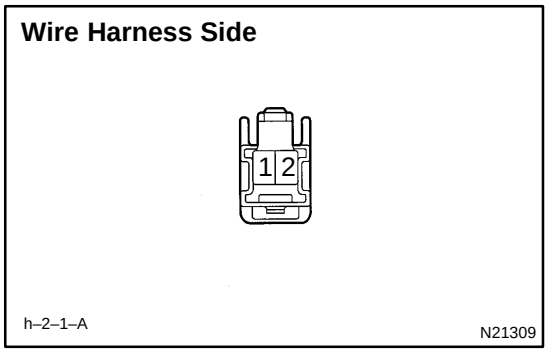


26. INSPECT BUCKLE SWITCH CONTINUITY

(a) Check that continuity exists between terminals 1 and 2 on the switch side connector with the switch ON (belt fastened).

(b) Check that no continuity exists between terminals 1 and 2 on the switch side connector with the switch OFF (belt unfastened).

If operation is not as specified, replace the front seat inner belt.

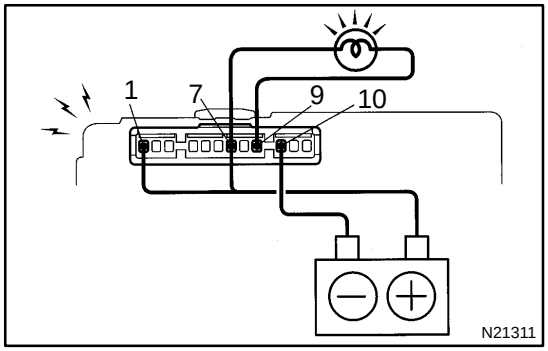


27. INSPECT BUCKLE SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
–	Turn the ignition switch ON	Chime sounds for 4 – 8 sec.
–	Ground terminal 1 and turn the ignition switch ON	No chime sound

If the circuit is not as specified, inspect the circuits connected to other parts.



28. INSPECT INTEGRATION RELAY SEAT BELT WARNING SYSTEM OPERATION

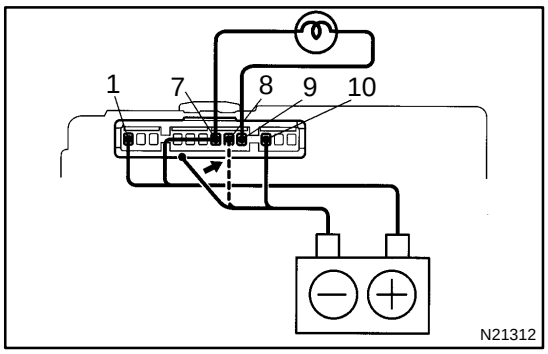
(a) Connect the positive (+) lead from the battery to terminals 1 and 7.

(b) Connect the terminal 7 to terminal 9 through the 3.4 W test bulb.

(c) Connect the negative (–) lead from the battery to terminal 10.

(d) Check that the bulb lights and the buzzer sounds for 4 to 8 seconds.

(e) Return to step (a) and operate the chime again.



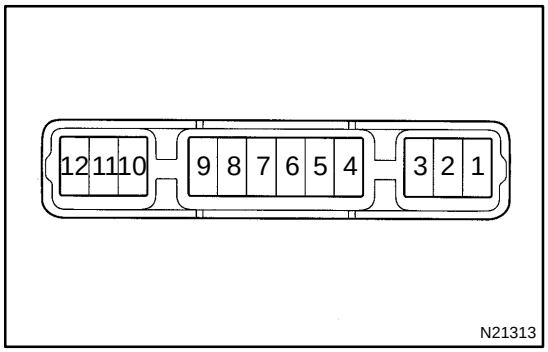
(f) Connect the negative (–) lead from the battery to terminal 8.

(g) Check that the buzzer stops sounding.

HINT:

Check the buzzer within a period of 4 to 8 seconds.

If operation is not as specified, replace the relay.



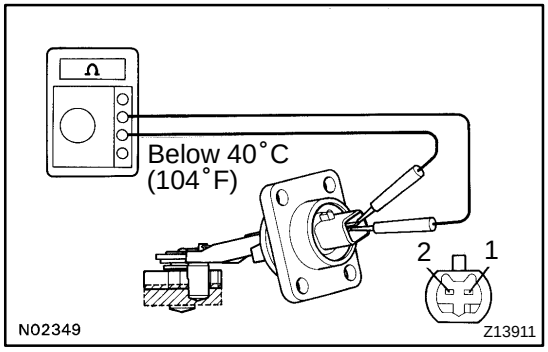
29. Seat belt warning : INSPECT INTEGRATION RELAY CIRCUIT

Remove the relay from the junction block No.1 and inspect the connectors on the junction block side.

Tester connection	Condition	Specified condition
8 – Ground	Driver's buckle switch OFF (Seat best unfastened)	No continuity
8 – Ground	Driver's buckle switch ON (Seat best fastened)	Continuity
10 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage
7 – Ground 9 – Ground	Ignition switch position OFF or ACC	No voltage
7 – Ground 9 – Ground	Ignition switch position ON	Battery positive voltage

If the circuit is as specified, try to replace the relay with a new one.

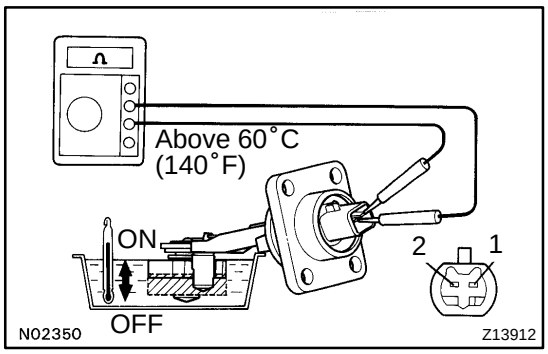
If the circuit is not as specified, inspect the circuits connected to other parts.



30. INSPECT ENGINE OIL LEVEL WARNING SWITCH CONTINUITY

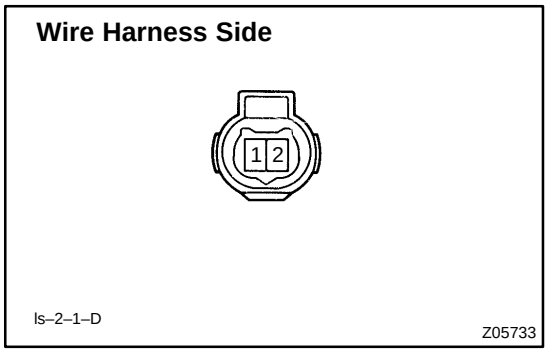
(a) Check that continuity exists between terminal with the switch in each position.

(b) Heat the switch to above 60˚C (140˚F) in an oil bath.



(c) Check that continuity exists between terminals with the switch ON (float up).
(d) Check that no continuity exists between terminals with the switch OFF (float down).

If operation is not as specified, replace the switch.

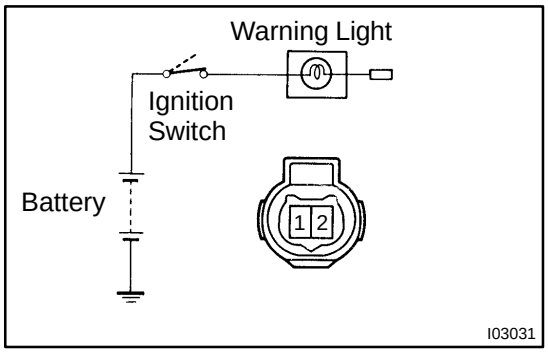


31. INSPECT ENGINE OIL LEVEL WARNING SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

If continuity is not as specified, inspect the wire harness or ground point.

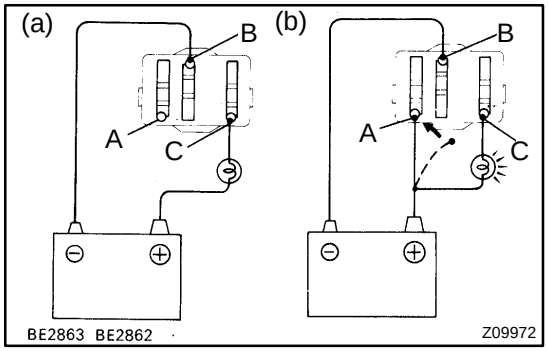


32. INSPECT ENGINE OIL LEVEL WARNING LIGHT

(a) Disconnect the connector from the switch.
(b) Turn the IG switch ON, the warning light lights up.
(c) The warning light lights up after 40 sec. from the engine has started.

If the warning light does not light up, inspect bulb or wire harness.

33. INSPECT LIGHT CONTROL RHEOSTAT
(See page BE–43)



34. INSPECT BULB CHECK RELAY OPERATION

(a) Connect the positive (+) lead from the battery to terminal C through a 1.4–W test bulb and the negative (–) lead to terminal B, check that the test bulb does not light up.
(b) Connect the positive (+) lead from the battery to terminal A and check that the test bulb lights up.

If operation is not as specified, replace the relay.

BE05J–01

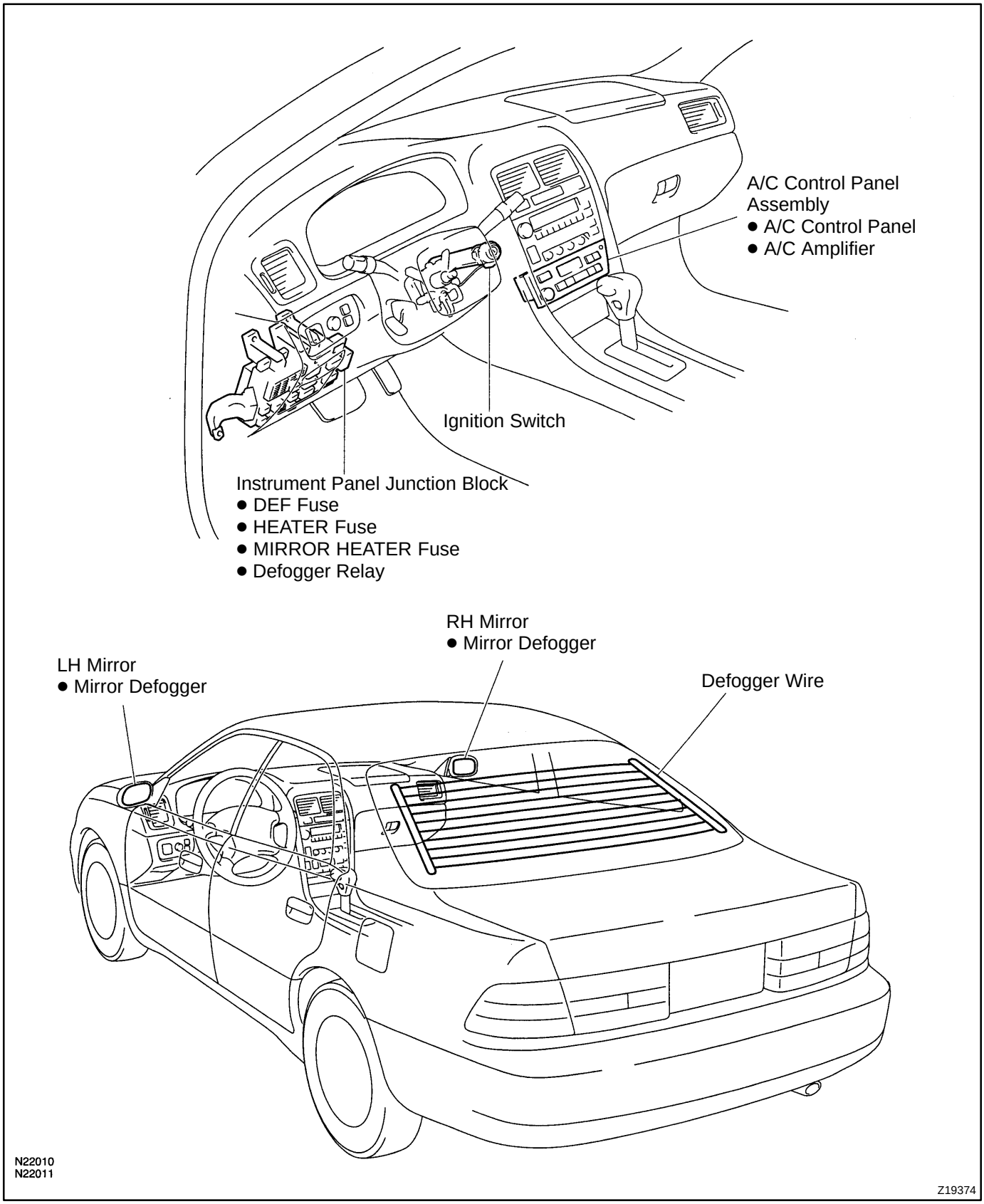
REASSEMBLY

Reassembly is in the reverse of the disassembly(See page BE–90).

DEFOGGER SYSTEM

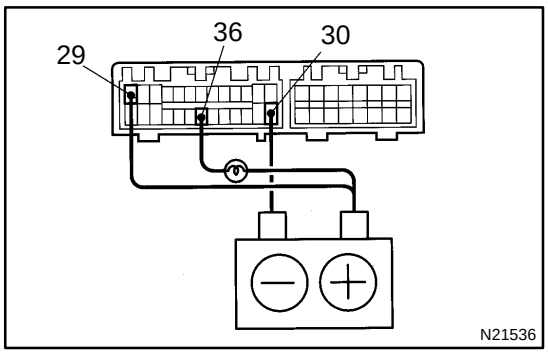
LOCATION

BE05K–04



BE05L–03

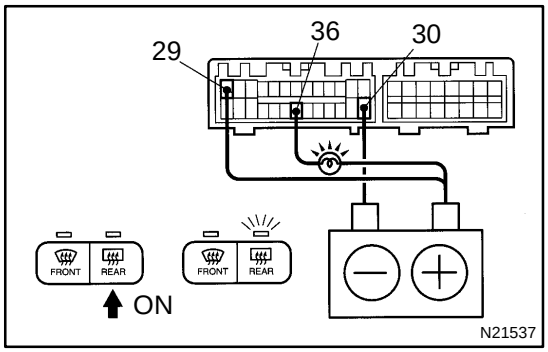
INSPECTION



1. A/C control panel assembly:
INSPECT DEFOGGER SWITCH OPERATION

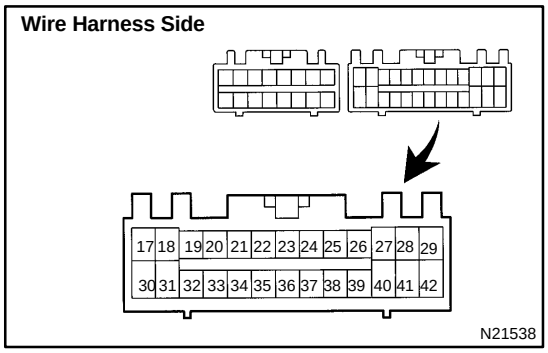
(a) Connect the positive (+) lead from the battery to terminal 29 and negative (–) lead to terminal 30.

(b) Connect the positive (+) lead from the battery to terminal 36 through a 1.4 W test bulb.



(c) Turn the defogger switch ON and check that the test bulb and indicator light turn ON, then turn OFF after approx. 15 minutes.

If operation is not as specified, proceed to inspect the A/C control assembly.
(See page AC–105)

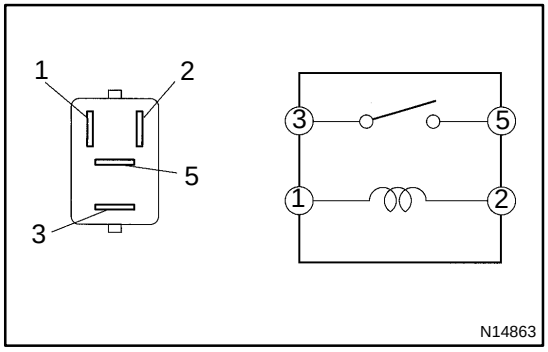


2. INSPECT DEFOGGER SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on wire harness side.

Tester connection	Condition	Specified condition
30 – Ground	Constant	Continuity
29 – Ground	Ignition switch position ACC or LOCK	No voltage
29 – Ground	Ignition switch position ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

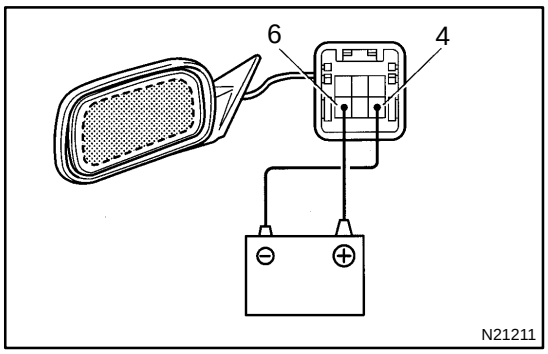


3. INSPECT DEFOGGER RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

4. INSPECT DEFOGGER RELAY CIRCUIT
(See page BE–11)



5. INSPECT MIRROR DEFOGGER OPERATION

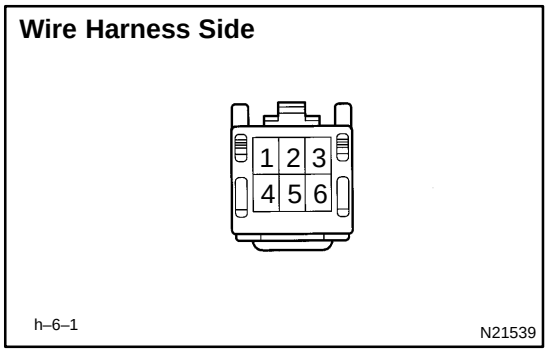
(a) Connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 4.

(b) Check that the mirror becomes warm.

HINT:

It will take a short time for the mirror to become warm.

If the mirror does not become warm, replace the mirror assembly.

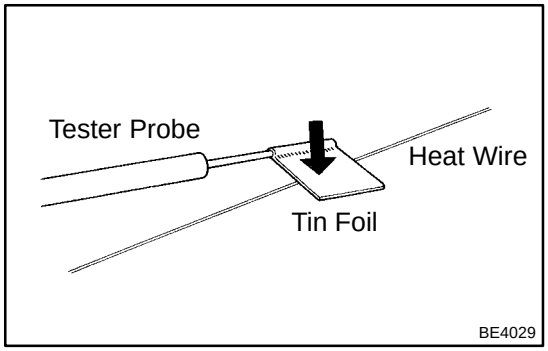


6. INSPECT MIRROR DEFOGGER CIRCUIT

Disconnect the connector from the outside mirror and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
4 – Ground	Constant	Continuity
6 – Ground	Ignition switch position ON (Defogger switch OFF)	No voltage
6 – Ground	Ignition switch position ON (Defogger switch ON)	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



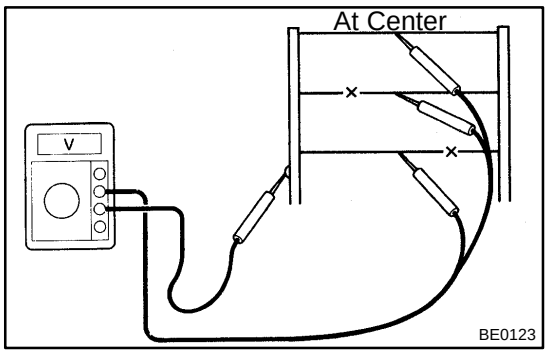
7. INSPECT DEFOGGER WIRE

NOTICE:

- **When cleaning the glass, use a soft, dry cloth, and wipe the glass in the direction of the wire. Take care not to damage the wires.**
- **Do not use detergents or glass cleaners with abrasive ingredients.**
- **When measuring voltage, wind a piece of tin foil around the top of the negative probe and press the foil against the wire with your finger, as shown.**

(a) Turn the ignition switch ON.

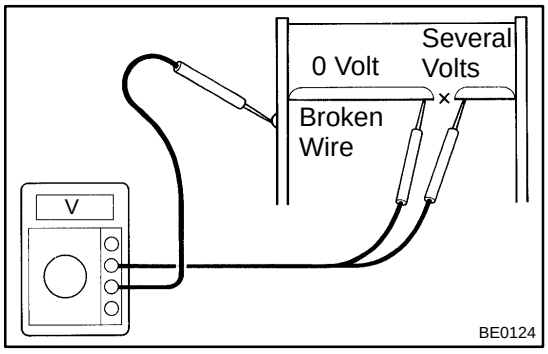
(b) Turn the defogger switch ON.



(c) Inspect the voltage at the center of each heat wire.

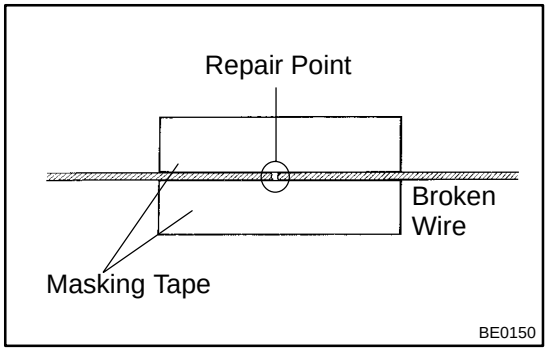
Voltage	Criteria
Approx. 5V	Okay (No break in wire)
Approx. 10V or 0V	Broken wire

HINT:
If there is approximately 10 V, the wire is broken between the center of the wire and the positive (+) end. If there is no voltage, the wire is broken between the center of the wire and ground.



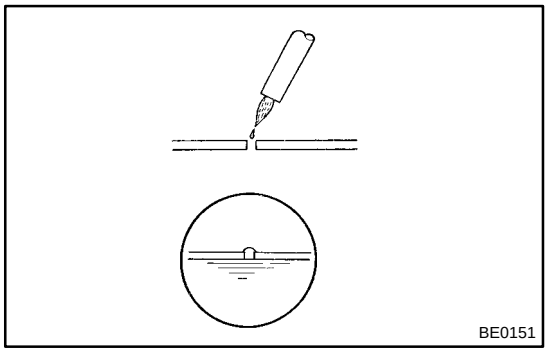
(d) Place the voltmeter positive (+) lead against the defogger positive (+) terminal.
(e) Place the voltmeter negative (–) lead with the foil strip against the heat wire at the positive (+) terminal end and slide it toward the negative (–) terminal end.
(f) The point where the voltmeter deflects from zero to several V is the place where the heat wire is broken.

HINT:
If the heat wire is not broken, the voltmeter indicates 0 V at the positive (+) end of the heat wire but gradually voltage increases to approx. 12 V as the meter probe moves to the other end.



8. IF NECESSARY, REPAIR DEFOGGER WIRE

(a) Clean the broken wire tips with grease, wax and silicone remover.
(b) Place the masking tape along both sides of the wire for repair.
(c) Thoroughly mix the repair agent (Dupont paste No. 4817).

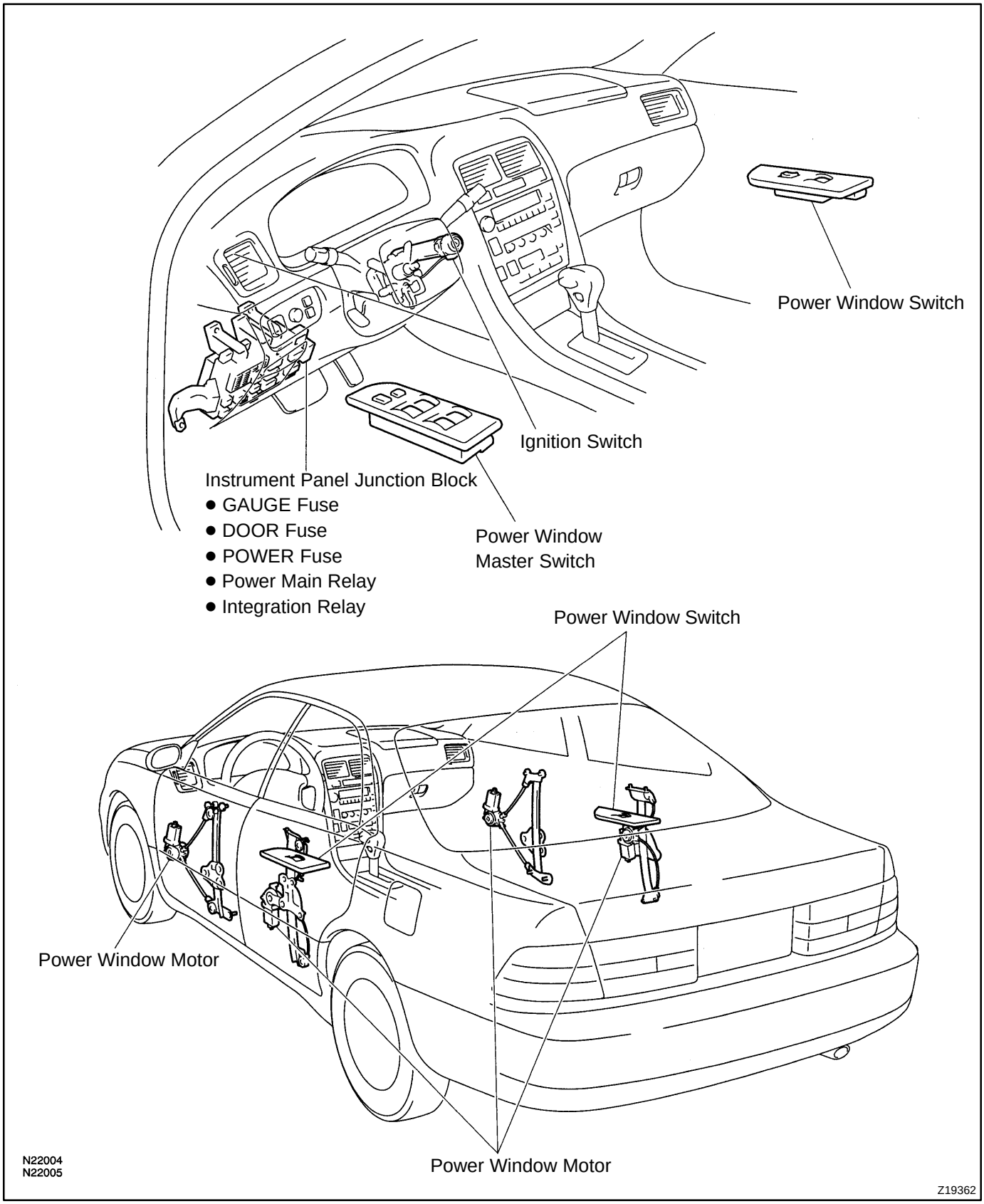


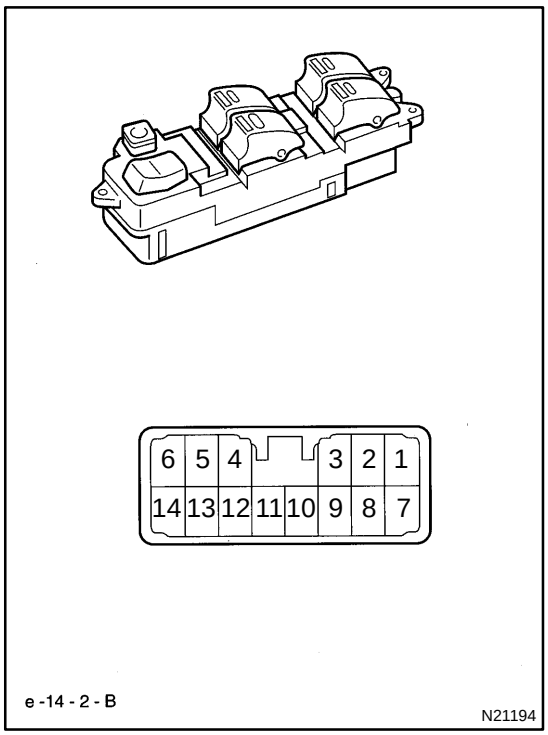
(d) Using a fine tip brush, apply a small amount of the agent to the wire.
(e) After a few minutes, remove the masking tape.
(f) Do not repair the defogger wire for at least 24 hours.

POWER WINDOW CONTROL SYSTEM

LOCATION

BE05M–01





BE05N–02

INSPECTION

1. INSPECT POWER WINDOW MASTER SWITCH CONTINUITY

(a) Inspect the front driver's switch.

Window unlock:

Switch position	Tester connection	Specified condition
UP	1 – 13 6 – 7	Continuity
OFF	1 – 6 – 13	Continuity
DOWN	1 – 6 7 – 13	Continuity

Window lock:

Switch position	Tester connection	Specified condition
UP	1 – 13 6 – 7	Continuity
OFF	1 – 6 – 13	Continuity
DOWN	1 – 6 7 – 13	Continuity

If continuity is not as specified, replace the master switch.

(b) Inspect the front passenger's switch.

Window unlock:

Switch position	Tester connection	Specified condition
UP	1 – 5 7 – 12	Continuity
OFF	1 – 5 – 12	Continuity
DOWN	1 – 12 5 – 7	Continuity

Window lock:

Switch position	Tester connection	Specified condition
UP	7 – 12	Continuity
OFF	5 – 12	Continuity
DOWN	5 – 7	Continuity

If continuity is not as specified, replace the master switch.

(c) Inspect the rear left switch.

Window unlock:

Switch position	Tester connection	Specified condition
UP	1 – 9 7 – 10	Continuity
OFF	1 – 9 – 10	Continuity
DOWN	1 – 10 7 – 9	Continuity

Window lock:

Switch position	Tester connection	Specified condition
UP	7 – 10	Continuity
OFF	9 – 10	Continuity
DOWN	7 – 9	Continuity

If continuity is not as specified, replace the master switch.

(d) Inspect the rear right switch.

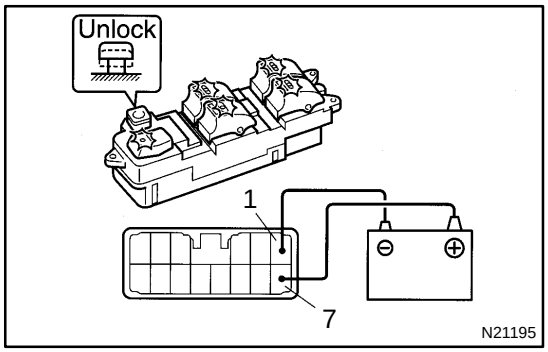
Window unlock:

Switch position	Tester connection	Specified condition
UP	1 – 14 7 – 11	Continuity
OFF	1 – 11 – 14	Continuity
DOWN	1 – 11 7 – 14	Continuity

Window lock:

Switch position	Tester connection	Specified condition
UP	7 – 11	Continuity
OFF	11 – 14	Continuity
DOWN	7 – 14	Continuity

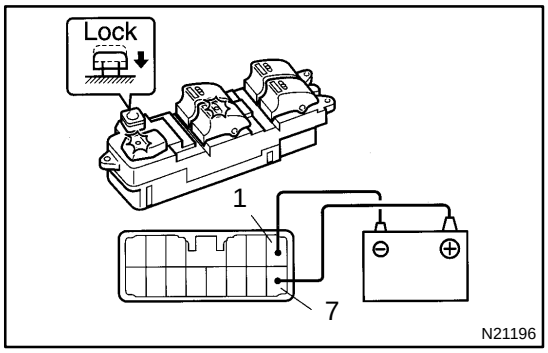
If continuity is not as specified, replace the master switch.



2. INSPECT POWER WINDOW MASTER SWITCH ILLUMINATION

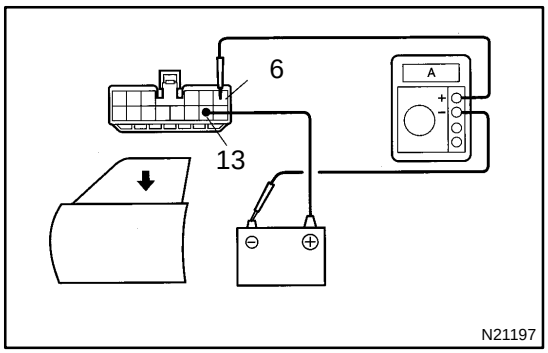
(a) Set the window lock switch to the unlock position.

(b) Connect the positive (+) lead from the battery to terminal 7 and the negative (–) lead to terminal 1, and check that all the illuminations light up.



(c) Set the window lock switch to the lock position, check that all the passenger's power window switch illuminations go out.

If operation is not as specified, replace the master switch.



3. INSPECT ONE TOUCH POWER WINDOW SYSTEM/ CURRENT OF CIRCUIT (Using an ammeter)

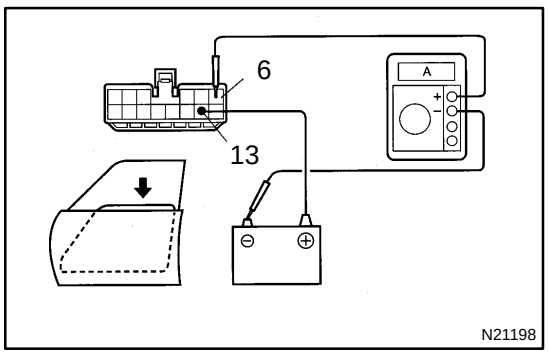
(a) Disconnect the connector from the master switch.

(b) Connect the positive (+) lead from the ammeter to terminal 6 on the wire harness side connector and the negative (–) lead to negative (–) terminal of the battery.

(c) Connect the positive (+) lead from the battery to terminal 13 on the wire harness side connector.

(d) As the window goes down, check that the current flow is approximately 7 A.

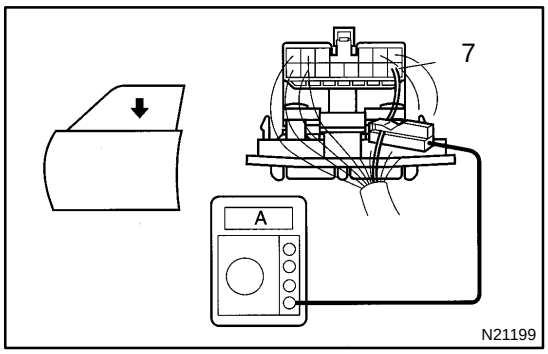
(e) Check that the current increases up to approximately 14.5 A or more when the window stops going down.



HINT:

The circuit breaker opens some 4 – 40 seconds after the window stops going down, so that check must be made before the circuit breaker operates.

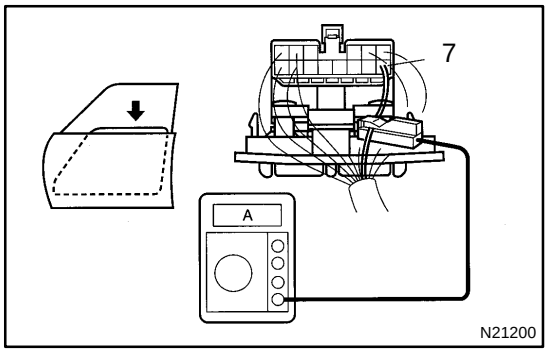
If the operation is as specified, replace the master switch.

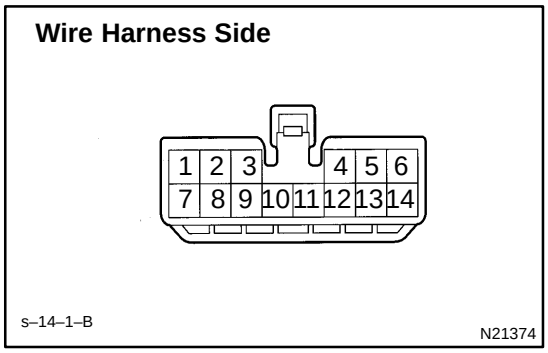


4. INSPECT ONE TOUCH POWER WINDOW SYSTEM/ CURRENT OF CIRCUIT (Using an ammeter with a current–measuring probe)

(a) Remove the master switch with connector connected.
(b) Attach a current–measuring probe to terminal 7 of the wire harness.
(c) Turn the ignition switch ON and set the power window switch in the down position.
(d) As the window goes down, check that the current flow is approximately 7 A.
(e) Check that the current increases up to approximately 14.5 A or more when the window stops going down.

HINT:
The circuit breaker opens some 4 – 40 seconds after the window stops going down, so that check must be made before the circuit breaker operates.
If operation is as specified, replace the master switch.



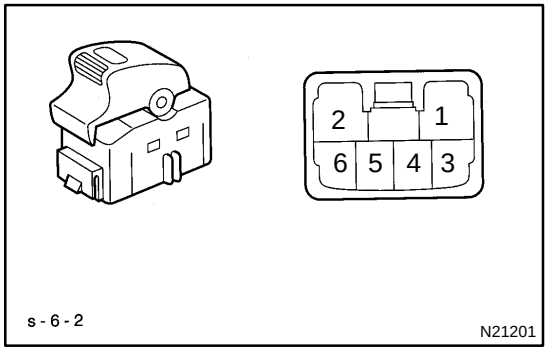


5. INSPECT POWER WINDOW MASTER SWITCH CIRCUIT

Disconnect the connector from the master switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
7 – Ground	Ignition switch position LOCK or ACC	*No voltage
7 – Ground	Ignition switch position ON	Battery positive voltage

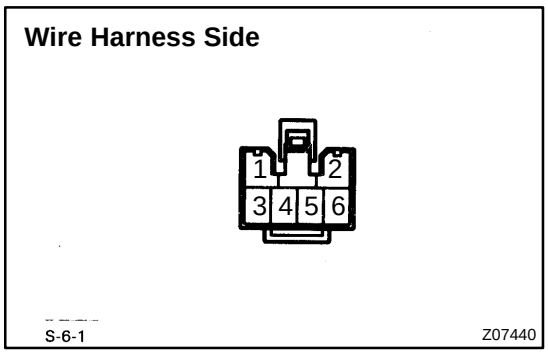
* Exceptions: During 60 seconds after the ignition switch is turned ON → OFF (ACC) or until driver or a passenger's door is opened after the ignition switch is turned ON → OFF (ACC).
If the circuit is not as specified, inspect the circuits connected to other parts.



6. INSPECT POWER WINDOW SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
UP	1 – 3 2 – 5	Continuity
OFF	1 – 3 2 – 4	Continuity
DOWN	2 – 4 3 – 5	Continuity

If continuity is not as specified, replace the switch.



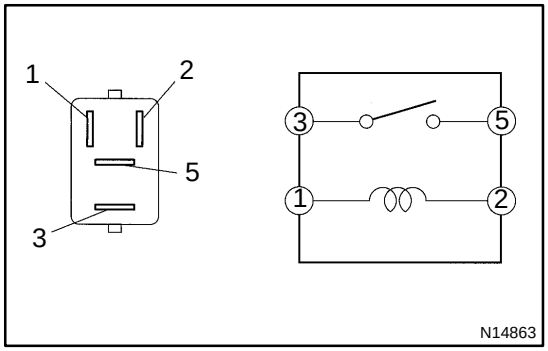
7. INSPECT POWER WINDOW SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Ignition switch position ON and master switch position OFF	No voltage
1 – Ground	Ignition switch positrion ON and master switch position DOWN	Battery positive voltage
4 – Ground	Ignition switch position ON and master switch position OFF	No voltage
4 – Ground	Ignition switch position ON and master switch position UP	Battery positive voltage
5 – Ground	Ignition switch position LOCK or ACC	*No voltage
5 – Ground	Ignition switch position ON	Battery positive voltage

*Exceptions: During 60 seconds period after the ignition switch is turned ON → OFF (ACC) or until driver or a passenger's door is opened after the ignition switch is turned ON → OFF (ACC).

If the circuit is not as specified, inspect the circuits connected to other parts.

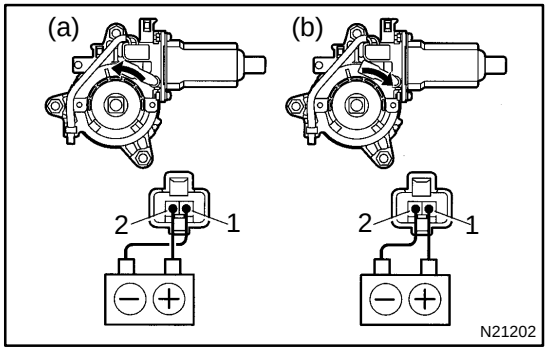


8. INSPECT POWER MAIN RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

9. INSPECT POWER MAIN RELAY CIRCUIT
(See page BE–11)

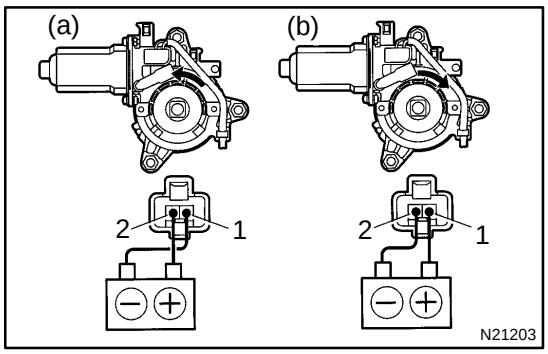


10. Driver's Door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

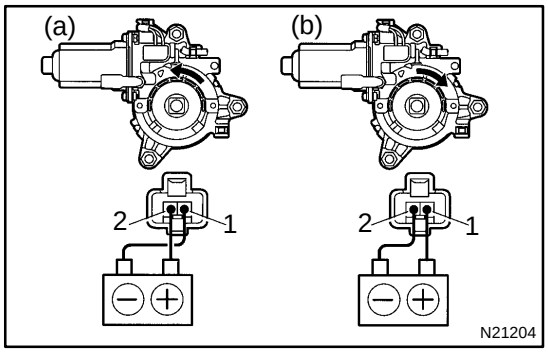


11. Front Passenger's Door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

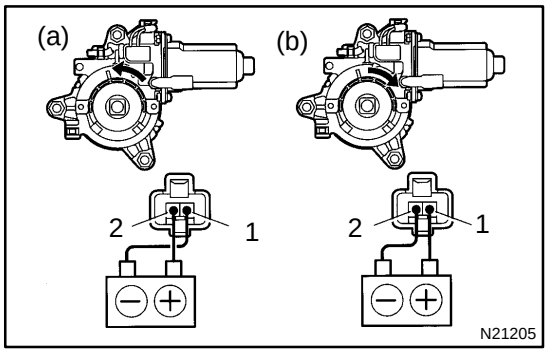


12. Rear Left Side Door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

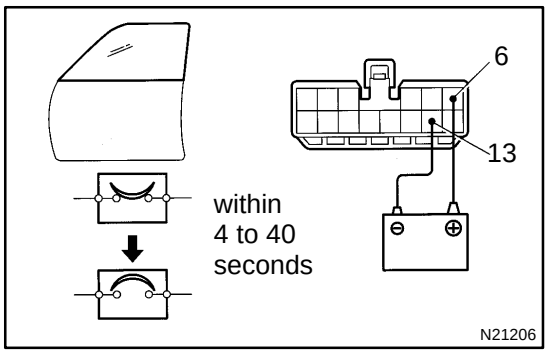


13. Rear Right Side Door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

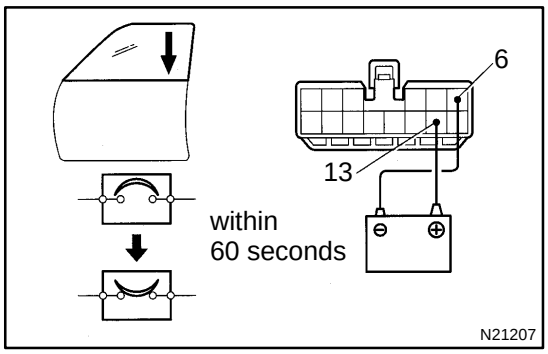


14. Driver's Door:
INSPECT POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

(a) Disconnect the connector from the master switch.

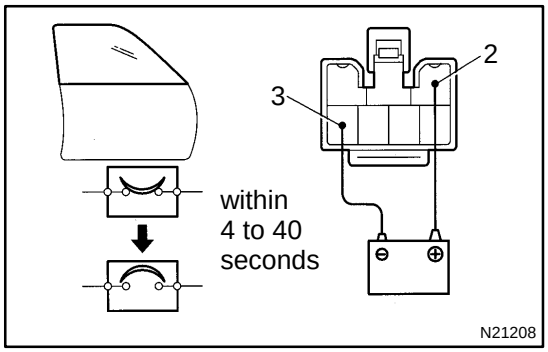
(b) Connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 13 on the wire harness side connector and raise the window to full closed position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within approximately 4 to 40 seconds.



(d) Reverse the polarity, check that the window begins to descend within approximately 60 seconds.

If operation is not as specified, replace the motor.

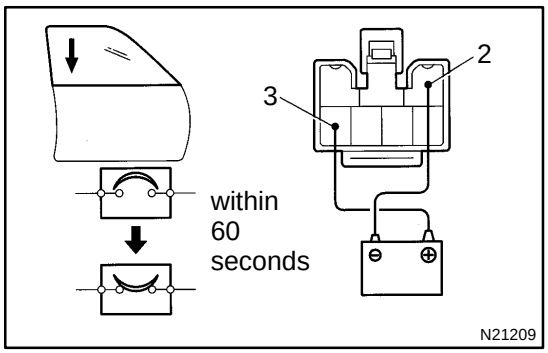


15. Front Passenger's Door Motor:
INSPECT POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

(a) Disconnect the connector from the power window switch.

(b) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3 on the wire harness side connector, and raise the window to full closed position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within approximately 4 to 40 seconds.



(d) Reverse the polarity, check that the window begins to descend within approximately 60 seconds.

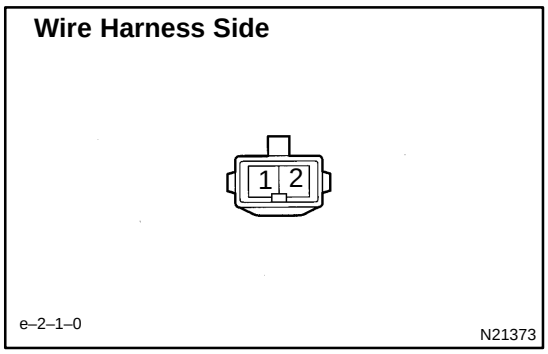
If operation is not as specified, replace the motor.

16. Rear Left Side Door:
INSPECT POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

See step of Front Passenger Door Motor.

17. Rear Right Side Door:
INSPECT POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

See step of Front Passenger Door Motor.



18. INSPECT POWER WINDOW MOTOR CIRCUIT

(a) Disconnect the connector from the motor.

(b) Connect the connector to the master switch and power window switch.

(c) Inspect the connector on the wire harness side.

Driver's Door Motor

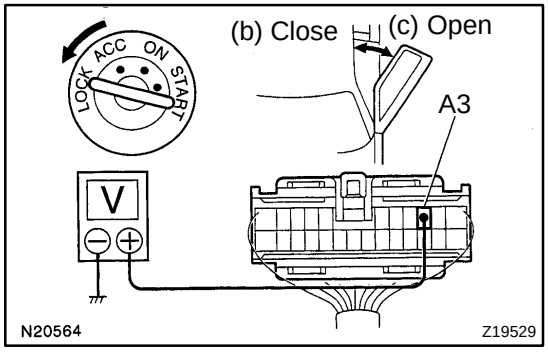
Tester connection	Condition	Specified condition
1 – Ground	*Master switch position DOWN or OFF	No voltage
1 – Ground	*Master switch position UP	Battery positive voltage
2 – Ground	*Master switch position UP or OFF	No voltage
2 – Ground	*Master switch position DOWN	Battery positive voltage

Except Driver's Door Motor

Tester connection	Condition	Specified condition
1 – Ground	*Master switch position UP or OFF	No voltage
1 – Ground	*Master switch position DOWN	Battery positive voltage
1 – Ground	*Power window switch position UP or OFF	No voltage
1 – Ground	*Power window switch position DOWN	Battery positive voltage
2 – Ground	*Master switch position DOWN or OFF	No voltage
2 – Ground	*Master switch position UP	Battery positive voltage
2 – Ground	*Power window switch position DOWN or OFF	No voltage
2 – Ground	*Power window switch position UP	Battery positive voltage

*: Set the window lock switch to the unlock position.(except driver's door motor)

If the circuit is not as specified, inspect the circuits connected to other parts.



19. Key–Off Power Window Signal: INSPECT INTEGRATION RELAY OPERATION

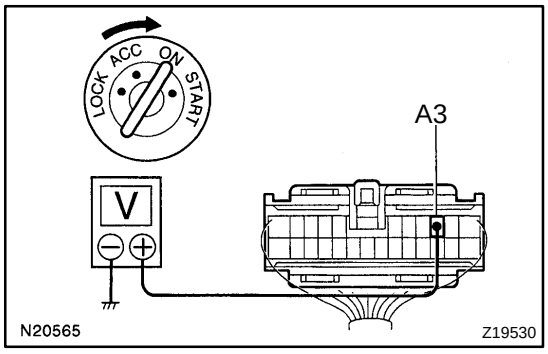
HINT:

When the relay circuit is as specified, inspect the key–off power window signal.

(a) Connect the positive (+) lead from the voltmeter to terminal A3 and the negative (–) lead to body ground.

(b) Close the door with ignition switch turned to LOCK or ACC, and check that the meter needle indicates battery positive voltage.

(c) Open the door and check that the meter needle indicates 0 V.



(d) Turn the ignition switch ON and check that the meter needle indicates battery positive voltage again.

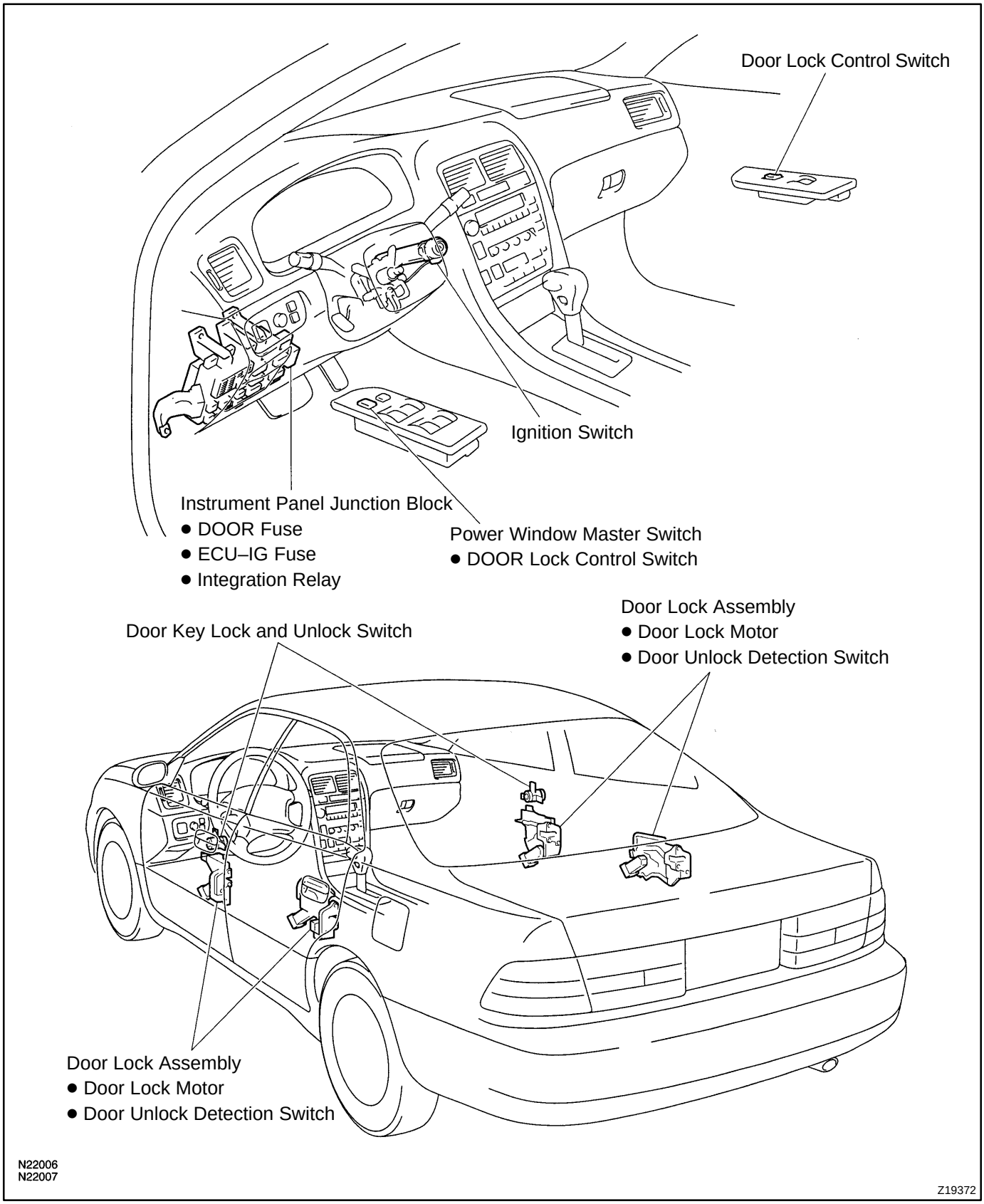
If operation is not as specified, replace the relay.

20. INSPECT INTEGRATION RELAY CIRCUIT
(See page BE–20)

POWER DOOR LOCK CONTROL SYSTEM

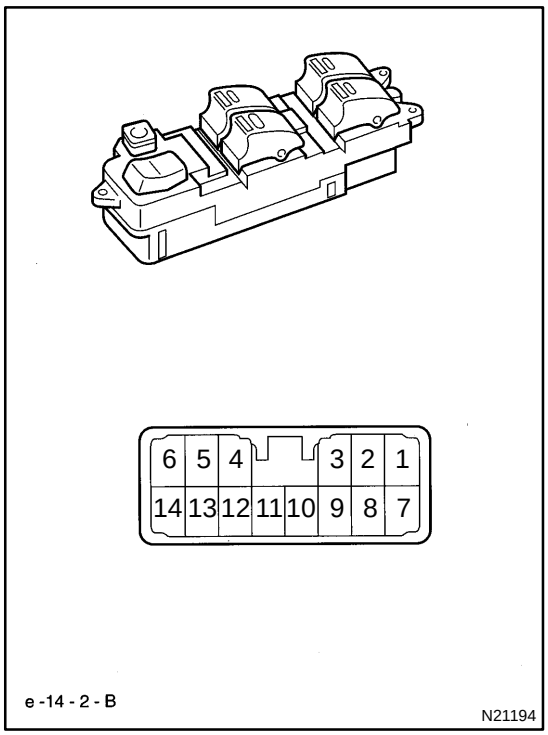
BE05O–01

LOCATION



BE05P–01

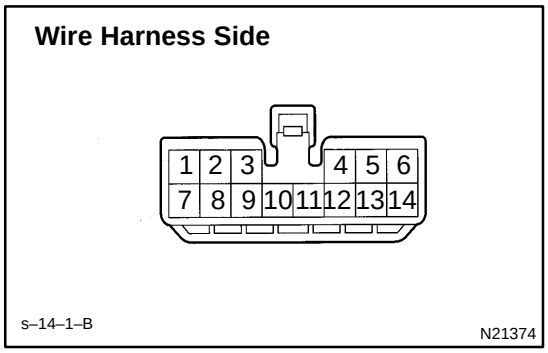
INSPECTION



1. Master Switch:
INSPECT DRIVER'S DOOR LOCK CONTROL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	1 – 4	Continuity
OFF	–	No continuity
UNLOCK	1 – 3	Continuity

If continuity is not as specified, replace the switch.

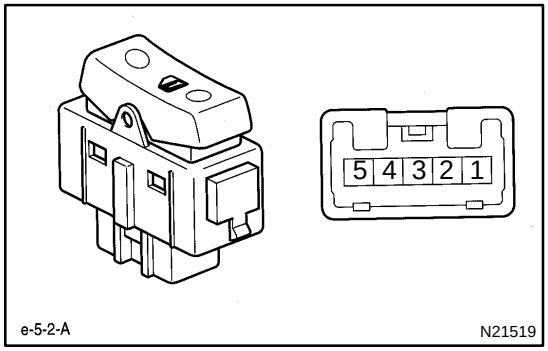


2. Master Switch:
INSPECT DRIVER'S DOOR LOCK CONTROL SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
3 – Ground	Constant	Battery positive voltage
4 – Ground	Constant	Battery positive voltage

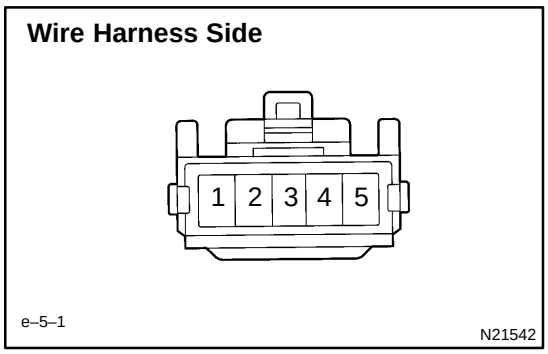
If the circuit is not as specified, inspect the circuits connected to other parts.



3. INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	2 – 3	Continuity
OFF	–	No continuity
UNLOCK	1 – 2	Continuity

If continuity is not as specified, replace the switch.

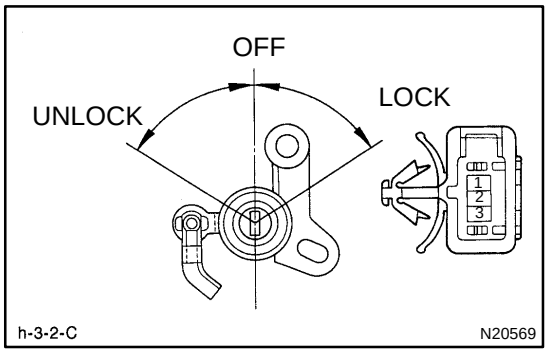


4. INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage
3 – Ground	Constant	Battery positive voltage
4 – Ground	Ignition switch position LOCK or ACC	No voltage
4 – Ground	Ignition switch position ON	Battery positive voltage

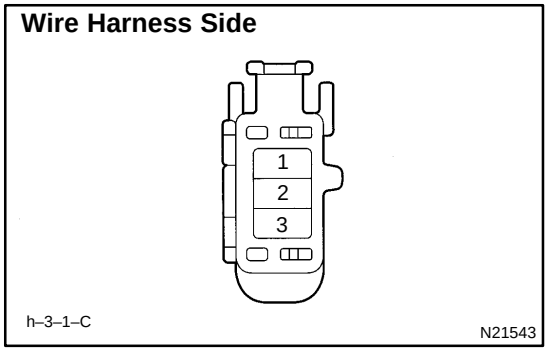
If the circuit is not as specified, inspect the circuits connected to other parts.



5. INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	1 – 2	Continuity
OFF	–	No continuity
UNLOCK	1 – 3	Continuity

If continuity is not as specified, replace the switch.

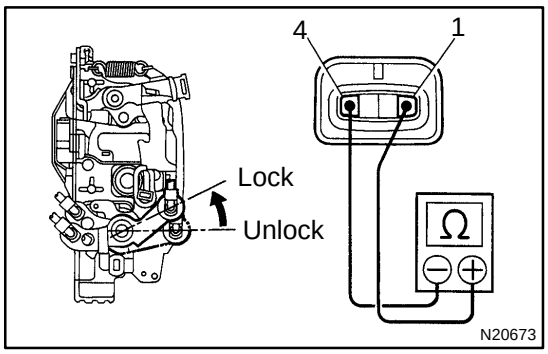


6. INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
2 – Ground	Constant	Battery positive voltage
3 – Ground	Constant	Battery positive voltage

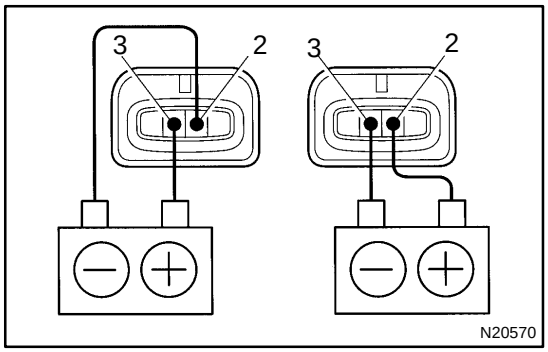
If the circuit is not as specified, inspect the circuits connected to other parts.



7. INSPECT DOOR UNLOCK DETECTION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	–	No continuity
ON (Door Lock set to UNLOCK)	1 – 4	Continuity

If continuity is not as specified, replace the switch.

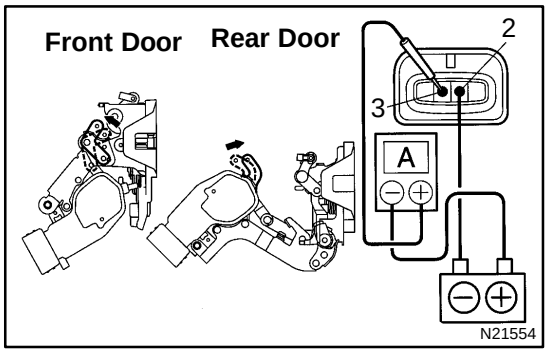


8. INSPECT MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 2, and check that the door lock link moves to UNLOCK position.

(b) Reverse the polarity and check that the door lock link moves to LOCK position.

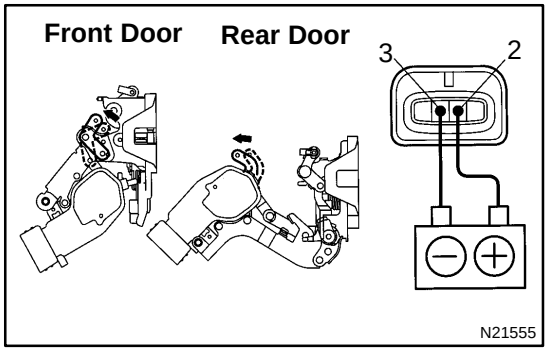
If operation is not as specified, replace the door lock assembly.



9. INSPECT PTC THERMISTOR OPERATION (Using an ammeter)

(a) Connect the positive (+) lead from the battery to terminal 3.

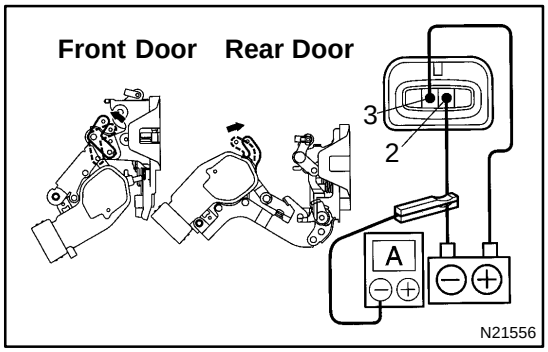
(b) Connect the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to battery negative (–) terminal, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



(c) Disconnect the leads from terminals.

(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3, and check that the door lock moves to the LOCK position.

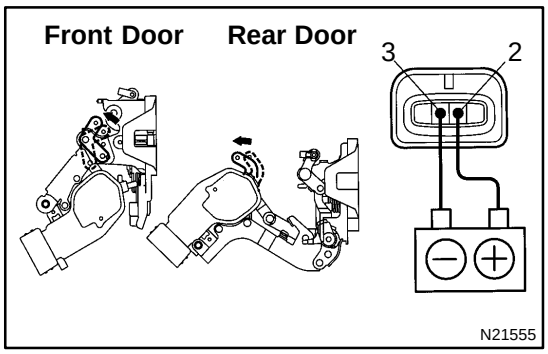
If operation is not as specified, replace the door lock assembly.



10. INSPECT PTC THERMISTOR OPERATION (Using an ammeter with a current–measuring probe)

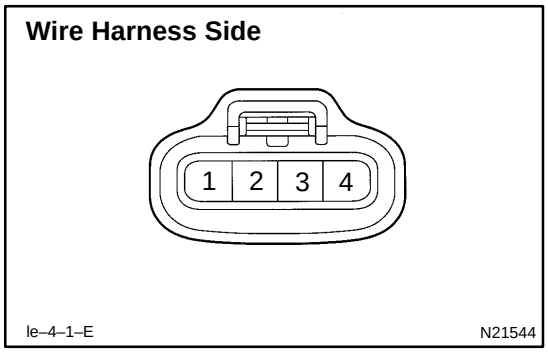
(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 2.

(b) Attach a current–measuring probe to either the positive (+) lead or the negative (–) lead, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



(c) Disconnect the leads from terminals.
(d) Approximately 60 seconds later, reverse the polarity, and check that the door lock moves to the LOCK position.

If operation is not as specified, replace the door lock assembly.

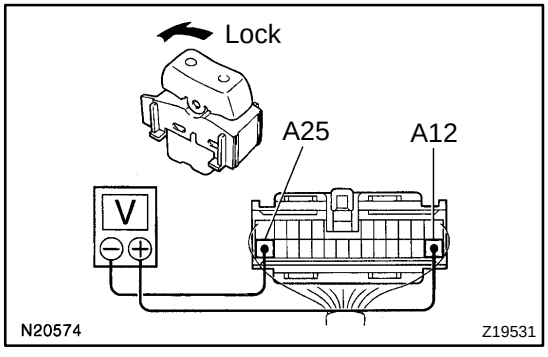


11. INSPECT DOOR LOCK ASSEMBLY CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
4 – Ground	Constant	Continuity
1 – Ground 3 – Ground	Door lock manual switch OFF or LOCK	No voltage
1 – Ground 3 – Ground	Door lock manual switch UNLOCK	Battery positive voltage
2 – Ground	Door lock manual switch OFF or UNLOCK	No voltage
2 – Ground	Door lock manual switch LOCK	Battery positive voltage

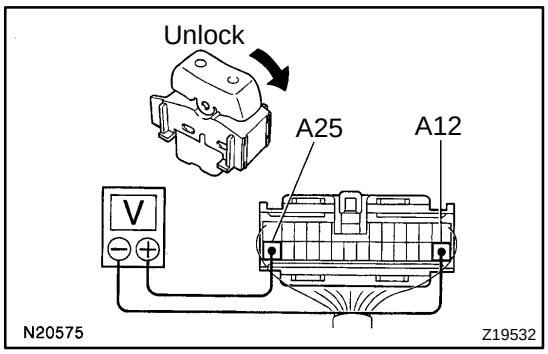
If the circuit is not as specified, inspect the circuits connected to other parts.



12. Door Lock Signal: INSPECT INTEGRATION RELAY OPERATION

HINT:
When the relay circuit is as specified, inspect the door lock signal.

(a) Connect the positive (+) lead from the voltmeter to terminal A12 and the negative (–) lead to terminal A25.
(b) Set the door lock control switch to UNLOCK and check that the voltage rises from 0 V to battery positive voltage for approximately 0.2 seconds.



(c) Reverse the polarity of the voltmeter leads.
(d) Set the door lock control switch to LOCK and check that the voltage rises from 0 V to battery positive voltage for approximately 0.2 seconds.

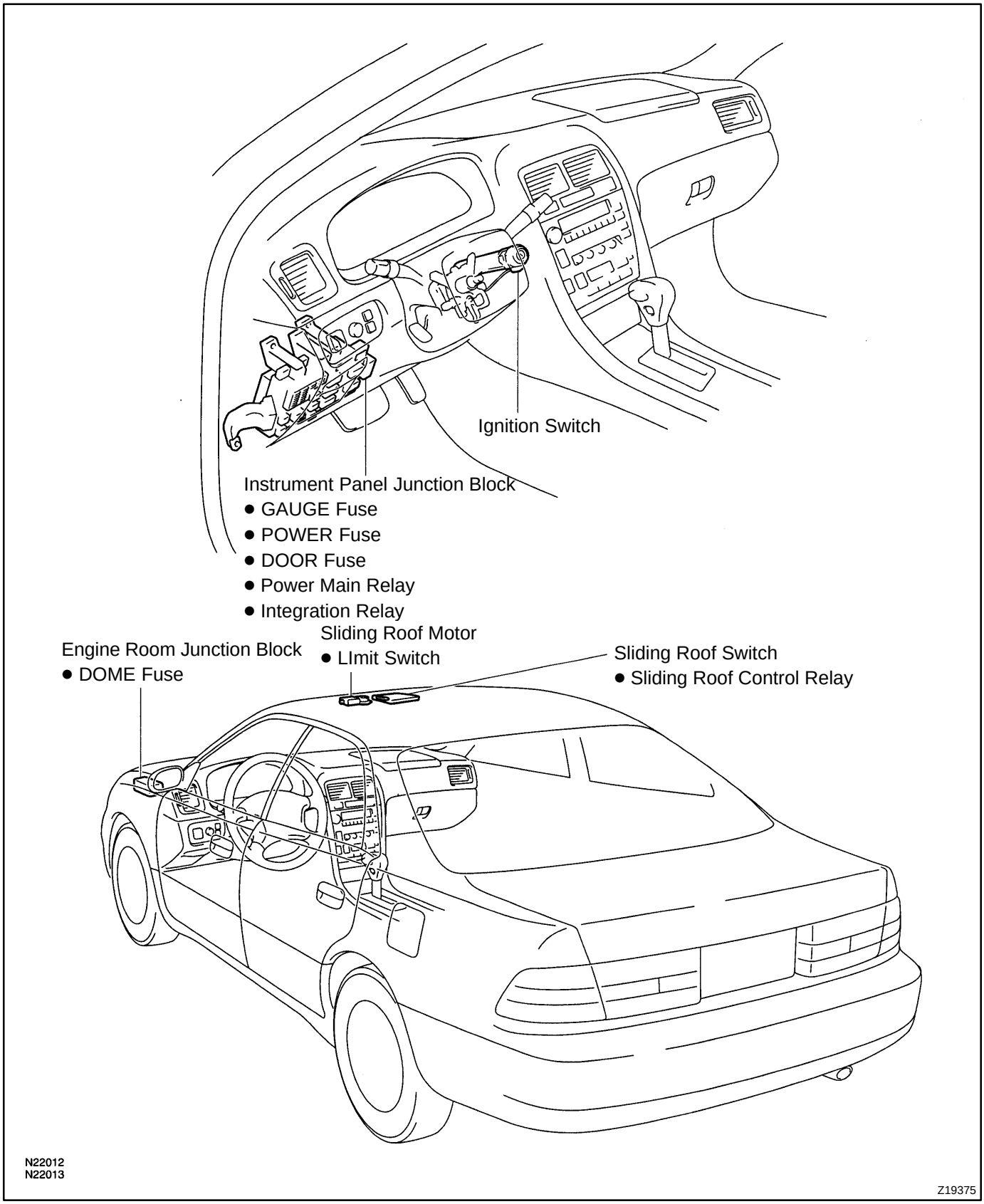
If operation is not as specified, replace the relay.

13. INSPECT INTEGRATION RELAY CIRCUIT
(See page BE–20)

SLIDING ROOF SYSTEM

LOCATION

BE05Q–01

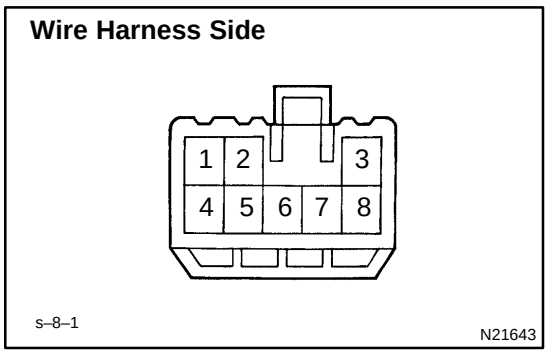


BE05R–01

INSPECTION

1. INSPECT SLIDING ROOF CONTROL RELAY AND SWITCH CIRCUIT

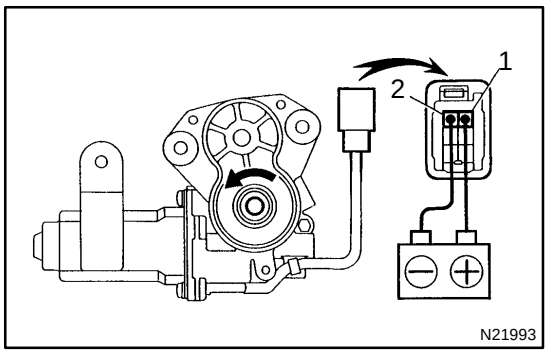
Disconnect the connector from the relay and switch and inspect the connector on the wire harness side, as shown in the chart.



Tester connection	Condition	Specified condition
1 – 5	Constant	Continuity
2 – Ground	Constant	Continuity
3 – Ground	No.1 limit switch OFF (Sliding roof closed)	No continuity
3 – Ground	No.1 limit switch ON (Sliding roof opened)	Continuity
7 – Ground	No.2 limit switch OFF (Sliding roof tilted up or open approx. 200 mm (7.87 in.))	No continuity
7 – Ground	No.2 limit switch ON (Except for conditions mentioned above)	Continuity
4 – Ground	Ignition switch LOCK or ACC	*No voltage
	Ignition switch ON	Battery positive voltage

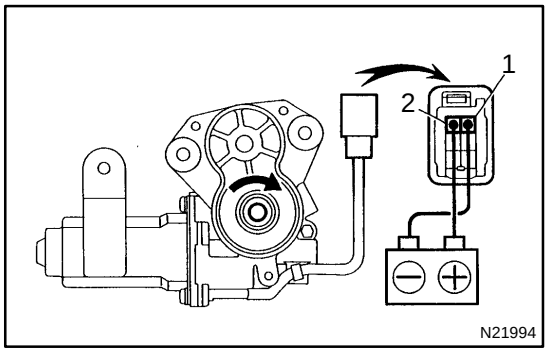
*Exceptions: For 60 seconds after the ignition switch is turned ON → OFF (ACC) or until driver or passenger door is opened after the ignition switch is turned ON → OFF (ACC).

If the circuit is as specified, replace the relay and switch.



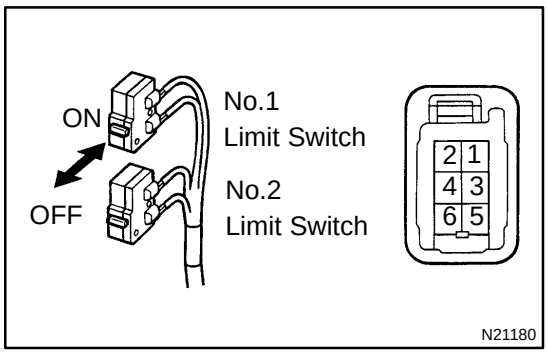
2. INSPECT SLIDING ROOF MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise (moves of the close and up side).



(b) Reverse the polarity, check that the motor turns clockwise. (moves of the open and down side).

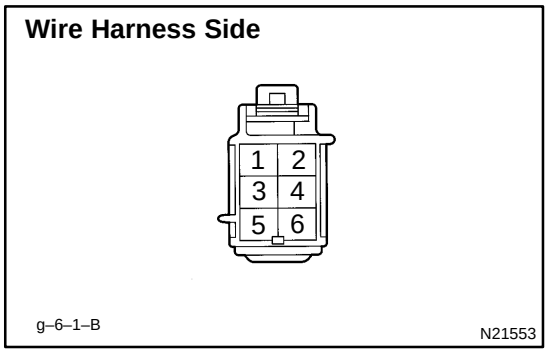
If operation is not as specified, replace the motor.



3. INSPECT SLIDING ROOF LIMIT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
No.1 limit switch OFF (SW pin released)	4 – 5	No continuity
No.1 limit switch ON (SW pin pushed in)	4 – 5	Continuity
No.2 limit switch OFF (SW pin released)	4 – 6	No continuity
No.2 limit switch ON (SW pin pushed in)	4 – 6	Continuity

If continuity is not as specified, replace the switch.

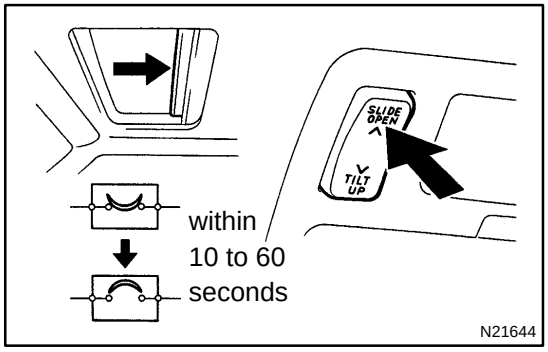


4. INSPECT SLIDING ROOF MOTOR AND LIMIT SWITCH CIRCUIT

Disconnect the connector from the limit switch and inspect the connector on the wire harness side.

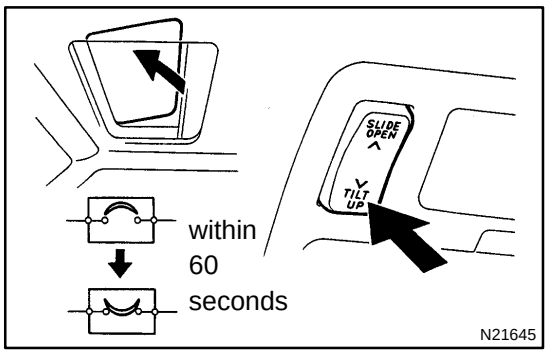
Tester connection	Condition	Specified condition
3 – Ground	Constant	Continuity
4 – Ground	Constant	Continuity

If the circuit is not as specified, inspect the circuits connected to other parts.



5. INSPECT CIRCUIT BREAKER OPERATION

(a) With the sliding roof in the fully opened position, hold the sliding roof switch in ”OPEN” position and check that there is a circuit breaker operation noise within 10 to 60 seconds.



(b) With the sliding roof in fully opened position, hold the sliding roof switch in "TILT UP" position and check that the sliding roof begins to close within 60 seconds.

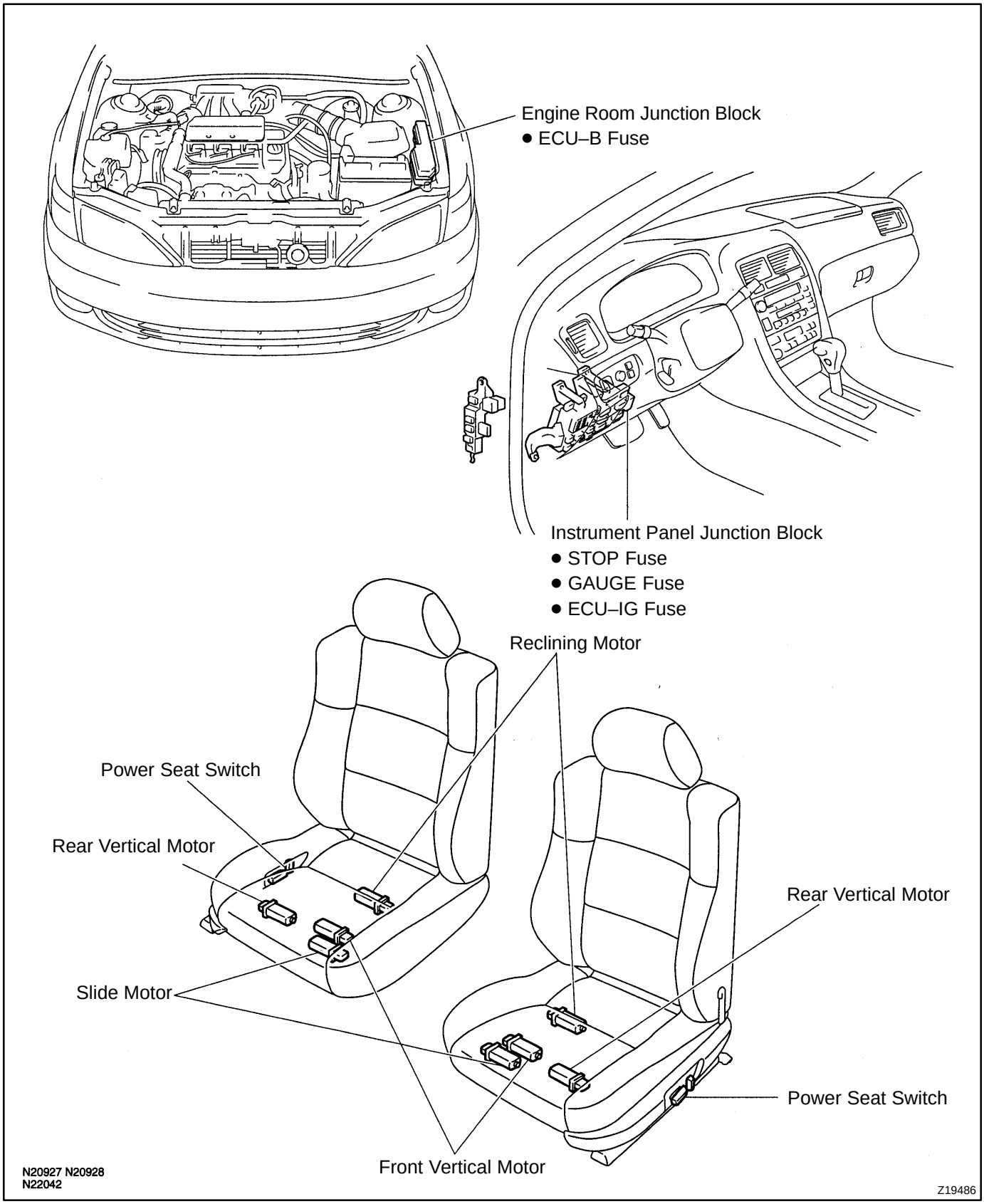
If operation is not as specified, replace the motor.

6. INSPECT KEY–OFF SLIDING ROOF OPERATION
(See integration relay circuit on page BE–20)

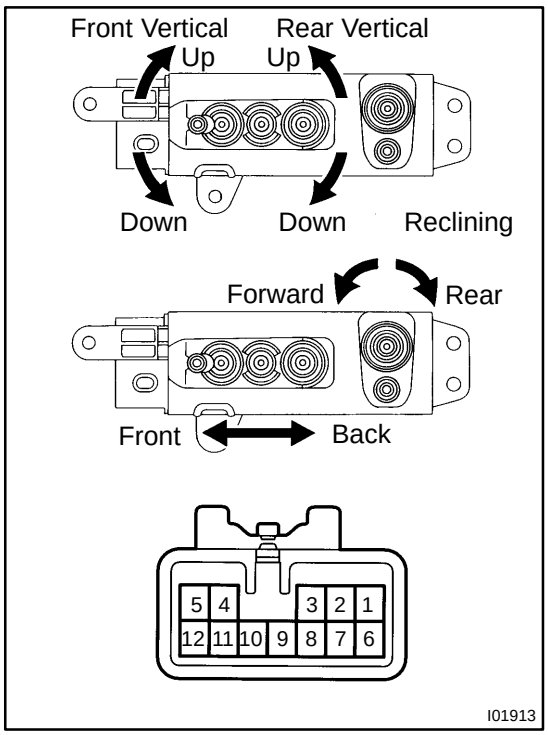
POWER SEAT CONTROL SYSTEM

BE05S–01

LOCATION



BE05T–03



INSPECTION

1. INSPECT DRIVER'S POWER SEAT SWITCH CONTINUITY

Slide Switch:

Switch position	Tester connection	Specified condition
FRONT	4 – 7 8 – 11	Continuity
OFF	4 – 7 – 8	Continuity
BACK	4 – 11 7 – 8	Continuity

Front vertical switch:

Switch position	Tester connection	Specified condition
UP	7 – 9 10 – 11	Continuity
OFF	7 – 9 – 10	Continuity
DOWN	7 – 10 9 – 11	Continuity

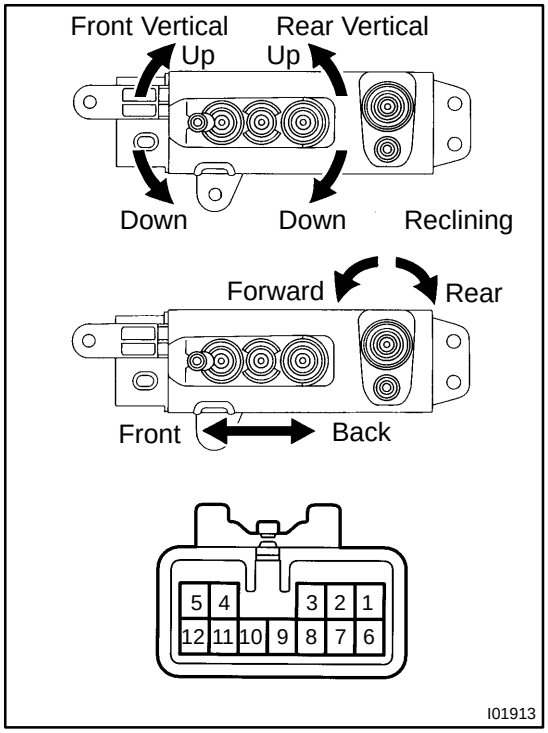
Rear vertical switch:

Switch position	Tester connection	Specified condition
UP	2 – 11 3 – 7	Continuity
OFF	2 – 3 – 7	Continuity
DOWN	2 – 7 3 – 11	Continuity

Reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 – 11 5 – 7	Continuity
OFF	1 – 5 – 7	Continuity
REAR	1 – 7 5 – 11	Continuity

If continuity is not as specified, replace the switch.



2. INSPECT PASSENGER'S POWER SEAT SWITCH CONTINUITY

Slide switch:

Switch position	Tester connection	Specified condition
FRONT	4 – 7 8 – 11	Continuity
OFF	4 – 7 – 8	Continuity
BACK	4 – 11 7 – 8	Continuity

Front vertical switch:

Switch position	Tester connection	Specified condition
UP	7 – 10 9 – 11	Continuity
OFF	7 – 9 – 11	Continuity
DOWN	7 – 11 9 – 10	Continuity

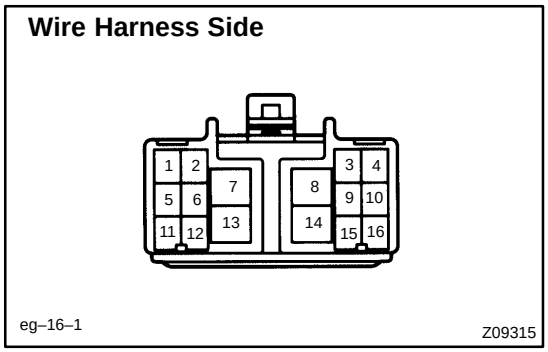
Rear vertical switch:

Switch position	Tester connection	Specified condition
UP	2 – 7 3 – 11	Continuity
OFF	2 – 3 – 7	Continuity
DOWN	2 – 11 3 – 7	Continuity

Reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 – 11 5 – 7	Continuity
OFF	1 – 5 – 7	Continuity
REAR	1 – 7 5 – 11	Continuity

If continuity is not as specified, replace the switch.



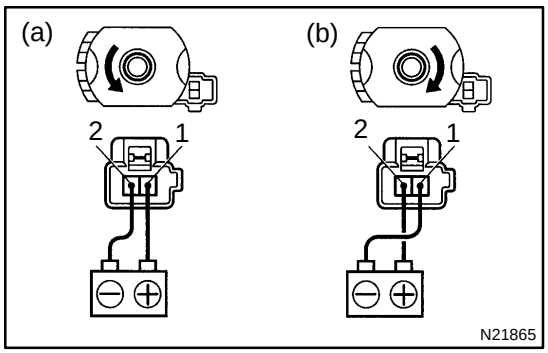
3. INSPECT POWER SEAT SWITCH CIRCUIT

(a) Disconnect the switch connector and connect the seat wire harness to the floor wire harness.

(b) Inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
7 – Ground	Constant	Continuity
11 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.

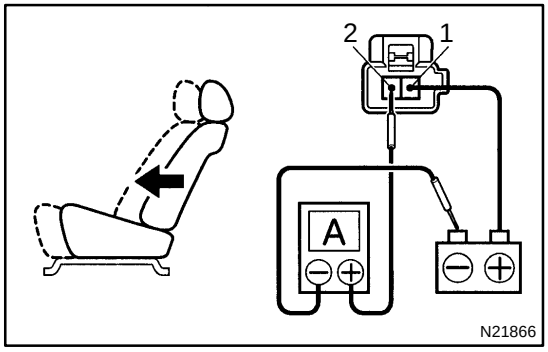


4. INSPECT SLIDE MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

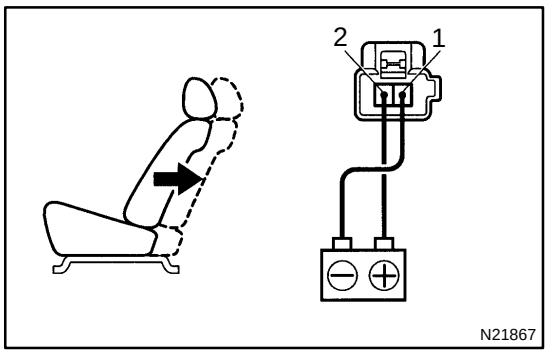
If operation is not as specified, replace the seat adjuster.



5. INSPECT SLIDE MOTOR PTC THERMISTOR OPERATION

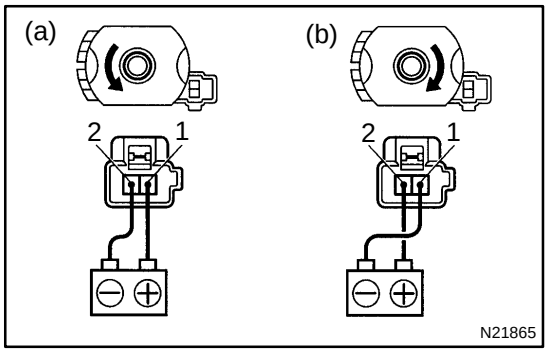
(a) Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to the battery negative (–) terminal, then move the seat cushion to the front position.

(b) Continue to apply voltage, check that current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the leads from terminals.
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the seat cushion begins to move backwards.

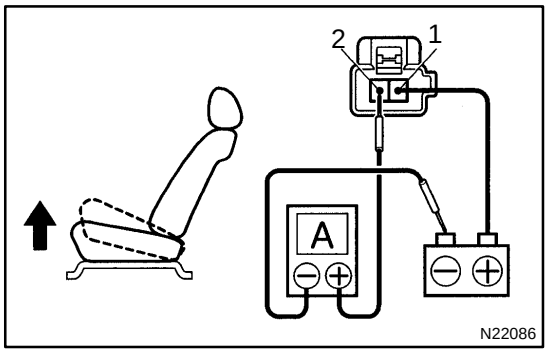
If operation is not as specified, replace the seat adjuster.



6. INSPECT FRONT VERTICAL MOTOR OPERATION

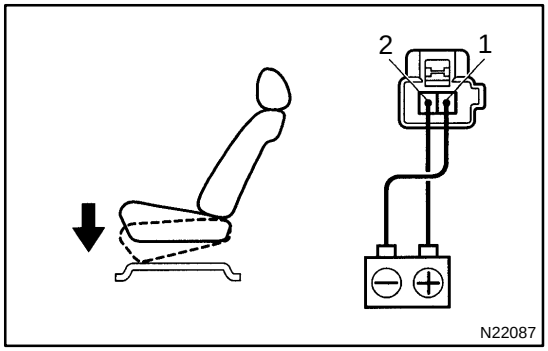
(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.
(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the seat adjuster.



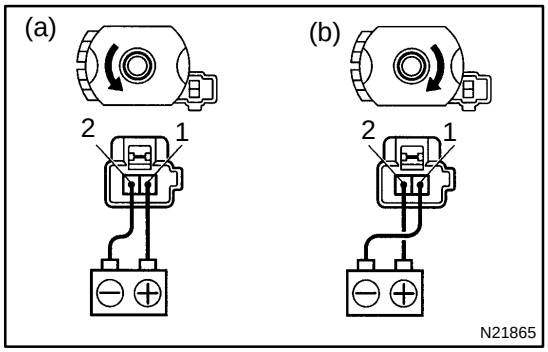
7. INSPECT FRONT VERTICAL MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to the battery negative (–) terminal, then move the seat cushion to the highest position.
(b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the leads from the terminals.
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the seat cushion begins to descend.

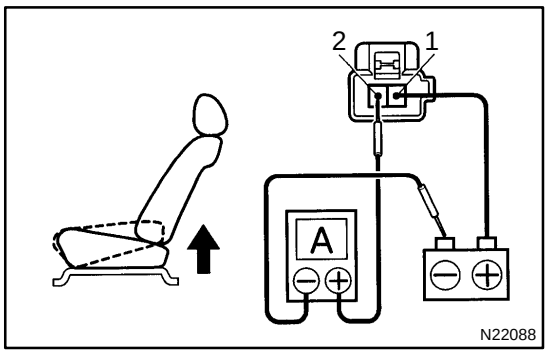
If operation is not as specified, replace the seat adjuster.



8. INSPECT REAR VERTICAL MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.
(b) Reverse the polarity, check that the motor turns clockwise.

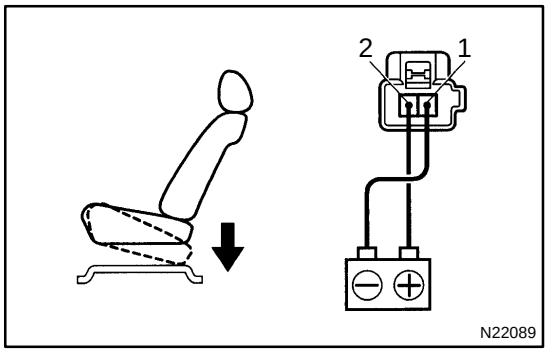
If operation is not as specified, replace the seat adjuster.



9. INSPECT REAR VERTICAL MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to the battery negative (–) terminal, then move the seat cushion to the highest position.

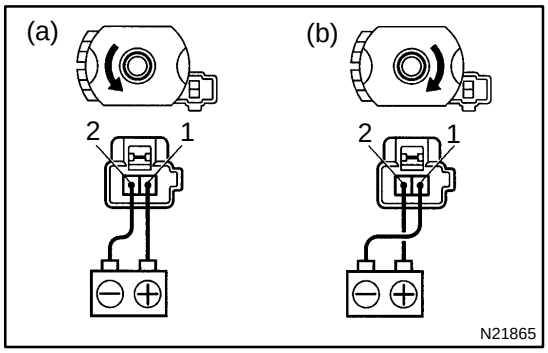
(b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the leads from the terminals.

(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the seat cushion begins to descend.

If operation is not as specified, replace the seat adjuster.

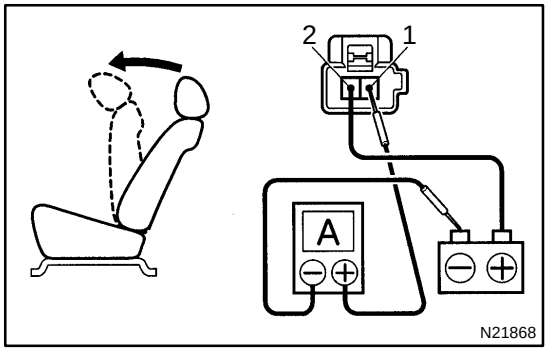


10. INSPECT RECLINING MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

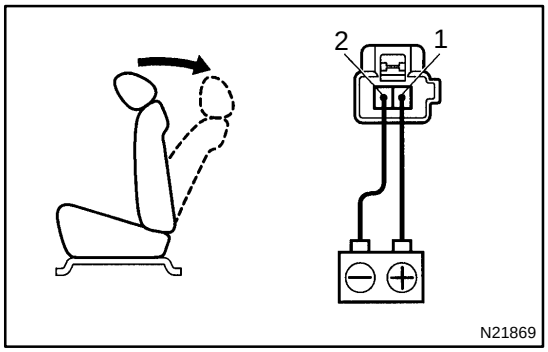
If operation is not as specified, replace the seat adjuster.



11. INSPECT RECLINING MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2, the positive (+) lead from the ammeter to terminal 1 and the negative (–) lead to the battery negative (–) terminal, then recline the seat back to the most forward position.

(b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the leads from the terminals.

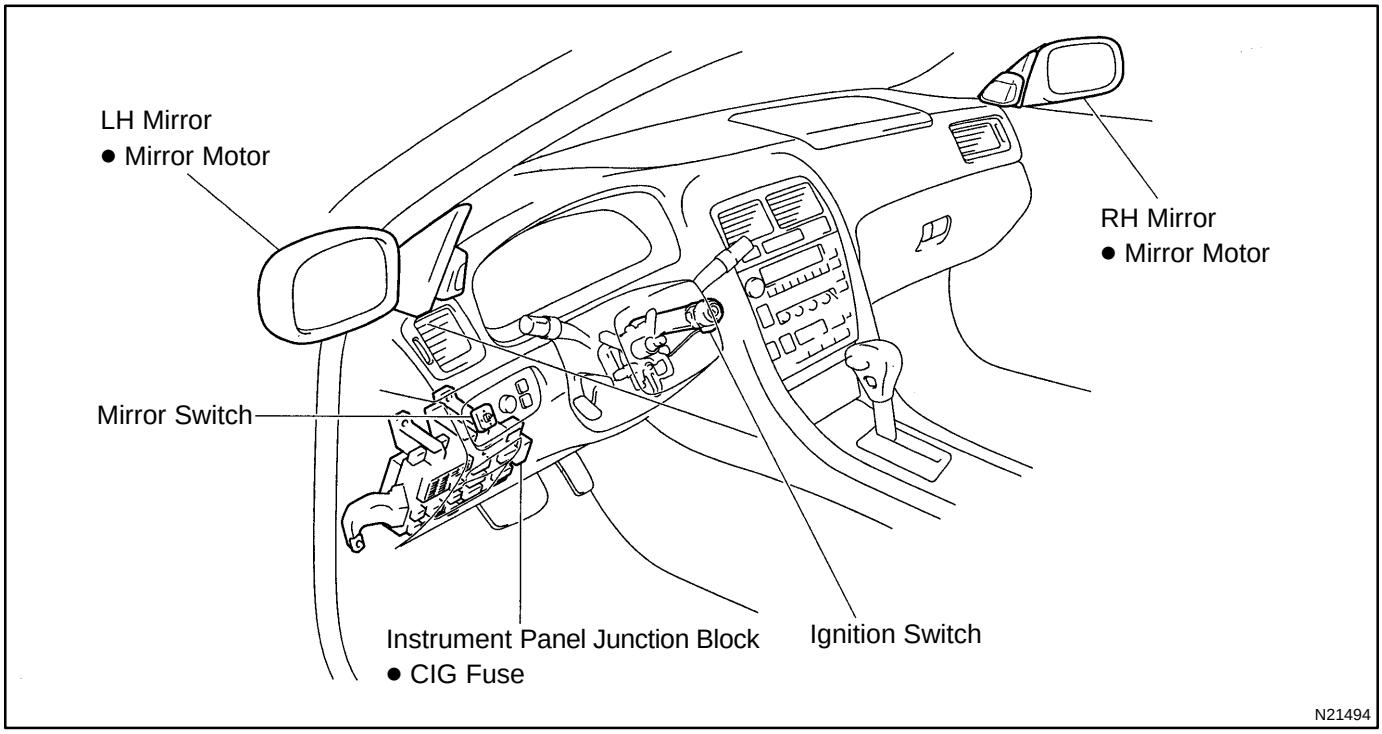
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the seat back starts to fall backward.

If operation is not as specified, replace the seat adjuster.

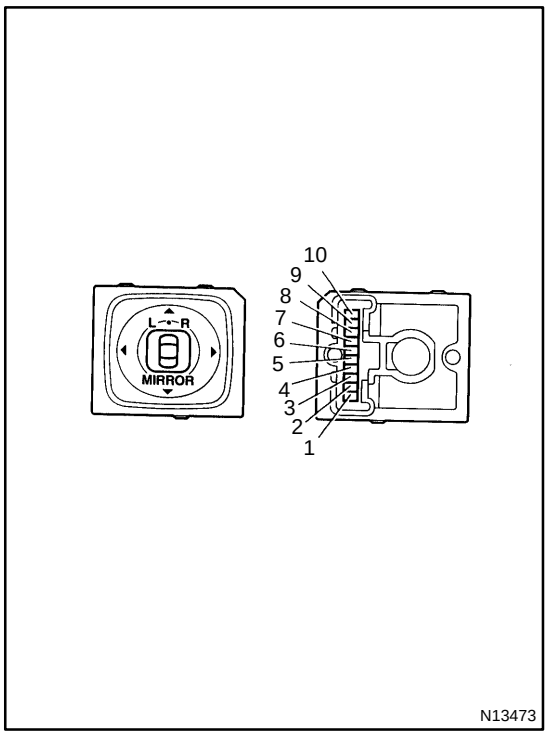
POWER MIRROR CONTROL SYSTEM

BE05U–01

LOCATION



BE05V–01



INSPECTION

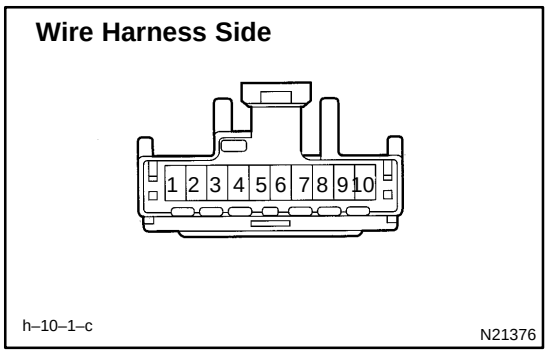
1. Master switch left side:
INSPECT MIRROR SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
UP	3 – 4 7 – 8	Continuity
DOWN	3 – 8 4 – 7	Continuity
LEFT	4 – 9 7 – 8	Continuity
RIGHT	4 – 7 8 – 9	Continuity

2. Master switch right side:
INSPECT MIRROR SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
UP	2 – 4 1 – 7 – 8	Continuity
DOWN	4 – 7 1 – 2 – 8	Continuity
LEFT	4 – 10 1 – 7 – 8	Continuity
RIGHT	4 – 7 1 – 8 – 10	Continuity

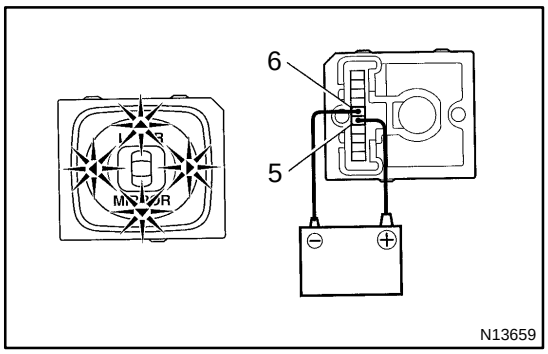
If continuity is not as specified, replace the switch.
If continuity is as specified. inspect the switch circuit.



3. INSPECT MIRROR SWITCH CIRCUIT
Disconnect the connector from the switch and inspect the connector on the wire harness side.

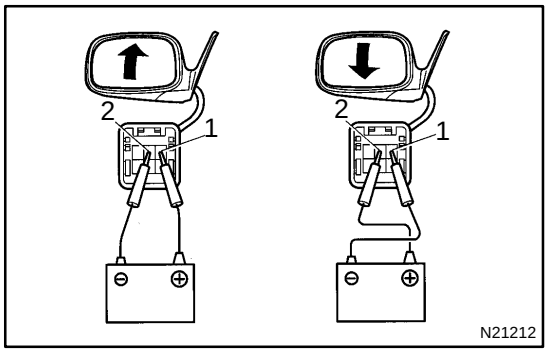
Tester connection	Condition	Specified condition
8 – Ground	Constant	Continuity
4 – Ground	Ignition switch position LOCK	No voltage
4 – Ground	Ignition switch position ACC or ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



4. INSPECT INDICATOR LIGHT OPERATION

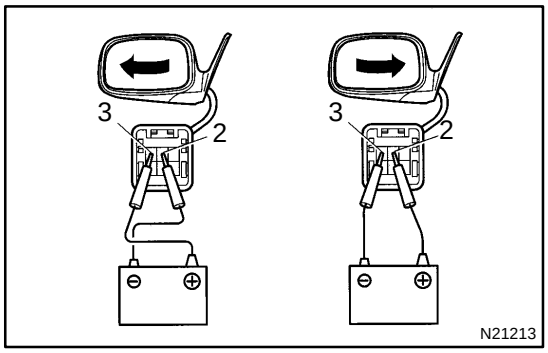
Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 6, and check that the indicator light does not light up, replace the switch.



5. INSPECT MIRROR MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the mirror turns upward.

(b) Reverse the polarity, and check that the mirror turns downward.



(c) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 2, and check that the mirror turns to the left side.

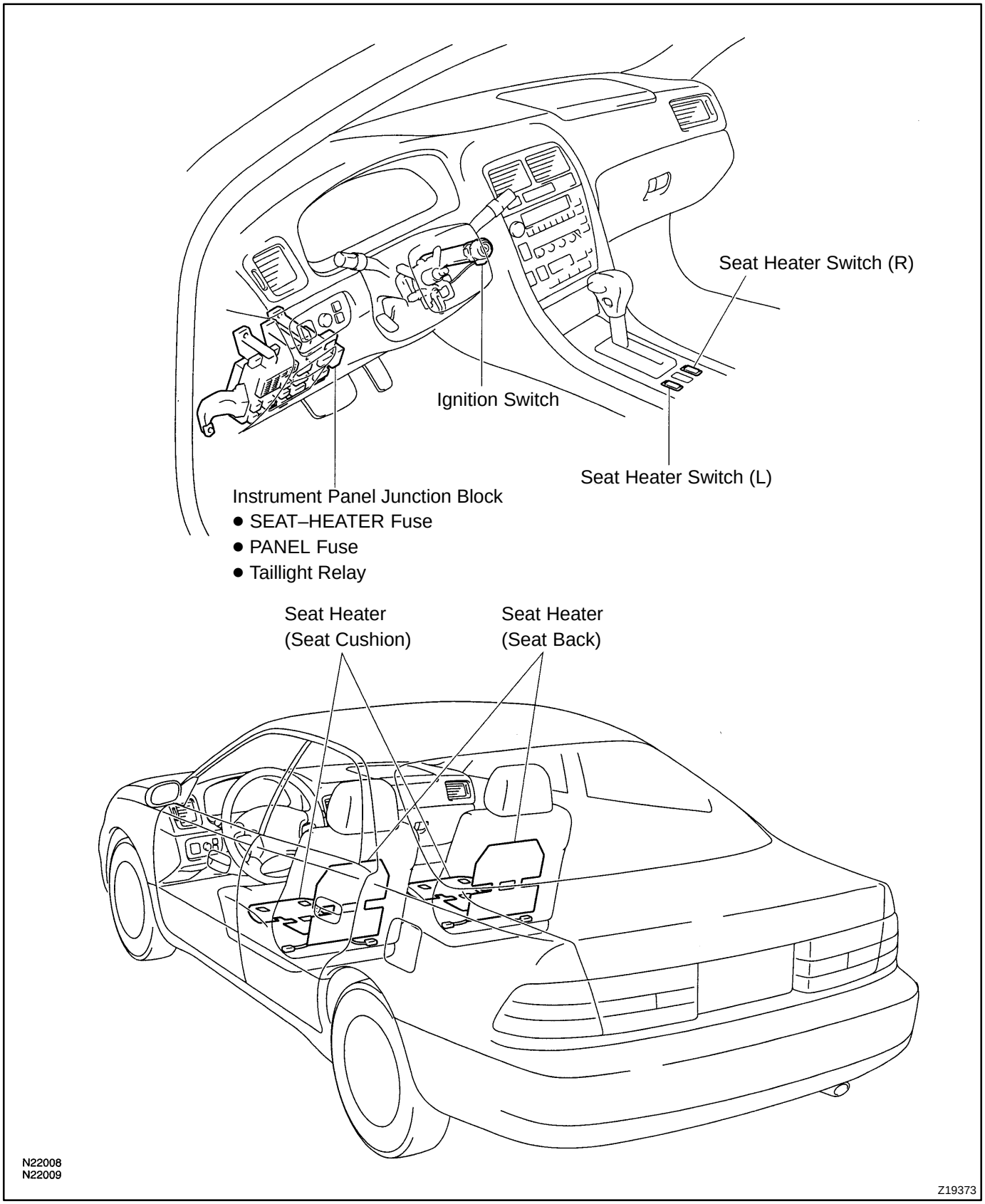
(d) Reverse the polarity, and check that the mirror turns to the right side.

If operation is not as specified, replace the mirror.

SEAT HEATER SYSTEM

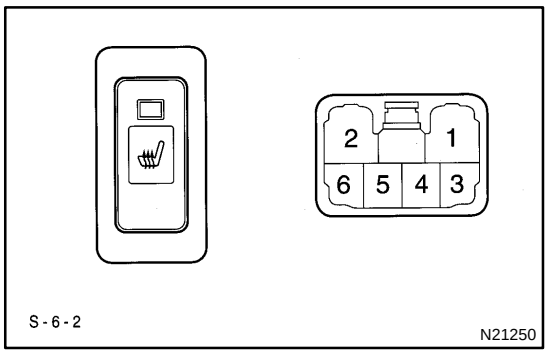
LOCATION

BE05W–01



BE05X–01

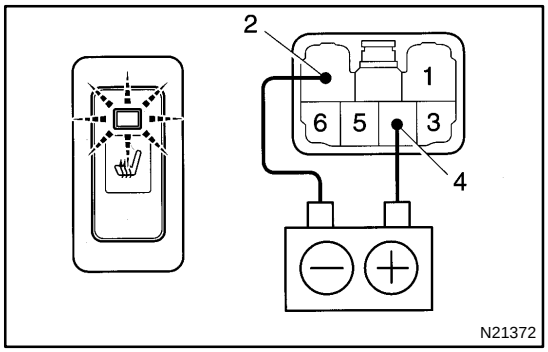
INSPECTION



1. INSPECT SEAT HEATER SWITCH CONTINUITY

Condition	Tester connection	Specified condition
OFF	2 – 6	Continuity
ON	2 – 4 – 6	Continuity
Illumination circuit	1 – 3	Continuity

If continuity is not as specified, replace the switch or bulb.

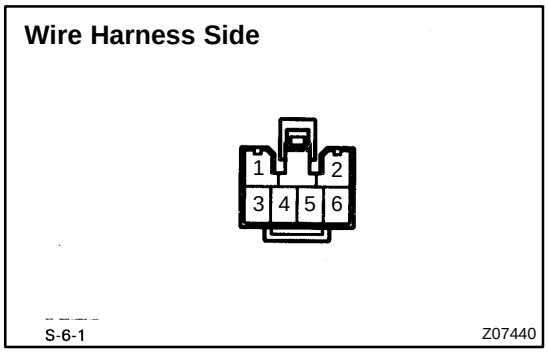


2. INSPECT SEAT HEATER SWITCH INDICATOR

(a) Connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to terminal 2.

(b) Push the switches, check that the indicator lights up.

If operation is not as specified, replace the switch and inspect the circuits connected to other parts.



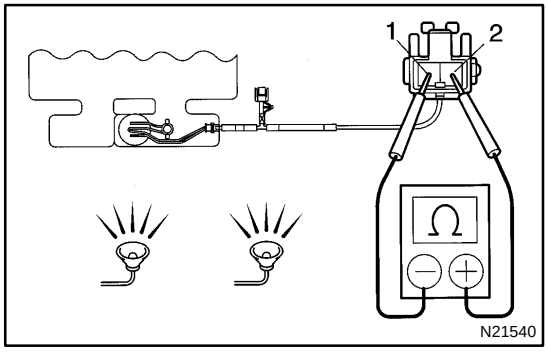
3. INSPECT SEAT HEATER SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	*Continuity
6 – Ground	Constant	*Continuity
4 – Ground	Ignition switch position LOCK or ACC	No voltage
4 – Ground	Ignition switch position ON	Battery positive voltage

*: There is resistance because this circuit is grounded through the resistance.

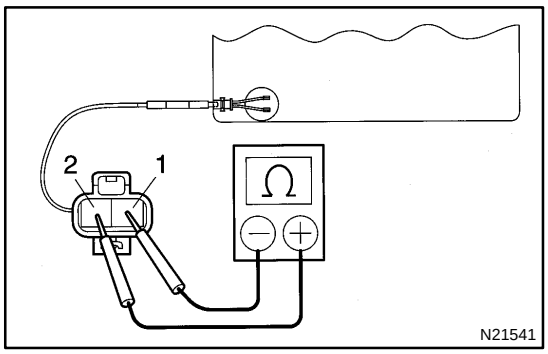
If the circuit is not as specified, inspect the circuits connected to other parts.



4. INSPECT SEAT CUSHION CONTINUITY

(a) Heat the 2 thermostats with light. Check that there is no continuity above 45˚C (113˚F) between terminals 1 and 2.

(b) Cool the 2 thermostats below 15˚C (59˚F). Check that there is continuity between terminals 1 and 2.



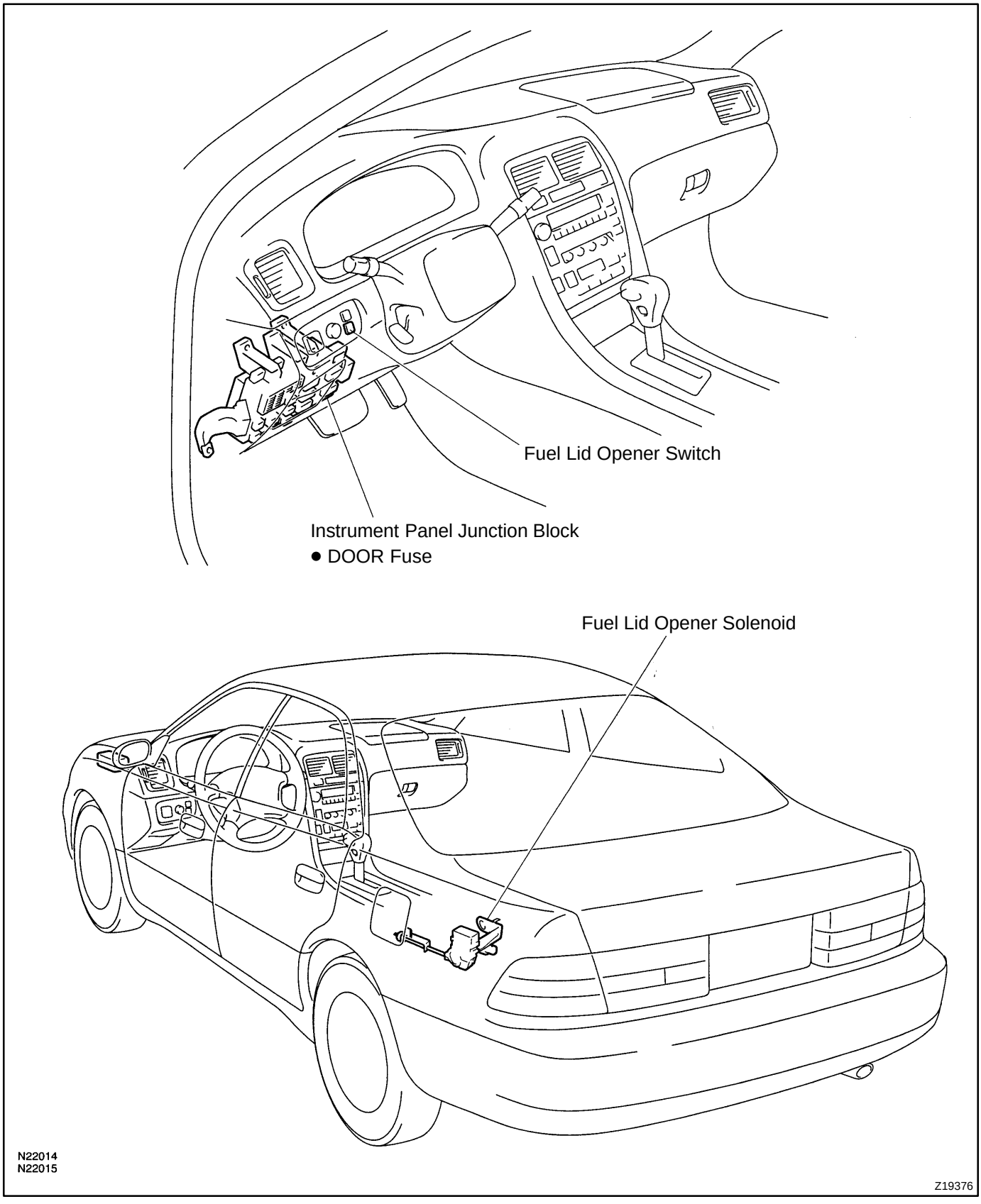
5. INSPECT SEAT BACK CONTINUITY

Check that there is continuity between terminals 1 and 2.
If continuity is not as specified, replace the seat back pad.

FUEL LID OPENER SYSTEM

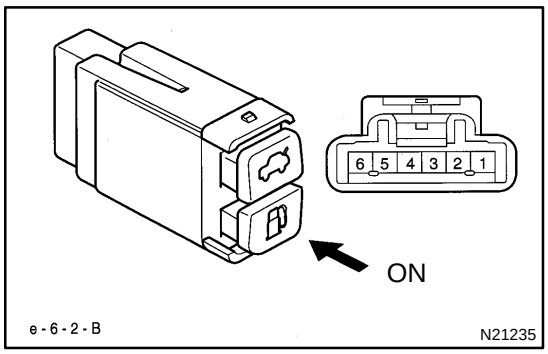
LOCATION

BE05Y–01



BE05Z–01

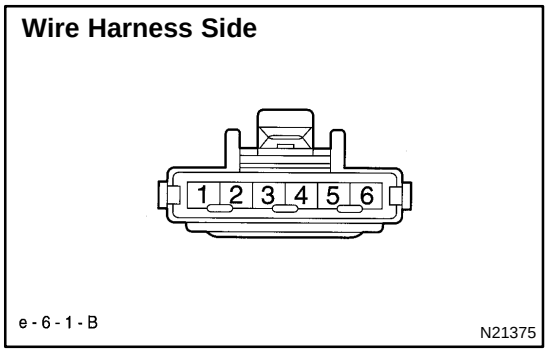
INSPECTION



1. INSPECT FUEL LID OPENER SWITCH CONTINUITY

(a) Check that continuity exists between terminals 2 and 3 with the switch ON.
(Switch button pushed)

(b) Check that no continuity exists between terminals 2 and 3 with the switch OFF.
(Switch button released)

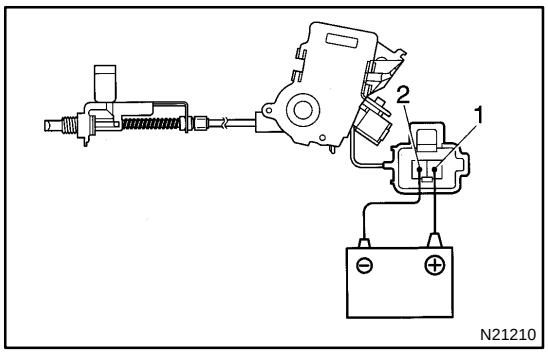


2. INSPECT FUEL LID OPENER SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
3 – Ground	Constant	Battery positive voltage

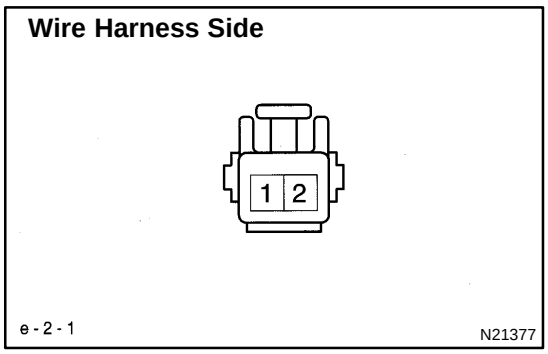
If the circuit is not specified, inspect power source or wire harness.



3. INSPECT FUEL LID OPENER SOLENOID OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the solenoid operates in the open direction.

If operation is not as specified, replace the solenoid.



4. INSPECT FUEL LID OPENER SOLENOID CIRCUIT

Disconnect the connector from the solenoid and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Fuel lid opener switch OFF	No voltage
1 – Ground	Fuel lid opener switch ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

AUDIO SYSTEM

BE060–01

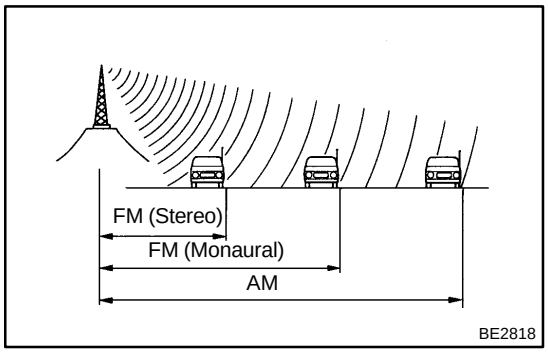
DESCRIPTION

1. RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows:

Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM		FM	
Modulation method	Amplitude modulation			Frequency modulation	

LF: Low frequency MF: Medium Frequency HF: High Frequency VHF: Very High Frequency

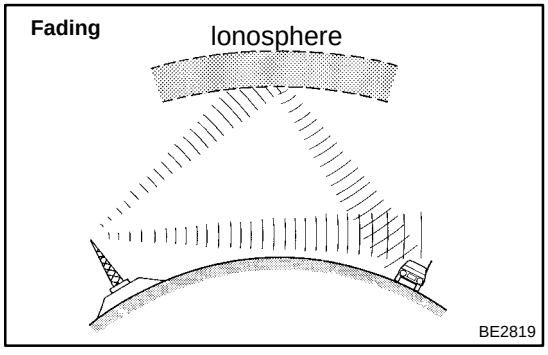


2. SERVICE AREA

There are great differences in the size of the service area for AM and FM monaural. Sometimes FM stereo broadcasts cannot be received even through AM can be received in very clearly.
Not only does FM stereo have the smallest service area, but it also picks up static and other types of interference (”noise”) easily.

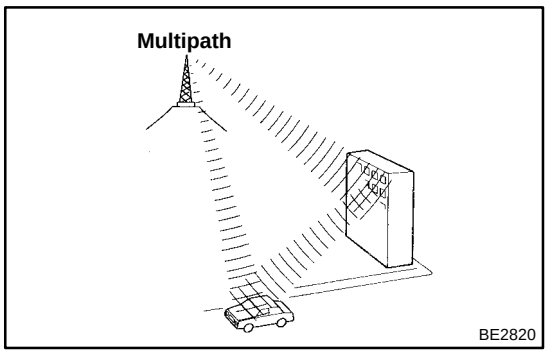
3. RECEPTION PROBLEMS

Besides the problem of static, there are also the problems called ”fading”, ”multipath” and ”fade out”. These problems are caused not by electrical noise but by the nature of the radio waves themselves.



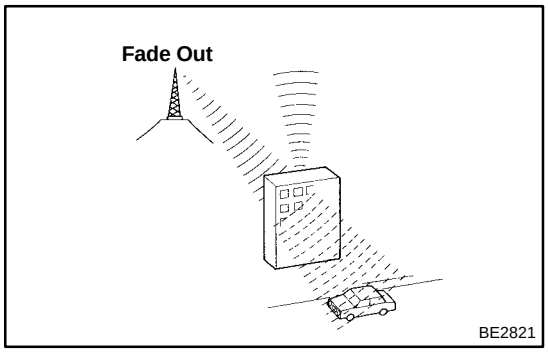
(a) Fading

Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals from the same transmitter that reach the vehicle’s antenna directly. This type of interference is called ”fading”.



(b) Multipath

One type of interference caused by the bounce of radio waves off of obstructions is called ”multipath”. Multipath occurs when a signal from the broadcast transmitter antenna bounces off buildings and mountains and interferes with the signal that is received directly.



(c) Fade Out

Because FM radio waves are of higher frequencies than AM radio waves, they bounce off buildings, mountains, and other obstructions. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind a building or other obstruction. This is called ”fade out”.

4. NOISE PROBLEMS

(a) Questionnaire for noise:

It is very important for noise troubleshooting to have good understanding of the claims from the customers, so that make the best use of following questionnaire and diagnose the problem accurately.

AM	Noise occurs at a specific place.	Strong possibility of foreign noise.
	Noise occurs when listening to faint broadcasting.	There is a case that the same program is broadcasted from each local station and that may be the case you are listening different station if the program is the same.
	Noise occurs only at night.	Strong possibility of the beat from a distant broadcasting.
FM	Noise occurs while driving and at a specific place.	Strong possibility of multipath noise and fading noise caused by the changes of FM waves.

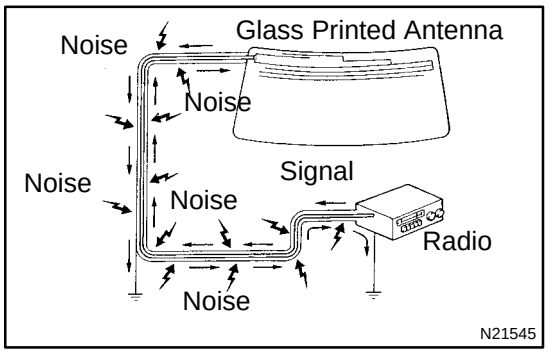
HINT:

In the case that the noise occurrence condition does not meet any of the above questionnaire, check based on the ”Trouble Phenomenon”.

Refer to above descriptions for multipath and fading.

(b) Matters that require attention when checking:

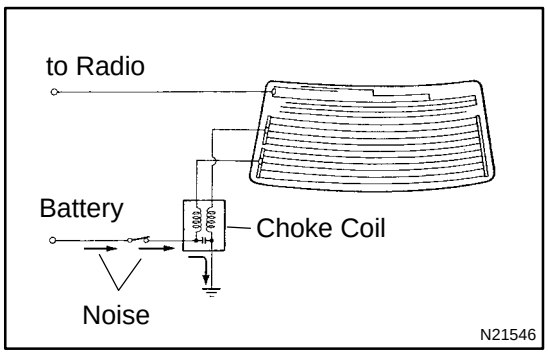
- Noise coming into the radio usually has no harm for practical use as the noise protection is taken and it is hardly thinkable for an extremely loud noise to come in. When extremely loud noise comes into the radio, check if the grounding is normal where the antenna is installed.
- Check if all the regular noise prevention parts are properly installed and if there is any installation of non–authorized parts and non–authorized wiring.
- If you leave the radio under out of tune (not tuning), it is easy to diagnose the phenomenon as noise occurs frequently.



(c) Antenna and noise:

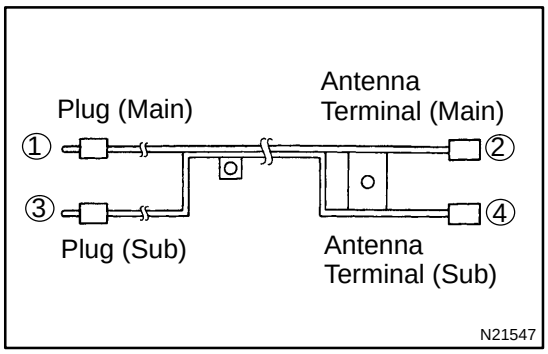
Electronic signal received by the antenna will reach to the radio transmitting through the core wire of the coaxial cable. Any noise wave other than radio wave is mixed into this core wire, that naturally causes noise in the radio and poor sound quality. In order to prevent these noises from mixing into the radio, the core wire inside the coaxial cable is covered with a mesh wire called shield wire. This shield wire shelters the noise and transmits it to the ground, thus preventing noise from mixing in.

If this shield wire has grounding failure, that causes noise.



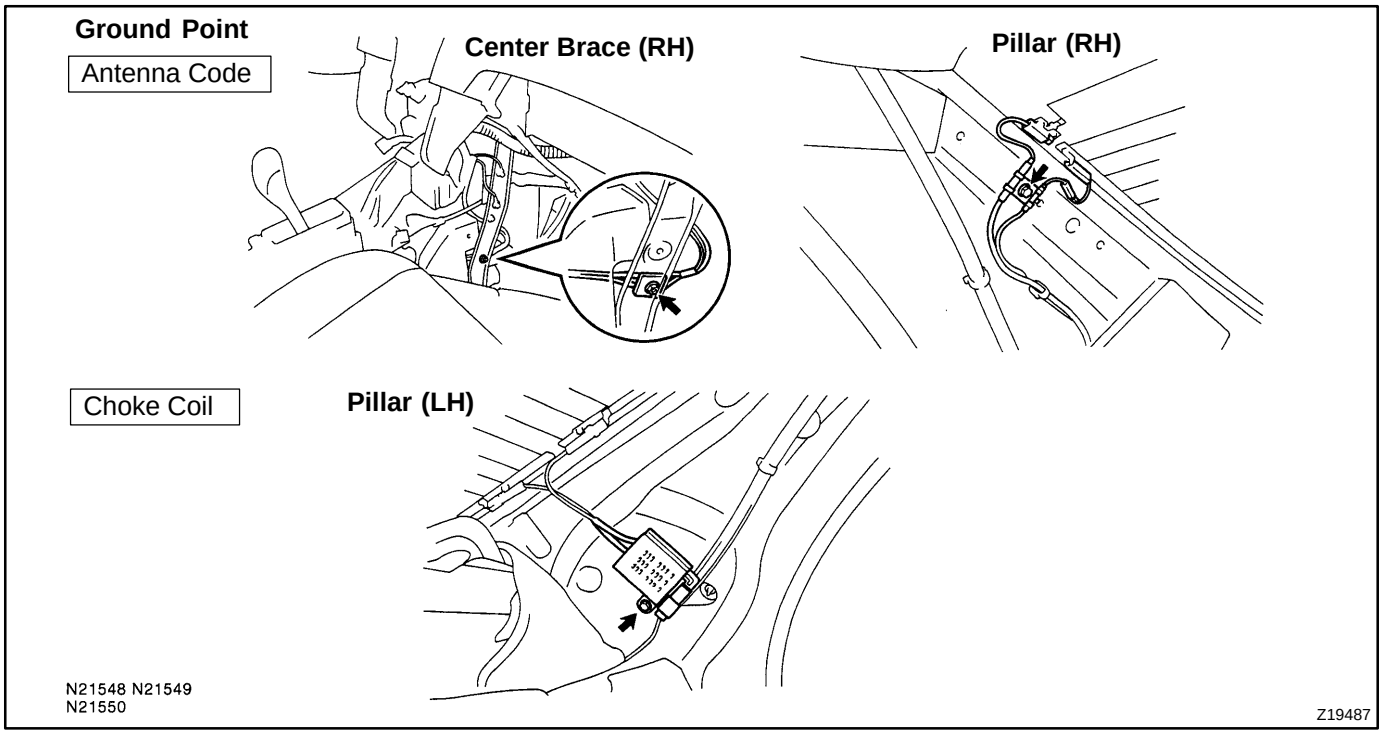
(d) Choke coil and noise:

The choke coil is connected in the rear window defogger circuit. This is connected so to prevent noise from mixing into the radio by making the noise current included in the power source of the rear window defogger flow to the ground.



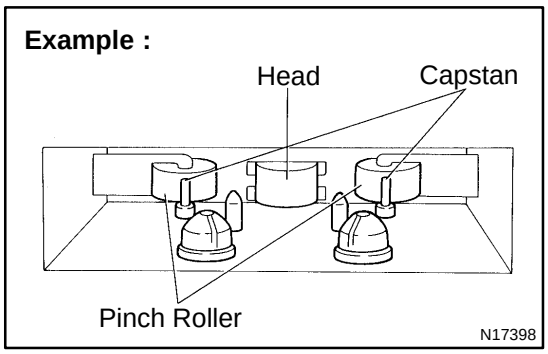
(e) Antenna code continuity check and grounding point:
HINT:
During troubleshooting, in case that the antenna code continuity check, grounding check and grounding check of the choke coil are needed, please check refering to the following illustration.

Terminal connection	Normal condition
(1) ↔ (2)	Continuity
(3) ↔ (4)	No continuity



5. COMPACT DISC PLAYER

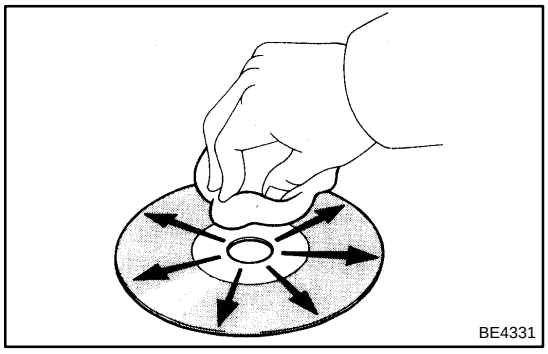
Compact Disc (hereafter called ”CD”) Players use a laser beam pick–up to read the digital signals recorded on the CD and reproduce analog signals of the music, etc. There are 4.7 in. (12 cm) and 3.2 in. (8 cm) discs in the CD player.
HINT:
Never attempt to disassemble or oil any part of the player unit. Do not insert any object other than a disc into the magazine.
NOTICE:
CD players use an invisible laser beam which could cause hazardous radiation exposure. Be sure to operate the player correctly as instructed.



6. Tape Player/Head Cleaning:
MAINTENANCE

(a) Raise the cassette door with your finger.
Next, using a pencil or similar object, push in the guide.

(b) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.



7. CD Player/Disc Cleaning:
MAINTENANCE

If the disc gets dirty, clean the disc by wiping the surface from the center to outside in the radial directions with a soft cloth.

NOTICE:

Do not use a conventional record cleaner or anti–static preservative.

BE061–01

TROUBLESHOOTING

NOTICE:

When replacing the internal mechanism (computer part) of the audio system, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement part (spare part).

HINT:

This inspection procedure is a simple troubleshooting which should be carried out on the vehicle during system operation and was prepared on the assumption of system component troubles (except for the wires and connectors, etc.).

Always inspect the trouble taking the following items into consideration.

Open or short circuit of the wire harness

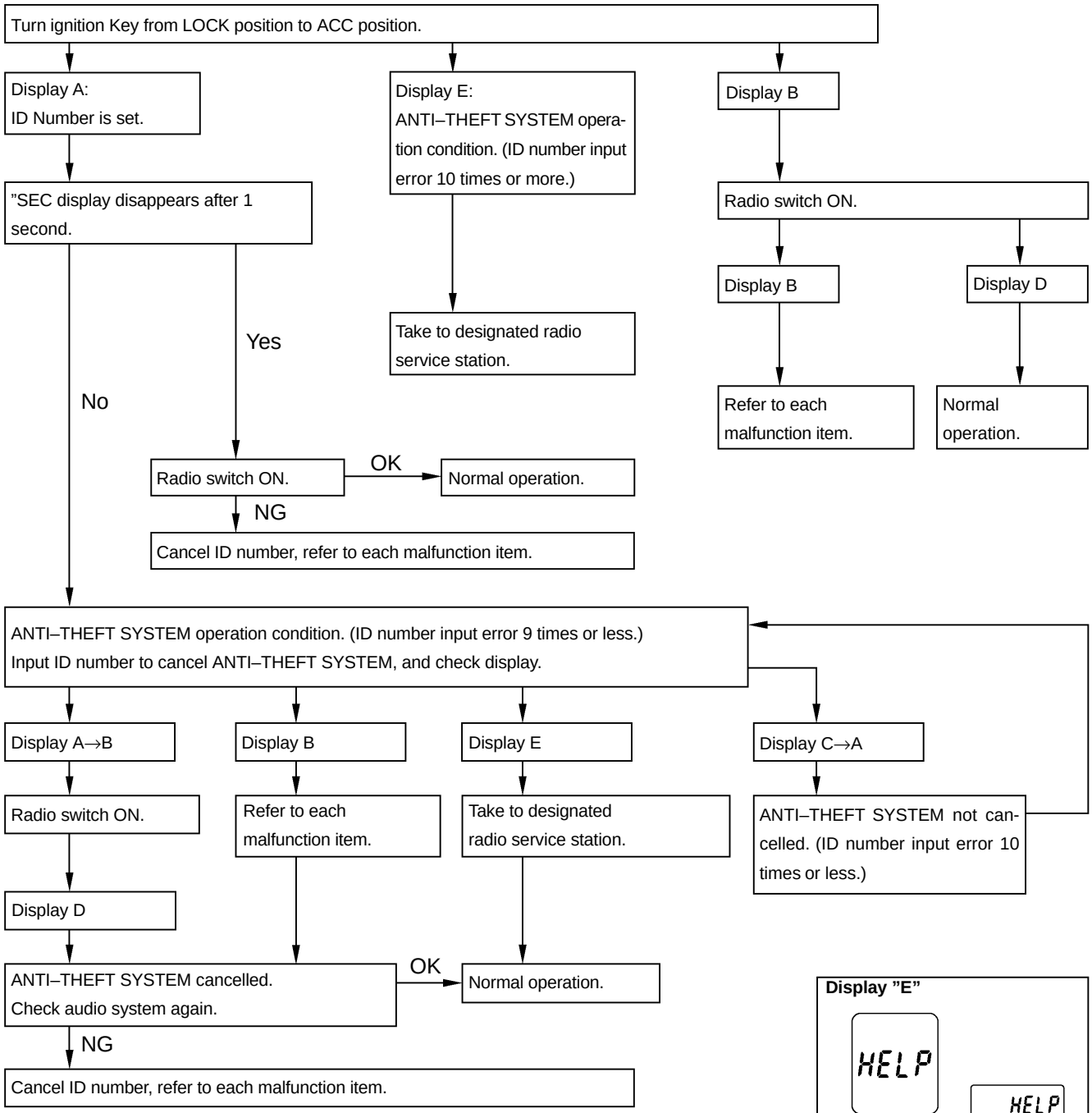
Connector or terminal connection fault

For audio systems with anti–theft system, troubleshooting items marked (*) indicate that ”Troubleshooting for ANTI–THEFT SYSTEM” should be carried out first.

	Problem	No.
Radio	Radio not operating when power switch turned to ’ON’.	1
	Display indicates when power switch turned to ’ON’, but no sound (including ’noise’) is produced.	2
	Noise present, but AM – FM not operating.	3
	Any speaker does not work.	4
	Either AM or FM does not work.	5
	Few preset turning bands.	5
	Reception poor.	6
	Sound quality poor.	7
	Preset memory disappears.	8
Tape Player	Cassette tape cannot be inserted.	9
	Cassette tape inserts, but no power.	10
	Power coming in, but tape player not operating.	11
	Any speaker does not work.	12
	Sound quality poor.	13
	Tape jammed, malfunction with tape speed or auto–reverse.	14
	Cassette tape will not eject.	15
CD Player	CD cannot be inserted.	16
	CD inserted, but no power.	17
	Power coming in, but CD player not operating.	18
	Sound jumps.	19
	Sound quality poor (Volume faint).	20
	Any speaker does not work.	21
	CD will not be ejected.	22
Noise	Noise occurs	23
	Noise produced by vibration or shock while driving.	24
	Noise produced when engine starts.	25

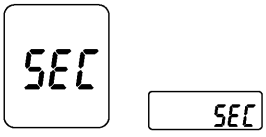
The term ”AM” includes LW,MW and SW, and the term ”FW” includes UKW.

Troubleshooting for ANTI–THEFT SYSTEM



Liquid Crystal Display (LCD) or VFD for Audio System

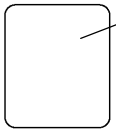
Display "A"



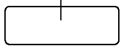
2 DIN Type

1 DIN Type

Display "B"

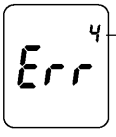


2 DIN Type

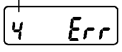


1 DIN Type

Display "C"



2 DIN Type



1 DIN Type

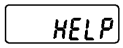
Display "D" Example:

2 DIN Type

1 DIN Type

Display "E"

2 DIN Type



1 DIN Type

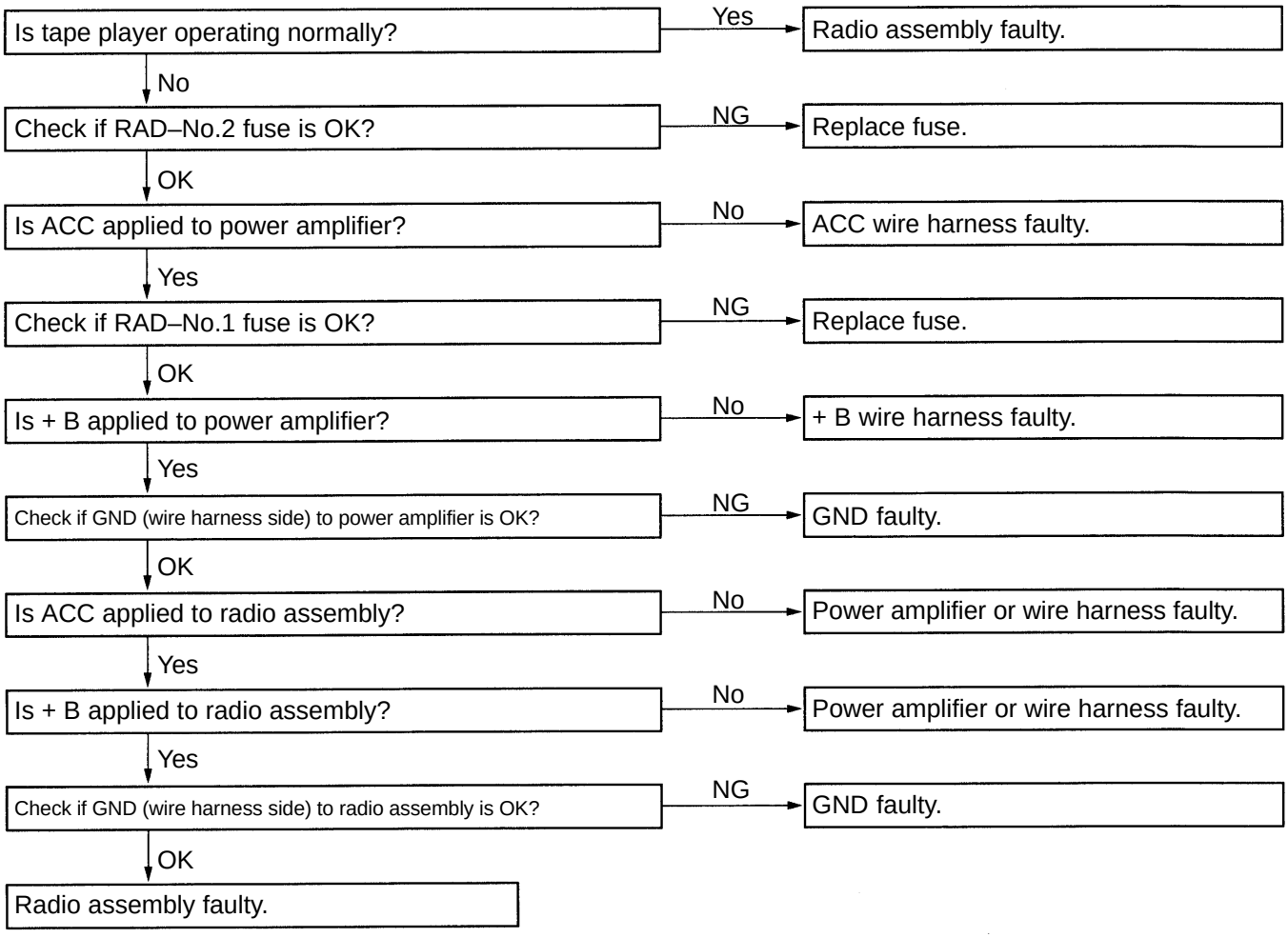
HINT:

- Refer to Owner's Manual for operation details of ANTI–THEFT SYSTEM.
- When the ID number has been cancelled, reset the same number after completing the operation, or inform the customer that it has been cancelled.

V08418

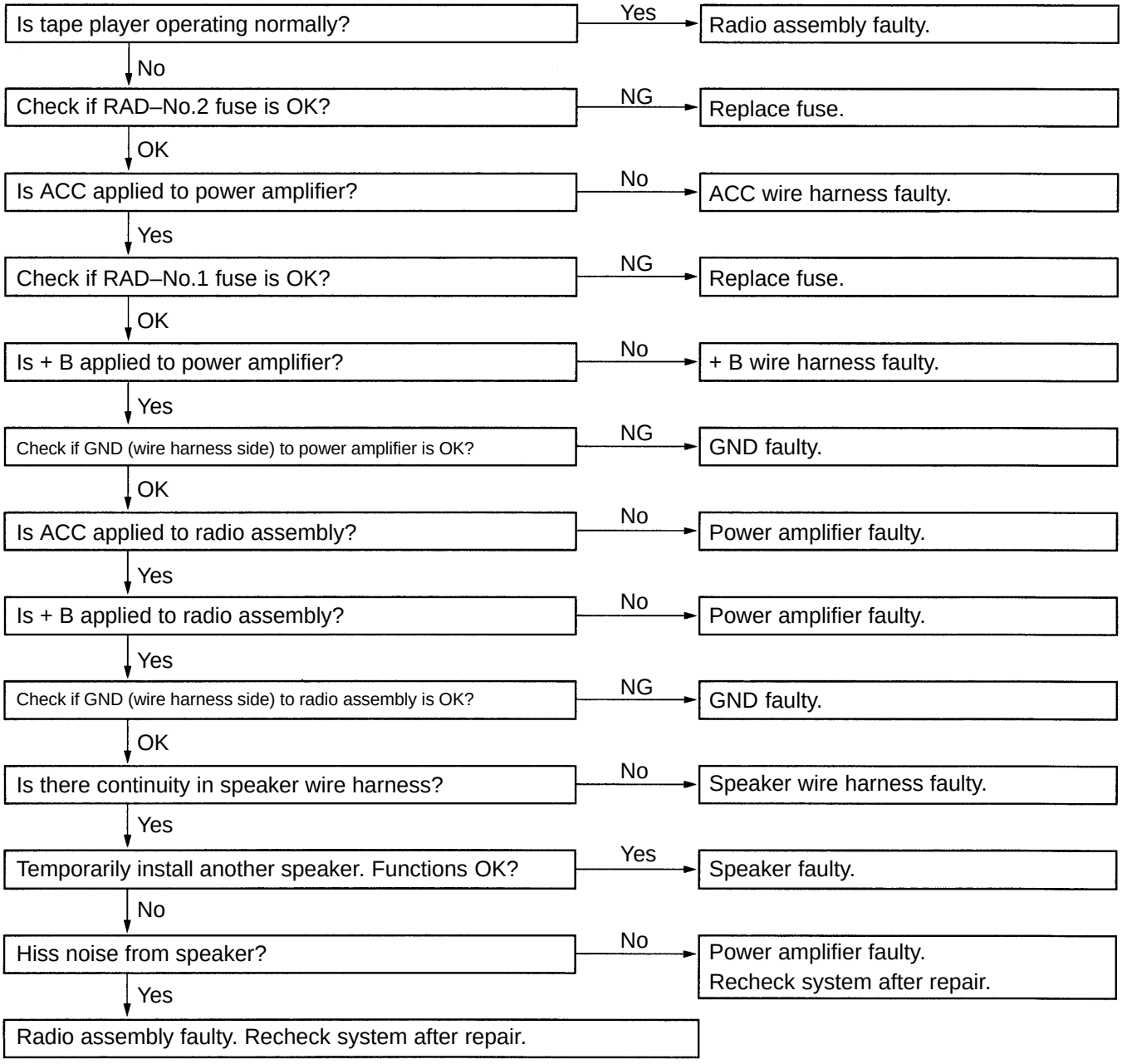
*

1	Radio	RADIO NOT OPERATING WHEN POWER SWITCH TURNED TO "ON"



V08480

2	Radio	DISPLAY INDICATES WHEN POWER SWITCH TURNED TO "ON", BUT NO SOUND (INCLUDING "NOISE") IS PRODUCED



V08481

3	Radio	NOISE PRESENT, BUT AM–FM NOT OPERATING

Go to No.25

If radio side faulty. → Radio faulty.

4	Radio	ANY SPEAKER DOSE NOT WORK

Is tape player operating normally? Yes → Radio assembly faulty.

No

Is hiss noise produced by non–functioning speaker? Yes → Radio assembly faulty. Recheck system after repair.

No

Is there continuity in speaker wire harness? No → Speaker wire harness faulty.

Yes

Temporarily install another speaker? Functions OK? Yes → Speaker faulty.

No

Power amplifier faulty. Recheck system after repair.

5	Radio	EITHER AM OR FM DOES NOR WORK FEW PRESET TUNING BANDS

Problem with radio wave signals or location? Yes → Poor signals, poor location.

No

Are both AM and FM defective? Yes → Radio assembly faulty.

No

Is power for the antenna being output from the radio assembly? No → Radio assembly faulty.

Yes

Go to No.16

Is tape player operating normally? Yes → Radio assembly faulty.

No

Temporarily install another speaker. Functions OK? Yes → Speaker faulty.

No

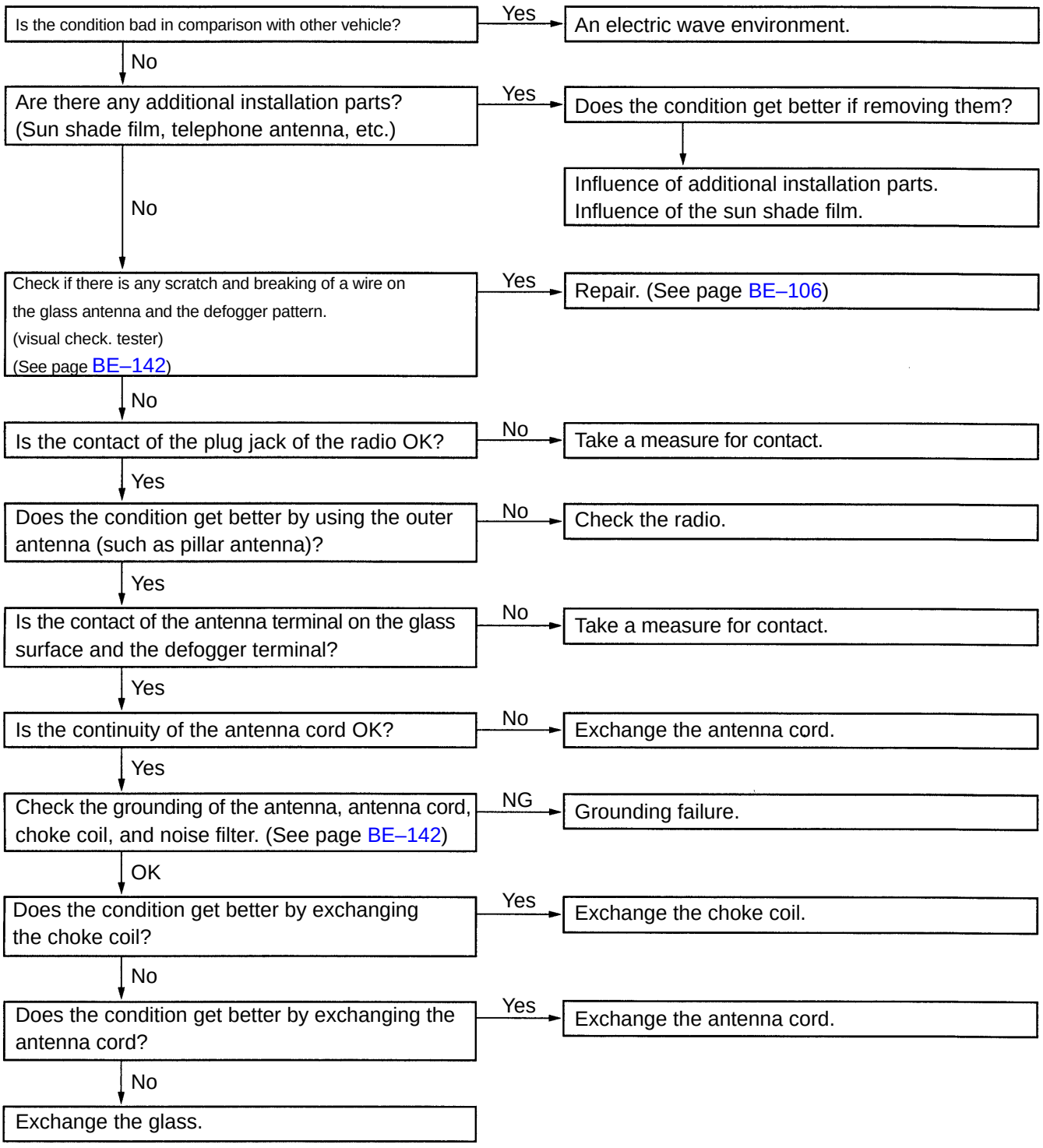
Hiss noise from speaker? No → Power amplifier faulty. Recheck system after repair.

Yes

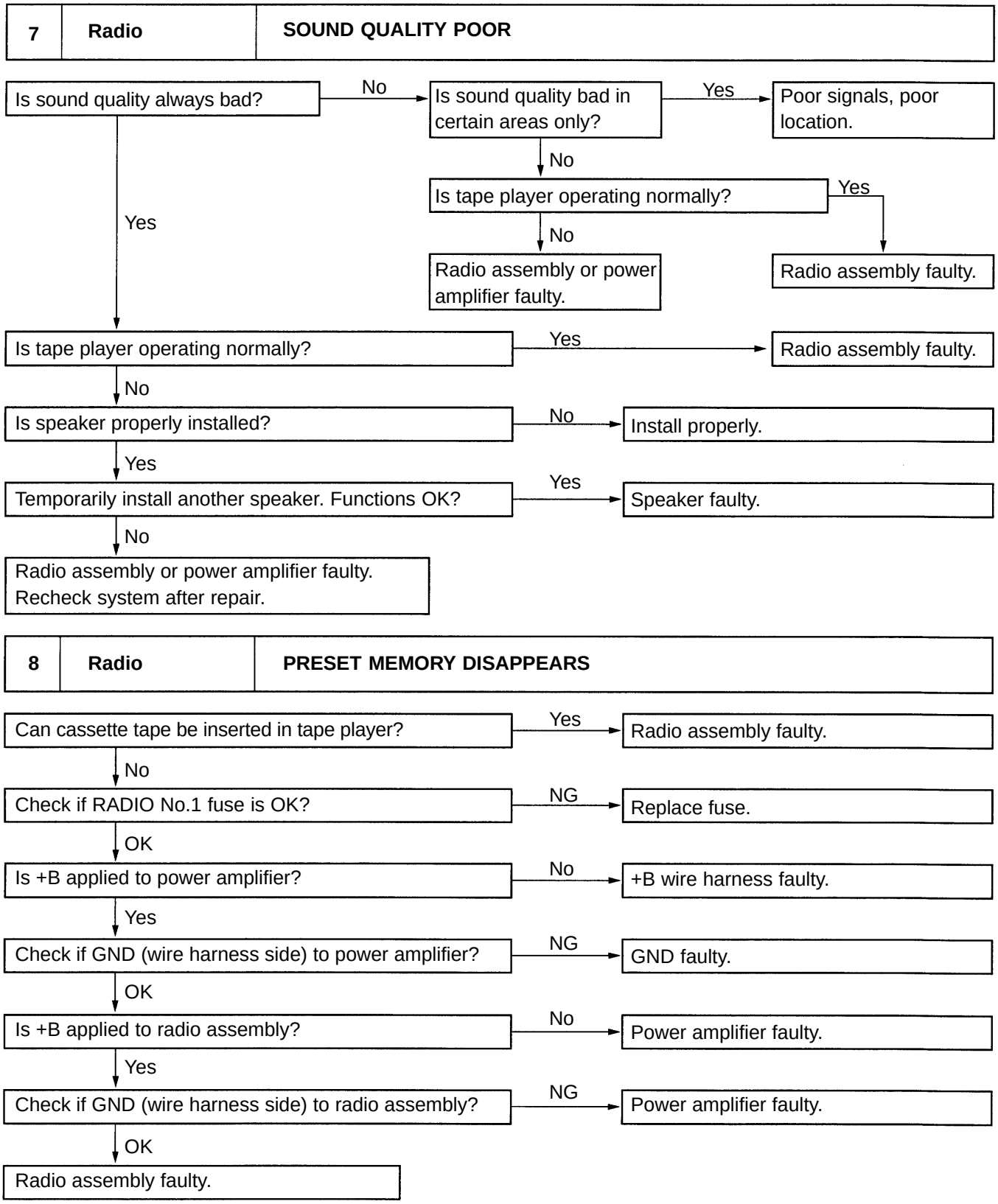
Radio assembly faulty. Recheck system after repair.

V08482

6	Radio	POOR RECEPTION

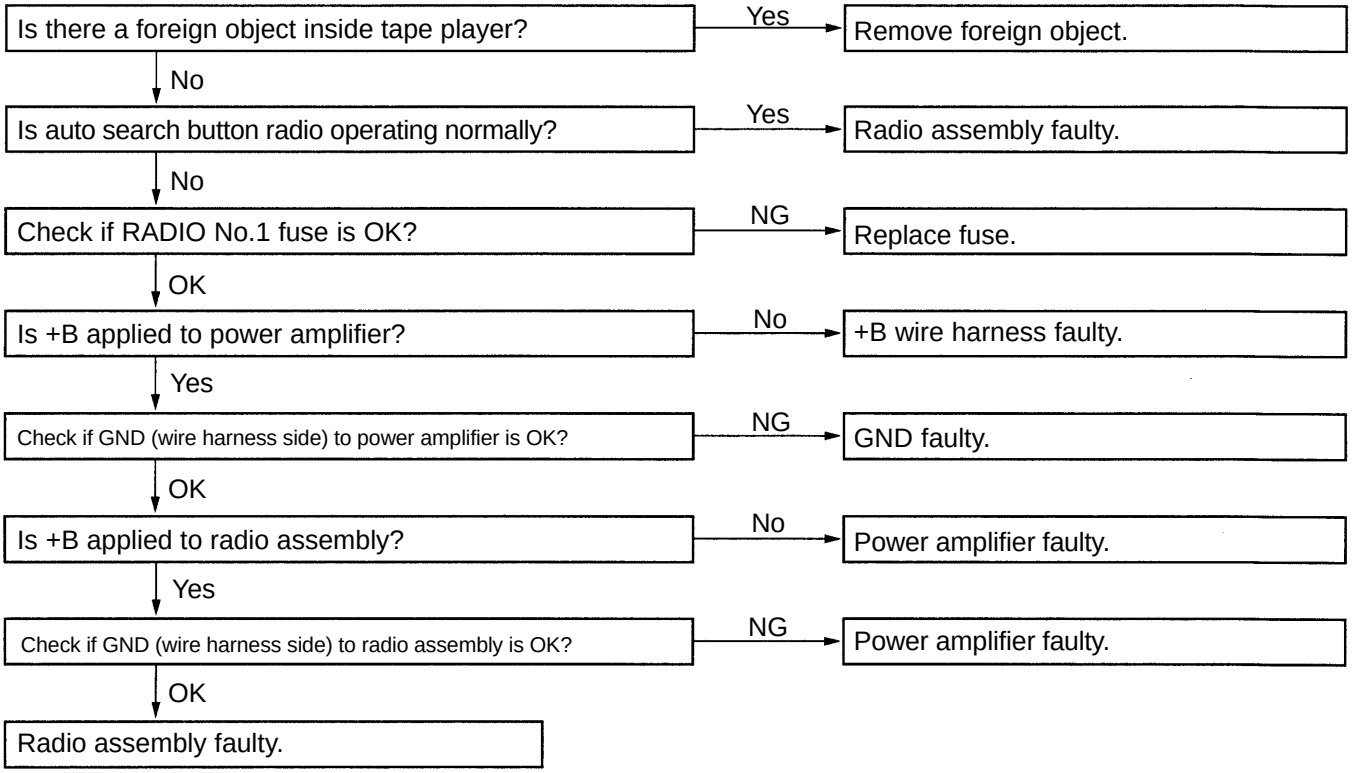


V08549

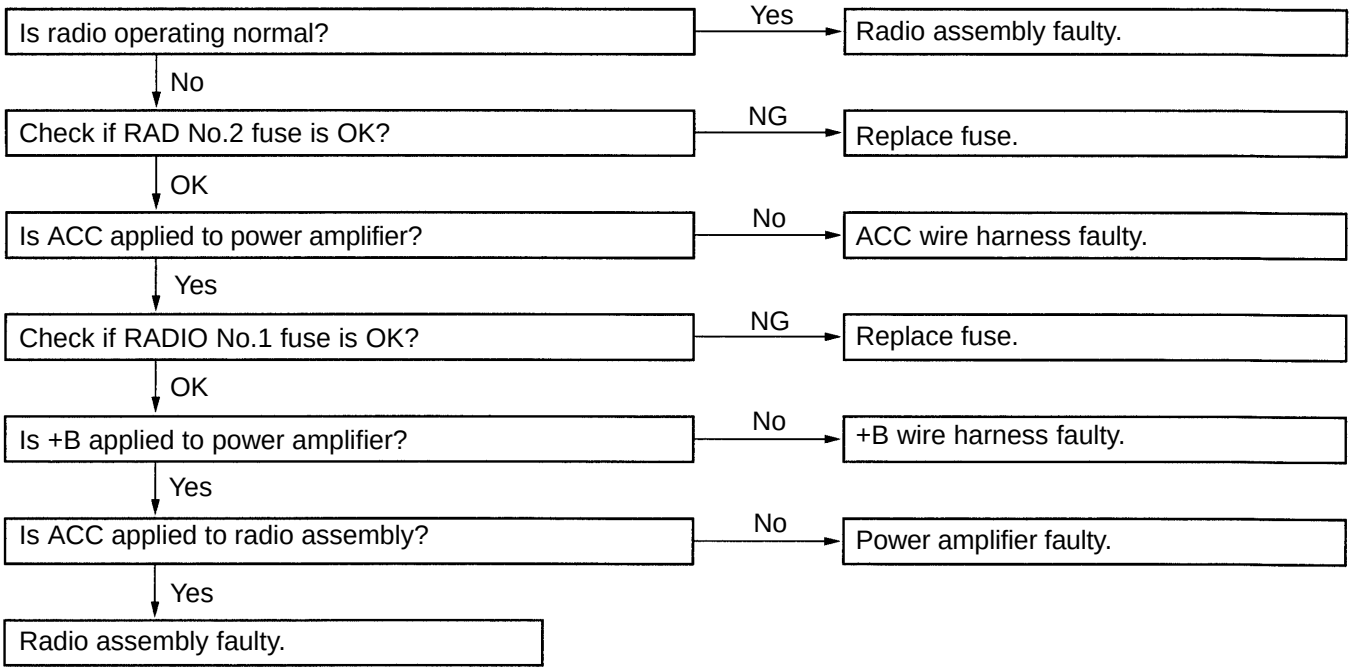

7
Radio
SOUND QUALITY POOR
Is sound quality always bad?
No
Is sound quality bad in certain areas only?
Yes
Poor signals, poor location.
No
Is tape player operating normally?
Yes
Radio assembly faulty.
No
Radio assembly or power amplifier faulty.
Yes
Is tape player operating normally?
Yes
Radio assembly faulty.
No
Is speaker properly installed?
No
Install properly.
Yes
Temporarily install another speaker. Functions OK?
Yes
Speaker faulty.
No
Radio assembly or power amplifier faulty.
Recheck system after repair.
8
Radio
PRESET MEMORY DISAPPEARS
Can cassette tape be inserted in tape player?
Yes
Radio assembly faulty.
No
Check if RADIO No.1 fuse is OK?
NG
Replace fuse.
OK
Is +B applied to power amplifier?
No
+B wire harness faulty.
Yes
Check if GND (wire harness side) to power amplifier?
NG
GND faulty.
OK
Is +B applied to radio assembly?
No
Power amplifier faulty.
Yes
Check if GND (wire harness side) to radio assembly?
NG
Power amplifier faulty.
OK
Radio assembly faulty.

V08483

9	Tape Player	CASSETTE TAPE CANNOT BE INSERTED

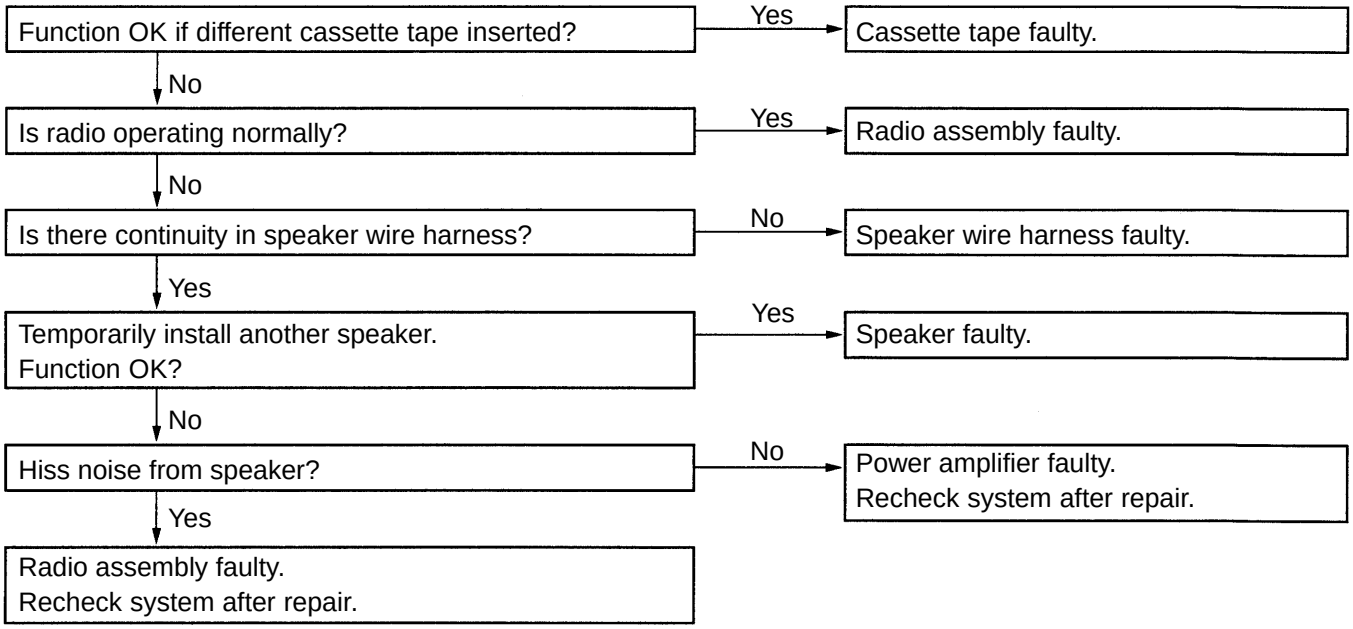


10	Tape Player	CASSETTE TAPE INSERTED, BUT NO POWER

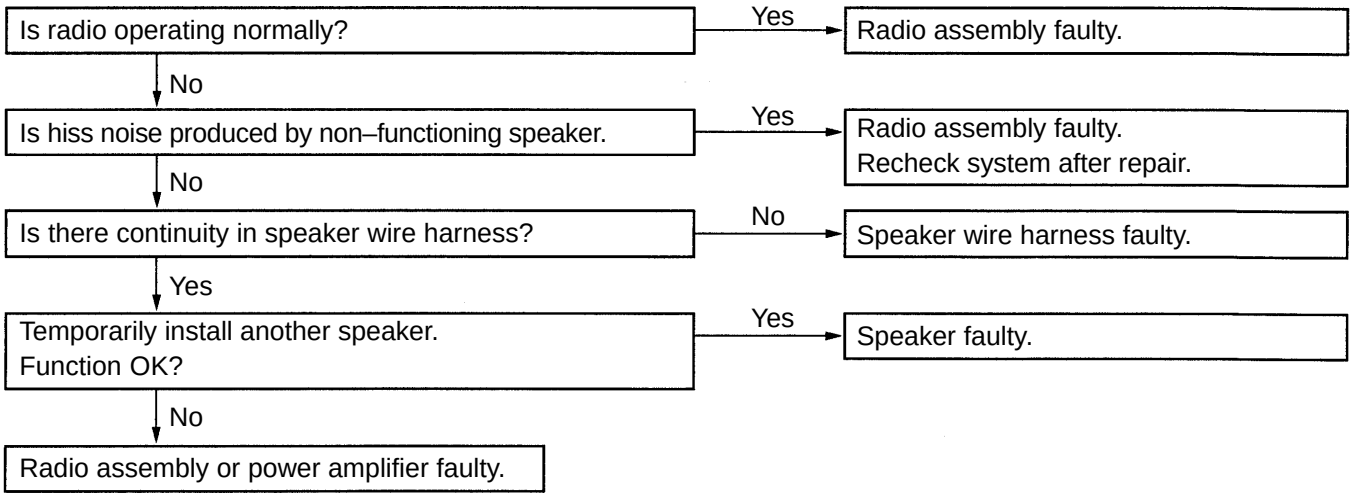


V08484

11	Tape Player	POWER COMING IN, BUT TAPE PLAYER NOT OPERATING



12	Tape Player	EITHER SPEAKER DOES NOT WORK



V08485

13	Tape Player	SOUND QUALITY POOR (VOLUME FAINT)

Function OK if different cassette tape inserted?
- Yes → Cassette tape faulty.
- No → Operates normally after cleaning the heads?
  - Yes → Head dirty.
  - No → Is radio operating normally?
    - Yes → Radio assembly faulty.
    - No → Is speaker properly installed?
      - No → Install properly.
      - Yes → Temporarily install another speaker. Function OK?
        - Yes → Speaker faulty.
        - No → Radio assembly faulty.

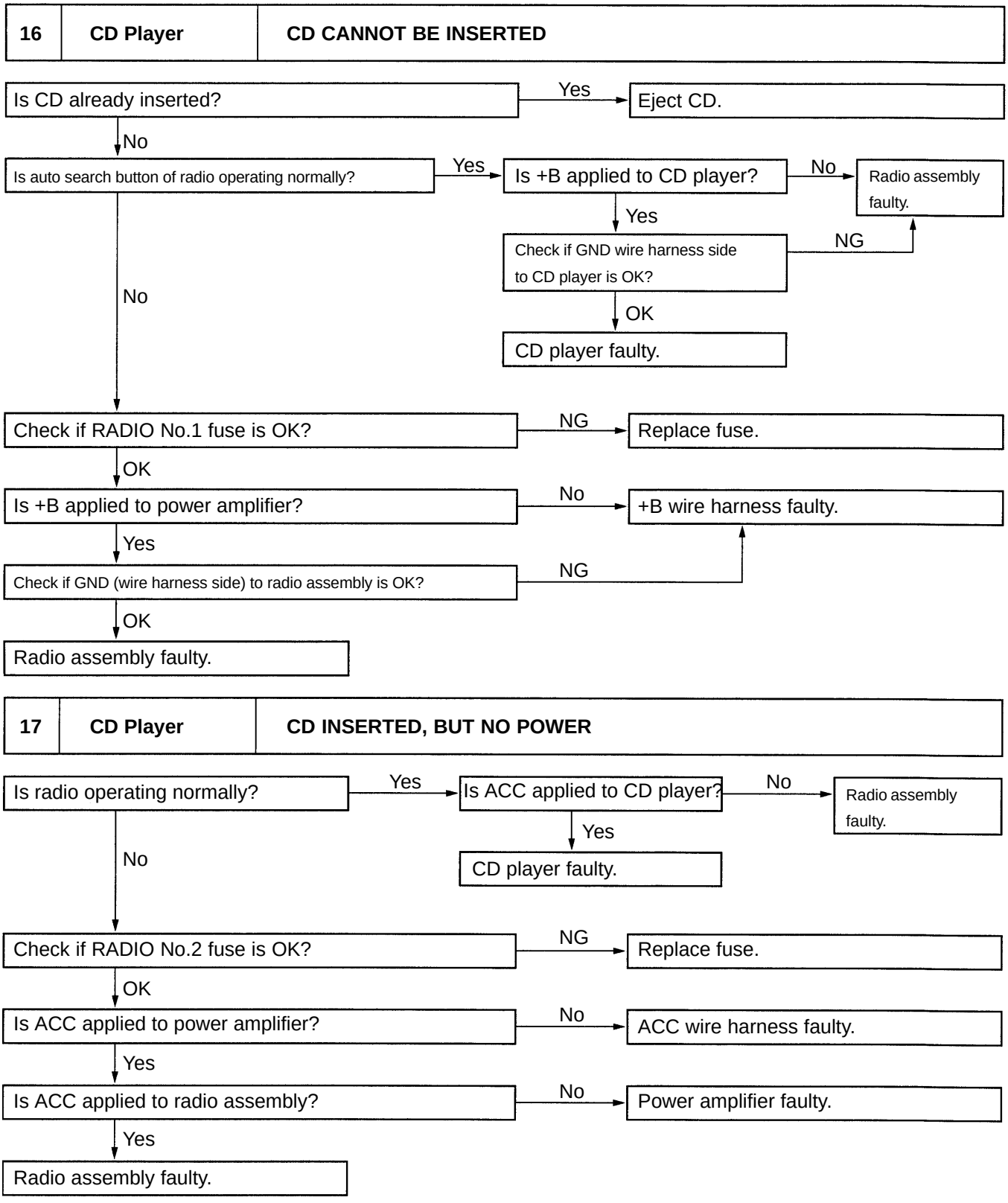
14	Tape Player	TAPE JAMMED MALFUNCTION WITH TAPE SPEED OR AUTO–REVERSE

Function OK if different tape (less than 120 mins.) is inserted?
- Yes → Cassette tape faulty.
- No → Is there a foreign object inside tape player?
  - Yes → Remove foreign object.
  - No → Operates normally after cleaning the heads?
    - Yes → Head dirty.
    - No → Radio assembly faulty.

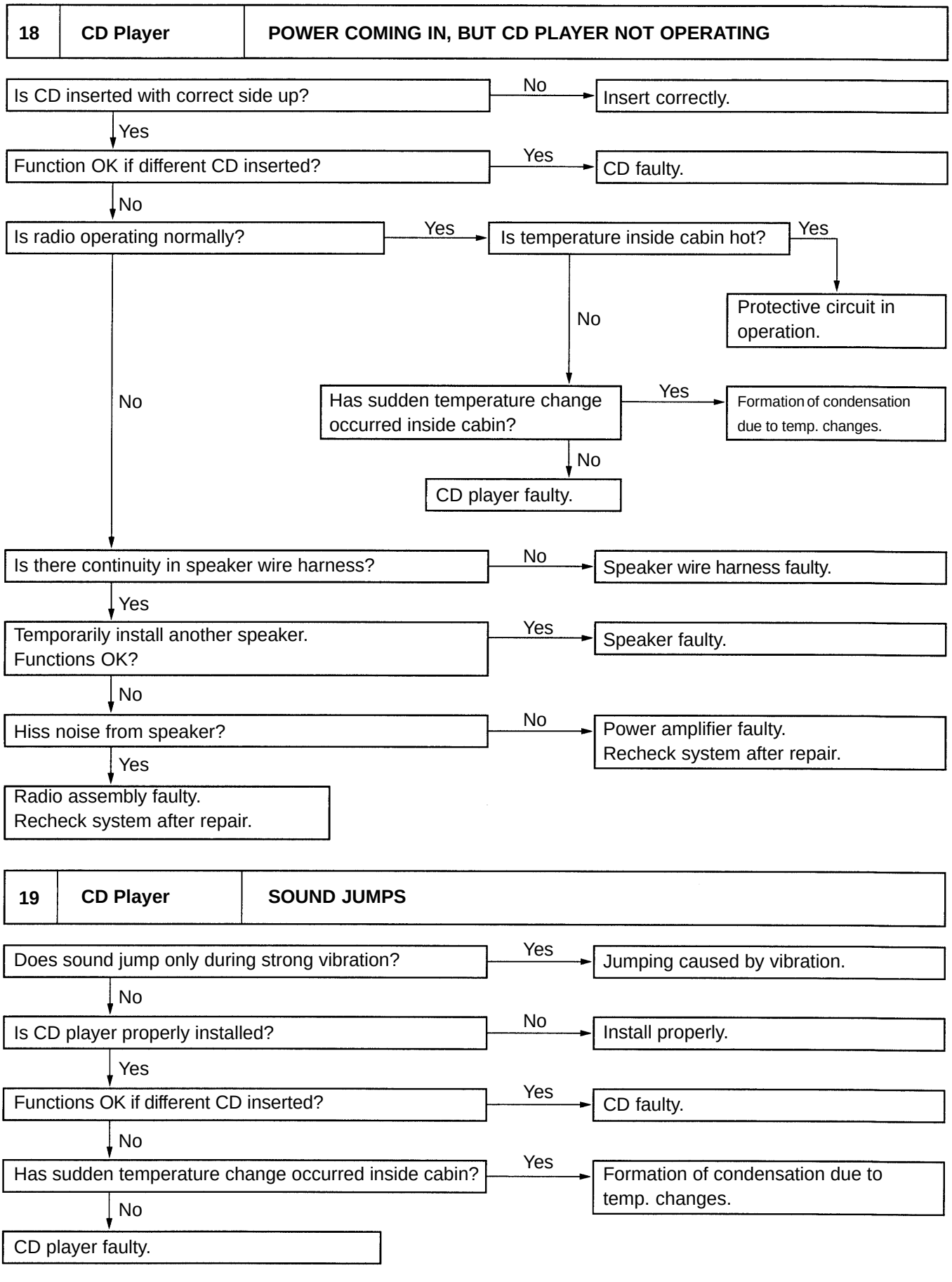
15	Tape Player	CASSETTE TAPE WILL NOT EJECTED

Is tape player operating normally?
- No → Cassette tape jammed.
- Yes → Is auto search button of radio operating normally?
  - Yes → Radio assembly faulty.
  - No → Check if RADIO No.1 fuse is OK?
    - NG → Replace fuse.
    - OK → Is –B applied to power amplifier?
      - No → +B wire harness faulty.
      - Yes → Is +B applied to radio assembly?
        - No → Power amplifier faulty.
        - Yes → Radio assembly faulty.

V08486

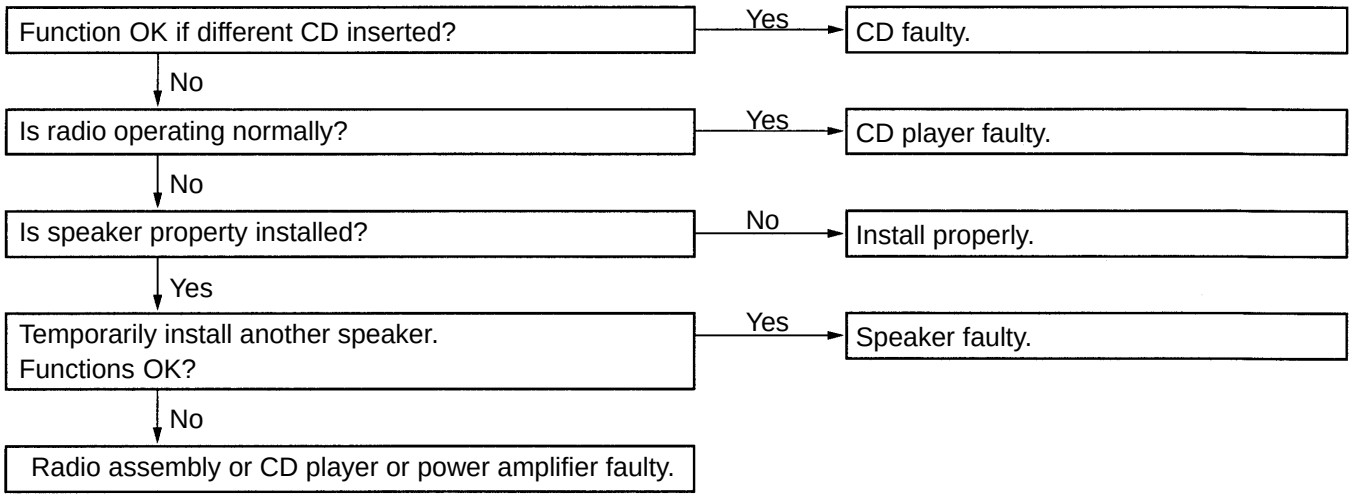

16
CD Player
CD CANNOT BE INSERTED
Is CD already inserted?
Yes
Eject CD.
No
Is auto search button of radio operating normally?
Yes
Is +B applied to CD player?
No
Radio assembly faulty.
Yes
Check if GND wire harness side to CD player is OK?
NG
OK
CD player faulty.
No
Check if RADIO No.1 fuse is OK?
NG
Replace fuse.
OK
Is +B applied to power amplifier?
No
+B wire harness faulty.
Yes
Check if GND (wire harness side) to radio assembly is OK?
NG
OK
Radio assembly faulty.
17
CD Player
CD INSERTED, BUT NO POWER
Is radio operating normally?
Yes
Is ACC applied to CD player?
No
Radio assembly faulty.
Yes
CD player faulty.
No
Check if RADIO No.2 fuse is OK?
NG
Replace fuse.
OK
Is ACC applied to power amplifier?
No
ACC wire harness faulty.
Yes
Is ACC applied to radio assembly?
No
Power amplifier faulty.
Yes
Radio assembly faulty.

V08487

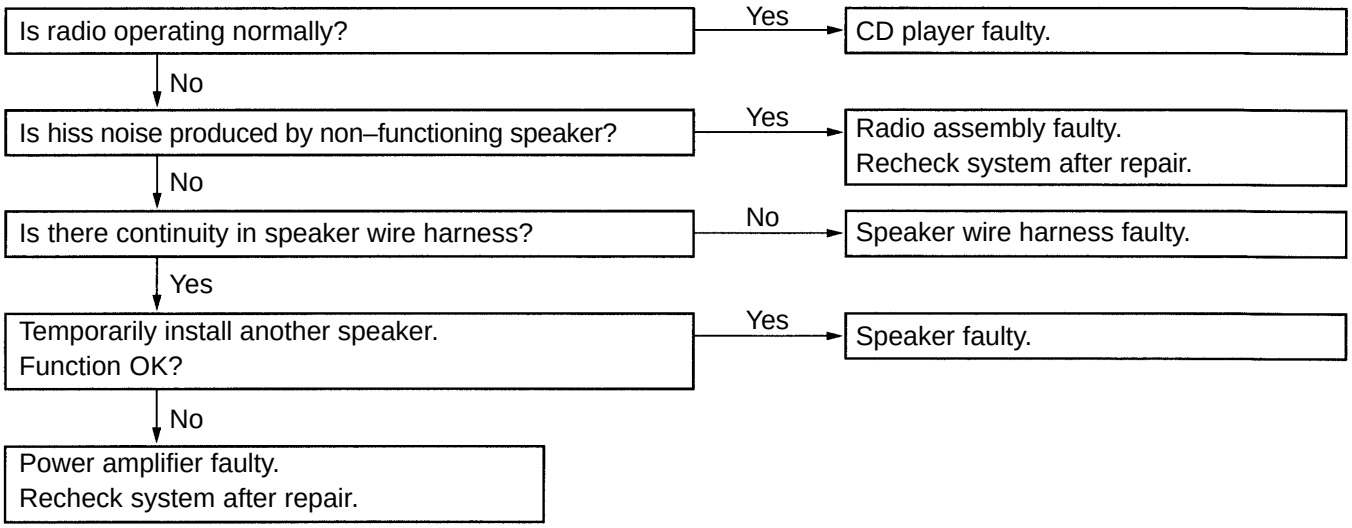

18
CD Player
POWER COMING IN, BUT CD PLAYER NOT OPERATING
Is CD inserted with correct side up?
No
Insert correctly.
Yes
Function OK if different CD inserted?
Yes
CD faulty.
No
Is radio operating normally?
Yes
Is temperature inside cabin hot?
Yes
Protective circuit in operation.
No
Has sudden temperature change occurred inside cabin?
Yes
Formation of condensation due to temp. changes.
No
CD player faulty.
No
Is there continuity in speaker wire harness?
No
Speaker wire harness faulty.
Yes
Temporarily install another speaker. Functions OK?
Yes
Speaker faulty.
No
Hiss noise from speaker?
No
Power amplifier faulty. Recheck system after repair.
Yes
Radio assembly faulty. Recheck system after repair.
19
CD Player
SOUND JUMPS
Does sound jump only during strong vibration?
Yes
Jumping caused by vibration.
No
Is CD player properly installed?
No
Install properly.
Yes
Functions OK if different CD inserted?
Yes
CD faulty.
No
Has sudden temperature change occurred inside cabin?
Yes
Formation of condensation due to temp. changes.
No
CD player faulty.

V08550

20	CD Player	SOUND QUALITY POOR (VOLUME FAINT)

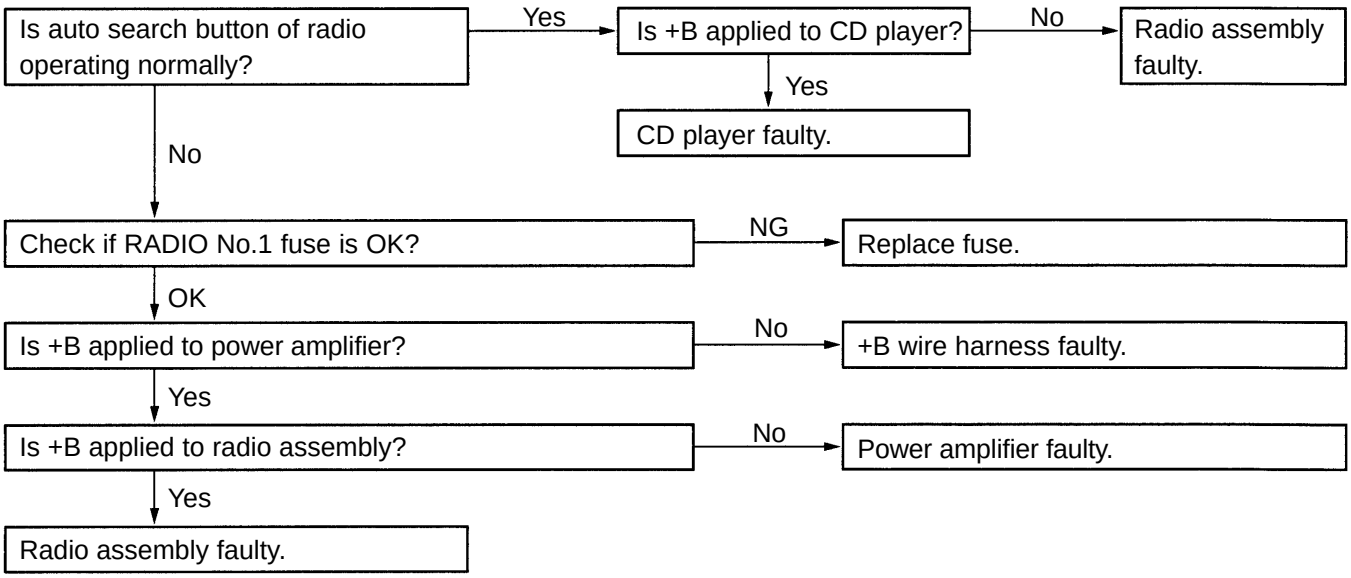


21	CD Player	EITHER SPEAKER DOES NOT WORK



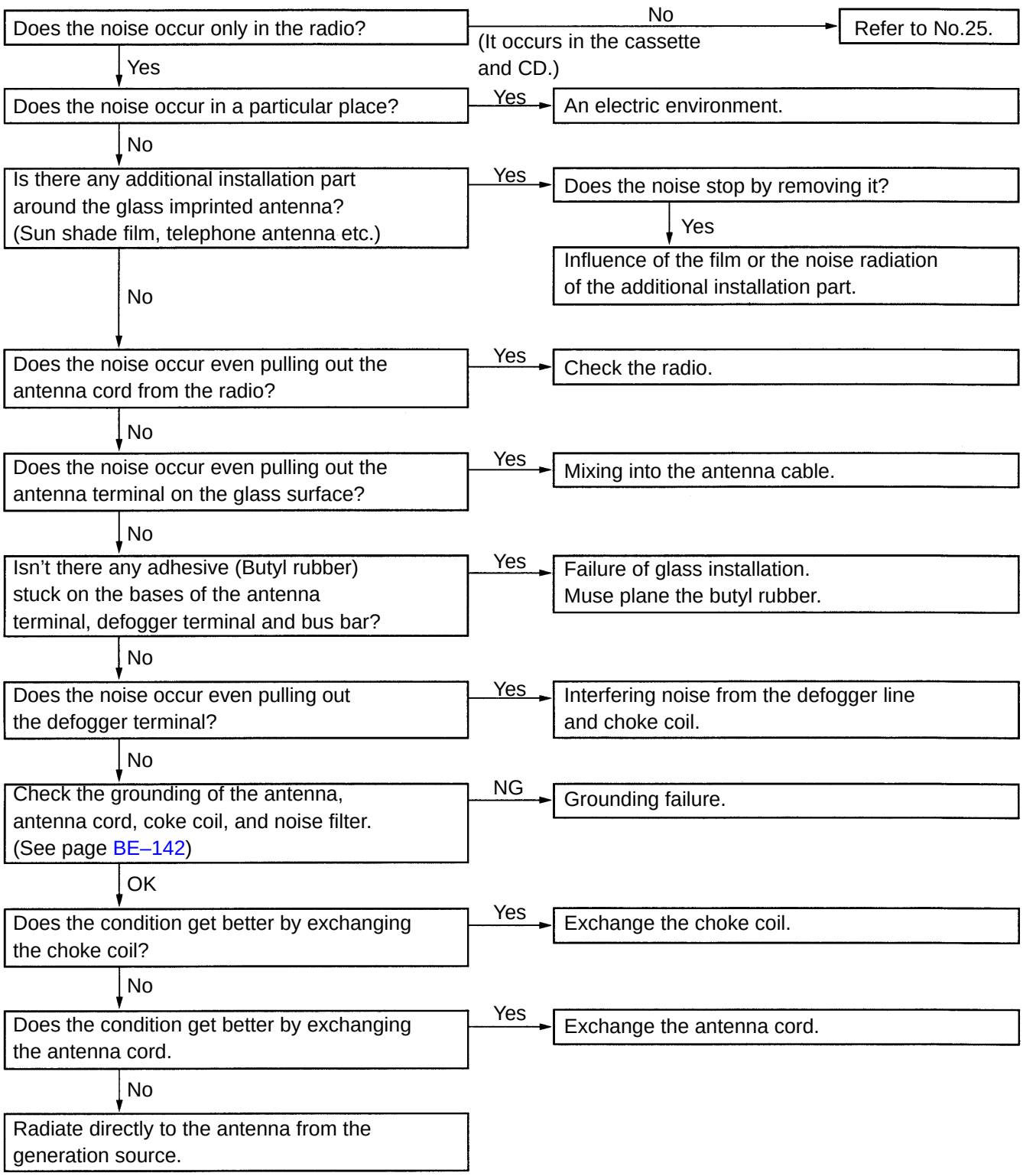
V08551

22	CD Player	CD WILL NOT BE EJECTED

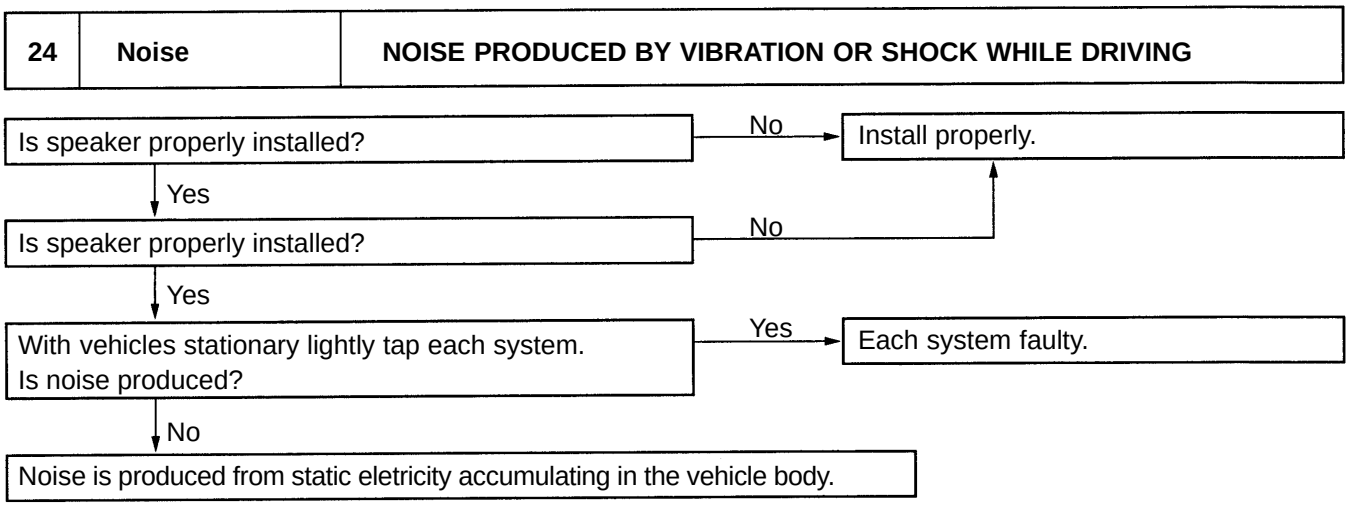


V08488

23	Noise	NOISE OCCURS

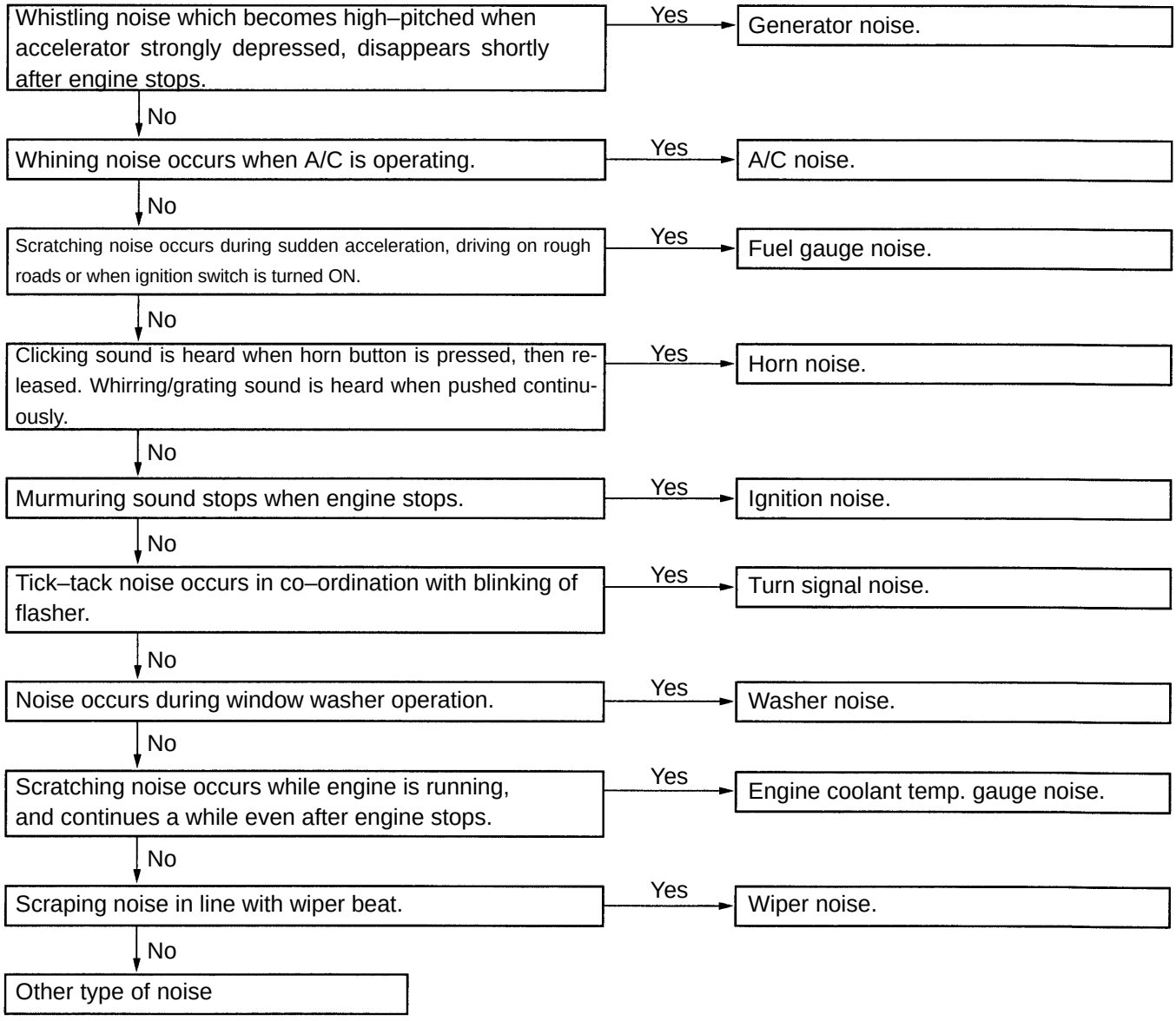


V08552


24
Noise
NOISE PRODUCED BY VIBRATION OR SHOCK WHILE DRIVING
Is speaker properly installed?
No
Install properly.
Yes
Is speaker properly installed?
No
Yes
With vehicles stationary lightly tap each system.
Is noise produced?
Yes
Each system faulty.
No
Noise is produced from static eletricity accumulating in the vehicle body.

V08553

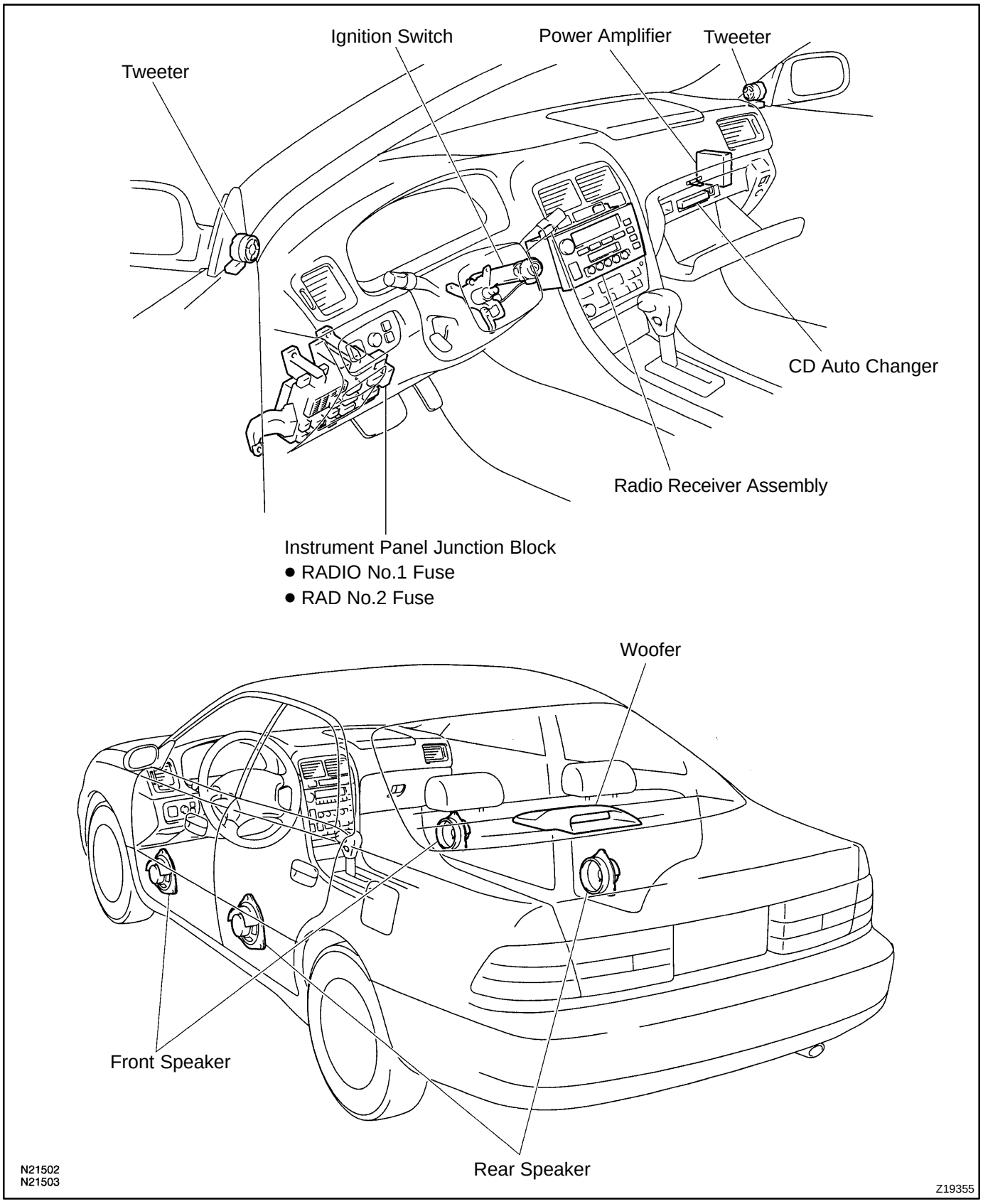
25	Noise	NOISE PRODUCED WHEN ENGINE STARTS



V08554

BE062–01

LOCATION

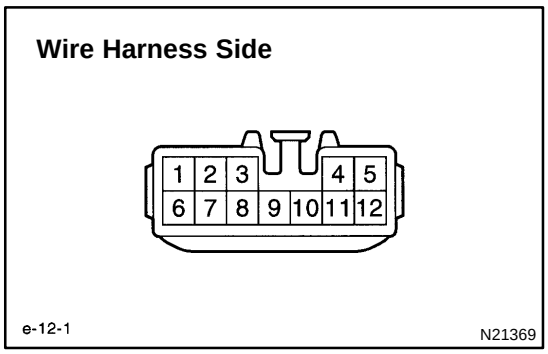


BE063–01

INSPECTION

1. INSPECT CD AUTO CHANGER CIRCUIT

Disconnect connectors from CD auto changer and inspect the connector on the wire harness side.



Tester connection	Condition	Specified condition
8 – Ground	Constant	Continuity
5 – Ground	Constant	Battery positive voltage
12 – Ground	Ignition switch LOCK	No voltage
12 – Ground	Ignition switch ACC or ON	Battery positive voltage

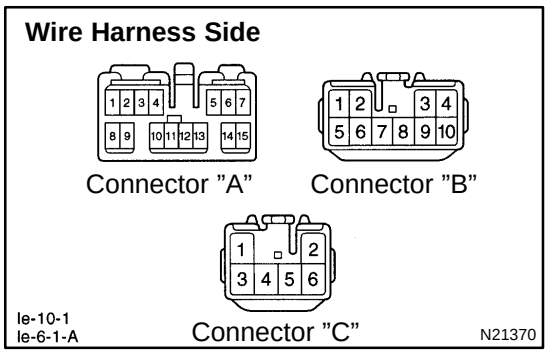
If the circuit is not as specified, inspect the circuits connected to other parts.

HINT:

- Check the wire harness between the radio receiver assembly and the CD auto changer.
- Since the signals to and from the MUTE, R^-, R^+, L^-, L^+, TX^- and TX^+ terminals are serial signals, they cannot ordinarily be measured with a tester.

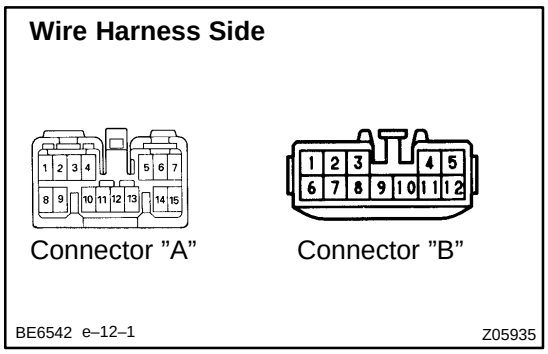
2. INSPECT POWER AMPLIFIER CIRCUIT

Disconnect the connector from power amplifier and inspect the connector on the wire harness side.



Tester connection	Condition	Specified condition
C7 – Ground	Constant	Continuity
C3 – Ground	Ignition switch LOCK	No voltage
C3 – Ground	Ignition switch ACC or ON	Battery positive voltage
C4 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



3. INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT

Disconnect the connectors from the radio receiver assembly, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
A4 – Ground	Constant	Battery positive voltage
A3 – Ground	Ignition switch LOCK	No voltage
A3 – Ground	Ignition switch ACC or ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

HINT:

Check the wire harness between radio receiver assembly and the CD auto changer, between radio receiver assembly and power amplifier.

4. INSPECT GLASS IN PRINTED ANTENNA

(Use same procedure as for ”INSPECT DEFOGGER WIRES” on page BE–126.)

5. REPAIR GLASS PRINTED ANTENNA

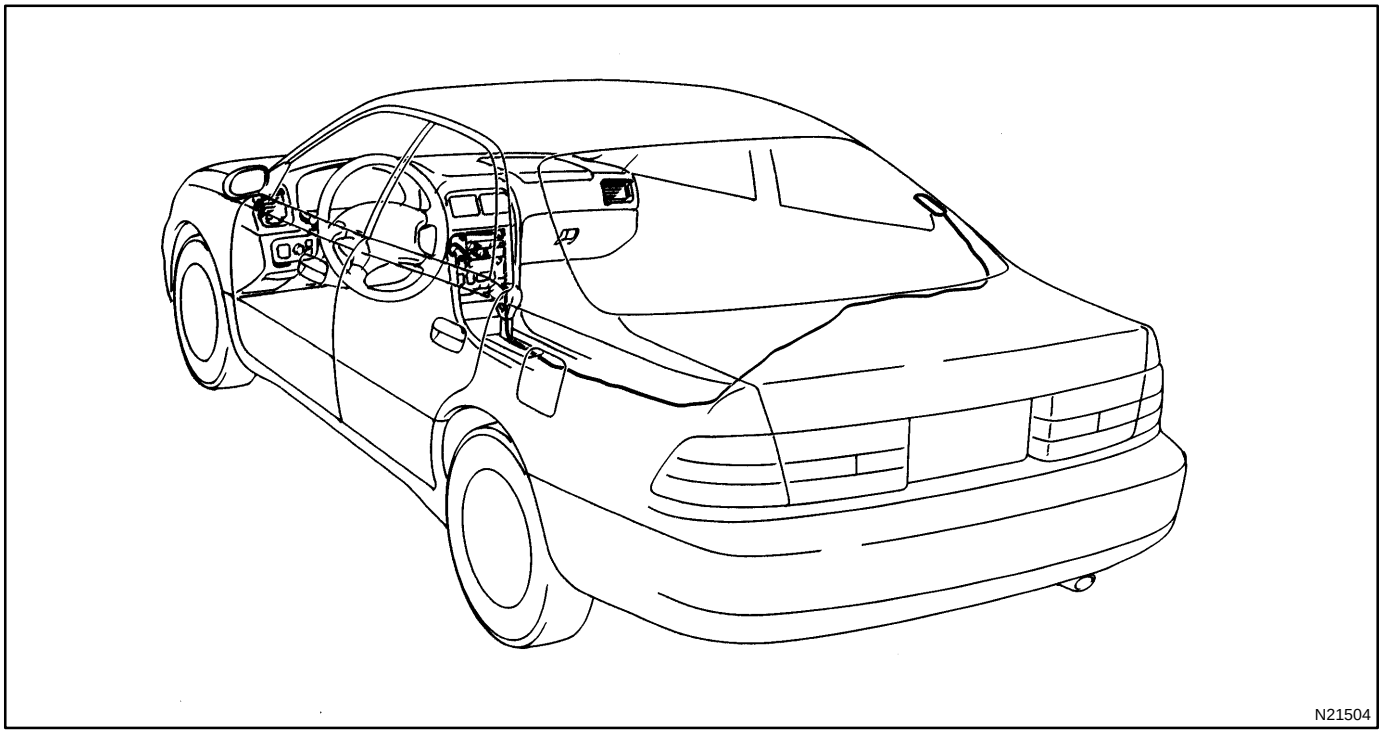
(Use same procedure as for ”REPAIR DEFOGGER WIRES” on page BE–127.)

ANTENNA CORD

BE064–01

REMOVAL

REMOVE ANTENNA CORD



(a) Remove the following parts:
- Instrument panel assembly
- Console box
- Rear seat
- Right rear poller garnish
- Package tray trim
- Room partition trim

HINT:
See BO section

(b) Remove antenna cord from glass printed antenna.
(c) Disconnect the connectors shown in the illustration.
(d) Remove the clips and antenna cord assembly.

BE065–01

INSTALLATION

Installation is in the reverse order of removal (See page BE–167).

CLOCK

TROUBLESHOOTING

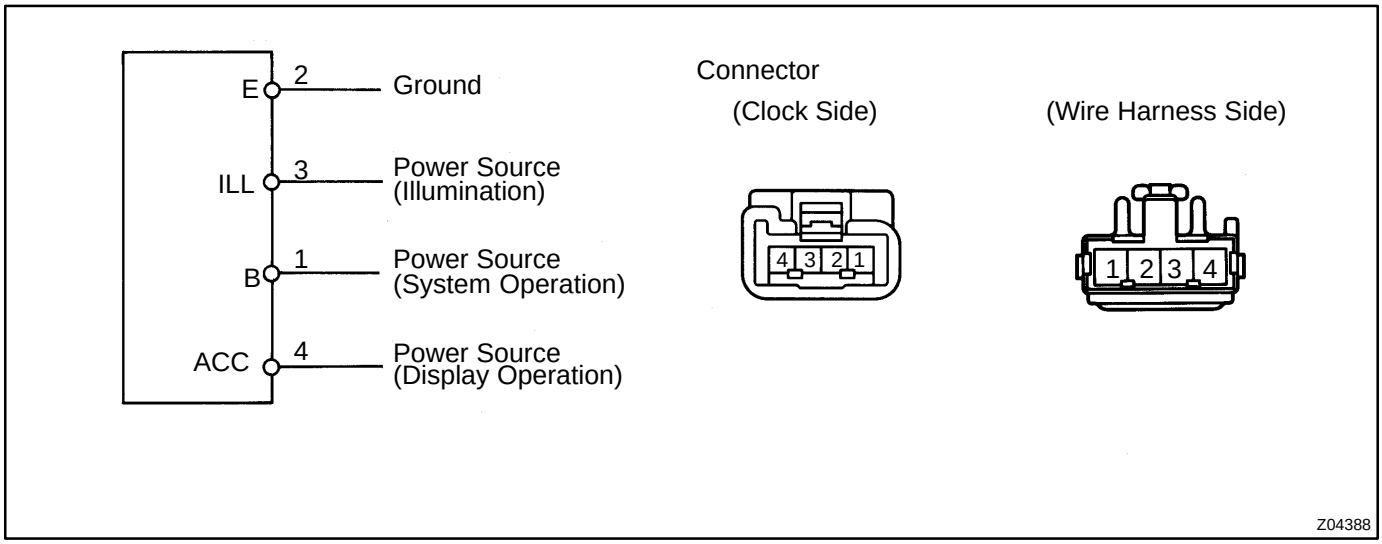
BE066–01

HINT:

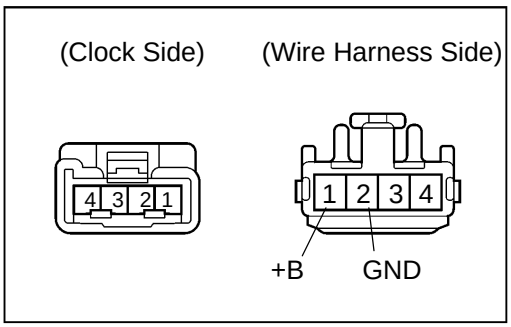
Troubleshoot the clock according to the table below.

Clock will not operate	1
Clock loses or gains time	2

± 1.5 seconds / day



1	CLOCK WILL NOT OPERATE



(a) Check that the battery positive voltage is 10 –14 V.
If voltage is not as specified, replace the battery.

(b) Check that the DOME fuse is not blown.
If the fuse is blown, replace the fuse and check for short circuit.

(c) Troubleshoot the clock as follows.
HINT:
Inspect the connector on the wire harness side.

Is there battery voltage between terminal +B and body ground?
- No → Open or short circuit in wire harness between terminal +B and DOME fuse.
- Yes ↓

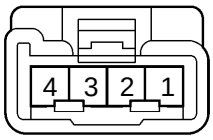
Does continuity exist between terminal GND and body ground?
- No → Open circuit in wire harness between terminal GND and body ground.
- Yes ↓

Replace clock.

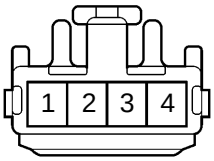
I01417

2	CLOCK LOSES OR GAINS TIME

(Clock Side)



(Wire Harness Side)



(a) Check that the battery positive voltage is 10–16 V.
If voltage is not as specified, replace the battery.

(b) Inspect the error of the clock.
Allowable error (per day): ± 1.5 sec.
If the error exceeds the allowable error, replace the clock.

(c) Check that the clock adjusting button is caught in position, and does not return.
If the button is not returned, repair or replace the clock.

(d) Troubleshoot the clock as follows.
HINT:
Inspect the connector on the wire harness side.

Is there 10 – 16 V between terminal +B and body ground?

Below 10V → Detect cause and repair, or recharge battery.

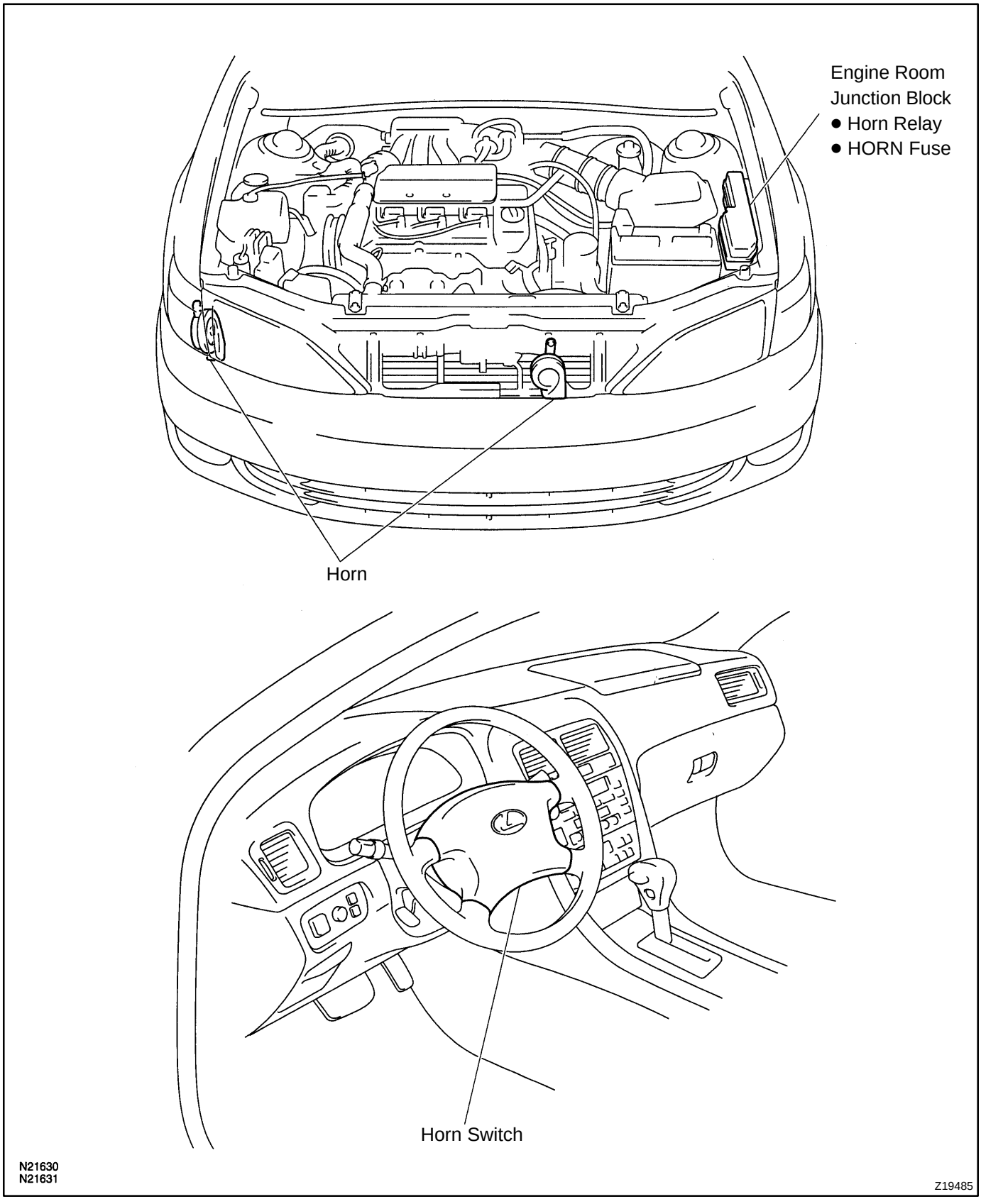
Yes ↓

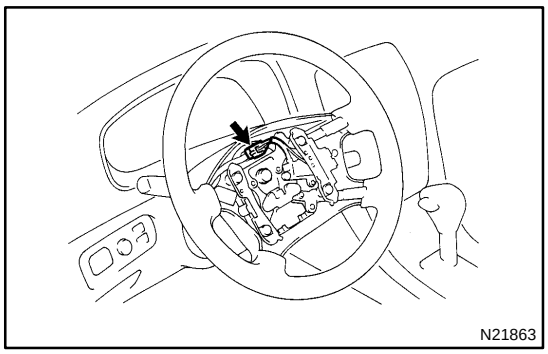
Adjust or replace clock.

I01418

HORN SYSTEM
LOCATION

BE067–01




N21863

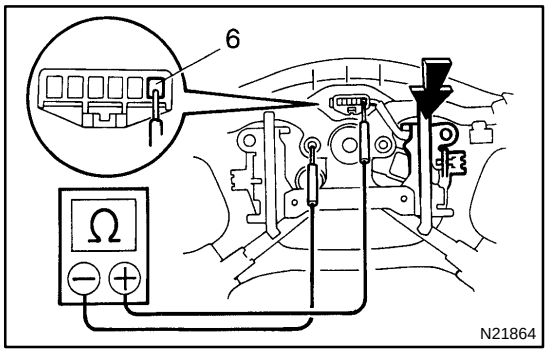
INSPECTION

1. INSPECT HORN SWITCH

(a) Disconnect the negative (–) terminal from the battery.
(b) Remove the left and right covers from the steering wheel.
(c) Using a torx socket wrench, loosen the 2 bolts.
(d) Pull up the horn pad and place it on the steering column, as shown.

HINT:
Do not disconnect the connector from the horn pad.

(e) Disconnect the connector from the slip ring. BE068–03

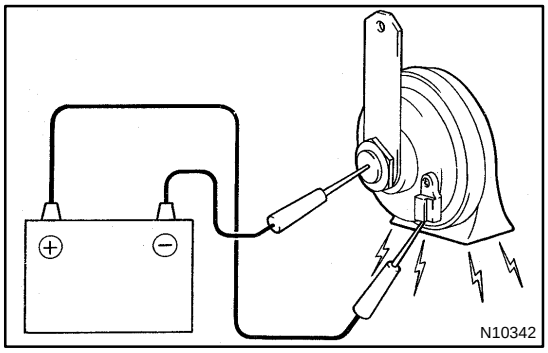


N21864

(f) Check that no continuity exists between terminal 6 of the connector and body ground.
(g) Check that continuity exists between terminal 6 of the connector and body ground when the horn contact plate is pressed against the steering spoke assembly.

If continuity is not as specified, repair or replace the steering wheel or wire harness as necessary.

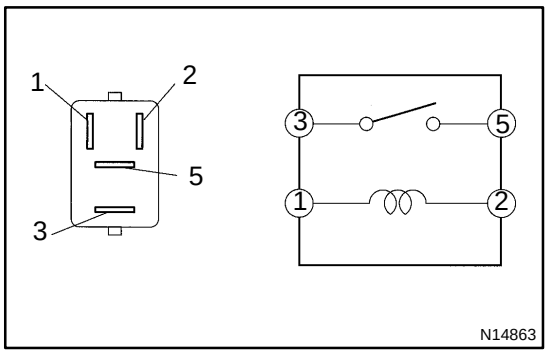
(h) Install the horn pad in place and using a torx socket wrench, torque the 2 bolts.
Torque: 7.1 N·m (72 kgf·cm, 62 in.·lbf)
(i) Install the left and right covers.
(j) Connect the negative (–) terminal to the battery.


N10342

2. INSPECT HORN OPERATION

Connect the positive (+) lead from the battery to the terminal and negative (–) lead to the horn body and check that the horn blows.

If operation is not as specified, replace the horn.



3. INSPECT HORN RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

BODY ELECTRICAL SYSTEM

BE04P–01

PRECAUTION

HINT:

Take care to observe the following precautions when performing inspections or removal and replacement of body electrical related parts.

1. HEADLIGHT SYSTEM

Halogen bulbs have pressurized gas inside and require special handling. They can burst if scratched or dropped. Hold a bulb only by its plastic or metal case. Don't touch the glass part of a bulb with bare hands.

2. SRS (SUPPLEMENTAL RESTRAINT SYSTEM)

The LEXUS ES300 is equipped with an SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

3. AUDIO SYSTEM

- If the negative (–) terminal cable is disconnected from the battery, the preset AM, FM 1 and FM 2 stations stored in memory are erased, so make sure to note the stations and reset them after the negative (–) terminal cable is reconnected to the battery.
- If the negative (–) terminal cable is disconnected from the battery, the "ANTI–THEFT SYSTEM" will operate when the cable is reconnected, but the radio, tape player and CD player will not operate. Be sure to input the correct ID number so that the radio, tape player and CD player can be operated again.

4. MOBILE COMMUNICATION SYSTEM

If the vehicle is equipped with a mobile communication system, refer to precautions in the IN section.

BE04Q–09

PROBLEM SYMPTOMS TABLE

1. POWER OUTLET

Symptom	Suspect Area	See page
Electric power source cannot be taken out of the power outlet.	1. Battery 2. POWER OUTLET Fuse (Instrument Panel J/B) 3. Wire Harness	– – –

2. HEADLIGHT AND TAILLIGHT SYSTEM (USA):

Symptom	Suspect Area	See page
Headlight does not light. (Taillight is normal)	1. HEAD (LH, RH) Fuse (E/G Room J/B) 2. Headlight Control Relay (E/G Room J/B) 3. Headlight Bulbs 4. Wire Harness	– – – –
Headlight does not light. (Taillight does not light up)	1. Integration Relay (Instrument Panel J/B) 2. Light Control Switch 3. Wire Harness	BE–20 BE–27 –
Only one side light does not light.	1. HEAD (LH, RH) Fuse (E/G Room J/B) 2. Headlight Bulbs 3. Wire Harness	– – –
”Lo–Beam” does not light.	1. Light Control Switch 2. Headlight Dimmer Switch 3. Headlight Bulbs 4. Wire Harness	BE–27 BE–27 – –
”Hi–Beam” does not light.	1. Light Control Switch 2. Headlight Dimmer Switch 3. Headlight Bulbs 4. Wire Harness	BE–27 BE–27 – –
”Flash” does not light.	1. Headlight Dimmer Switch 2. Wire Harness	BE–27 –
”Auto Turn–off system” does not operate.	1. Integration Relay (Instrument Panel J/B) 2. GAUGE Fuse (Instrument Panel J/B) 3. Ignition Switch 4. Door Courtesy Switch (Driver’s) 5. Wire Harness 6. DOME Fuse (E/G Room J/B)	BE–20 – BE–20 BE–46 – –
Taillight does not light. (Headlight does not light)	1. Light Control Switch 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness	BE–27 BE–20 –
Taillight does not light. (Headlight is normal)	1. TAIL Fuse (Instrument Panel J/B) 2. Taillight Control Relay (Instrument Panel J/B) 3. Wire Harness	– BE–27 –
Only one side light does not light.	1. Bulb 2. Wire Harness	– –
Rear Combination light does not light.	1. Wire Harness 2. Light Failure Sensor 3. Bulb	– BE–92 –
”Light Auto Turn–off system” does not operate.	1. Integration Relay 2. Wire Harness 3. DOME Fuse (E/G Room J/B) 4. Door Courtesy Switch (Driver’s)	BE–20 – – BE–46

3. HEADLIGHT AND TAILLIGHT SYSTEM (CANADA):

Symptom	Suspect Area	See page
Headlight does not light. (Taillight is normal)	1. Wire Harness	–
Headlight does not light. (Taillight does not light up)	1. Wire Harness	–
Only one side light does not light.	1. Headlight Bulb 2. Wire Harness	– –
”Lo–Beam” does not light.	1. Headlight Control Relay (E/G Room J/B) 2. Light Control Switch 3. Integration Relay (Instrument Panel J/B) 4. Wire Harness 5. HEAD LO (LH, RH) Fuse (E/G Room R/B No.2) 6. Headlight Bulb	BE–27 BE–27 BE–20 – – –
”Hi–Beam” does not light.	1. DRL No.2 Fuse (E/G Room R/B No.2) 2. Daytime Running Light Relay No.2 (E/G Room R/B No.2) 3. Daytime Running Light Relay 4. Daytime Running Light Relay No.3 (E/G Room R/B No.2) 5. Daytime Running Light Relay No.4 (E/G Room R/B No.2) 6. DOME Fuse (E/G Room J/B) 7. Headlight Dimmer Switch 8. Wire Harness 9. HEAD HI (LH, RH) Fuse (E/G Room J/B) 10. Headlight Bulb	– – BE–27 BE–27 – BE–27 – BE–27 – BE–27 – – –
”Flash” does not light.	1. DRL No.2 Fuse (E/G Room R/B No.2) 2. Daytime Running Light Relay No.2 (E/G Room R/B No.2) 3. Daytime Running Light Relay 4. Daytime Running Light Relay No.3 (E/G Room R/B No.2) 5. Daytime Running Light Relay No.4 (E/G Room R/B No.2) 6. DOME Fuse (E/G Room J/B) 7. Headlight Dimmer Switch 8. Wire Harness 9. HEAD HI (LH, RH) Fuse (E/G Room J/B) 10. Headlight Bulb	– – BE–27 BE–27 – BE–27 – BE–27 – BE–27 – – –
”Auto Turn–off System” dose not operate.	1. Integration Relay (Instrument Panel J/B) 2. GAUGE Fuse (Instrument Panel J/B) 3. Ignition Switch 4. Door Courtesy Switch (Driver’s) 5. Wire Harness 6. DOME Fuse (E/G Room J/B)	BE–27 – BE–27 BE–46 – –
Headlight does not light with engine running and light control SW OFF.	1. GAUGE Fuse (Instrument Panel J/B) 2. DOME Fuse (E/G Room J/B) 3. Other Parts* 4. Daytime Running Light Relay 5. Daytime Running Light Relay No.3 (E/G Room R/B No.2) 6. Wire Harness 7. HEAD HI (LH, RH) Fuse (E/G Room J/B) 8. Headlight Bulb	– – – BE–27 – BE–27 – – –

Taillight does not light. (Headlight does not light)	1. Light Control Switch 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness	BE–27 BE–27 –
Taillight does not light. (Headlight is normal)	1. TAIL Fuse (Instrument Panel J/B) 2. Taillight Control Relay (Instrument Panel J/B) 3. Wire Harness	– BE–27 –
Only one side light does not light.	1. Bulb 2. Wire Harness	– –
Rear Combination light does not light.	1. Wire Harness 2. Light Failure Sensor 3. Bulb	– BE–92 –
”Light Auto Turn–off system” does not operate.	1. Integration Relay 2. Wire Harness 3. DOME Fuse (E/G Room J/B) 4. Door Courtesy Switch (Driver’s)	BE–27 – – BE–46

*: Parking Brake Switch and Terminal L of Generator

4. FOG LIGHT SYSTEM

Symptom	Suspect Area	See page
Fog light does not light with light control SW HEAD. (Headlight is normal)	1. FOG Fuse (Instrument Panel J/B) 2. Fog Light Relay 3. Fog Light Switch 4. Wire Harness	– BE–36 BE–36 –
Fog light does not light with light control SW HEAD. (Headlight does not light)	1. Other Parts*1 2. Wire Harness	– –
Only one light does not light.	1. Bulb 2. Wire Harness	– –

*1: Inspect Headlight System.

5. TURN SIGNAL AND HAZARD WARNING SYSTEM

Symptom	Suspect Area	See page
”Hazard” and ”Turn” do not light up.	1. Hazard Warning Switch 2. Turn Signal Flasher 3. Wire Harness	 BE–40 –
The flashing frequency is abnormal.	1. Bulb 2. Turn Signal Switch 3. Wire Harness	– BE–40 –
Hazard warning light does not light up. (Turn signal is normal)	1. HAZARD Fuse (E/G Room J/B) 2. Wire Harness	– –
Either of hazard warning lights does not light up .	1. Hazard Warning Switch 2. Wire Harness	BE–40 –
*1 Turn signal does not light up.	1. Ignition Switch 2. Turn Signal Switch 3. Wire Harness	BE–20 BE–40 –
*2 Turn signal does not light up.	1. TURN Fuse (Instrument Panel J/B) 2. Turn Signal Switch 3. Wire Harness	– BE–40 –
Turn signal does not light up in one direction.	1. Turn Signal Switch 2. Wire Harness	BE–40 –
Only one bulb does not light up.	1. Bulb 2. Wire Harness	– –

*1: Combination Meter, Wiper and Washer do not operate.

*2: Combination Meter, Wiper and Washer are normal.

6. ILLUMINATION LIGHT SYSTEM

Symptom	Suspect Area	See page
Illumination lights do not light up. (Taillight is normal)	1. PANEL Fuse (Instrument Panel J/B) 2. Wire Harness	– –
Illumination lights do not light up. (Taillight does not light)	1. Taillight Control Relay (Instrument Panel J/B) 2. Other parts* 3. Wire Harness	BE–27 – –
Illumination light with adjustable brightness do not light up.	1. Rheostat Light Control Volume 2. Wire Harness	BE–43 –
Only one light does not light up.	1. Bulb 2. Wire Harness	– –
Brightness does not chang when rheostat volume is trutned. (ALL)	1. Rheostat Light Control Volume 2. Wire Harness	BE–43 –
Brightness does not chang when rheostat volume is trutned. (Only Combination Meter)	1. Combination Meter Assembly 2. Wire Harness	BE–58 –
Glove box does not light up.	1. Glove Box Light Switch 2. Bulb 3. Wire Harness	BE–43 – –

*: Inspect Taillight System.

7. INTERIOR LIGHT SYSTEM

Symptom	Suspect Area	See page
Only one interior light does not light up.	1. Bulb 2. Wire Harness	– –
Interior lights do not light up (ALL).	1. DOME Fuse (E/G Room J/B) 2. Wire Harness	– –
”Illuminated Entry System” does not operate.	1. Integration Relay (Instrument Panel J/B) 2. Door Courtesy Switch 3. Wire Harness	– BE–46 –
Interior light does not light up.	1. Bulb 2. Interior Light Switch 3. Wire Harness	– BE–46 –
Front personal light does not light up.	1. Bulb 2. Personal Light Switch 3. Wire Harness	– BE–46 –
Vanity light does not light up.	1. Bulb 2. Vanity Light 3. Wire Harness	– BE–46 –
Luggage compartment light does not light up.	1. Bulb 2. Luggage Compartment Door Courtesy Switch 3. Wire Harness	– BE–46 –
Courtesy light does not light up.	1. Bulb 2. Door Courtesy Switch 3. Wire Harness	– BE–46 –

8. STOP LIGHT SYSTEM

Symptom	Suspect Area	See page
Stop light does not light up.	1. STOP Fuse (Instrument Panel J/B) 2. Stop Light Switch 3. Light Failure Sensor 4. Wire Harness	– BE–51 BE–51 –
Stop light always lights up.	1. Stop Light Switch 2. Wire Harness	BE–51 –

Only one light always lights up.	1. Wire Harness	–
Only one light does not light.	1. Bulb 2. Wire Harness	– –

9. WIPER AND WASHER SYSTEM

Symptom	Suspect Area	See page
Wiper and washers do not operate.	1. WIPER Fuse (Instrument Panel J/B) 2. Wiper Switch 3. Wire Harness	– BE–54 –
Wipers do not operate in LO or HI.	1. Wiper Switch 2. Wiper Motor 3. Wire Harness	BE–54 BE–54 –
Wipers do not operate in INT.	1. Wiper Switch 2. Wiper Motor 3. Wire Harness	BE–54 BE–54 –
Washer motor does not operate.	1. Washer Switch 2. Washer Motor 3.Wire Harness	BE–54 BE–54 –
Wiper do not operate when washer switch is ON.	1. Washer Motor 2. Wire Harness	BE–54 –
Washer fluid does not operate.	1. Washer Hose and Nozzle	–
●At wiper switch HI position, the wiper blade is in contact with the body. ●When the wiper switch is OFF, the wiper blade does not retract or the retract position is wrong.	1. Wiper Switch* 2. Wire Harness	BE–54 – – – –

*: Inspect wiper arm and blade set position.

10. DEFOGGER SYSTEM

Symptom	Suspect Area	See page
All defogger systems do not operate.	1. DEFOG Fuse (Instrument Panel J/B) 2. HEATER Fuse (Instrument Panel J/B) 3. Defogger Relay (Instrument Panel J/B) 4. Defogger Switch 5. Wire Harness	– – BE–106 BE–106 –
Rear window defogger does not operate.	1. Defogger Wire 2. Choke Coil 3. Wire Harness	– – –
Mirror defogger does not operate.	1. MIRROR–HEATER Fuse (Instrument Panel J/B) 2. Mirror Defogger 3. Wire Harness	– BE–106 –

11. POWER WINDOW CONTROL SYSTEM

Symptom	Suspect Area	See page
*1 Power window does not operate.	1. Integration Relay (Instrument Panel J/B) 2. Wire Harness	BE–20 –
*2 Power window does not operate.	1. POWER Fuse (Instrument Panel J/B) 2. Integration Relay (Instrument Panel J/B) 3. Power Main Relay (Instrument Panel J/B) 4. Power Window Master Switch 5. Wire Harness	– BE–20 BE–110 BE–110 –
*2 ”One Touch Power Window System” does not operate.	1. Power Window Master Switch	BE–110

Only one window glass does not move.	1. Power Window Master Switch 2. Power Window Switch 3. Power Window Motor 4. Wire Harness	BE–110 BE–110 BE–110 –
”Window Lock System” does not operate.	1. Power Window Master Switch	BE–110
”Window Lock Illumination” does not lightup.	1. Power Window Master Switch	BE–110
Key–off power window does not operate.	1. GAUGE Fuse (Instrument Panel J/B) 2. Integration Relay (Instrument Panel J/B) 3. Ignition Switch 4. Door Courtesy Switch 5. Wire Harness	– BE–20 BE–20 BE–46 –

*1: Door Lock does not operate.
*2: Door Lock is normal.

12. POWER DOOR LOCK CONTROL SYSTEM

Symptom	Suspect Area	See page
”Door lock system” does not operate at all.	1. ECU–IG Fuse (Instrument Panel J/B) 3. DOOR Fuse (Instrument Panel J/B) 4. Integration Relay (Instrument Panel J/B) 5. Wire Harness	– – BE–20 –
Door lock system does not operate by manual switch.	1. Power Window Master Switch 2. Door Lock Control Switch 3. Integration Relay (Instrument Panel J/B) 4. Wire Harness	BE–110 BE–119 BE–20 –
Door lock system does not operate by door key.	1. Door Key Lock and Unlock Switch 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness 4. Door Lock Link Disconnected	BE–119 BE–20 – –
Fault in 2–Operation unlock function of Driver’s side door key lock and unlock switch.	1. Door Key Lock and Unlock Switch 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness	BE–119 BE–20 –
Fault in key confine prevention operate.	1. Integration Relay (Instrument Panel J/B) 2. Key Unlock Warning Switch 3. Door Courtesy Switch 4. Wire Harness	BE–20 BE–20 BE–46 –
Only one door lock does not operation.	1. Door Lock Motor 2. Wire Harness	BE–119 –

13. SLIDING ROOF SYSTEM

Symptom	Suspect Area	See page
*1 Sliding roof system does not operate.	1. Power Main Relay (Instrument Panel J/B) 2. Integration Relay (Instrument Panel J/B) 3. Wire Harness	BE–110 BE–20 –
*2 Sliding roof system does not operate.	1. POWER Fuse (Instrument Panel J/B) 2. Integration Relay (Instrument Panel J/B) 3. Sliding Roof Switch 4. Sliding Roof Control Relay 5. Sliding Roof Motor 6. Wire Harness	– BE–20 BE–125 BE–125 BE–125 –

Sliding roof system operates abnormally.	1. Sliding Roof Control Relay 2. Limit Switch 3. Sliding Roof Switch	BE–125 BE–125 BE–125
Sliding roof system stops operation half way.	1. Sliding Roof Control Relay 2. Limit Switch 3. Sliding Roof Switch 4. Sliding Roof Motor (Stones or foreign material trapped in motor assembly)	BE–125 BE–125 BE–125 BE–125 –

*1: Door Lock does not operate.
*2: Door Lock is normal.

14. POWER SEAT CONTROL SYSTEM

Symptom	Suspect Area	See page
Power seat does not operate. (Power door lock system does not operate)	1. Wire Harness 2. POWER Fuse (Instrument Panel J/B)	– –
Power seat does not operate. (Power door lock system is normal)	1. Wire Harness 2. Power Seat Switch (D,P)	– BE–129
Driver's seat does not operate.	1. Power seat Switch (D) 2. Wire Harness	BE–129 –
Passenger's seat does not operate.	1. Power Seat Switch (P) 2. Wire Harness	BE–129 –
"Slide operation" does not operate.	1. Power Seat Switch (D,P) 2. Wire Harness 3. Slide Motor (D,P)	BE–129 – BE–129
"Front vertical operation" does not operate.	1. Power Seat Switch (D,P) 2. Wire Harness 3. Front Vertical Motor (D,P)	BE–129 – BE–129
"Rear Vertical operation" does not operate.	1. Power Seat Switch (D,P) 2. Wire Harness 3. Rear Vertical Motor (D,P)	BE–129 – BE–129
"Reclining operation" does not operate.	1. Power Seat Switch (D,P) 2. Wire Harness 3. Reclining Motor (D,P)	BE–129 – BE–129

(D): Driver's Seat
(P): Passenger's Seat

15. POWER MIRROR CONTROL SYSTEM

Symptom	Suspect Area	See page
Mirror does not operate.	1. CIG Fuse (Instrument Panel J/B) 2. Mirror Switch 3. Mirror Motor 4. Wire Harness	– BE–134 BE–134 –
Mirror operates abnormally.	1. Mirror Switch 2. Mirror Motor 3. Wire Harness	BE–134 BE–134 –

16. SEAT HEATER SYSTEM

Symptom	Suspect Area	See page
Seat heaters do not operate. (Driver's and Passenger's)	1. SEAT–HEATER Fuse (Instrument Panel J/B) 2. Wire Harness	– –
Driver's seat heater does not operate.	1. Seat Heater Switch (Driver's) 2. Seat Heater (Driver's) 3. Wire Harness	BE–137 BE–137 –

Passenger's seat heater does not operate.	1. Seat Heater Switch (Passenger's) 2. Seat Heater (Passenger's) 3. Wire Harness	BE–137 BE–137 –
Seat heater temperature is too high.	1. Seat Heater	BE–137

17. FUEL LID OPENER SYSTEM

Symptom	Suspect Area	See page
Fuel lid opener system does not operate.	1. DOOR Fuse (Instrument Panel J/B) 2. Fuel Lid Opener Switch 3. Fuel Lid Opener Solenoid 4. Wire Harness	– BE–140 BE–140 –

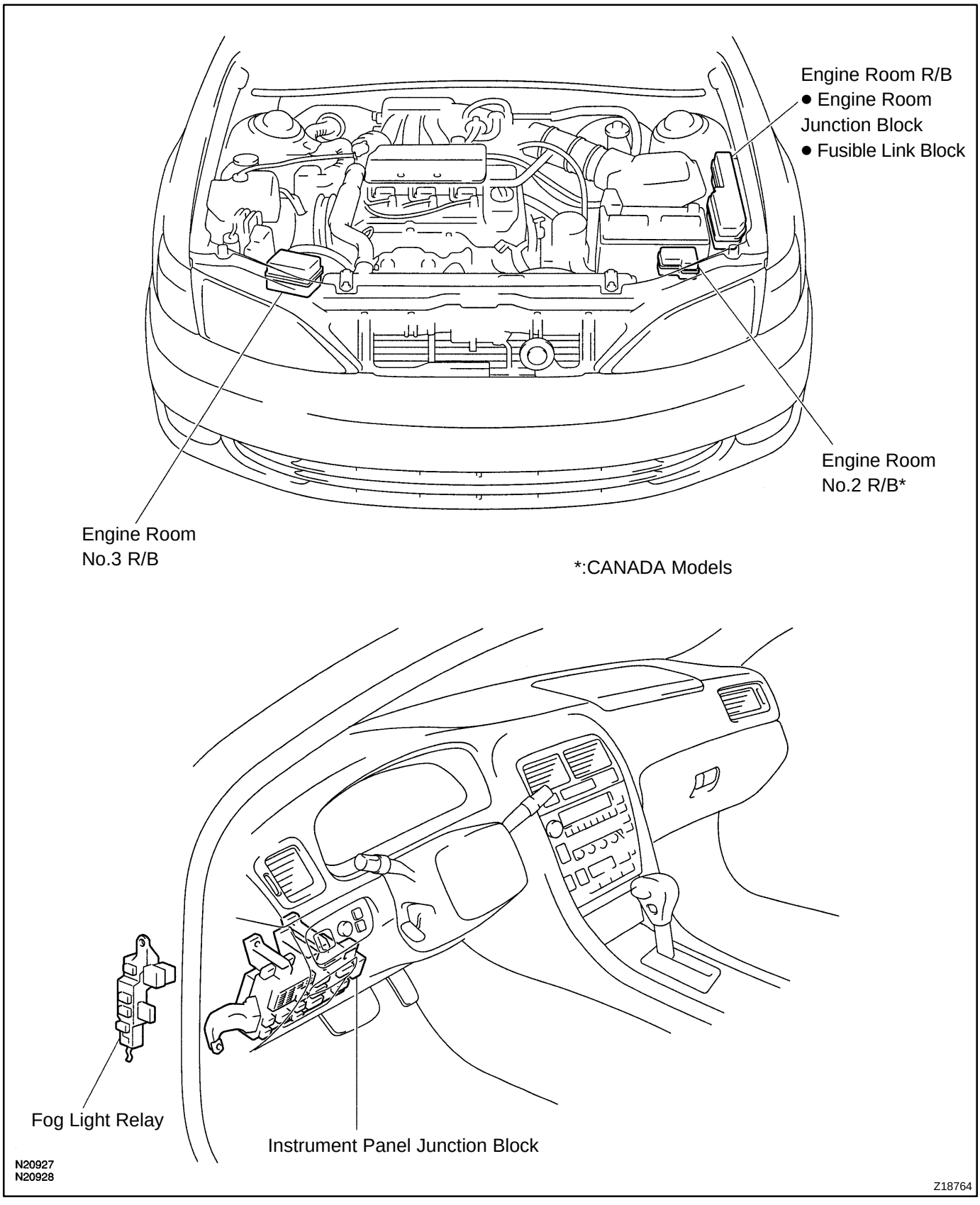
18. HORN SYSTEM

Symptom	Suspect Area	See page
Horn system does not operate.	1. HORN Fuse (E/G Room J/B) 2. Horn Relay (E/G Room J/B) 3. Horn Switch 4. Horn 5. Wire Harness	– BE–172 BE–172 BE–172 –
Horn blows all the time.	1. Horn Relay (E/G Room J/B) 2. Horn Switch 3. Wire Harness	BE–172 BE–172 –
One horn operates but the other horn does not operate.	1. Horn 2. Wire Harness	BE–172 –
Horns operate abnormally.	1. Horn Relay (E/G Room J/B) 2. Horn 3. Wire Harness	BE–172 BE–172 –

POWER SOURCE

LOCATION

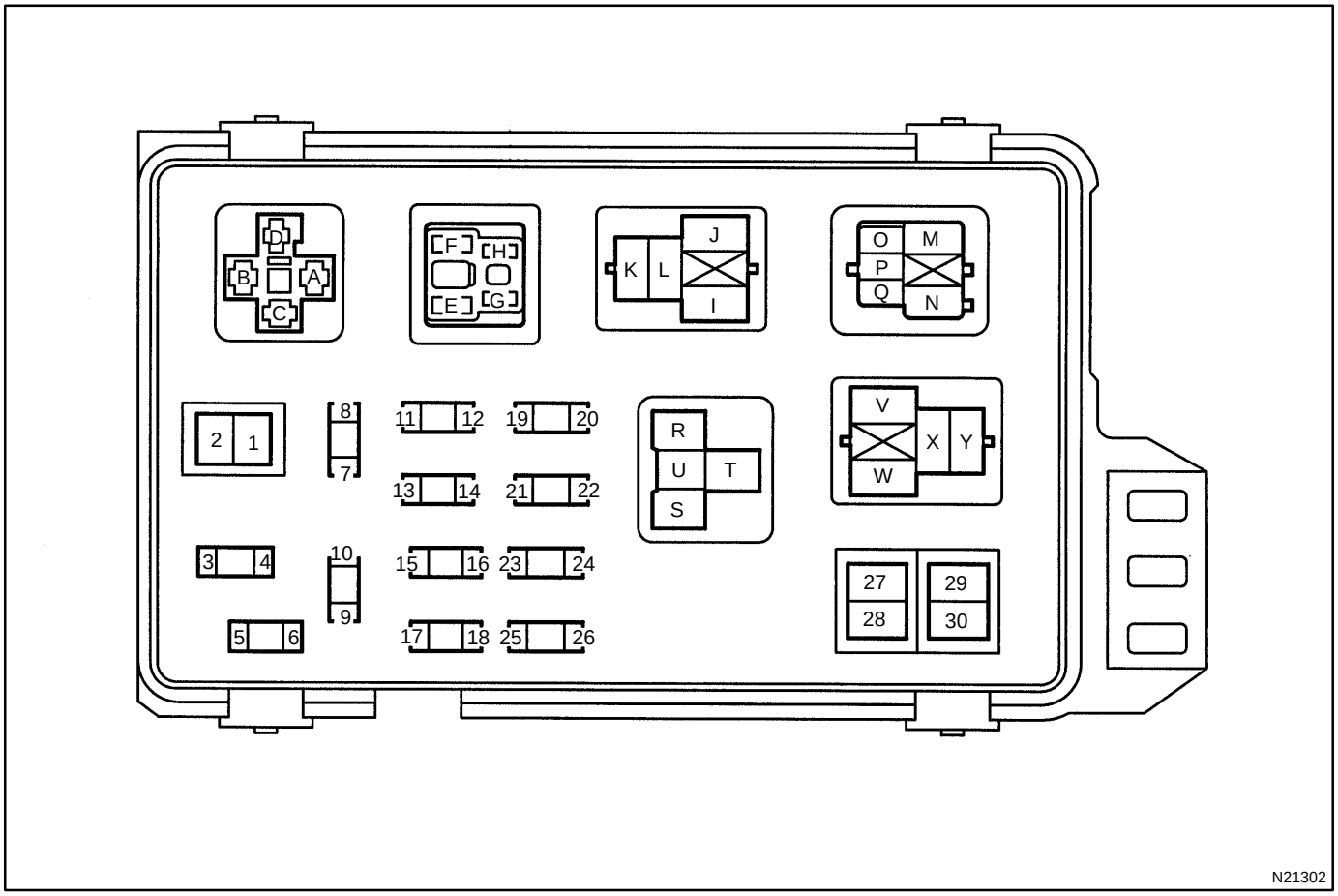
BE04R–01



BE04S–01

INSPECTION

1. INSPECT ENGINE ROOM JUNCTION BLOCK CIRCUIT



(a) Remove the fuse from the junction block and inspect the connector on junction block side.

Fuse	Tester connection	Condition	Specified condition
MAIN	1 – Ground	Constant	Battery positive voltage
DOME	4 – Ground	Constant	Battery positive voltage
ECU–B	6 – Ground	Constant	Battery positive voltage
RADIO No.1	7 – Ground	Ignition switch turned to ACC or ON	Battery positive voltage
SHORT PIN	9 – Ground	Constant	Battery positive voltage
HAZARD	11 – Ground	Constant	Battery positive voltage
AM2	13 – Ground	Constant	Battery positive voltage
TEL	15 – Ground	Constant	Battery positive voltage
HEAD (LH)	17 – Ground	Constant	Battery positive voltage
ALT–S	19 – Ground	Constant	Battery positive voltage
HEAD (RH)	21 – Ground	Constant	Battery positive voltage
EFI	23 – Ground	Constant	Battery positive voltage
HORN	25 – Ground	Constant	Battery positive voltage
RDI	28 – Ground	Constant	Battery positive voltage
CDS	30 – Ground	Constant	Battery positive voltage

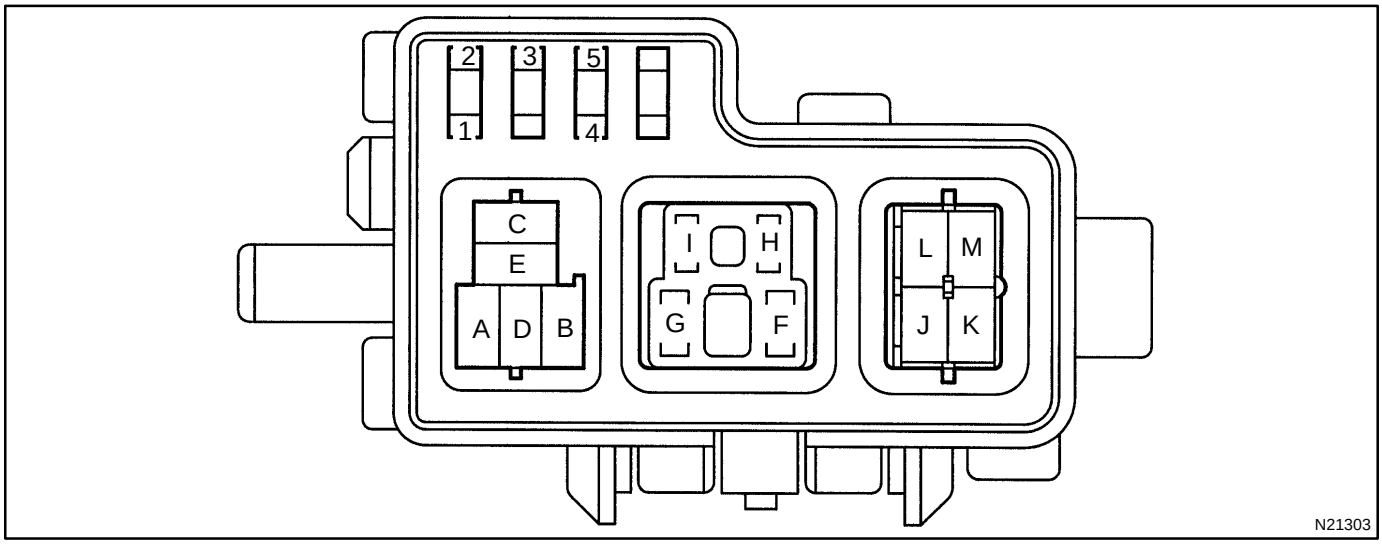
If the circuit is not as specified, inspect the circuits connected to other parts.

(b) Remove the relay from the junction block and inspect the connector on junction block side.

Relay	Tester connection	Condition	Specified condition
ST	C – Ground	Constant	Battery positive voltage
HEAD	E – Ground	Constant	Battery positive voltage
HEAD	H – Ground	Constant	Battery positive voltage
EFI	J – Ground	Constant	Continuity
ENGINE MAIN	M – Ground	Constant	Battery positive voltage
ENGINE MAIN	Q – Ground	Ignition switch turned to ON	Battery positive voltage
FAN No.1	U – Ground	Constant	Battery positive voltage
HORN	V – Ground	Constant	Battery positive voltage
HORN	Y – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

2. CANADA Models Only:
INSPECT ENGINE ROOM No.2 RELAY BLOCK CIRCUIT



(a) Remove the fuse from the relay block and inspect the connector on relay block side.

Fuse	Tester connection	Condition	Specified condition
H – LP RH (LO)	2 – Ground	Constant	Battery positive voltage
H – LP LH (LO)	3 – Ground	Constant	Battery positive voltage
DRL No.2	5 – Ground	Constant	Battery positive voltage

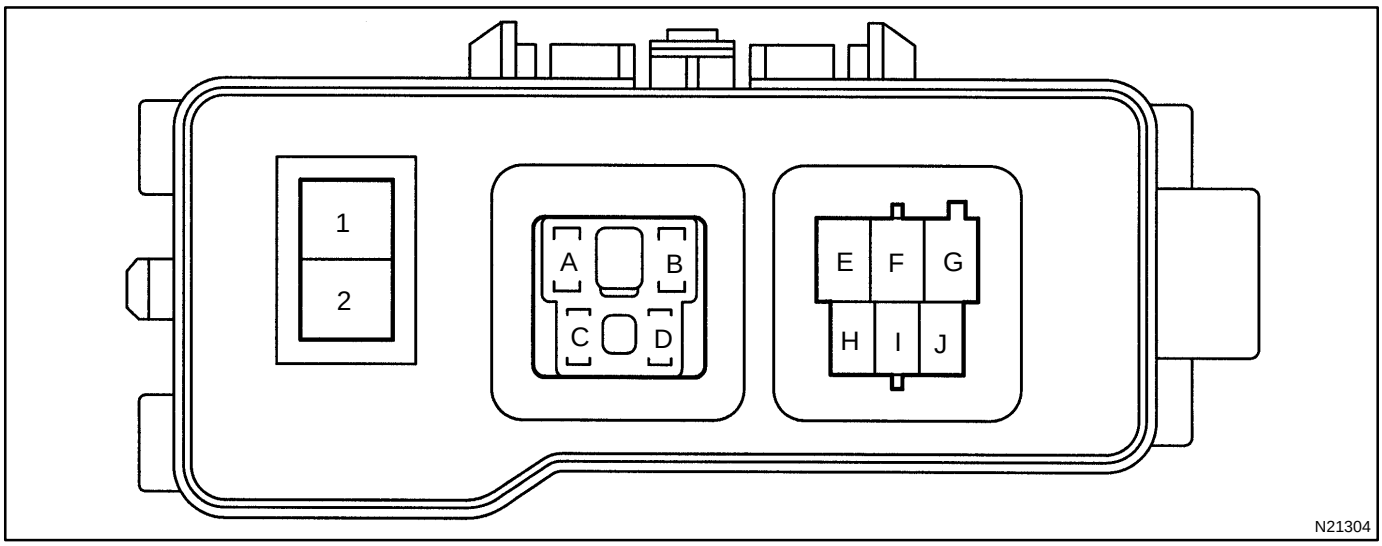
If the circuit is not as specified, inspect the circuits connected to other parts.

(b) Remove the relay from the relay block and inspect the connector on relay block side.

Relay	Tester connection	Condition	Specified condition
DRL No.3	D – Ground	Constant	Continuity
DRL No.3	A – Ground	Constant	Battery positive voltage
DRL No.3	E – Ground	Constant	Battery positive voltage
DRL No.4	H – Ground	Constant	Battery positive voltage
DRL No.4	I – Ground	Constant	Battery positive voltage
DIM	J – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

3. INSPECT ENGINE ROOM No.3 RELAY BLOCK CIRCUIT



(a) Remove the fuse from the relay block and inspect the connector on relay block side.

Fuse	Tester connection	Condition	Specified condition
ABS	2 – Ground	Constant	Battery positive voltage

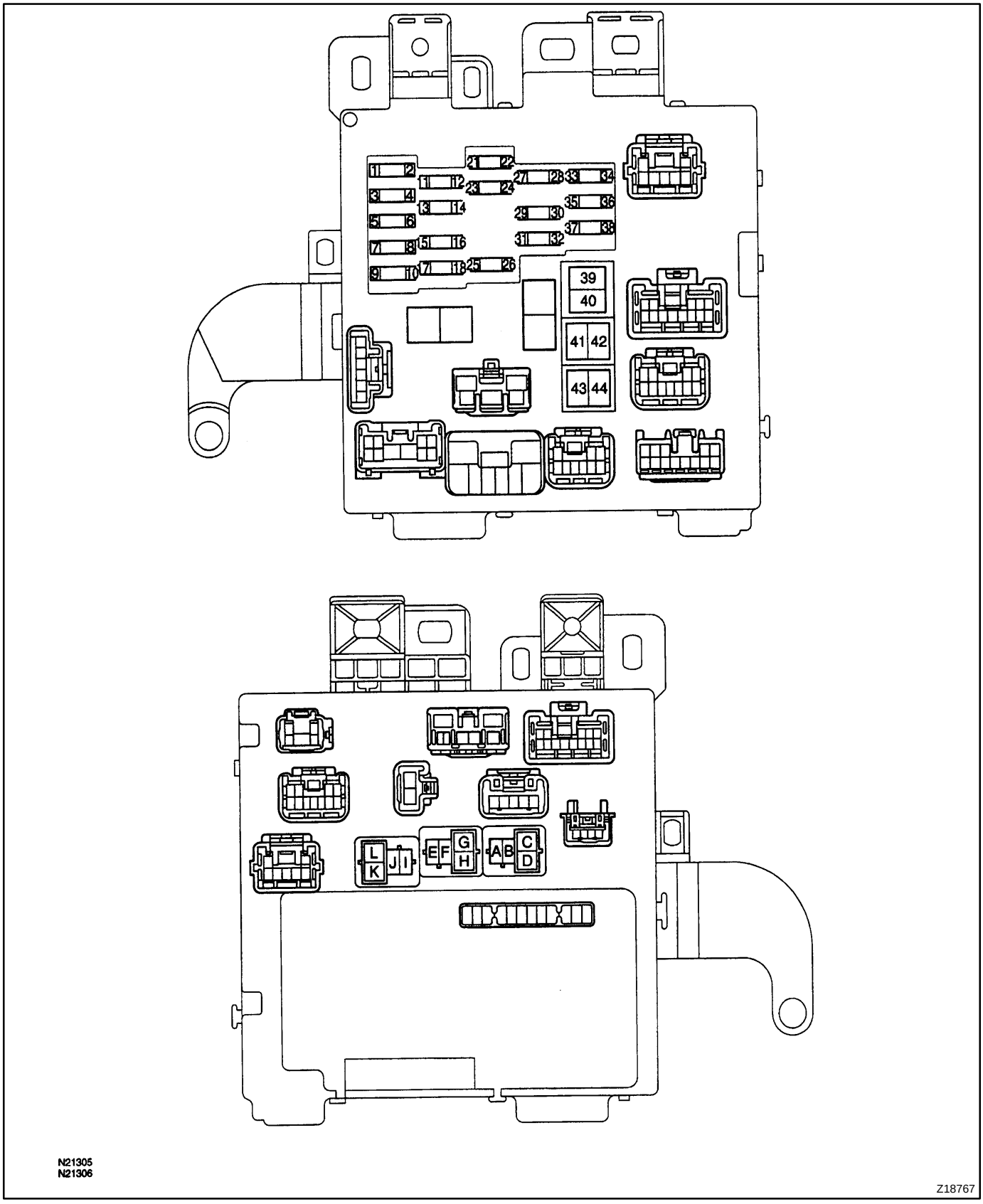
If the circuit is not as specified, inspect the circuits connected to other parts.

(b) Remove the relay from the relay block and inspect the connector on relay block side.

Relay	Tester connection	Condition	Specified condition
ABS SOL	F – Ground	Constant	Continuity
ABS SOL	E – Ground	Constant	Battery positive voltage
ABS MTR	G – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

4. INSPECT INSTRUMENT PANEL JUNCTION BLOCK CIRCUIT



(a) Remove the fuse from the instrument panel junction block and inspect the connector on instrument panel junction block side.

Fuse	Tester connection	Condition	Specified condition
S – HTR	2 – Ground	Ignition switch turned to ON	Battery positive voltage
HEATER	3 – Ground	Ignition switch turned to ON	Battery positive voltage
GAUGE	6 – Ground	Ignition switch turned to ON	Battery positive voltage
WIPER	7 – Ground	Ignition switch turned to ON	Battery positive voltage
M – HTR	10 – Ground	Ignition switch turned to ON	Battery positive voltage
ECU – IG	11 – Ground	Ignition switch turned to ON	Battery positive voltage
IGN	14 – Ground	Ignition switch turned to ON	Battery positive voltage
STOP	16 – Ground	Constant	Battery positive voltage
TAIL	18 – Ground	Light control switch turned to TAIL or HEAD and Engine running	Battery positive voltage
PWR	22 – Ground	Ignition switch turned to ON	Battery positive voltage
OBD – 2	24 – Ground	Constant	Battery positive voltage
FOG	26 – Ground	Constant	Battery positive voltage
ST	28 – Ground	Constant	Battery positive voltage
DOOR	29 – Ground	Constant	Battery positive voltage
PANEL	31 – Ground	Constant	Battery positive voltage
TURN	33 – Ground	Ignition switch turned to ON	Battery positive voltage
RAD/2	35 – Ground	Ignition switch turned to ACC or ON	Battery positive voltage
CIG	38 – Ground	Ignition switch turned to ACC or ON	Battery positive voltage
DEF	39 – Ground	Constant	Battery positive voltage
POWER	41 – Ground	Constant	Battery positive voltage
AM1	44 – Ground	Constant	Battery positive voltage

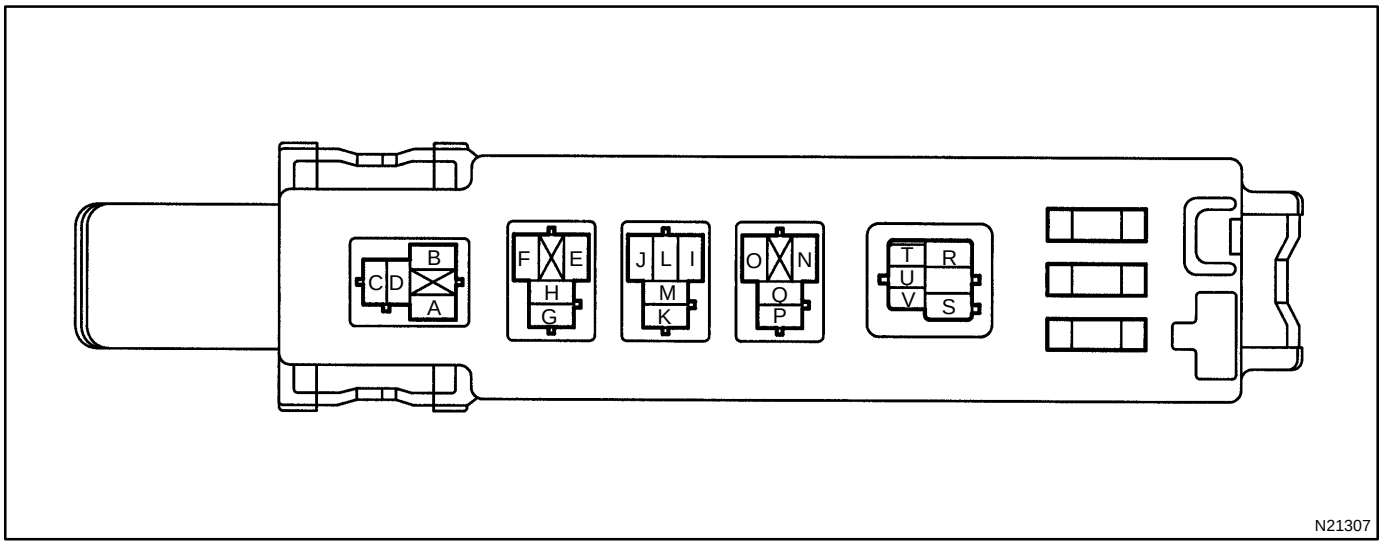
If the circuit is not as specified, inspect the circuits connected to other parts.

(b) Remove the relay from the junction block and inspect inspect the connector on junction block side.

Relay	Tester connection	Condition	Specified condition
Taillight	B – Ground	Constant	Battery positive voltage
Taillight	D – Ground	Constant	Battery positive voltage
Defogger	F – Ground	Constant	Battery positive voltage
Defogger	G – Ground	Defogger switch ON	Battery positive voltage
Power Main	J – Ground	Constant	Battery positive voltage
Power Main	K – Ground	Constant	Continuity

If the circuit is not as specified, inspect the circuits connected to other parts.

5. INSPECT INSIDE ENGINE ROOM JUNCTION BLOCK CIRCUIT

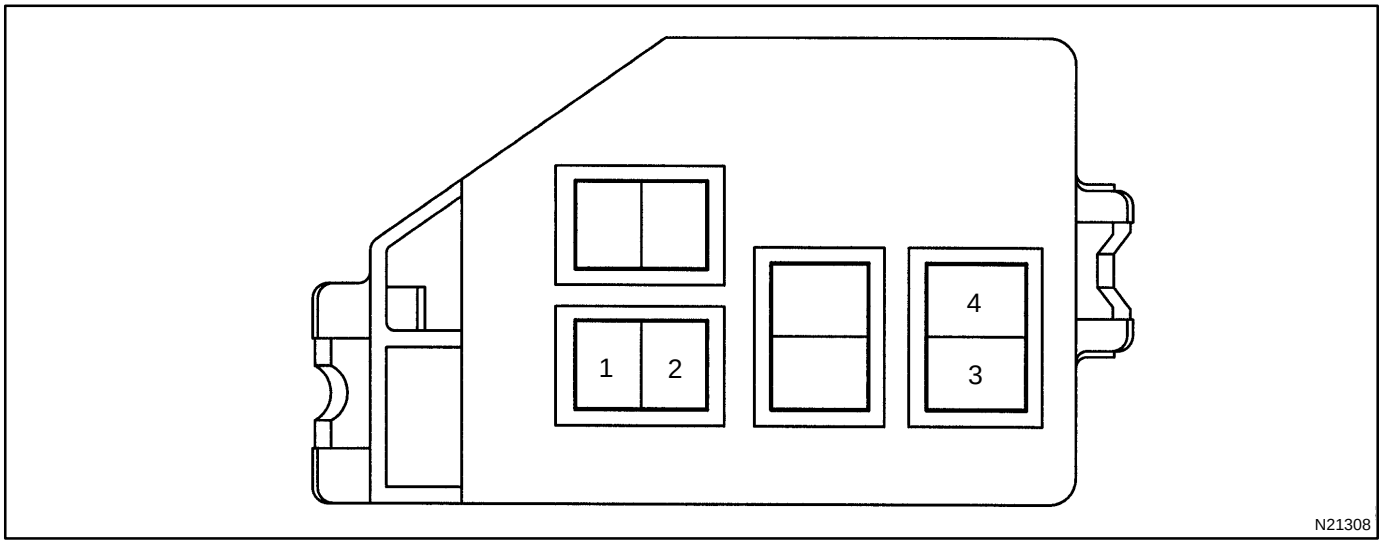


Remove the relay from the relay block and inspect the connector on relay block side.

Relay	Tester connection	Condition	Specified condition
MG/CLT	C – Ground	Constant	Continuity
MG/CLT	D – Ground	Ignition switch turned to ON	Battery positive voltage
C/OPN	G – Ground	Constant	Continuity
FAN No.2	L – Ground	Constant	Continuity
FAN No.2	J – Ground	Ignition switch turned to ON	Battery positive voltage
FAN No.2	K – Ground	Constant	Battery positive voltage
FAN No.3	P – Ground	Constant	Battery positive voltage
HEATER	U – Ground	Constant	Continuity
HEATER	R – Ground	Ignition switch turned to ON	Battery positive voltage
HEATER	V – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

6. INSPECT FUSIBLE LINK BLOCK CIRCUIT



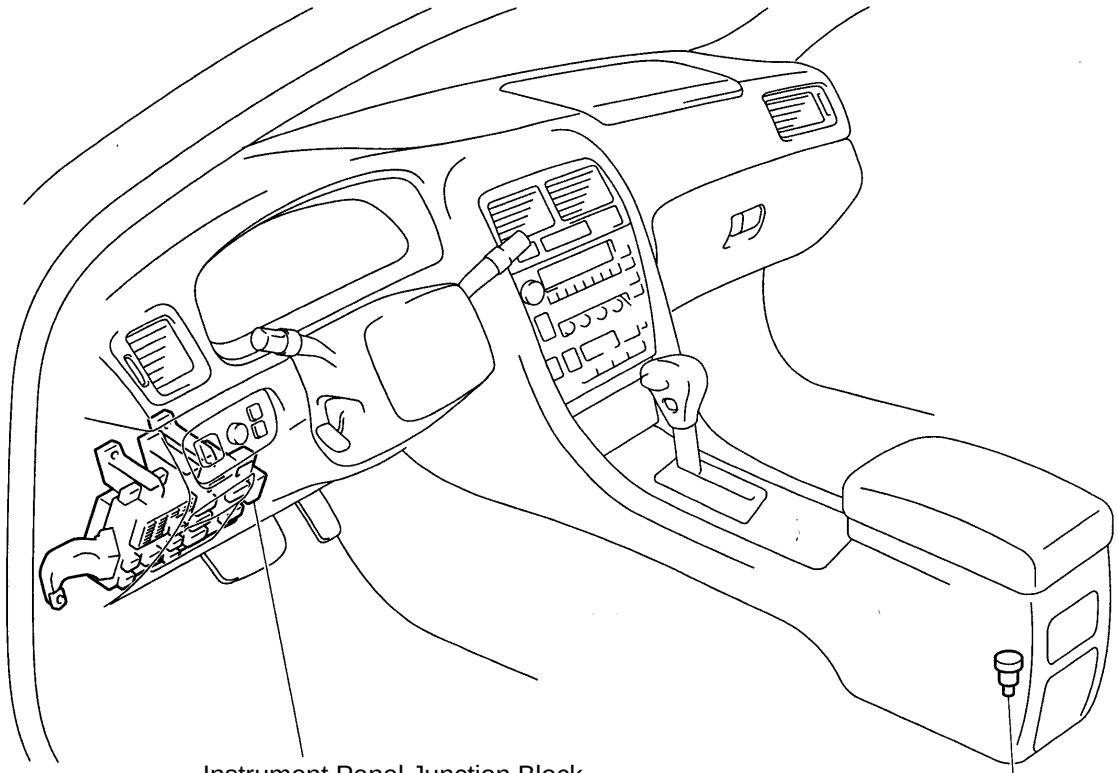
Remove the fuse from the junction block and inspect the connector on junction block side.

Fuse	Tester connection	Condition	Specified condition
HTR	1 – Ground	Ignition switch turned to ON	Battery positive voltage
ALT	4 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

POWER OUTLET
LOCATION

BE04T–01

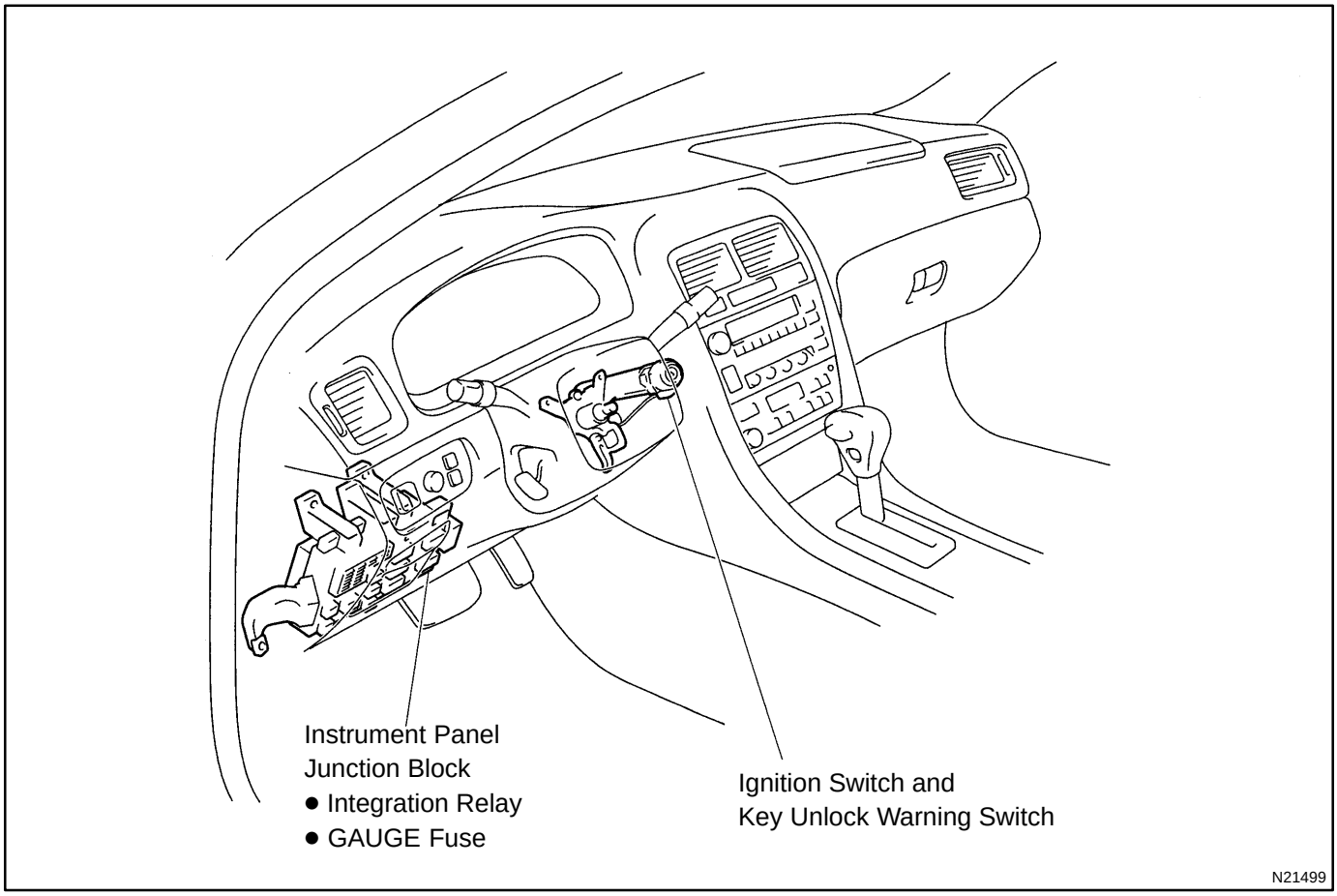


N21557

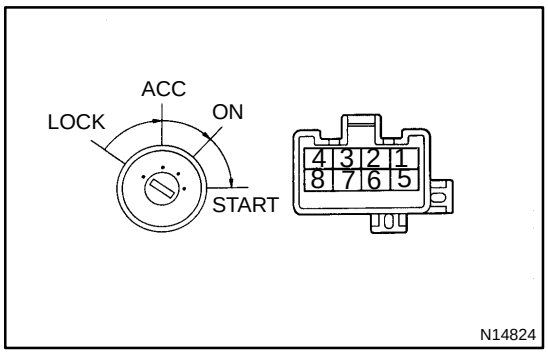
IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH

BE04U–01

LOCATION



BE04V–01

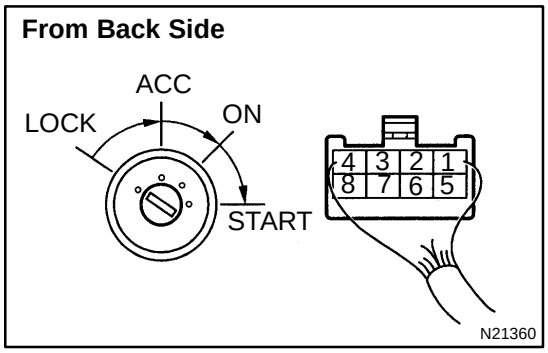


INSPECTION

1. INSPECT IGNITION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	–	No continuity
ACC	2 – 3	Continuity
ON	2 – 3 – 4 6 – 7	Continuity
START	1 – 2 – 4 6 – 7 – 8	Continuity

If continuity is not as specified, replace the switch.

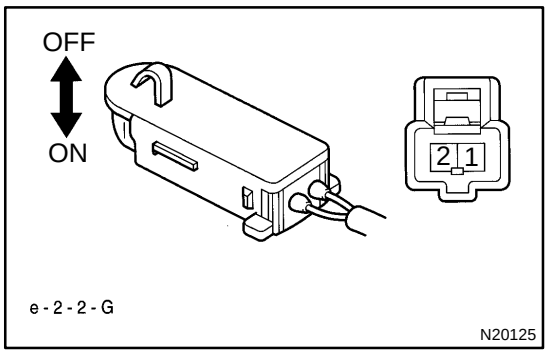


2. INSPECT IGNITION SWITCH CIRCUIT

Connect the switch connector and inspect the connector on the wire harness side from the back side.

Tester connection	Condition	Specified condition
1– Ground	Ignition switch START	Battery positive voltage
2 – Ground	Constant	Battery positive voltage
3 – Ground	Ignition switch ACC or ON	Battery positive voltage
4 – Ground	Ignition switch ON	Battery positive voltage
6 – Ground	Ignition switch ON	Battery positive voltage
7 – Ground	Constant	Battery positive voltage
8– Ground	Ignition switch START	Battery positive voltage

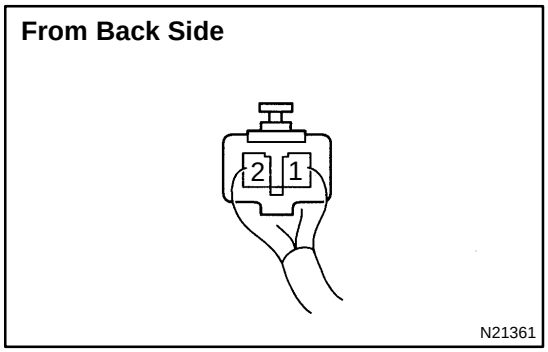
If circuit is not as specified, inspect the switch and circuits connected to other parts.



3. INSPECT KEY UNLOCK WARNING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Key removed)	–	No continuity
ON (Key set)	1 – 2	Continuity

If continuity is not as specified, replace the switch.

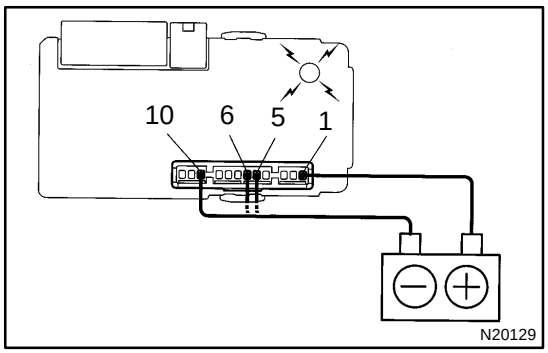


4. INSPECT KEY UNLOCK WARNING SWITCH CIRCUIT

Connect the switch connector and inspect the connector on the wire harness side from the back side.

Tester connection	Condition	Specified condition
2– Ground	Ignition key removed	No continuity
2– Ground	Ignition key set	Continuity
1– Ground	Constant	Continuity

If circuit is not as specified, inspect the switch and circuits connected to other parts.

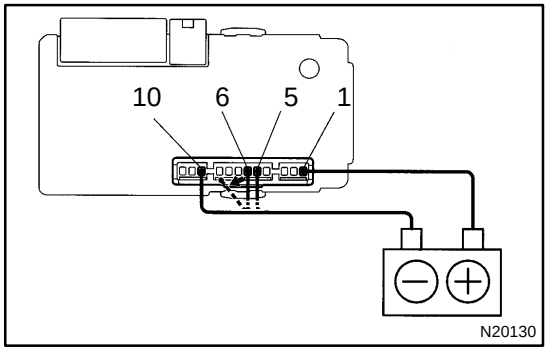


5. Key Unlock Warning System: INSPECT INTEGRATION RELAY OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1.

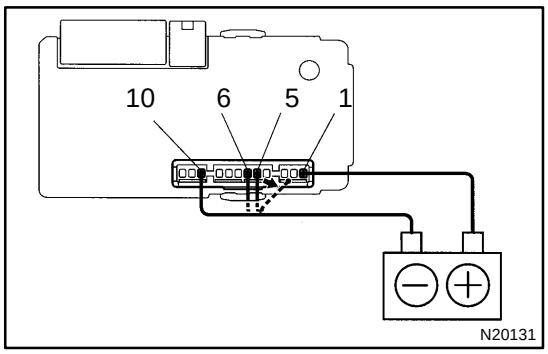
(b) Connect the negative (–) lead from the battery to terminals 5, 6 and 10.

(c) Check the buzzer sounds.



(d) Disconnect the negative (–) lead from the battery to terminal 6.

(e) Check that the buzzer stops sounding.

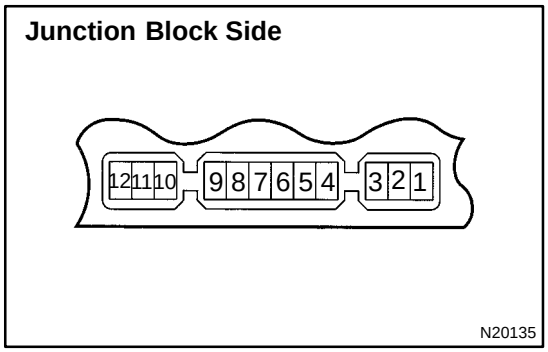


(f) Connect the negative (–) lead from the battery to terminal 6.

(g) Disconnect the negative (–) lead from the battery to terminal 5.

(h) Check that the buzzer stops sounding.

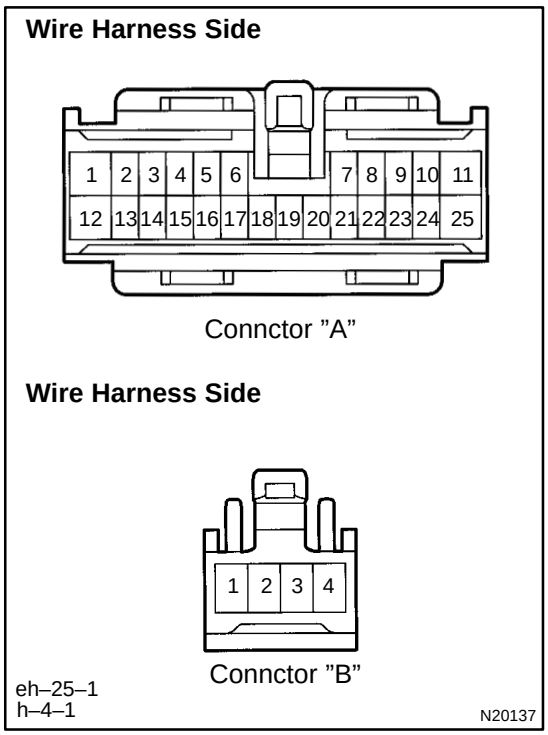
If operation is not as specified, replace the relay.



6. INSPECT INTEGRATION RELAY CIRCUIT

(a) Remove the relay from the junction block No.1 and inspect the connector on the junction block side.

Tester connection	Condition	Specified condition
2 – Ground	All door courtesy switches OFF (Door closed)	No continuity
2 – Ground	One of the door courtesy switches ON (Door opened)	Continuity
4 – Ground	Door courtesy switches except that of the driver's door OFF (Door closed)	No continuity
4 – Ground	One of the door courtesy switches except that of the driver's door ON (Door opened)	Continuity
3 – Ground	Door outside handle switch OFF	No continuity
3 – Ground	Door outside handle switch ON	Continuity
5 – Ground	Key unlock warning switch OFF	No continuity
5 – Ground	Key unlock warning switch ON	Continuity
6 – Ground	Driver's door courtesy switch OFF (Door closed)	No continuity
6 – Ground	Driver's door courtesy switch ON (Door opened)	Continuity
8 – Ground	Buckle switch OFF (Seat belt unfastened)	No continuity
8 – Ground	Buckle switch ON (Seat belt fastened)	Continuity
10 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage
7 – Ground 9 – Ground	Ignition switch LOCK or ACC	No voltage
7 – Ground 9 – Ground	Ignition switch ON	Battery positive voltage
11 – Ground	Ignition switch LOCK	No voltage
11 – Ground	Ignition switch ACC or ON	Battery positive voltage



(b) Disconnect the connector from the integration relay and inspect the connectors on the wire harness side.

Tester connection	Condition	Specified condition
A3 – Ground	Constant	Continuity
A5 – Ground	Driver’s door unlock detection switch OFF (Door closed)	No continuity
A5 – Ground	Driver’s door unlock detection switch ON (Door opened)	Continuity
A6 – Ground	Passenger’s door courtesy switch OFF (Door closed)	No continuity
A6 – Ground	Passenger’s door courtesy switch ON (Door opened)	Continuity
A7 – Ground	Passenger’s door unlock detection switch OFF (Door closed)	No continuity
A7 – Ground	Passenger’s door unlock detection switch ON (Door opened)	Continuity
A9 – Ground	Rear door unlock detection switch OFF (Door closed)	No continuity
A9 – Ground	Rear door unlock detection switch ON (Door opened)	Continuity
A11 – A12 A12 – A25	Constant	Continuity
A16 – Ground	Door lock manual switch OFF or UNLOCK	No continuity
A16 – Ground	Door lock manual switch LOCK	Continuity
A17 – Ground	Door lock manual switch OFF or LOCK	No continuity
A17 – Ground	Door lock manual switch UNLOCK	Continuity
A18 – Ground	Driver’s and passenger’s door key lock and unlock switch OFF or UNLOCK	No continuity
A18 – Ground	Driver’s or passenger’s door key lock and unlock switch LOCK	Continuity

Tester connection	Condition	Specified condition
A19 – Ground	Driver's door key lock and unlock switch OFF or LOCK	No continuity
A19 – Ground	Driver's door key lock and unlock switch UNLOCK	Continuity
A20 – Ground	Passenger's door key lock and unlock switch OFF or LOCK	No continuity
A20 – Ground	Passenger's door key lock and unlock switch UNLOCK	Continuity
A1 – Ground	Constant	Battery positive voltage
B1 – Ground	Light control switch OFF	No voltage
B1 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
B4 – Ground	Light control switch OFF or TAIL	No voltage
B4 – Ground	Light control switch HEAD	Battery positive voltage
B2 – Ground B3 – Ground	Constant	Battery positive voltage

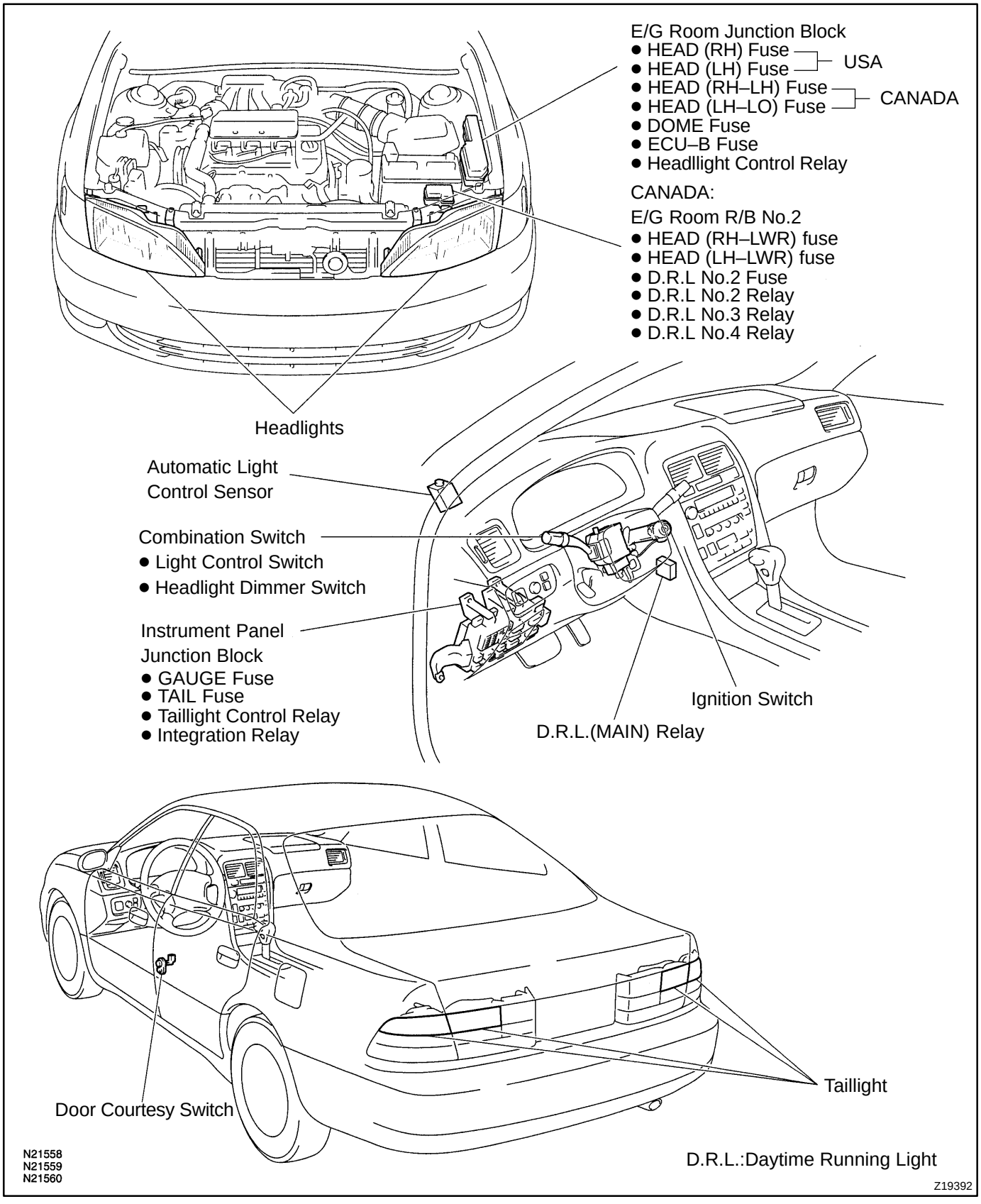
If the circuit is as specified, try replacing the relay with a new one.

If the circuit is not as specified, inspect the circuits connected to other parts.

HEADLIGHT AND TAILLIGHT SYSTEM

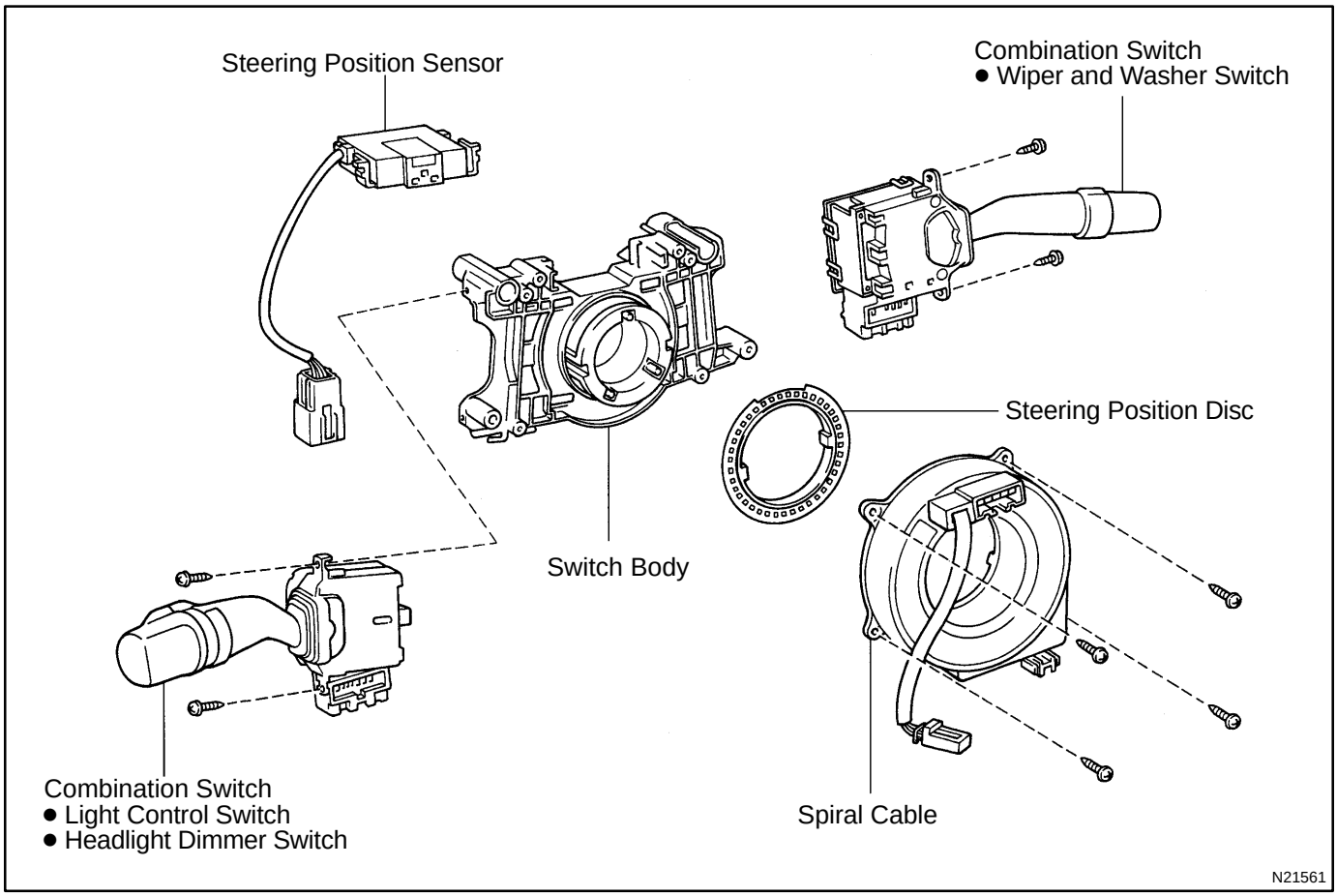
BE04W–01

LOCATION



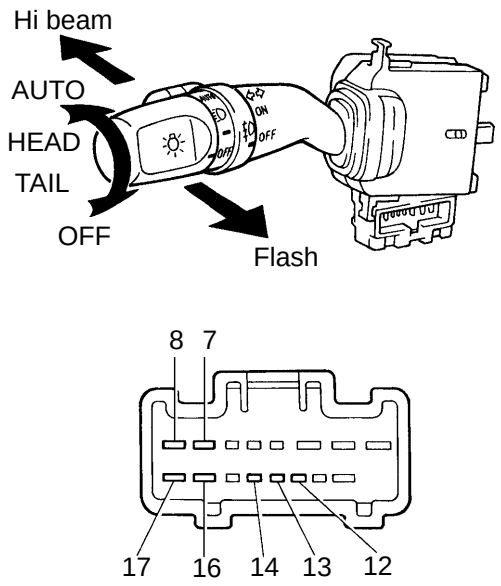
BE04X–01

COMPONENTS



BE04Y–02

INSPECTION



1. INSPECT LIGHT CONTROL SWITCH CONTINUITY

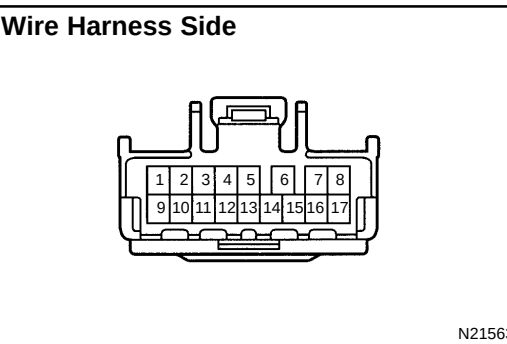
Switch position	Tester connection	Specified condition
OFF	–	No continuity
TAIL	14 – 16	Continuity
HEAD	13 – 14 – 16	Continuity
AUTO	12 – 16	Continuity

If continuity is not as specified, replace the switch.

2. INSPECT HEADLIGHT DIMMER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Low beam	16 – 17	Continuity
High beam	7 – 16	Continuity
Flash	7 – 8 – 16	Continuity

If continuity is not as specified, replace the switch.



3. INSPECT COMBINATION SWITCH CIRCUIT

Connect the wire harness side connector to the combination switch and inspect wire harness side connector from the back side.

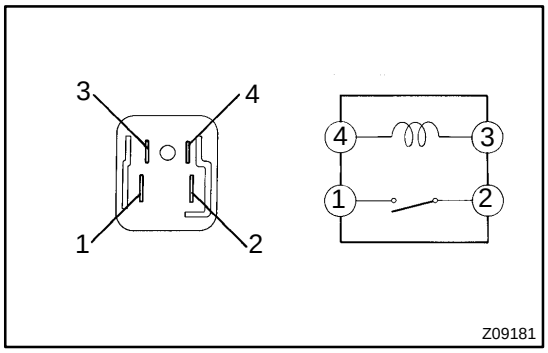
Light Control Switch:

Tester connection	Condition	Specified condition
16 – Ground	Constant	Continuity
12 – Ground	Light control switch OFF, TAIL or HEAD	No voltage
12 – Ground	Light control switch AUTO	Battery positive voltage
13 – Ground	Light control switch OFF or TAIL	No voltage
13 – Ground	Light control switch HEAD	Battery positive voltage
14 – Ground	Light control switch OFF	No voltage
14 – Ground	Light control switch TAIL or HEAD	Battery positive voltage

Headlight Dimmer Switch:

Tester connection	Condition	Specified condition
7 – Ground	Headlight dimmer switch Low Beam	No voltage
7 – Ground	Headlight dimmer switch High Beam or Flash	Battery positive voltage
8 – Ground	Headlight dimmer switch Low Beam or High Beam	No voltage
8 – Ground	Headlight dimmer switch Flash	Battery positive voltage
17– Ground	Headlight dimmer switch High Beam or Flash	No voltage
17– Ground	Headlight dimmer switch Low Beam	Battery positive voltage

If the circuit is not as specified, inspect the circuit connected to other parts.

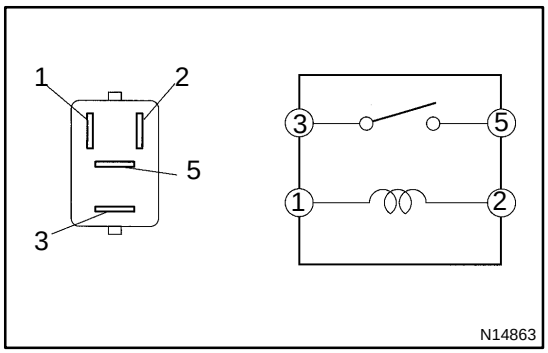


4. INSPECT HEADLIGHT CONTROL RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	3 – 4	Continuity
Apply B+ between terminals 3 and 4.	1 – 2	Continuity

If continuity is not as specified, replace the relay.

5. INSPECT HEADLIGHT CONTROL RELAY CIRCUIT (See page BE–11)

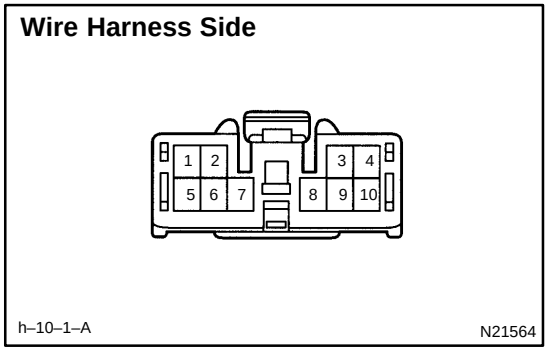


6. INSPECT TAILLIGHT CONTROL RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

7. INSPECT TAILLIGHT CONTROL RELAY CIRCUIT (See page BE–27)

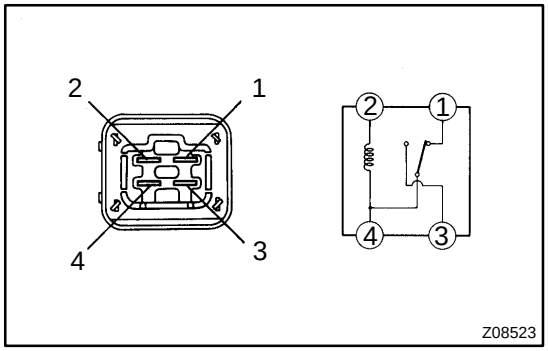


8. INSPECT DAYTIME RUNNING LIGHT RELAY CIRCUIT

Disconnect the connector from the relay and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Light control switch position OFF or TAIL	No continuity
2 – Ground	Light control switch position HEAD	Continuity
4 – Ground	Parking brake switch position OFF (Parking brake lever released)	No continuity
4 – Ground	Parking brake switch position ON (Parking brake lever pulled up)	Continuity
6 – Ground	Constant	Continuity
8 – Ground	Headlight dimmer switch position Low beam	No continuity
8 – Ground	Headlight dimmer switch position High beam or Flash	Continuity
10 – Ground	Brake fluid level warning switch position OFF	No continuity
10 – Ground	Brake fluid level warning switch position ON	Continuity
1 – Ground	Ignition switch position LOCK or ACC	No voltage
1 – Ground	Ignition switch position ON or START	Battery positive voltage
5 – Ground	Engine Stop	No voltage
5 – Ground	Engine Running	Battery positive voltage
7 – Ground	Constant	Battery positive voltage
9 – Ground	Constant	Battery positive voltage

If circuit is as specified, try replacing the relay with a new one.
If circuit is not as specified, inspect the circuits connected to other parts.

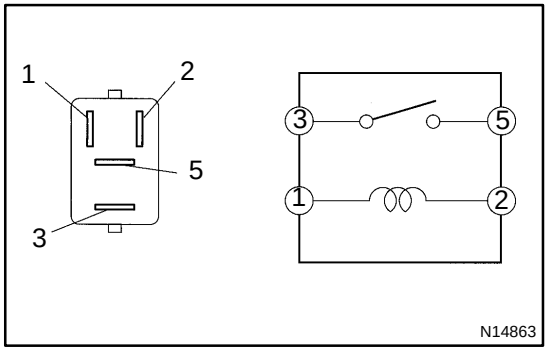


9. INSPECT HEADLIGHT DIMMER RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 4, 2 – 4	Continuity
Apply B+ between terminals 2 and 4.	3 – 4	Continuity

If continuity is not as specified, replace the relay.

10. INSPECT HEADLIGHT DIMMER RELAY CIRCUIT (See page BE–11)

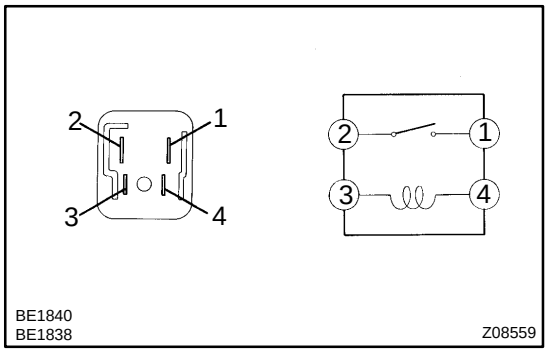


11. INSPECT DAYTIME RUNNING LIGHT NO.3 RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

12. INSPECT DAYTIME RUNNING LIGHT NO.3 RELAY CIRCUIT
(See page BE–11)



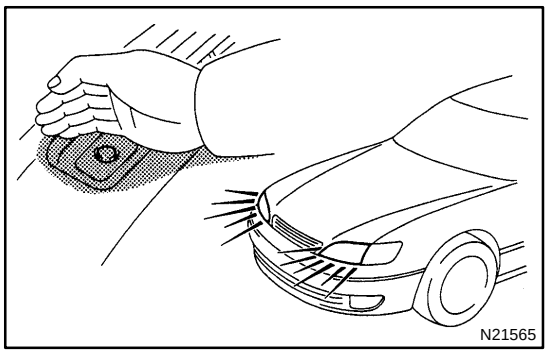
13. INSPECT DAYTIME RUNNING LIGHT NO.4 RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	3 – 4	Continuity
Apply B+ between terminals 3 and 4.	1 – 2	Continuity

If continuity is not as specified, replace the relay.

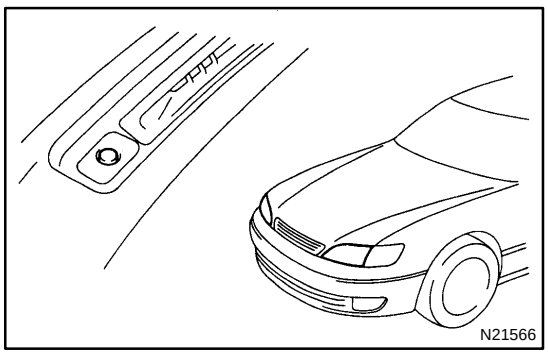
14. INSPECT DAYTIME RUNNING LIGHT NO.4 RELAY CIRCUIT
(See page BE–11)

15. INSPECT LIGHT AUTO TURN OFF SYSTEM
(See Integration relay circuit on page BE–20)



16. Auto ON:
INSPECT AUTOMATIC LIGHT CONTROL

(a) Turn the ignition switch ON.
(b) Turn the light control switch to AUTO.
(c) Gradually cover the top of the sensor.
(d) Verify that the accessory lights and the headlights turn ON.



17. Auto OFF:
INSPECT AUTOMATIC LIGHT CONTROL

(a) Gradually expose the sensor.
(b) Verify that the headlights and the accessory lights turn OFF.

18. INSPECT LIGHT–OFF CONDITION

(a) Turn the ignition switch ON.

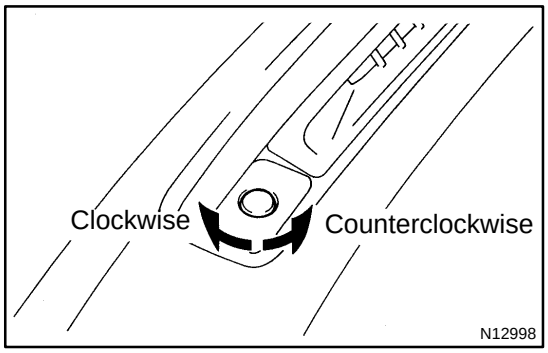
(b) Gradually cover the top of the sensor.
Lights auto ON:

(c) Verify that the lights will go out when light control switch position is OFF or the area surrounding the sensor gets bright or open the driver's door while the ignition switch is OFF.

19. INSPECT LIGHTS–ON CONDITION

(a) Open the driver's door while the ignition switch is OFF.

(b) Turn the light control switch to AUTO leaving the door open and cover the top of the sensor, and verify that the lights go on when the ignition switch is turned ON.

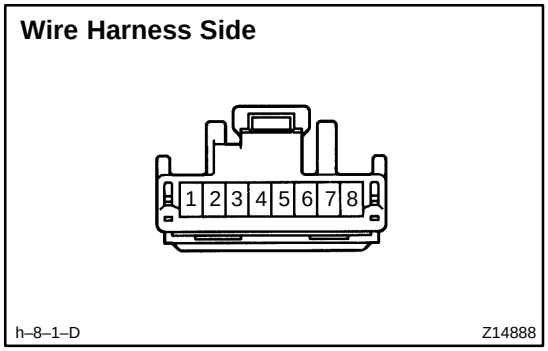


20. ADJUST AUTOMATIC LIGHT CONTROL SENSOR

(a) Adjustment of the light control is performed by turning the sensitivity knob on the sensor.

(b) This will determine at what light condition the automatic control will take place.

- If response is too quick, turn the knob counterclockwise.
- If response is too slow, turn the knob clockwise.



**21. Connector disconnected:
INSPECT SENSOR CIRCUIT**

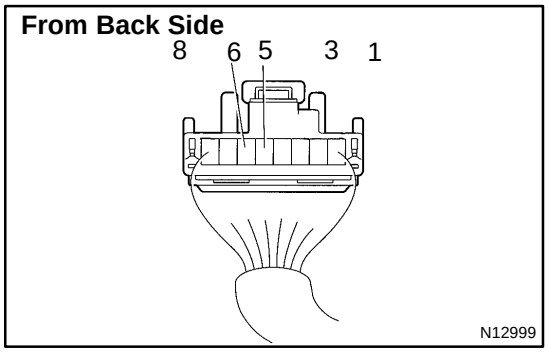
Disconnect the connector from the sensor and inspect the connector on the wire harness side, as shown in the chart.

Tester connection	Condition	Specified condition
3 – Ground	Door courtesy switch OFF	No continuity
3 – Ground	Door courtesy switch ON	Continuity
5 – Ground	Light control switch OFF, TAIL or AUTO	No continuity
5 – Ground	Light control switch HEAD	Continuity
6 – Ground	Light control switch OFF, TAIL or HEAD	No continuity
6 – Ground	Light control switch AUTO	Continuity
7 – Ground	Light Control Switch OFF or AUTO	No continuity
7 – Ground	Light Control Switch TAIL or HEAD	Continuity

Tester connection	Condition	Specified condition
1 – Ground	Ignition switch position LOCK or ACC	No voltage
1 – Ground	Ignition switch position ON	Battery positive voltage
2 – Ground	Constant	Battery positive voltage

If circuit is as specified, perform the inspection on the following page.

If the circuit is not as specified, inspect the circuit connected to other parts.



22. Connector connected:
INSPECT SENSOR CIRCUIT

Connect the wire harness side connector to the sensor and inspect wire harness side connector from the back side.

HINT:

- Ignition switch ON.
- Light control switch AUTO.
- Vehicle's surroundings are bright.

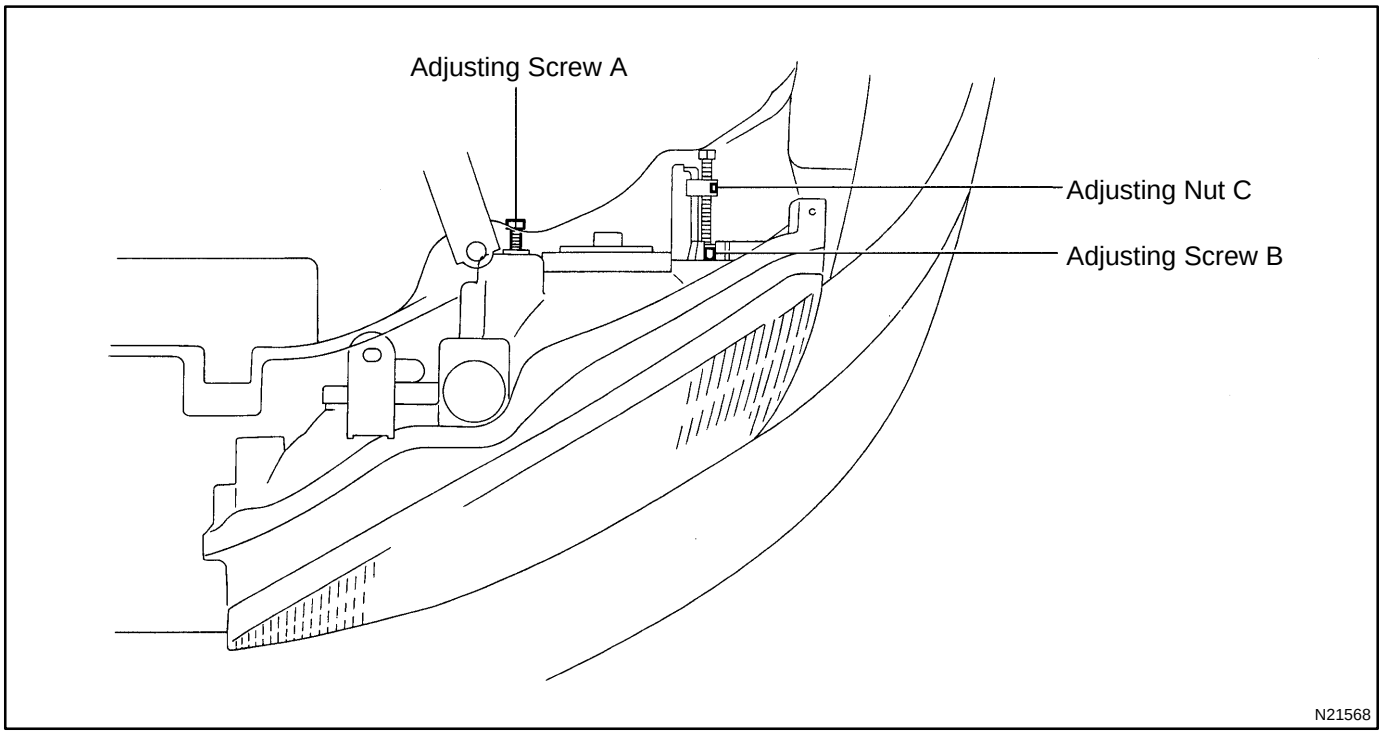
Tester connection	Condition	Specified condition
1 – Ground	Ignition switch position ON	10 V or more
1 – Ground	Ignition switch position OFF	1 V or less
3 – Ground	Door courtesy switch ON	1 V or less
3 – Ground	Door courtesy switch OFF	9 V or more
5 – Ground	Vehicle's surroundings are dark	1.8 V or less
5 – Ground	Dimmer switch position Flash	0.3 V or less
6 – Ground	Vehicle's surroundings are dark	1.5 V or less
8 – Ground	Vehicle is under the direct sun light. (Sensor is not covered)	3.7 V or more
8 – Ground	Vehicle's surroundings are dim. (Sensor is covered and taillights are ON)	1.32 ~ 2.32 V
8 – Ground	Vehicle's surroundings are dark. (Sensor is covered and headlights are ON)	0.42 V

If circuit is as specified, try replacing the sensor with a new one.

If the circuit is not as specified, inspect the circuit connected to other parts.

BE04Z–02

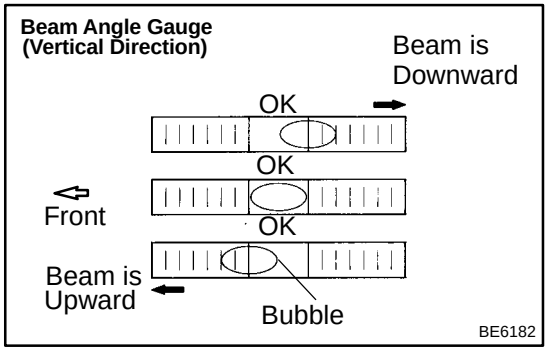
ADJUSTMENT



1. ADJUSTING HEADLIGHT AIM ONLY

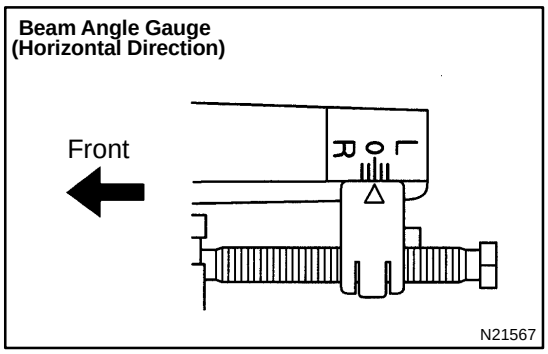
(a) Put the vehicle in below conditions.

- Make sure the body around the headlight is not deformed.
- Park the vehicle on a level spot.
- The driver gets into the driver's seat and puts the vehicle in a state ready for driving (with a full tank).
- Bounce the vehicle several times.



(b) Adjust the headlight in vertical direction.

If the bubble is outside the acceptable range of the beam angle gauge, adjust it using adjusting screw A.



(c) Adjust the headlight in horizontal direction.

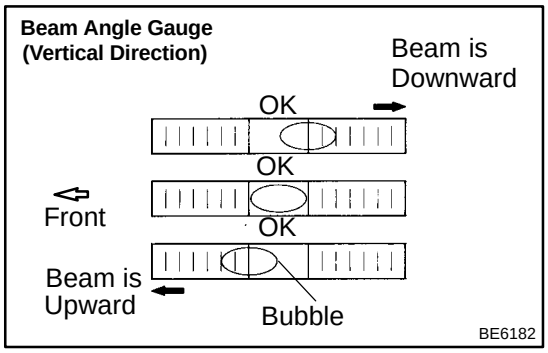
If the ”0” moves away from the mark beyond the acceptable range, adjust the ”0” back to the mark using adjusting screw B.

2. REPLACING HEADLIGHT

(a) Replace the headlight.

(b) Put the vehicle in below conditions.

- Make sure the body around the headlight is not deformed.
- Park the vehicle on a level spot.
- The driver gets into the driver’s seat and puts the vehicle in a state ready for driving (with a full tank).
- Bounce the vehicle several times.



(c) Adjust the headlight in vertical direction.

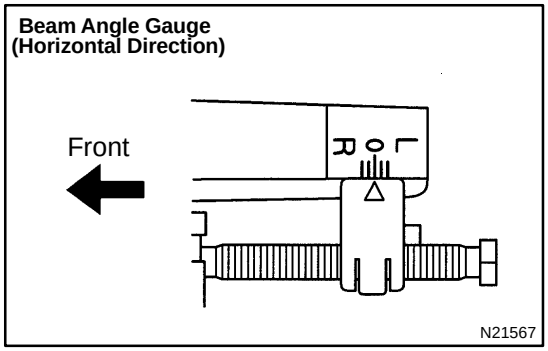
(1) Using adjusting screw A, adjust the headlight aim to within the specifications.

(2) Make sure that the gauge bubble is within the acceptable range.

HINT:

If the gauge bubble is outside the acceptable range, check that the vehecle is parked on a level place.

Readjust the headlight aim after parking the vehicle on a level place.



(d) Adjust the headlight in horizontal direction.

(1) Using adjusting screw B, adjust the headlight aim to within the specifications.

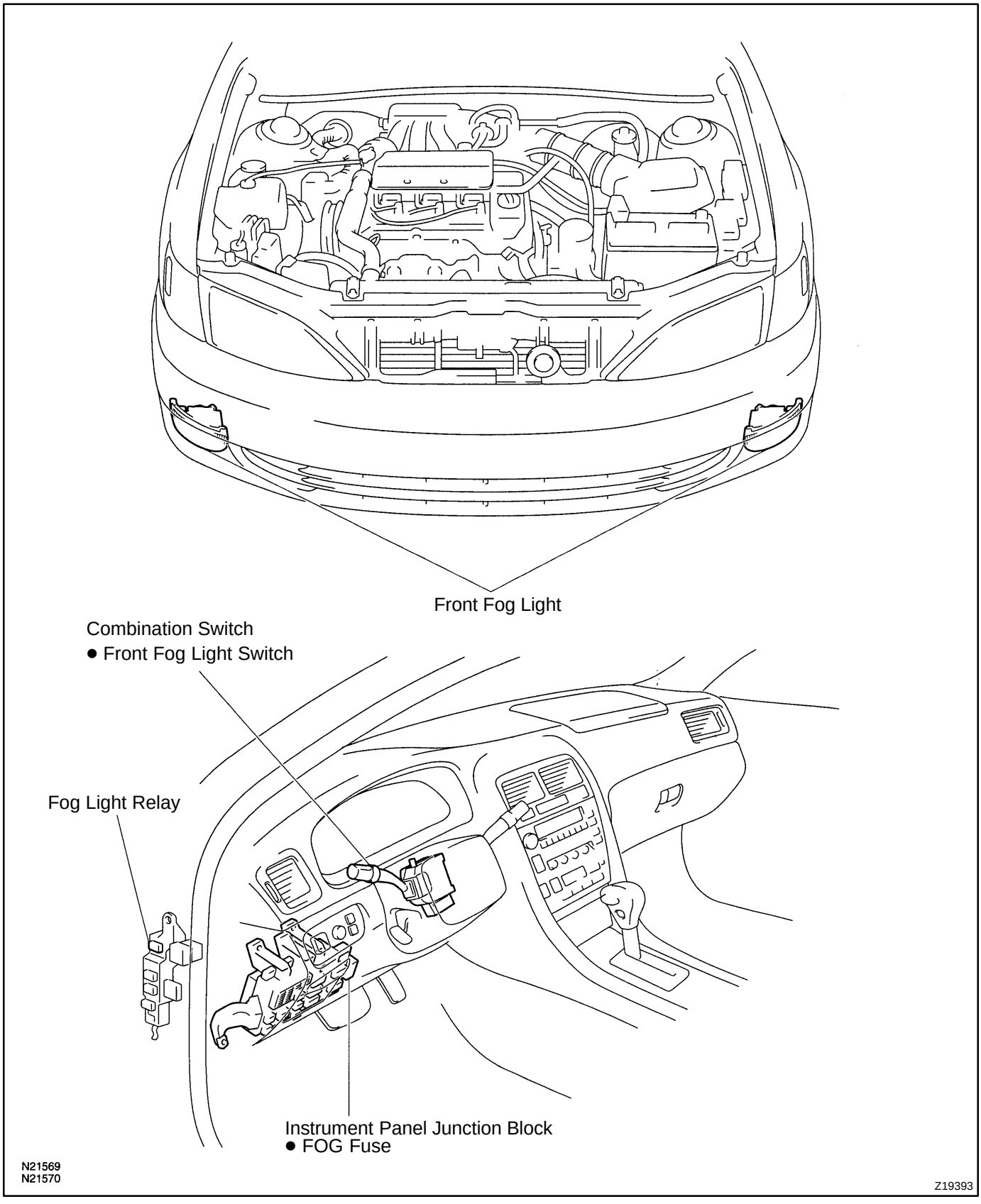
(2) Using adjusting nut C, adjust the ”0” back to the mark.

3. ADJUST SPIRAL CABLE

(See page SR–16)

FOG LIGHT SYSTEM
LOCATION

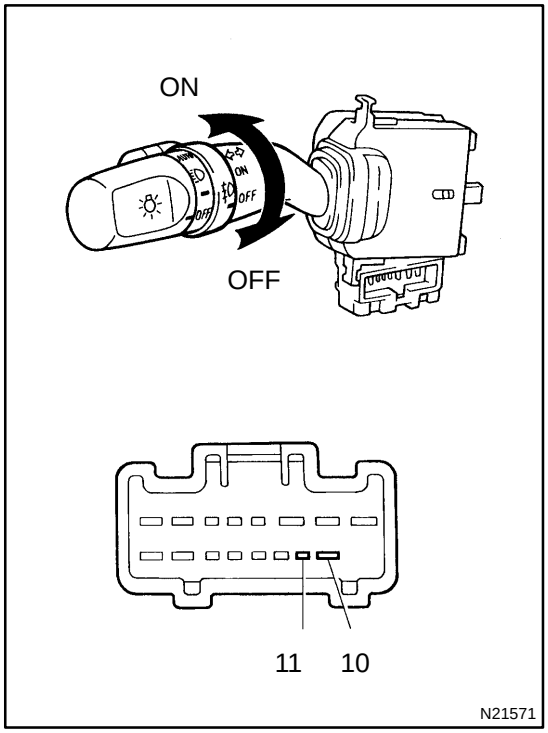
BE050–01



BE051–01

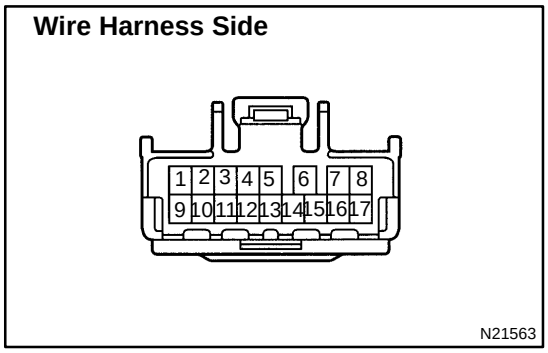
INSPECTION

1. INSPECT FOG LIGHT SWITCH CONTINUITY



Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	10 – 11	Continuity

If continuity is not as specified, replace the switch.

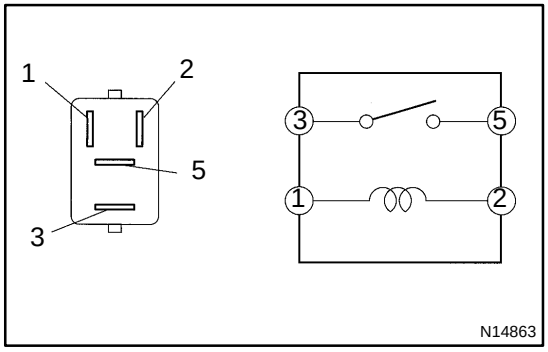


2. INSPECT COMBINATION SWITCH CIRCUIT

Connect the wire harness side connector to the combination switch and inspect wire harness side connector from the back side.

Tester connection	Condition	Specified condition
10– Ground	Headlight dimmer switch High Beam or Flash	No continuity
10– Ground	Headlight dimmer switch Low Beam	Continuity
11 – Ground	Light control switch OFF or TAIL	No voltage
11 – Ground	Light control switch HEAD	Battery positive voltage

If the circuit is not as specified, inspect the circuit connected to other parts.



3. INSPECT FOG LIGHT RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

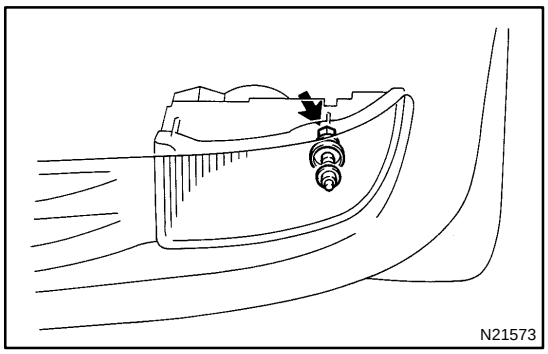
4. INSPECT FOG LIGHT RELAY CIRCUIT

Remove the relay from the driver's side relay block and inspect the connector on relay block side.

Tester connection	Condition	Specified condition
3 – Ground	Constant	Continuity
1 – Ground	Light control switch HEAD	Battery positive voltage
5 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuit connected to other parts.

BE052–01



ADJUSTMENT

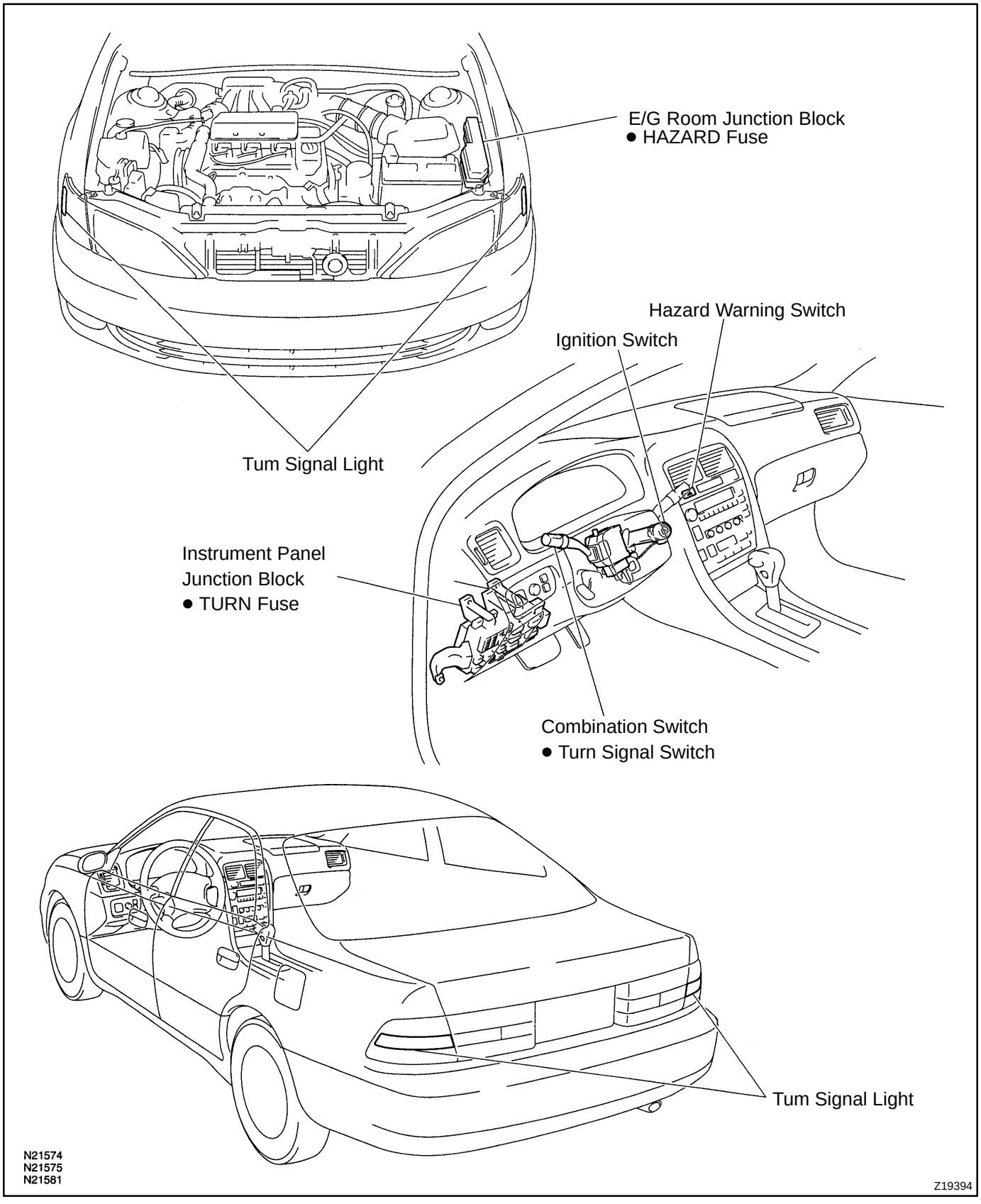
ADJUST FOG LIGHT AIM

A–bolt: Vertical Direction

TURN SIGNAL AND HAZARD WARNING SYSTEM

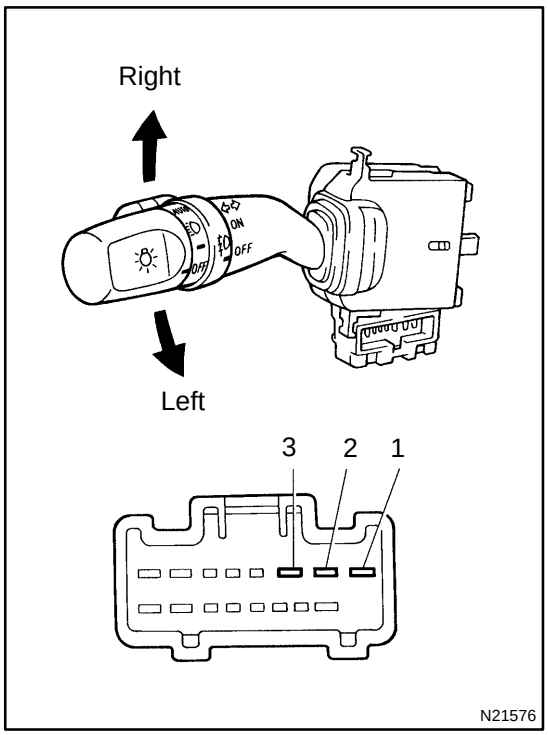
BE053–01

LOCATION



BE054–01

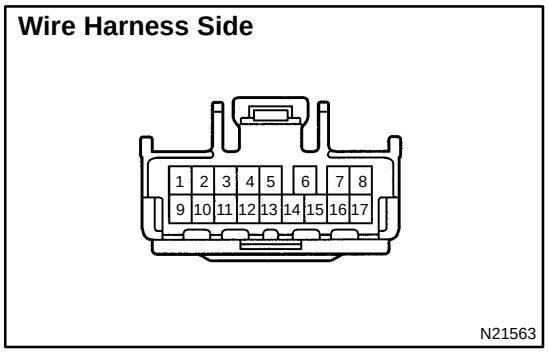
INSPECTION



1. INSPECT TURN SIGNAL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Left turn	1 – 2	Continuity
Neutral	–	No continuity
Right turn	2 – 3	Continuity

If continuity is not as specified, replace the switch.



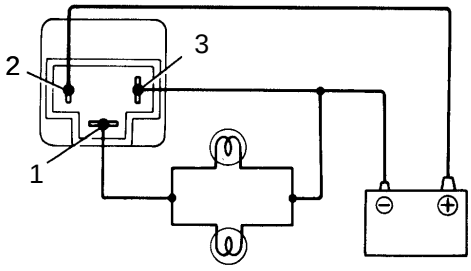
2. INSPECT COMBINATION SWITCH CIRCUIT

Connect the wire harness side connector to the combination switch and inspect wire harness side connector from the back side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	*Continuity
3 – Ground	Constant	*Continuity
2 – Ground	Ignition switch ON and turn signal switch position Neutral	No voltage
2 – Ground	Hazard warning switch ON	Battery positive voltage
2 – Ground	Ignition switch ON and turn signal switch position Left or Right	Battery positive voltage

*There is resistance because this circuit is grounded through the bulb.

If the circuit is not as specified, inspect the circuit connected to other parts.



Turn Signal Light Bulbs(21W)

BE1843

3. INSPECT TURN SIGNAL FLASHER OPERATION

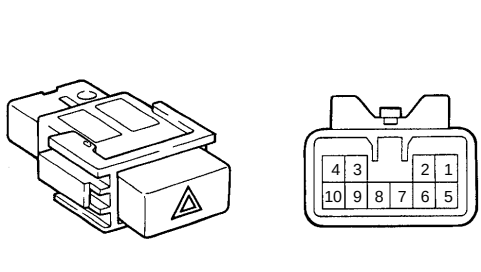
(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3.

(b) Connect the 2 turn signal light bulbs in parallel to each other to terminals 1 and 3, check that the bulbs flash.

HINT:

The turn signal lights should flash 60 to 120 times per minute. If one of the front or rear turn signal lights has an open circuit, the number of flashes will be more than 140 per minute.

If operation is not as specified, replace the flasher.



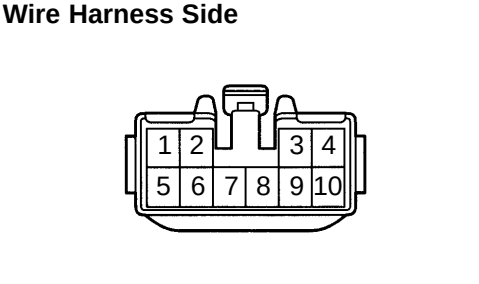
e–10–2

N21578

4. INSPECT HAZARD WARNING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch OFF	5 – 7	Continuity
Switch ON	1 – 2 – 3 – 4 5 – 6	Continuity
Illumination circuit	8 – 9	Continuity

If continuity is not as specified, replace the switch.



e–10–1

N21579

5. INSPECT HAZARD WARNING SWITCH CIRCUIT

Disconnect the switch connector and inspect the connection on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	*2Continuity
2 – Ground	Constant	*2Continuity
*19 – Ground	Constant	Continuity
6 – Ground	Constant	Battery positive voltage
7 – Ground	Ignition switch position LOCK or ACC	No voltage
7 – Ground	Ignition switch position ON	Battery positive voltage
*18 – Ground	Light control switch position OFF	No voltage
*18 – Ground	Light control switch position TAIL or HEAD	Battery positive voltage

*1: Illumination

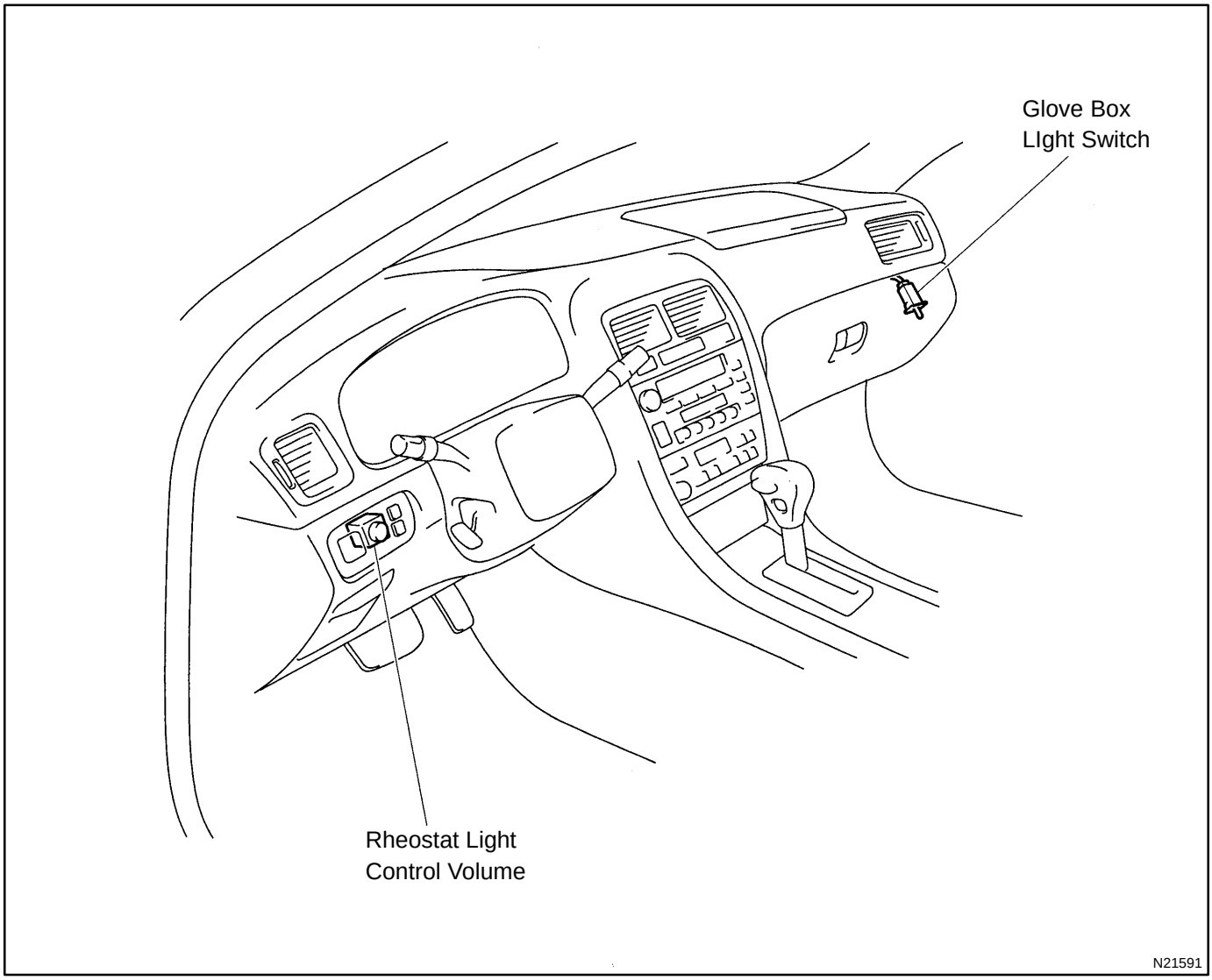
*2: There is resistance because this circuit is grounded through the bulb.

If the circuit is not as specified, inspect the circuits connected to other parts.

ILLUMINATION LIGHT SYSTEM

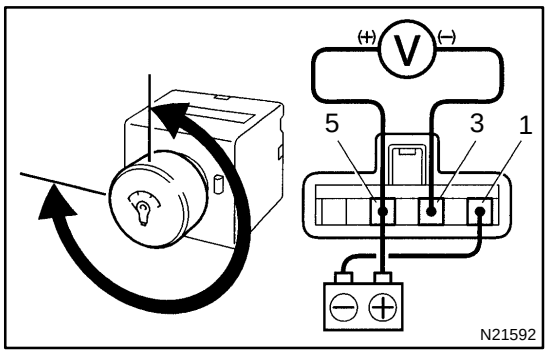
LOCATION

BE055–01



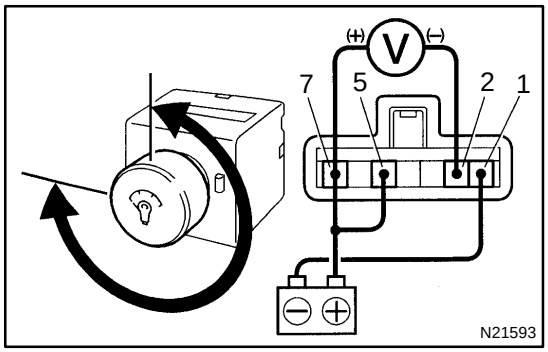
BE056–01

INSPECTION



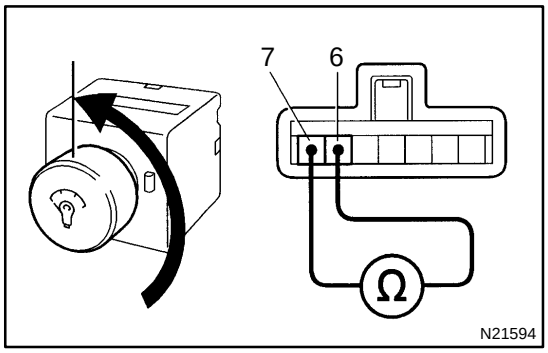
1. Combination Meter Adjustment:
INSPECT RHEOSTAT LIGHT CONTROL VOLUME

(a) Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 1.
(b) Connect the positive (+) lead from the voltmeter to terminal 5 and negative (–) lead to terminal 3.
(c) Turn the rheostat knob and check that the voltage changes.



2. Illumination Adjustment:
INSPECT RHEOSTAT LIGHT CONTROL VOLUME

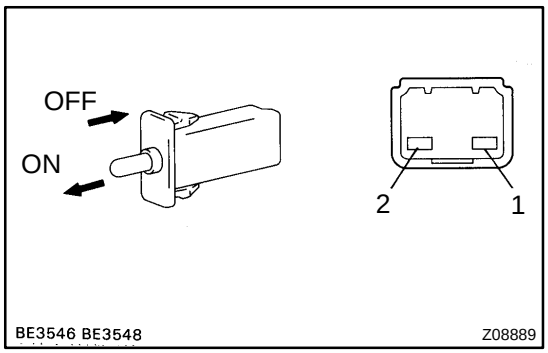
(a) Connect the positive (+) lead from the battery to terminal 5 and 7 and negative (–) lead to terminal 1.
(b) Connect the positive (+) lead from the voltmeter to terminal 7 and negative (–) lead to terminal 2.
(c) Turn the rheostat knob and check that the voltage changes.



3. Tail Cancel:
INSPECT RHEOSTAT LIGHT CONTROL VOLUME

(a) Connect the ohmmeter to terminals 6 and 7.
(b) Turn the rheostat knob fully clockwise and check that current flow stops.

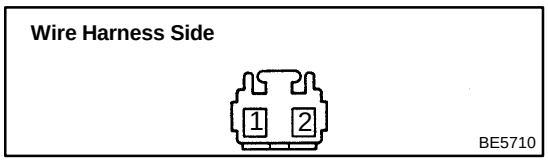
If switch is not as specified, replace the volume.



4. INSPECT GLOVE BOX LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Closed)	–	No continuity
ON (Opened)	1 – 2	Continuity

If continuity is not as specified, replace the relay.



5. INSPECT GLOVE BOX LIGHT SWITCH CIRCUIT

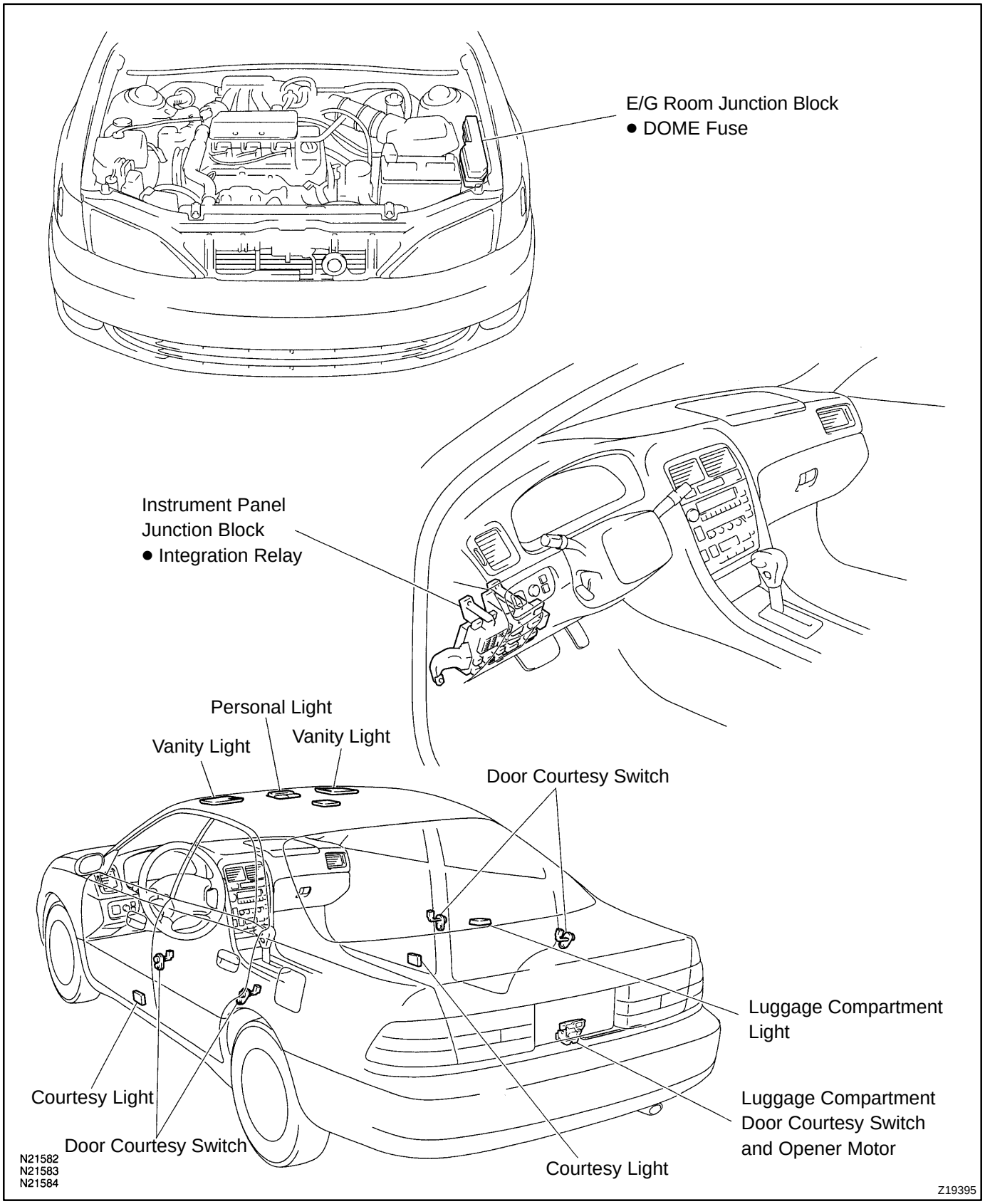
Disconnect the connector fromt the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Light control switch position OFF	No voltage
1 – Ground	Light control switch position TAIL or HEAD	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

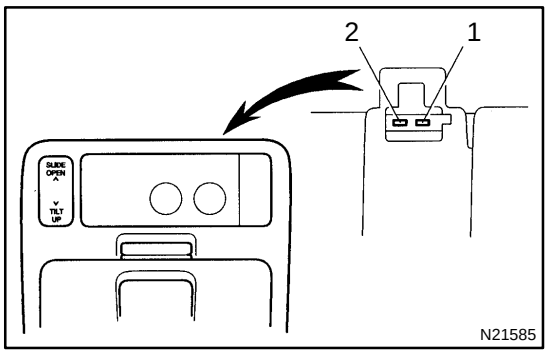
INTERIOR LIGHT SYSTEM
LOCATION

BE057–01



BE058–03

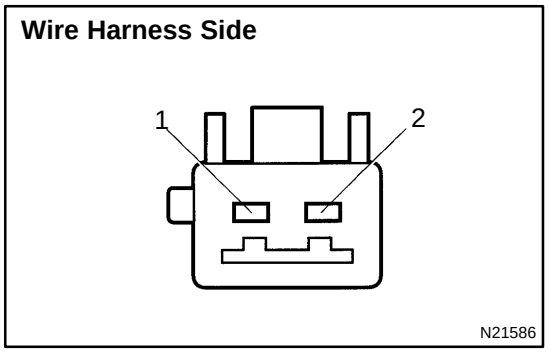
INSPECTION



1. INSPECT PERSONAL LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	1 – 2	Continuity

If continuity is not as specified, replace the light assembly or bulb.

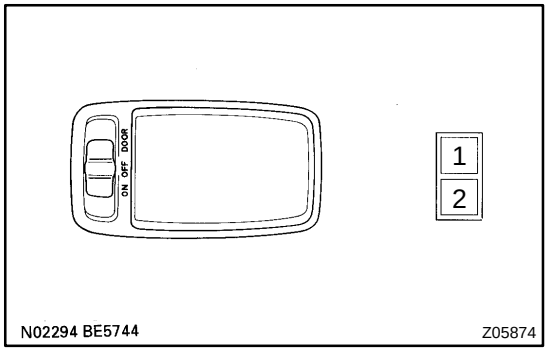


2. INSPECT PERSONAL LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage

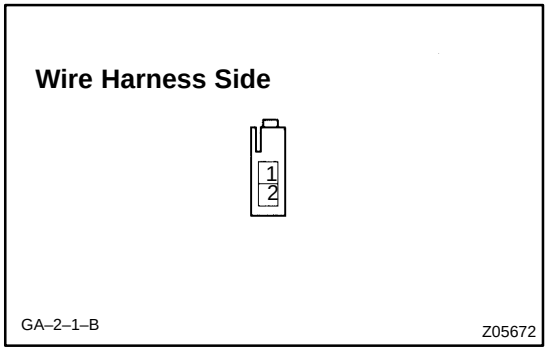
If the circuit is as specified, inspect power source or wire harness.



3. INSPECT INTERIOR LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
DOOR	2 – Switch body	Continuity
OFF	–	No continuity
ON	1 – 2	Continuity

If continuity is not as specified, replace the light assembly or bulb.

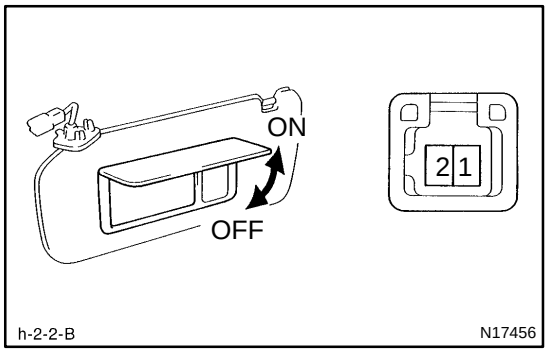


4. INSPECT INTERIOR LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Battery positive voltage

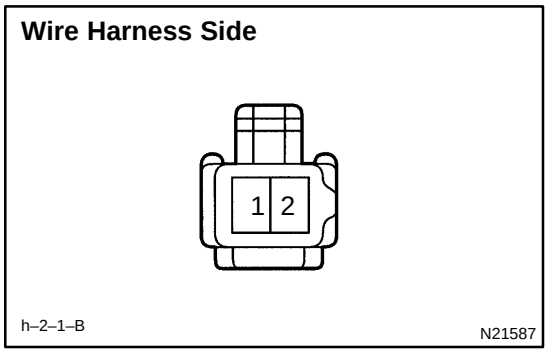
If the circuit is not as specified, inspect power source or wire harness.



5. INSPECT VANITY LIGHT CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Closed)	–	No continuity
ON (Opened)	1 – 2	Continuity

If continuity is not as specified, replace the bulb or vanity light.

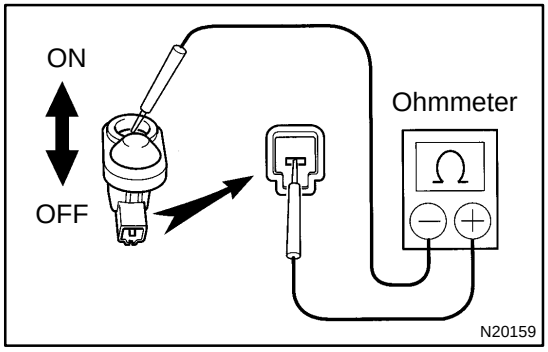


6. INSPECT VANITY LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect power source or wire harness.

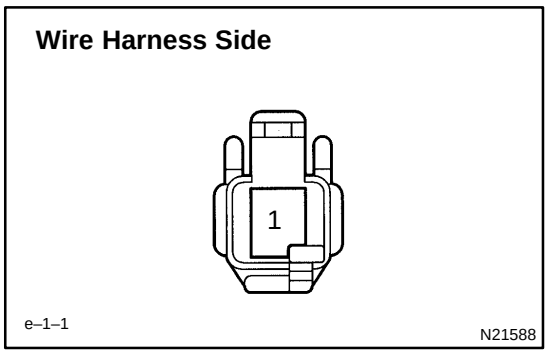


7. INSPECT DOOR COURTESY SWITCH CONTINUITY

(a) Check that continuity exists between terminals and the switch body with the switch ON (switch pin released: opened door).

(b) Check that no continuity exists between terminals and the switch body with the switch OFF (switch pin pushed in: closed doors).

If operation is not as specified, replace the switch.

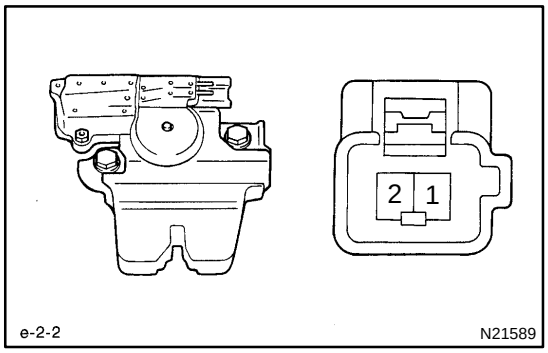


8. INSPECT DOOR COURTESY SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Battery positive voltage

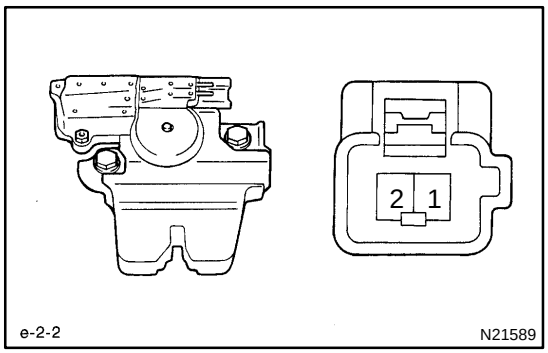
If the circuit is not as specified, inspect power source or wire harness.



9. INSPECT LUGGAGE COMPARTMENT DOOR COURTESY SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch OFF	–	No continuity
Switch ON	2 – Body Ground	Continuity

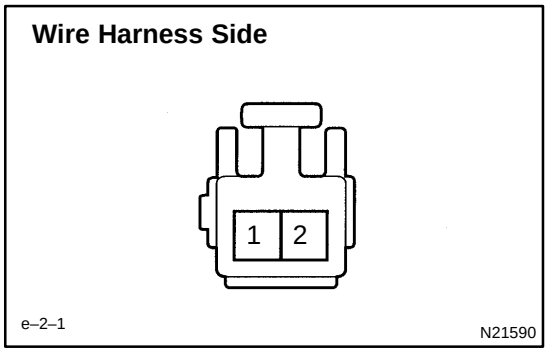
If continuity is not as specified, replace the switch and motor.



10. INSPECT LUGGAGE COMPARTMENT DOOR OPENER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to body ground, check that the motor operates.

If operation is not as specified, replace the switch and motor.



11. INSPECT LUGGAGE COMPARTMENT DOOR COURTESY SWITCH AND OPENER MOTOR CIRCUIT

Disconnect the connector from the switch and opener motor, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Luggage compartment door opener switch OFF	No voltage
1 – Ground	Luggage compartment door opener switch ON	Battery positive voltage
2 – Ground	Constant	Battery positive voltage

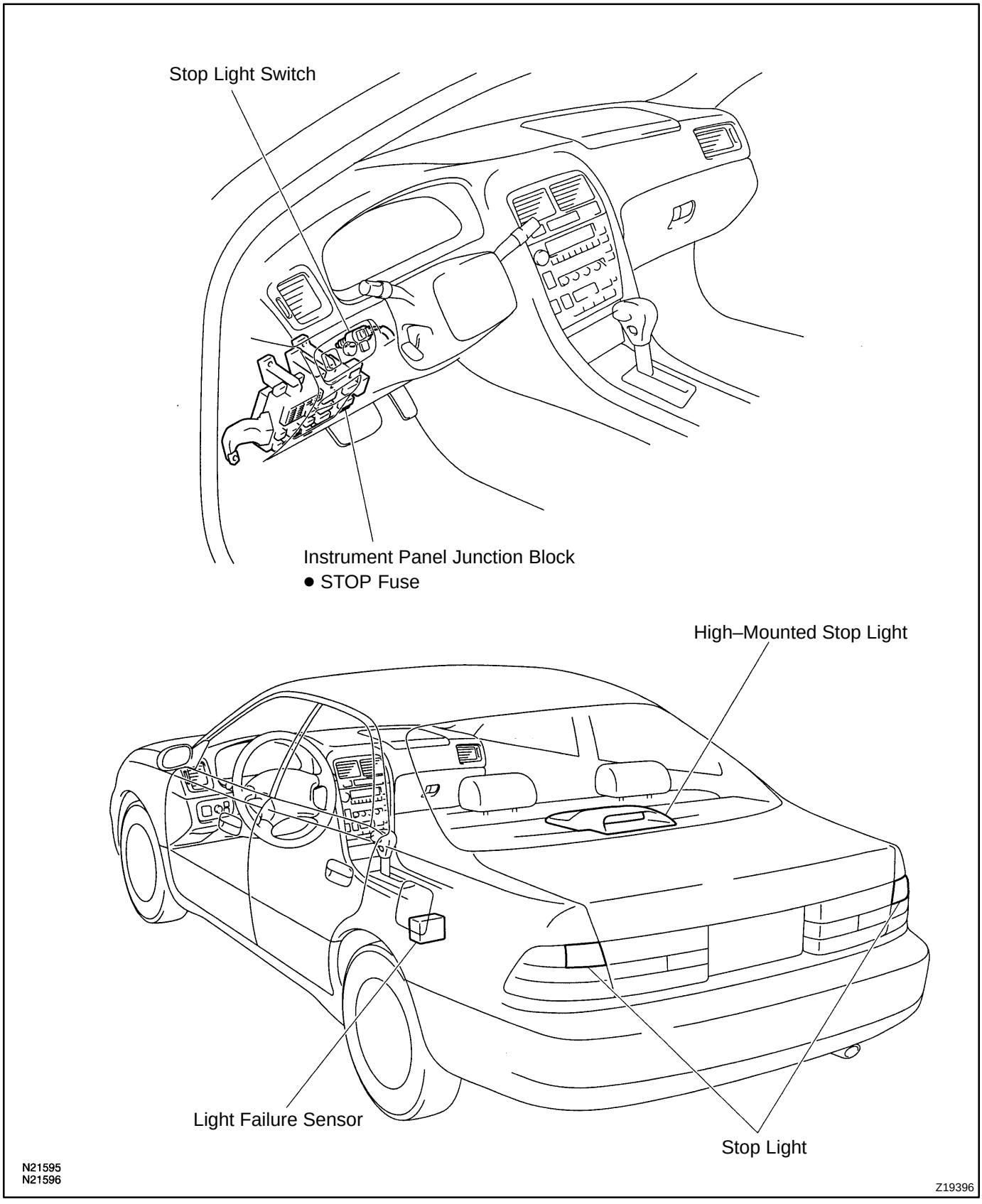
If the circuit is not as specified, inspect power source or wire harness.

12. INSPECT ILLUMINATED ENTRY SYSTEM
(See integration relay circuit on page BE–20)

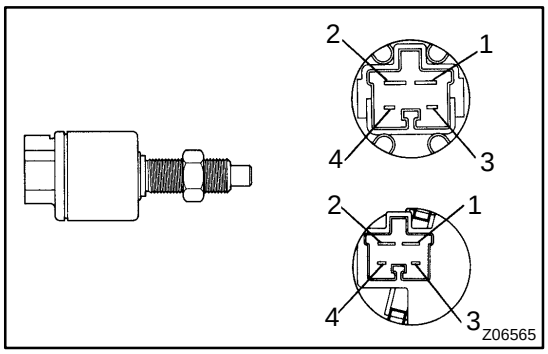
STOP LIGHT SYSTEM

LOCATION

BE059–01



BE05A–01

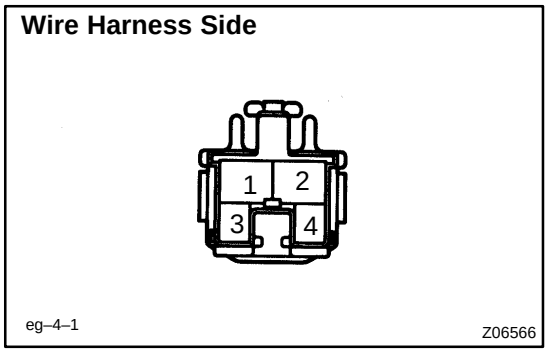


INSPECTION

1. INSPECT STOP LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch pin free	1 – 2	Continuity
Switch pin pushed in	3 – 4	Continuity

If continuity is not as specified, replace the switch.

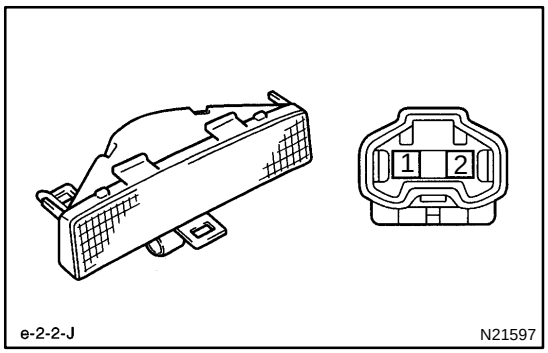


2. INSPECT STOP LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Battery positive voltage

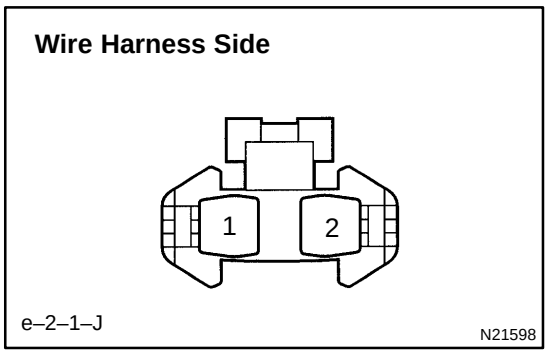
If circuit is not as specified, inspect the power source or wire harness.



3. INSPECT HIGH–MOUNTED STOP LIGHT ASSEMBLY CONTINUITY

Using the ohmmeter, check that continuity exists between terminals.

If continuity is not as specified, replace the bulb or light assembly.

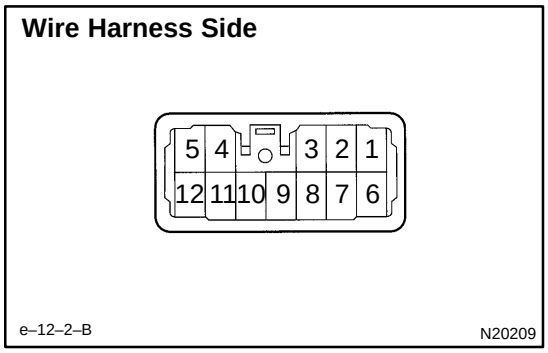


4. INSPECT HIGH–MOUNTED STOP LIGHT ASSEMBLY CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the power source or wire harness.



5. INSPECT LIGHT FAILURE SENSOR CIRCUIT

Disconnect the connector from the sensor and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity*
2 – Ground	Constant	Continuity*
9 – Ground	Constant	Continuity*
11 – Ground	Constant	Continuity
3 – Ground	Light control switch OFF	No voltage
3 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
4 – Ground	Ignition switch LOCK or ACC	No voltage
4 – Ground	Ignition switch ON	Battery positive voltage
7 – Ground	Stop light switch OFF	No voltage
7 – Ground	Stop light switch ON	Battery positive voltage
8 – Ground	Ignition switch LOCK or ACC	No voltage
8 – Ground	Ignition switch ON	Battery positive voltage

*: There is resistance because this circuit is grounded through the bulb.

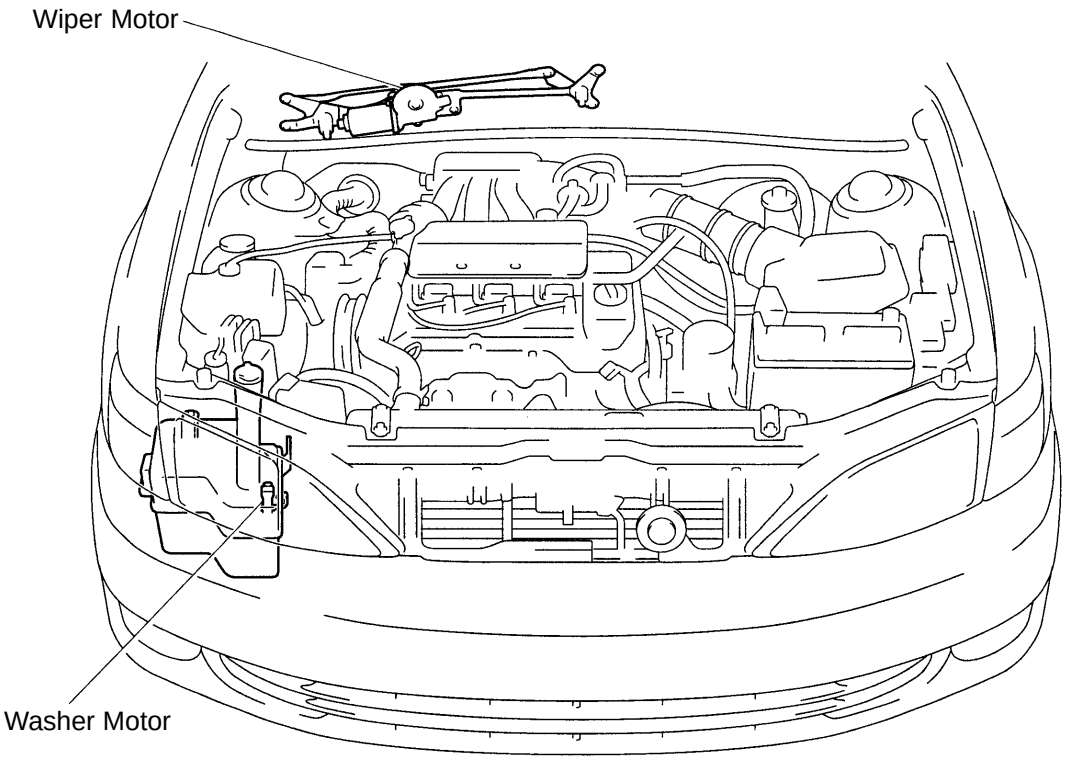
If the circuit is as specified, replace the sensor.

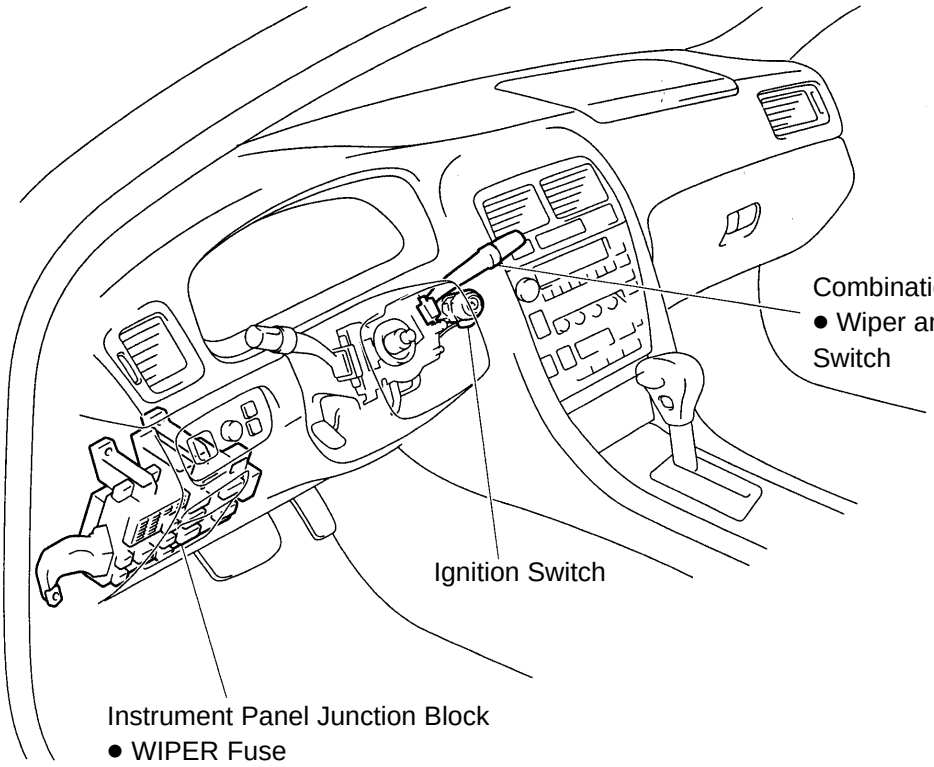
If the circuit is not as specified, inspect the circuits connected to other parts.

WIPER AND WASHER SYSTEM

LOCATION

BE05B–01



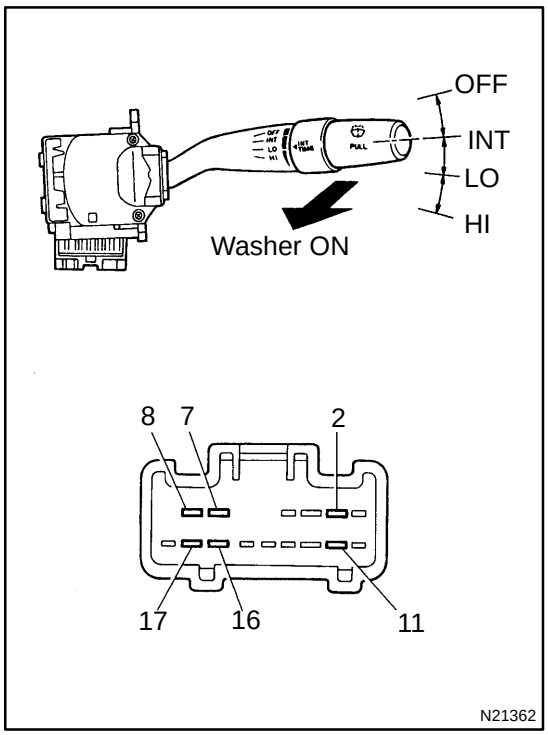


N21500
N21501

Z19354

BE05C–03

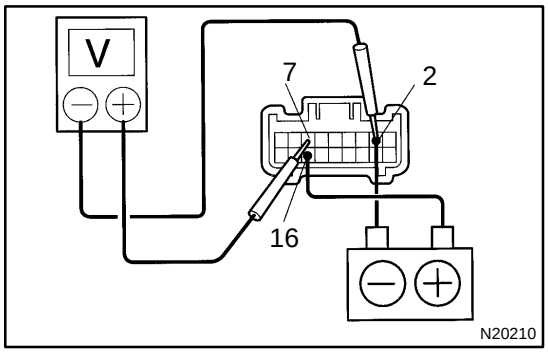
INSPECTION



1. INSPECT FRONT WIPER AND WASHER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	7 – 16	Continuity
INT	7 – 16	Continuity
LO	7 – 17	Continuity
HI	8 – 17	Continuity
Washer ON	2 – 11	Continuity

If continuity is not as specified, replace the switch.



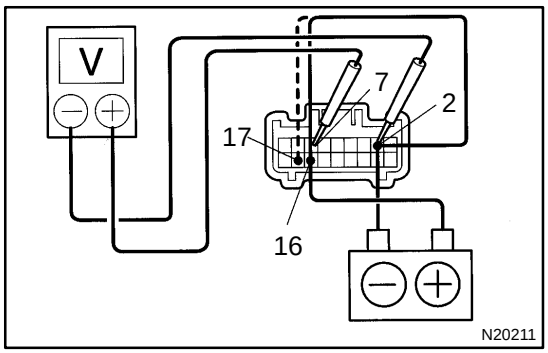
2. INSPECT INTERMITTENT OPERATION

(a) Turn the wiper switch to INT position.

(b) Turn the intermittent time control switch to FAST position.

(c) Connect the positive (+) lead from the battery to terminal 16 and the negative (–) lead to terminal 2.

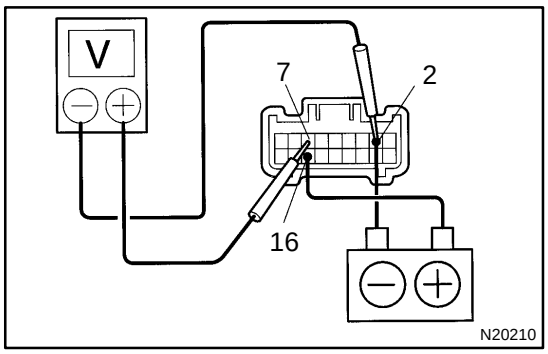
(d) Connect the positive (+) lead from the voltmeter to terminal 7 and the negative (–) lead to terminal 2, check that the meter needle indicates battery positive voltage.



(e) After connecting terminal 16 to terminal 17, connect it to terminal 2, check the voltage rises from 0 volt to battery positive voltage within the time, as shown in the table.

INT time control switch position	Voltage
FAST	Approx. 2 sec. → Battery positive voltage / 0 V
SLOW	10.7 ± 5 sec. → Battery positive voltage / 0 V
Non variable type	3.3 ± 1 sec. → Battery positive voltage / 0 V

If operation is not as specified, replace the wiper and washer switch.

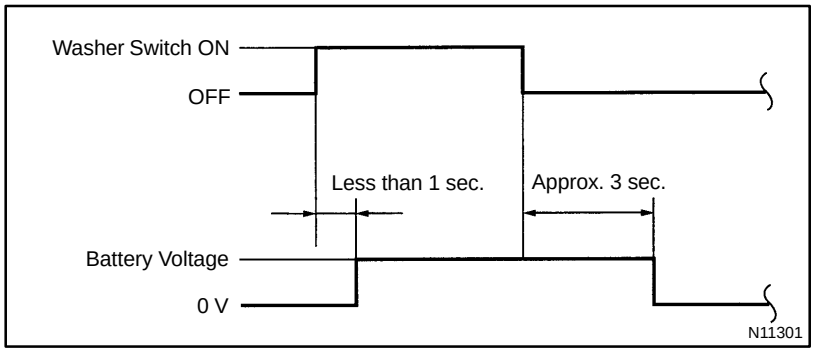


3. INSPECT WASHER LINKED OPERATION

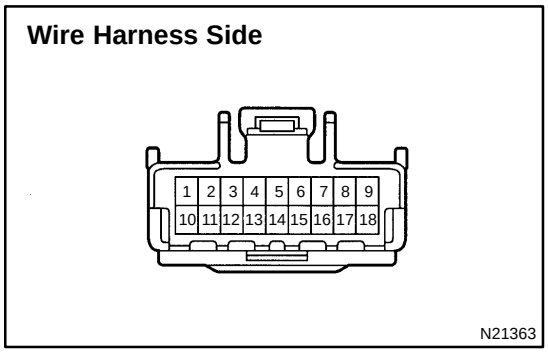
(a) Connect the positive (+) lead from the battery to terminal 16 and the negative (–) lead to terminal 2.

(b) Connect the positive (+) lead from the voltmeter to terminal 7 and the negative (–) lead to terminal 2.

(c) Push in the washer switch, and check that the voltage changes as shown in the table below.



If operation is not as specified, replace the wiper and washer switch.

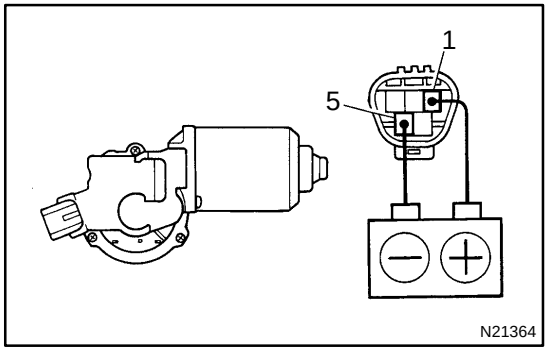


4. INSPECT WIPER SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
11 – Ground	Ignition switch LOCK or ACC	No voltage
11 – Ground	Ignition switch ON	Battery positive voltage

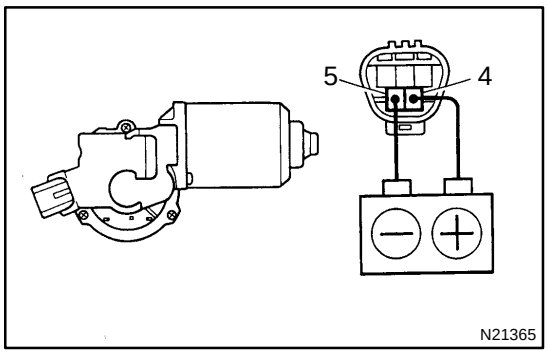
If circuit is not as specified, inspect the circuits connected to other parts.



5. Low Speed: INSPECT FRONT WIPER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 5, check that the motor operates at low speed.

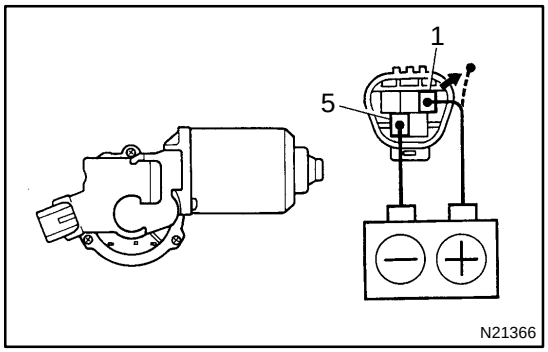
If operation is not as specified, replace the motor.



6. High Speed:
INSPECT FRONT WIPER MOTOR OPERATION

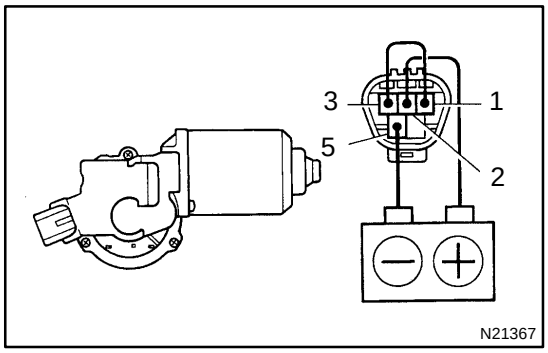
Connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to terminal 5, check that the motor operates at high speed.

If operation is not as specified, replace the motor.



7. Stopping at Stop Position:
INSPECT FRONT WIPER MOTOR OPERATION

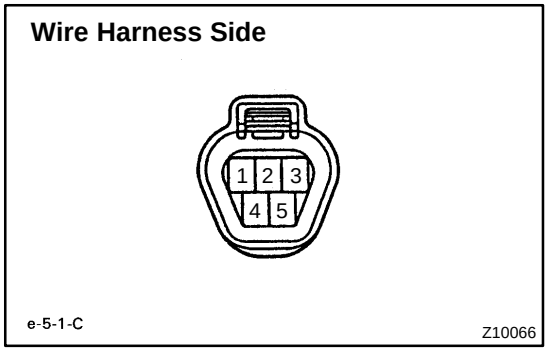
(a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting positive (+) lead from terminal 1.



(b) Connect terminals 1 and 3.

(c) Connect the positive (+) lead from the battery to terminal 2 and negative (–) lead to terminal 5, check that the motor stops running at the stop position after the motor operates again.

If operation is not as specified, replace the motor.

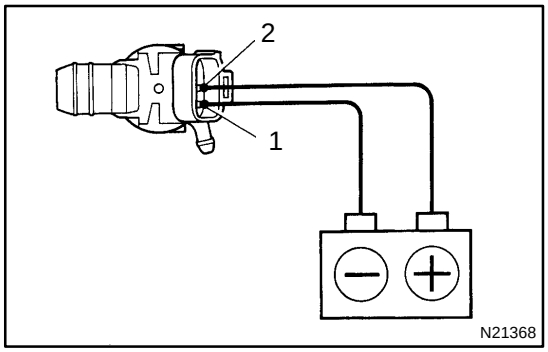


8. INSPECT WIPER MOTOR CIRCUIT

Disconnect the connector from the motor and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
5 – Ground	Constant	Continuity
1 – Ground	* Wiper switch OFF or INT, HIGH	No voltage
1 – Ground	* Wiper switch LOW	Battery positive voltage
2 – Ground	Ignition switch LOCK or ACC	No voltage
2 – Ground	Ignition switch ON	Battery positive voltage
4 – Ground	* Wiper switch OFF or INT, LOW	No voltage
4 – Ground	* Wiper switch HIGH	Battery positive voltage

*: Turn ignition switch ON
If circuit is not as specified, inspect the circuits connected to other parts.



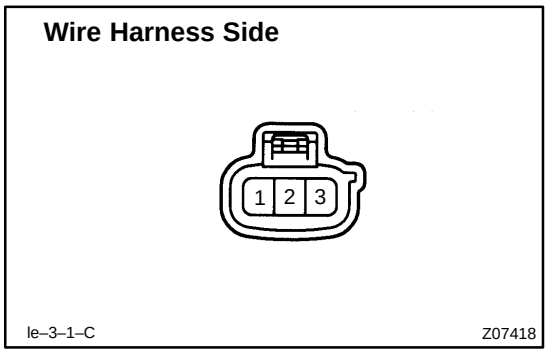
9. INSPECT WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the motor operates.

NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



10. INSPECT WASHER MOTOR CIRCUIT

Disconnect the connector from the washer motor and inspect the connector on harness side.

Tester connection	Condition	Specified condition
1 – Ground	Washer switch OFF (released)	No continuity
1 – Ground	Washer switch ON (pushed in)	Continuity
2 – Ground	Ignition switch LOCK or ACC	No voltage
2 – Ground	Ignition switch ON	Battery positive voltage

If circuit is not as specified, inspect wire harness, power source or wiper switch.

COMBINATION METER

BE05D–03

TROUBLESHOOTING

PRECAUTIONS

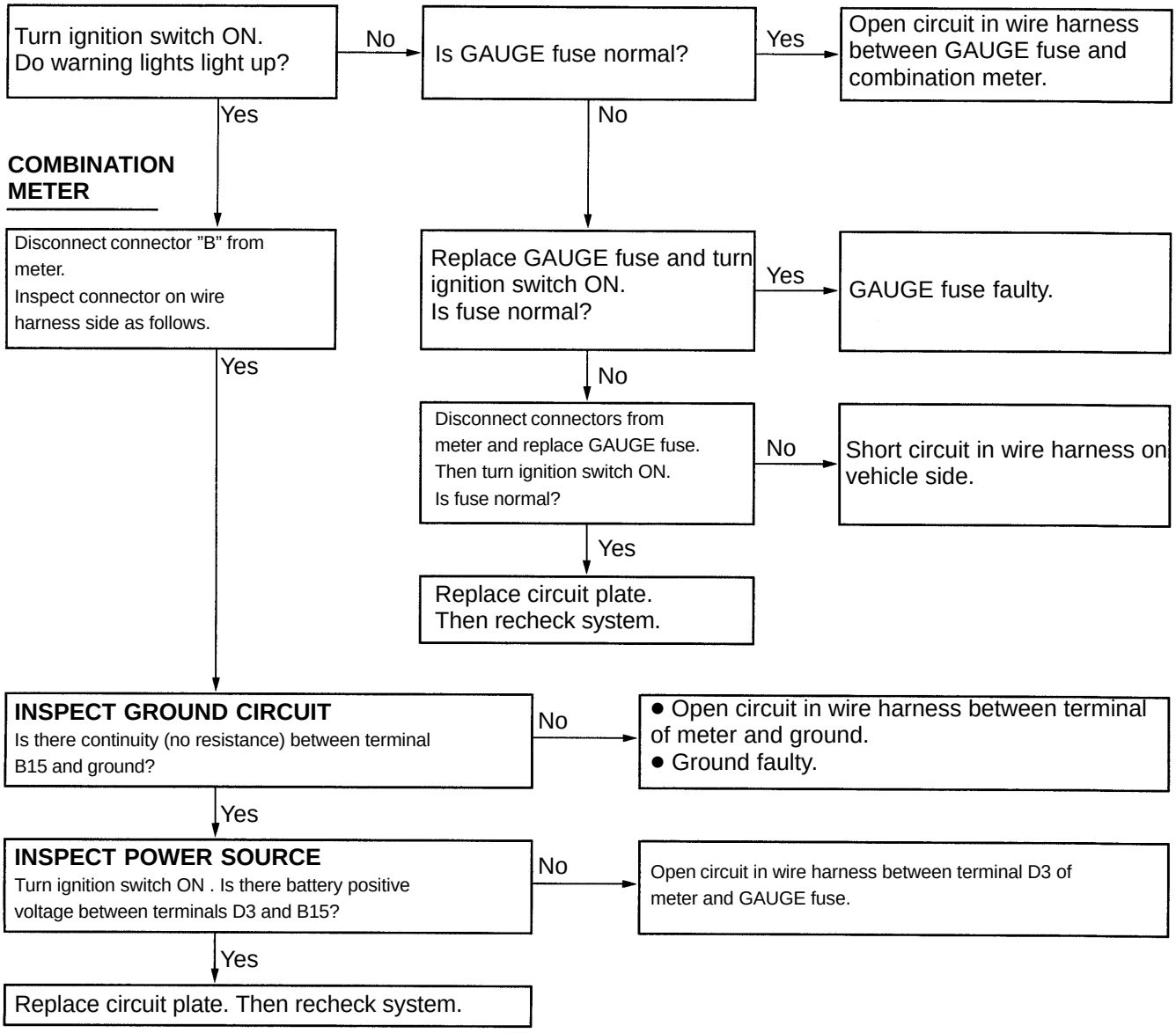
(a) When checking voltage, resistance, etc., use a high impedance type tester (It is impossible to use a simple tester).
(b) When the ignition switch is turned to START, all meters will go out but this is normal.
(c) When replacing the internal mechanism (computer parts) of the meter, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement parts (spare parts).
(d) Do not disconnect the battery while the engine is running as this would cause an instant reverse charge, resulting in damage to the components.
(e) Always disconnect the battery terminals before pulling apart connectors or terminals.
(f) To prevent damage, handle meters with care.

Trouble		Refer to
All Meters, Gauges, and Illuminations	No display at all.	1
	The four indicator needles do not light up.	Replace combination meter computer.
	One indicator needle does not light up.	2
	The character plate is not illuminated at one or two locations.	3
	Brightness does not change even when light control switch is operated (OFF↔TAIL).	4
	Brightness does not change even when rheostat volume is turned.	5
	Remains dimmed when the light control switch is turned OFF.	Replace combination meter computer.
	Does not go out while starter running.	6
Speedometer	Speedometer does not operate while driving.	7
	Vehicle speed signal (4P) faulty.	8
Tachometer	Tachometer does not operate while engine running.	9
Fuel Gauge	Does not operate or operation is abnormal.	10
Fuel Level Warning	Warning light does not light up or always lights up.	11
Engine Coolant Temperature Gauge	Does not operate or operation is abnormal.	12
Low Oil Pressure warning	Abnormal operation or warning light does not light up.	13
Brake Warning	Abnormal operation or warning light does not light up.	14
Rear Lights Warning	Abnormal operation or warning light does not light up.	15
Open Door Warning	Abnormal operation or warning light does not light up.	16
Engine Oil Level Warning	Abnormal operation or warning light does not light up.	17
Seat Belt Warning Chime	Abnormal operation or chime does not operate.	BE–92
Seat Belt Warning	Abnormal operation or warning light does not light up.	18

Trouble		Refer to
Turn Signal Indicator	Abnormal operation or Indicator does not light up.	19
O/D OFF Indicator	Abnormal operation or Indicator does not light up.	20
Shift Position Indicator	Abnormal operation or Indicator does not light up.	21
Malfunction Indicator	Abnormal operation or warning light does not light up	22
ABS Warning	Abnormal operation or warning light does not light up.	23
CRUISE Indicator	Abnormal operation or Indicator does not light up.	24
SRS Warning	Abnormal operation or warning light does not light up.	25
Discharge Warning	Abnormal operation or warning light does not light up.	26
High Beam Indicator	Abnormal operation or Indicator does not light up.	27
Window Washer Warning	Abnormal operation or warning light does not light up.	28
Taillight Indicator	Abnormal operation or Indicator does not light up.	29
Headlight Indicator	Abnormal operation or Indicator does not light up.	30

1	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**No display at all.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08429

2	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**One indicator needle does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Is LED OK?
- No → Replace the LED. Then recheck system.
- Yes ↓

Disconnect connector "B" from meter.
Inspect connector on wire harness side as follows

INSPECT GROUND CIRCUIT
Is there continuity (no resistance) between terminal B15 and ground?
- No → ● Open circuit in wire harness between terminal of meter and ground. ● Ground faulty.
- Yes ↓

INSPECT POWER SOURCE
Turn ignition switch ON . Is there battery positive voltage between terminals D3 and B15?
- No → Open circuit in wire harness between terminal D3 of meter and GAUGE fuse.
- Yes ↓

Replace circuit plate. Then recheck system.

3	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**The character plate is illuminated on one side.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Is bulb OK?
- No → Replace the LED. Then recheck system.
- Yes ↓

Disconnect connector "B" from meter.
Inspect connector on wire harness side as follows.

INSPECT GROUND CIRCUIT
Is there continuity (no resistance) between terminal B15 and ground?
- No → ● Open circuit in wire harness between terminal D3 of meter and ground. ● Ground faulty.
- Yes ↓

INSPECT POWER SOURCE
Turn ignition switch ON . Is there battery positive voltage between terminals D3 and B15?
- No → Open circuit in wire harness between terminal D3 of meter and GAUGE fuse.
- Yes ↓

Replace circuit plate. Then recheck system.

V08430

4	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**Brightness does not change even when light control switch is operated. (OFF↔TAIL)**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

COMBINATION METER

Disconnect connector "B" from meter.
Inspect connector on wire harness side as follows.

INSPECT TAILLIGHT SIGNAL CIRCUIT
Does voltage change between terminal B8 and ground as follows?

Condition		Voltage
Light control switch position	OFF	No voltage
	TAIL or HEAD	Battery positive voltage

No → Taillight signal circuit faulty on vehicle side. Inspect illumination light system.

Yes

Replace circuit plate. Then recheck system.

5	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**Brightness does not change even when rheostat volume is turned.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

RHEOSTAT LIGHT CONTROL VOLUME

INSPECT RHEOSTAT LIGHT CONTROL VOLUME
(See page BE–)
Is operation normal?

No → Replace rheostat light control volume. Then recheck system.

Yes

COMBINATION METER

Connect connector to rheostat volume.
Disconnect connector "D" from meter.
Inspect connector on wire harness side as follows.

Turn ignition switch ON. Does voltage change evenly between terminal D1 and D2 when rheostat knob is turned?

No → Wire harness faulty between terminal D1 of meter and terminal D2 of rheostat volume and rheostat light control.

Yes

Replace circuit plate. Then recheck system.

V08431

6	**ALL METERS, GAUGES, AND ILLUMINATIONS**	**Does not go out while starter running.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connector ”B” from meter.
Inspect connector on wire harness side as follows.

↓

Turn ignition switch START.
Is there battery positive voltage between terminal and ground or B16?

No → Wire harness faulty between terminal B16 of Meter and ST fuse.

↓ Yes

Replace circuit plate. Then recheck system.

7	**SPEEDOMETER**	**Speedometer does not operate while driving**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

INSPECT ODOMETER OPERATION
Does odometer operate while driving?

Yes → **INSPECT TRIP METER OPERATION**
Does trip meter operate while driving?

Yes → Replace speedometer. Then recheck system.

No → Go to step 7–A

↓ No

COMBINATION METER

Disconnect connector ”C” from meter.
Inspect connector on wire harness side as follows.

↓

Jack up the vehicle.
Turn ignition switch ON. Rotate propeller shaft.
Does the voltage between terminals C9 and C10 change (approx. 0V to 11V or more) per revolution of propeller shaft?

Yes → Replace circuit plate. Then recheck system.

↓ No

CONTINUED ON NEXT PAGE

V08432

8	**SPEEDOMETER**	**Vehicle speed signal (4P) faulty**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

INSPECT ODOMETER OPERATION
Does odometer operate while driving?
No → See chart 18.
Yes ↓

COMBINATION METER

Remove meter with connector connected.
Inspect connector "C" from back side as follows.

Jack up the vehicle. Turn ignition switch ON.
Rotate propeller shaft. Does the voltage between terminals C10 and ground change (approx. 0V to 5V or more) per revolution of propeller shaft?
No → Replace circuit plate. Then recheck system.
Yes ↓

Wire harness between terminal C10 of meter and*ECU faulty.

- ECM
- Suspension ECU
- Power Steering ECU
- ABS and TRAC ECU
- Cruise Control ECU

9	**TACHOMETER**	**Tachometer dose not operate while engine running.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connectors "A" and "C" from meter.
Inspect connector on wire harness side as follows.

* : An electrical tester availble to measure frrequency is necessary for this inspection.
REFERENCE : TOYOTA ELECTRICAL TESTER (09082–00050)

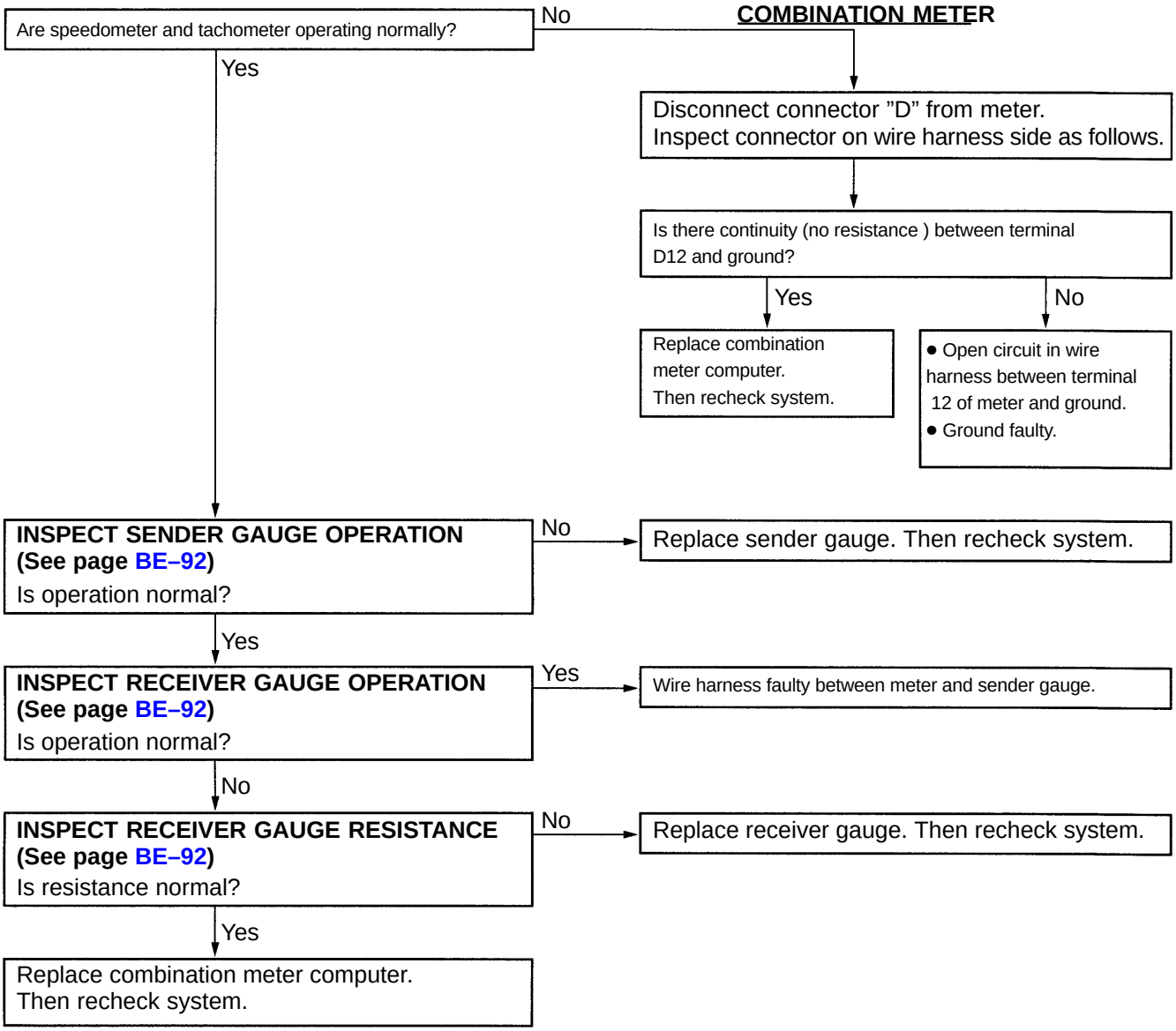
*** INSPECT TACHOMETER CIRCUIT**
With engine running, does voltage between terminals A13 and C10 fluctuate?
No → Wire harness faulty between terminal A13 of meter and igniter.
Yes ↓

Replace circuit plate. Then recheck system.

V08433

10	FUEL GAUGE	**Does not operate or operation is abnormal.**

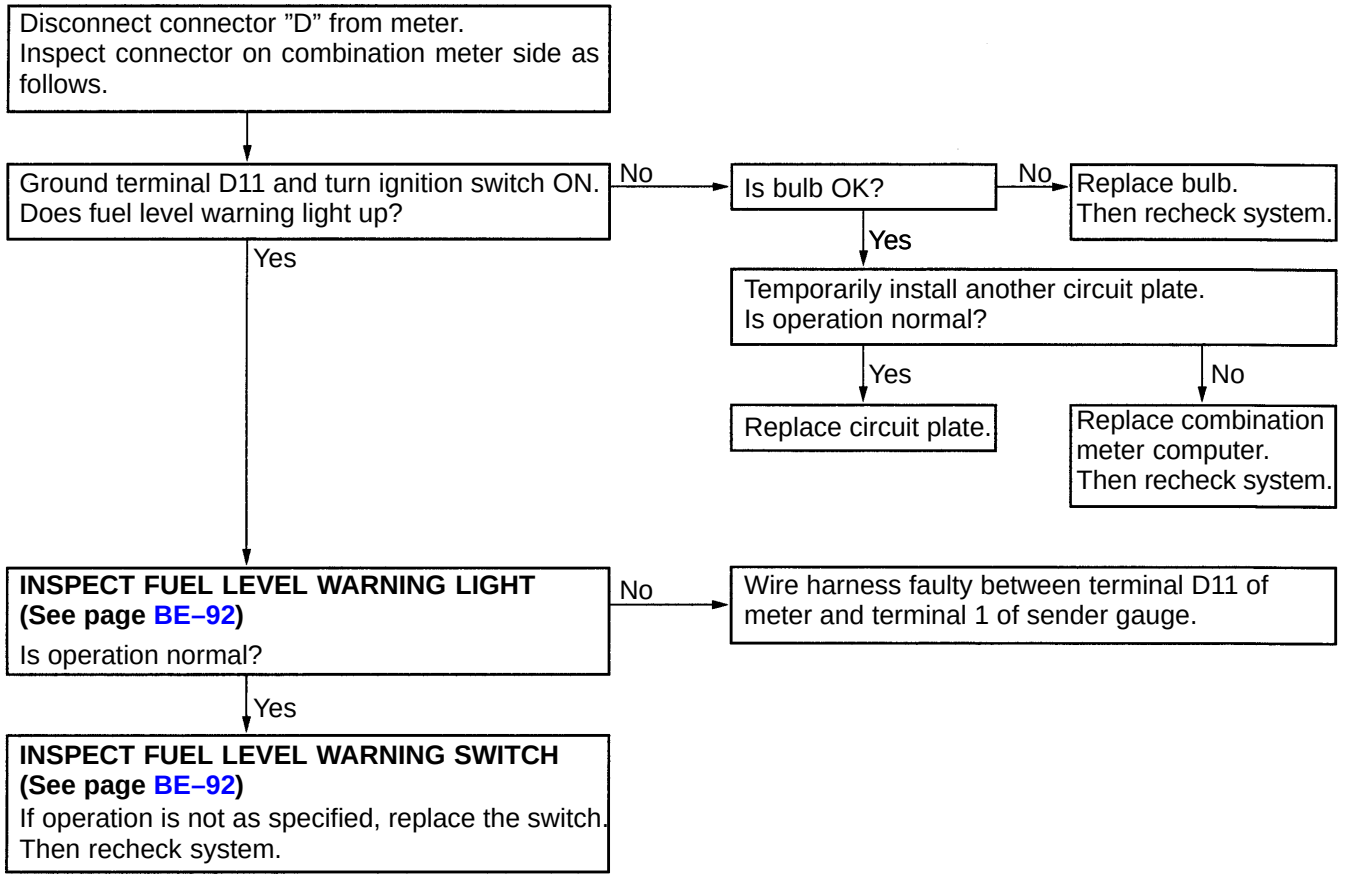
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08434

11	FUEL LEVEL WARNING	**Warning light does not light up or always lights up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



12	**ENGINE COOLANT TEMPERATURE GAUGE**	**Does not operate or operation is abnormal.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

INSPECT SENDER GAUGE GROUND CONDITION
Is there continuity (no resistance) between gauge body and engine block?
- No → Sender gauge ground condition faulty.
- Yes ↓

INSPECT RECEIVER GAUGE OPERATION (See page BE–92)
Is operation normal?
- Yes → Replace sender gauge. Then recheck system.
- No ↓

COMBINATION METER

Disconnect connector "A" from meter.
Inspect connector on wire harness side. ↓

Is there continuity between terminal A1 and ground?
- No → Wire harness faulty between terminal A1 of meter and ground.
- Yes ↓

Is there continuity between terminal A3 and ground?
- No → Wire harness faulty between terminal A3 of meter and sender gauge.
- Yes ↓

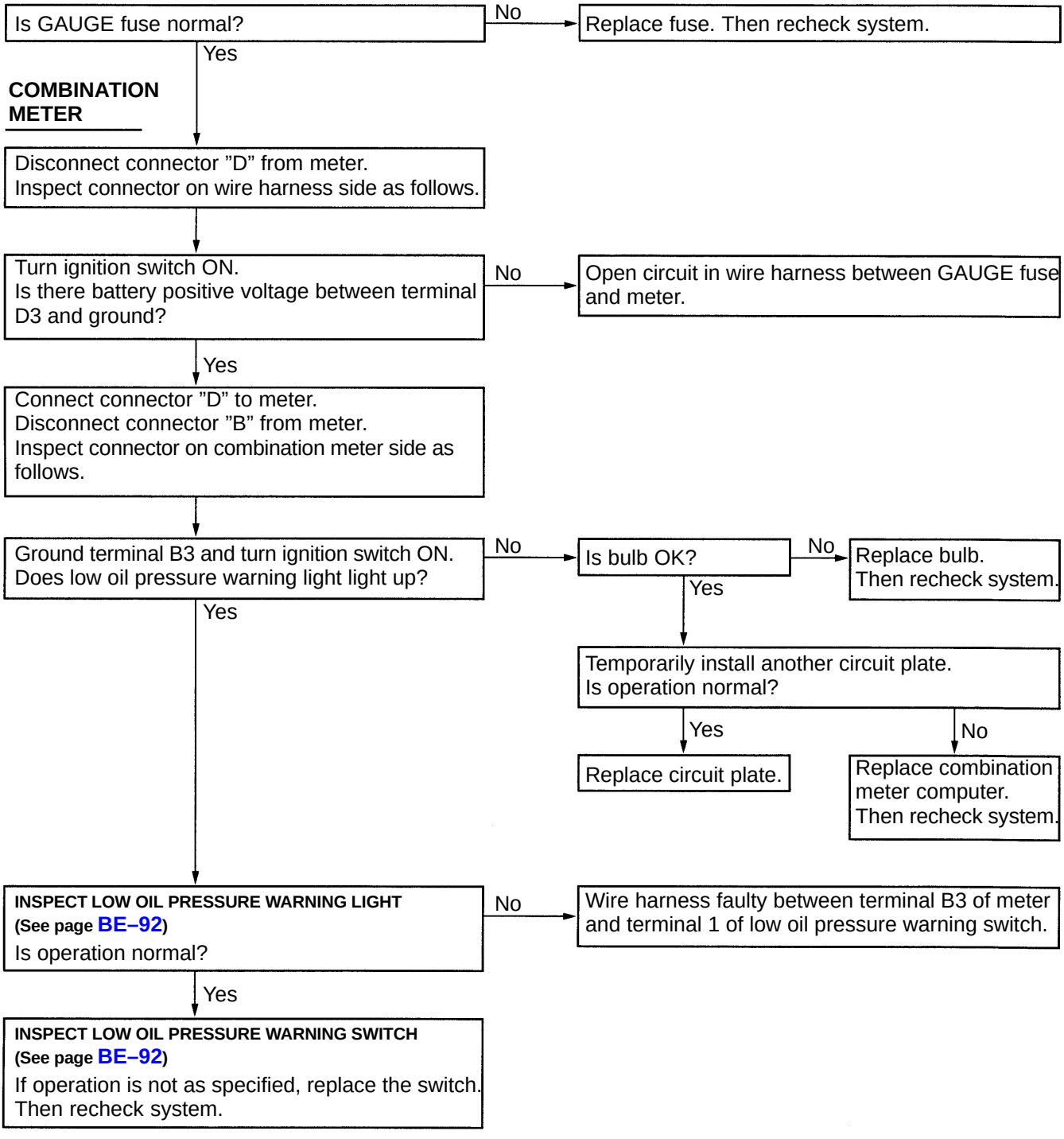
INSPECT RECEIVER GAUGE RESISTANCE (See page BE–92)
Is resistance normal?
- No → Replace receiver gauge. Then recheck system.
- Yes ↓

Replace combination meter computer.
Then recheck system.

V08436

13	LOW OIL PRESSURE WARNING	Abnormal operation or warning light does not light up.

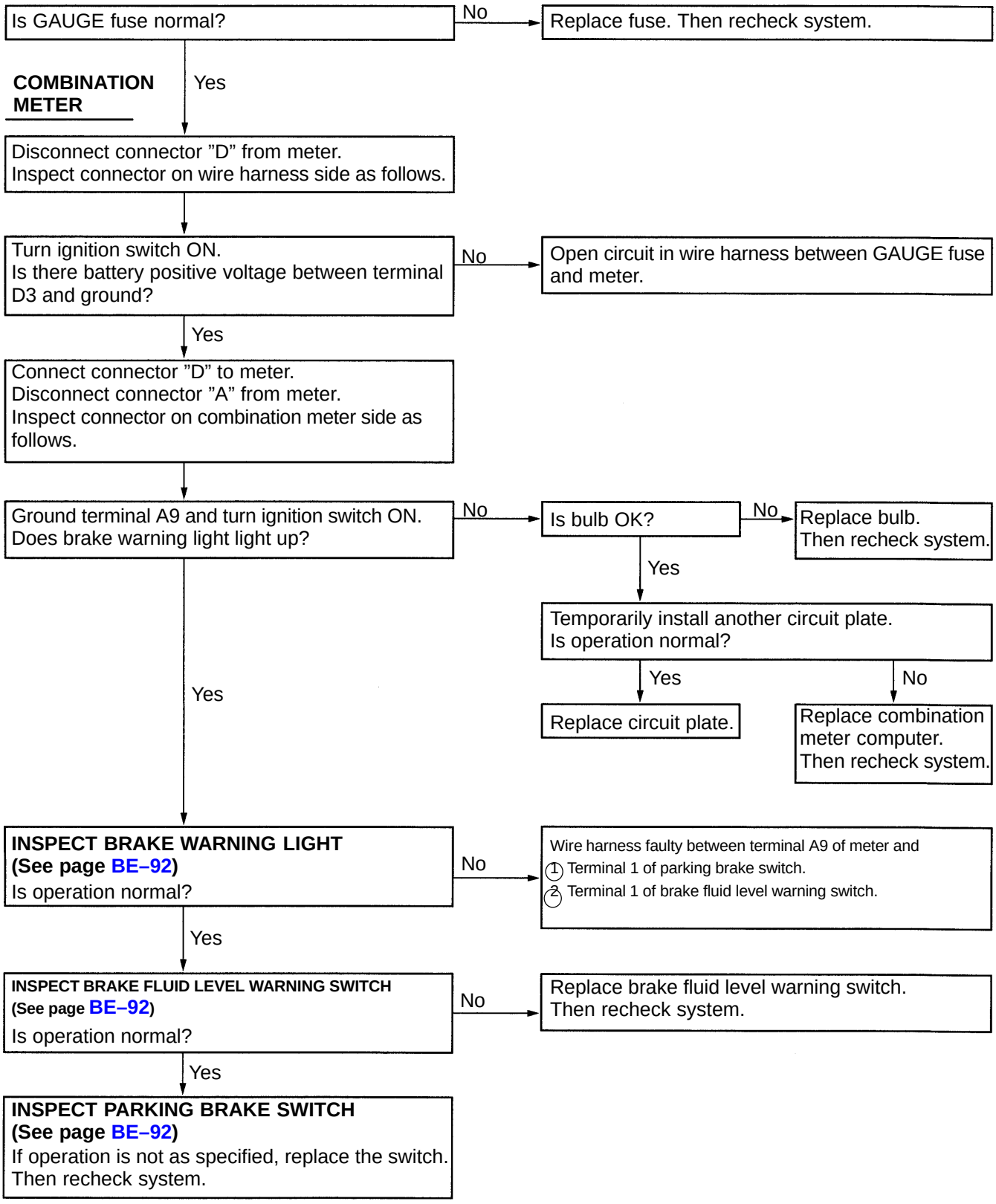
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08437

14	**BRAKE WARNING**	**Abnormal operation or warning light does not light up.**

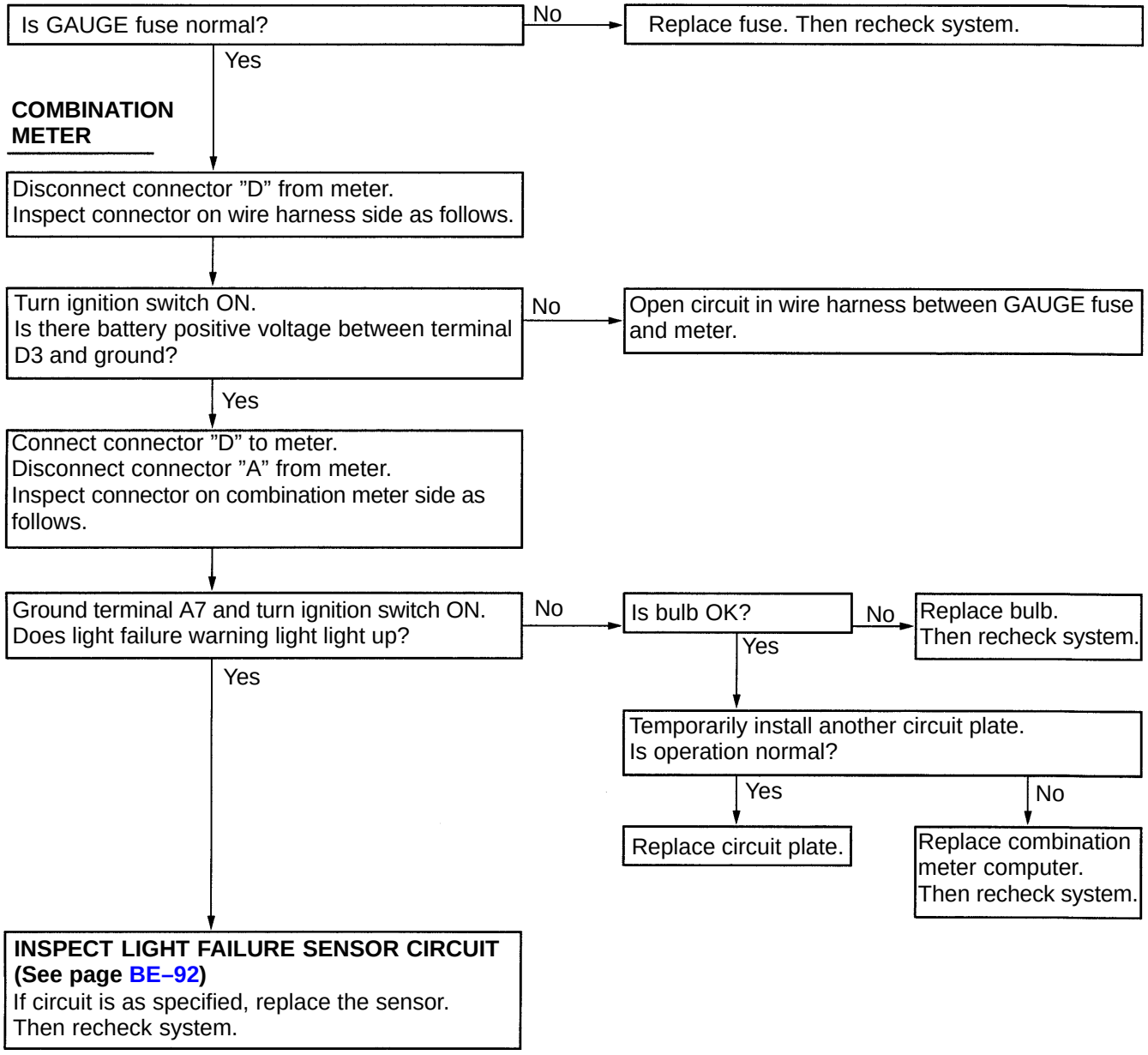
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08438

15	**REAR LIGHTS WARNING**	**Abnormal operation or warning light does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08439

16	**OPEN DOOR WARNING**	**Abnormal operation or warning light does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Is DOME fuse normal?
- No → Replace fuse. Then recheck system.
- Yes ↓

COMBINATION METER

Disconnect connector "C" from meter.
Inspect connector on wire harness side as follows.

Is there battery positive voltage between terminal C6 and ground?
- No → Open circuit in wire harness between GAUGE fuse and meter.
- Yes ↓

Connect connector "C" to meter.
Disconnect connector "C" from meter.
Inspect connector on combination meter side as follows.

Ground terminal C6.
Does open door warning light light up?
- No → Is bulb OK?
  - No → Replace bulb. Then recheck system.
  - Yes ↓ Temporarily install another circuit plate. Is operation normal?
    - Yes → Replace circuit plate.
    - No → Replace combination meter computer. Then recheck system.
- Yes ↓

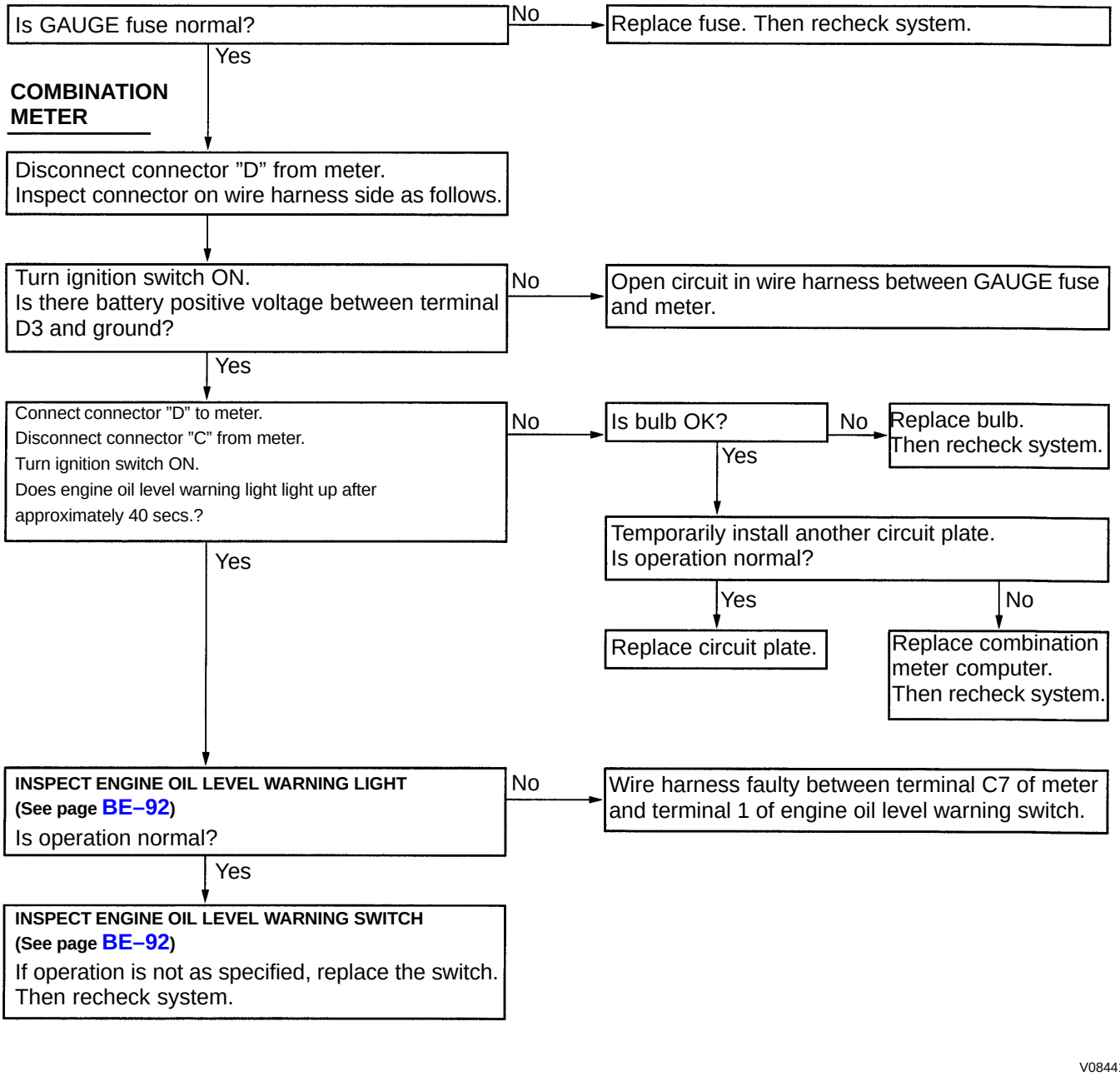
INSPECT OPEN DOOR WARNING LIGHT (See page BE–92)
Is operation normal?
- No → Wire harness faulty between terminal C6 of meter and terminal 1 of door courtesy switch.
- Yes ↓

INSPECT DOOR COURTESY SWITCH (See page BE–92)
If operation is not as specified, replace the switch. Then recheck system.

V08440

17	ENGINE OIL LEVEL WARNING	Abnormal operation or warning light does not light up.

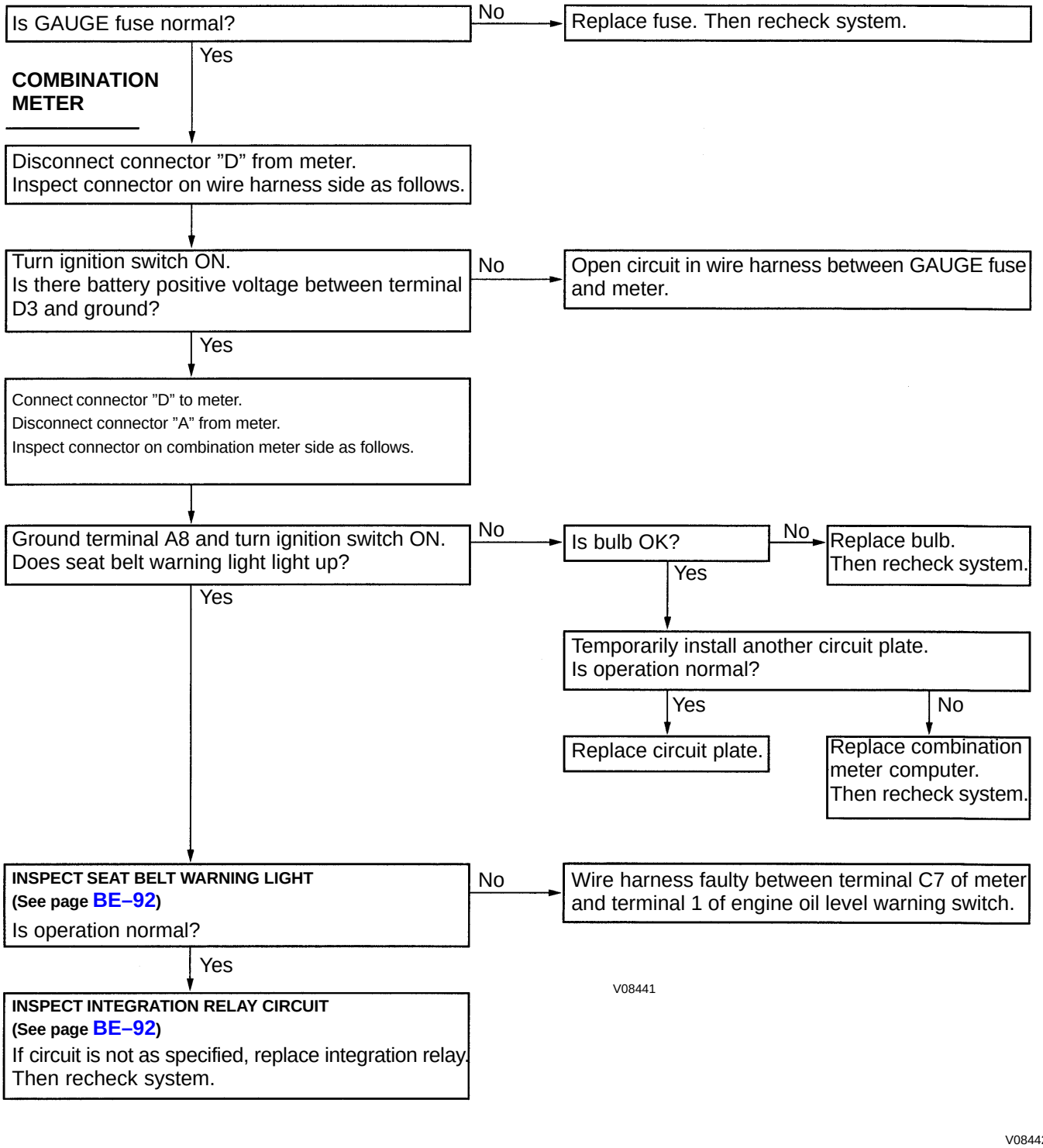
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08441

18	SEAT BELT WARNING	Abnormal operation or warning light does not light up.

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08442

19	**TURN SIGNAL INDICATOR**	**Abnormal operation or warning light does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connector "D" from meter.
Inspect connector on wire harness side as follows.

↓

Turn ignition switch ON.
Is there battery positive voltage between terminals xx and ground with the turn signal lever to left and right?

Turn signal to	Left	Right
Terminal xx	B11	B13

No → Turn signal indicator signal circuit faulty. Inspect the turn signal and hazard warning light system.

Yes ↓

Is bulb OK?

No → Replace the bulb. Then recheck system.

Yes ↓

Replace circuit plate. Then recheck system.

V08443

20	**TRAC OFF INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Inspect connector on wire harness side as follows.

Yes ↓

Ground terminal D6 and turn ignition switch ON.
Does TRAC OFF indicator light up?

No → Inspect the wire harness between terminal D6 of meter and ABS & TRAC ECU or inspect ABS & TRAC ECU.

Yes ↓

Is bulb OK?

No → Replace the bulb. Then recheck system.

Yes ↓

Replace circuit plate. Then recheck system.

No → Replace power source unit.

21	**O/D OFF INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connector "B" from meter.
Inspect connector on combination meter side as follows.

↓

Ground terminal B5 and turn ignition switch ON.
Does O/D OFF indicator light up?

Yes → O/D OFF indicator signal circuit faulty.

↓ No

Is bulb OK?

No → Replace the bulb.

↓ Yes

Replace circuit plate. Then recheck system.

22	**SHIFT POSITION INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Disconnect connector "D" from meter.
Inspect connector on wire harness side as follows.

↓

Turn ignition switch ON.
Is there battery positive voltage between terminals XX and ground with turn shift lever to P through L

Shift to	P	R	N	D	2	L
Terminal XX	B12	B14	C1	C2	B10	B9

No → Shift position indicator signal circuit faulty.

↓ Yes

Is bulb OK?

No → Replace the bulb. Then recheck system.

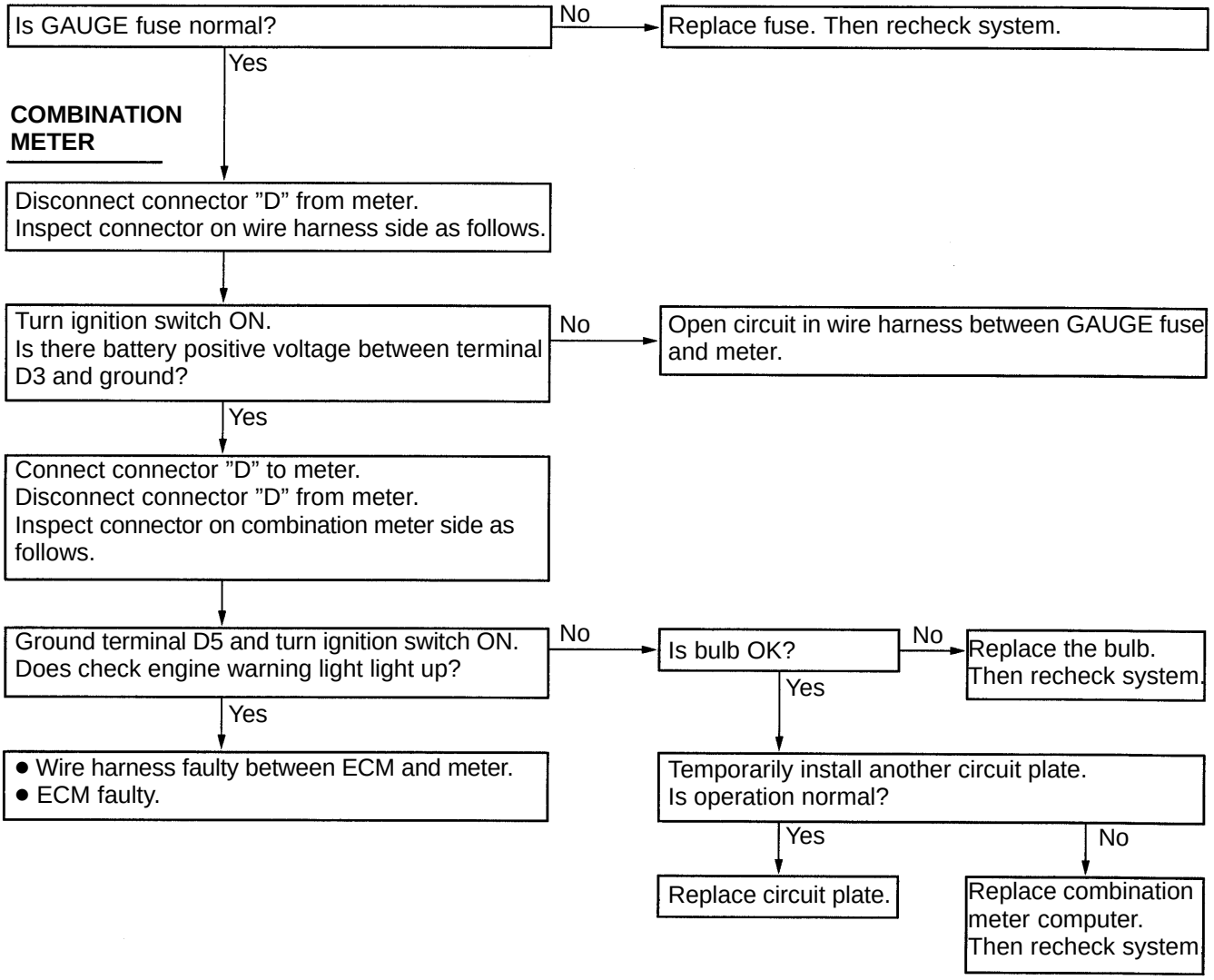
↓ Yes

Replace circuit plate. Then recheck system.

V08444

23	MALFUNCTION WARNING	**Abnormal operation or warning light does not light up.**

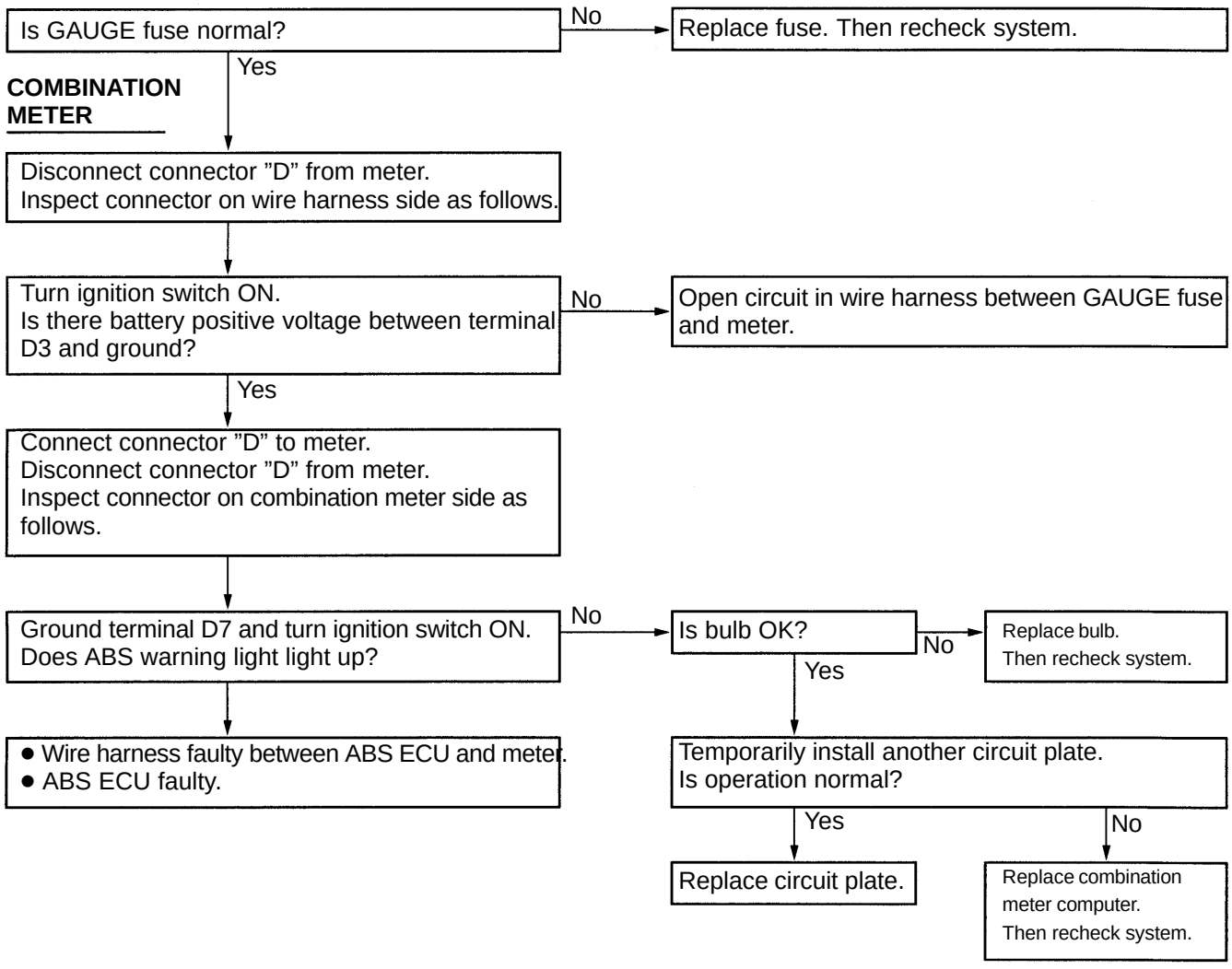
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08445

24	**ABS WARNING**	**Abnormal operation or warning light does not light up.**

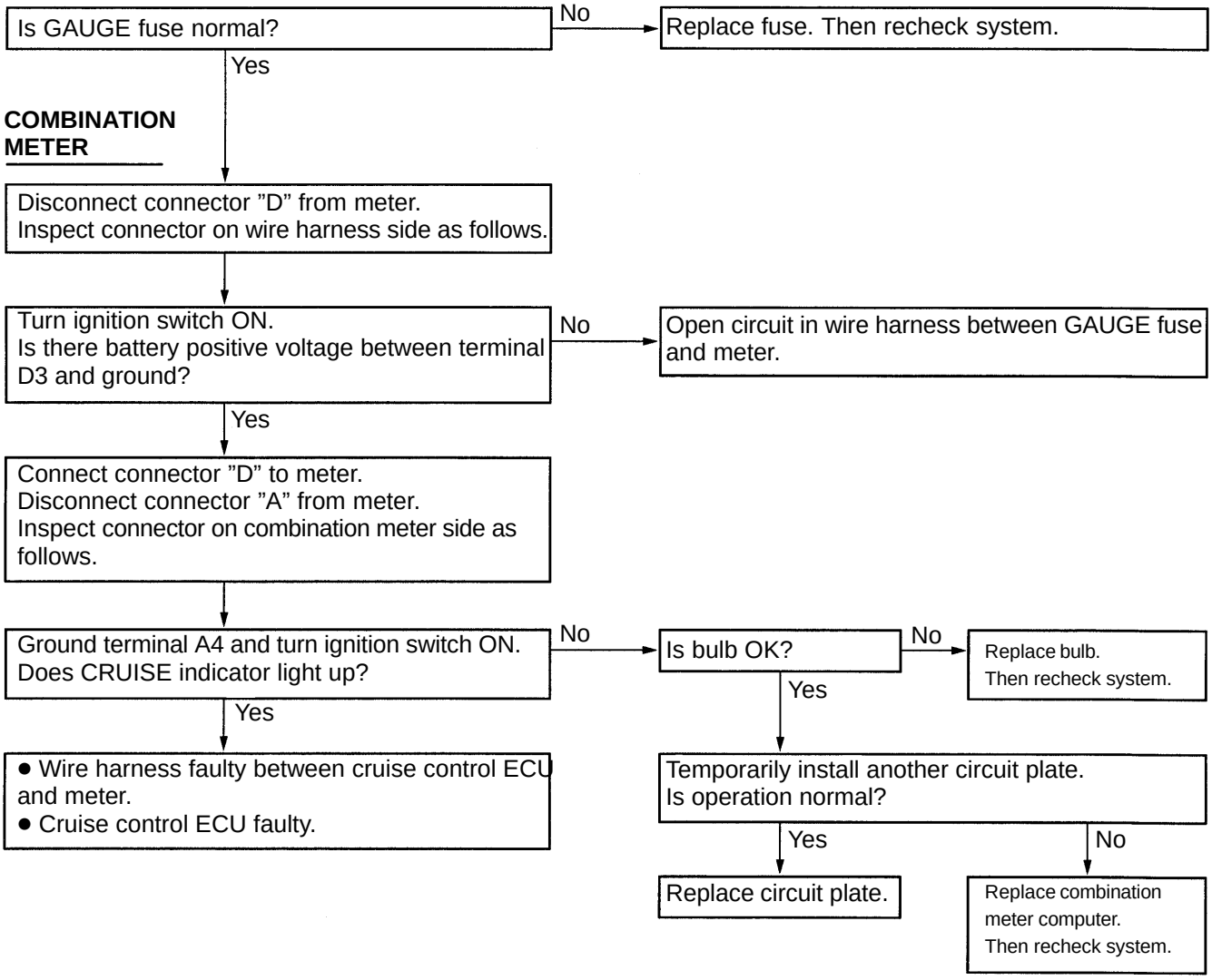
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08446

25	**CRUISE INDICATOR**	**Abnormal operation or indicator does not light up.**

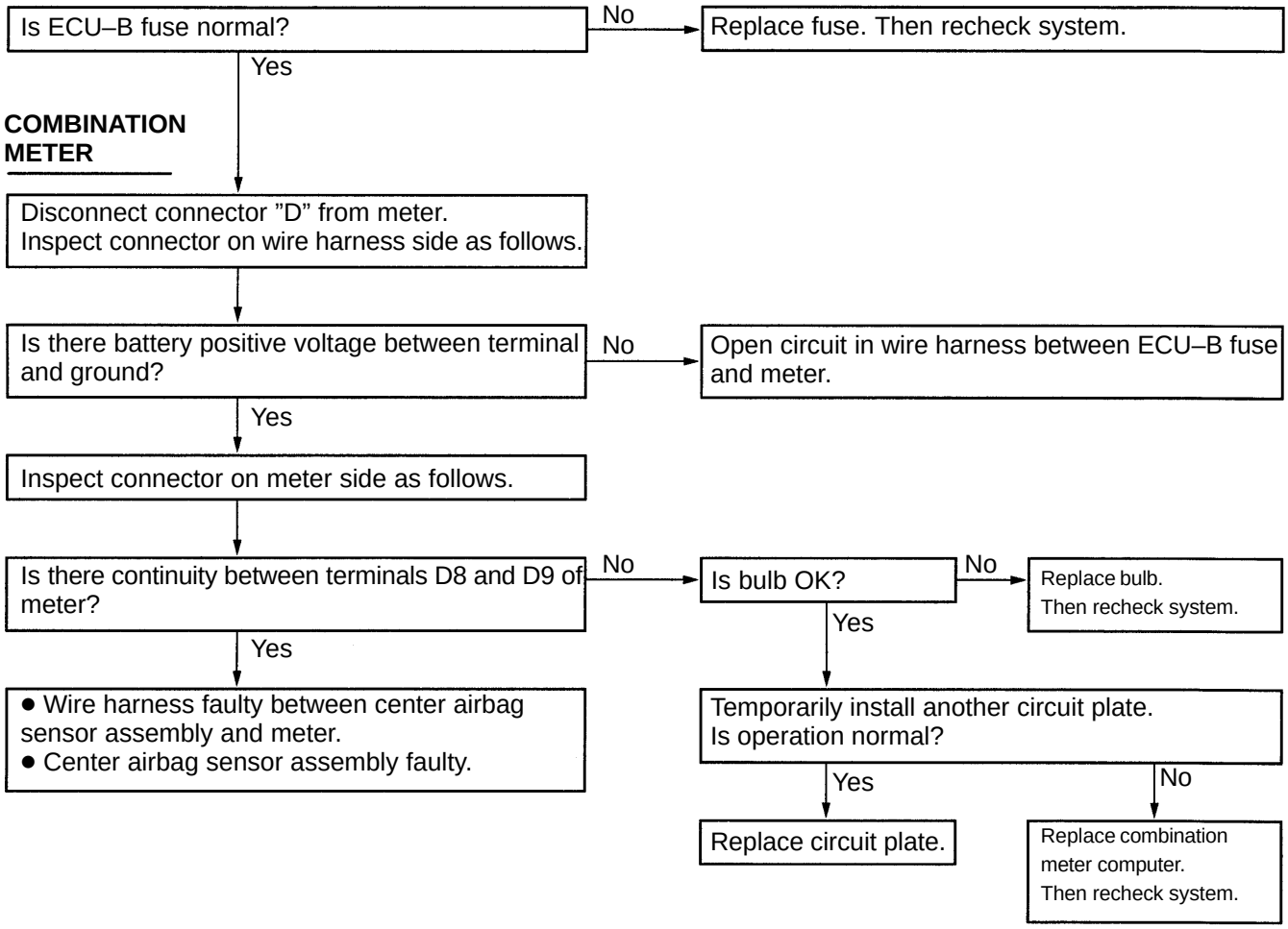
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08447

26	SRS WARNING	**Abnormal operation or warning light does not light up.**

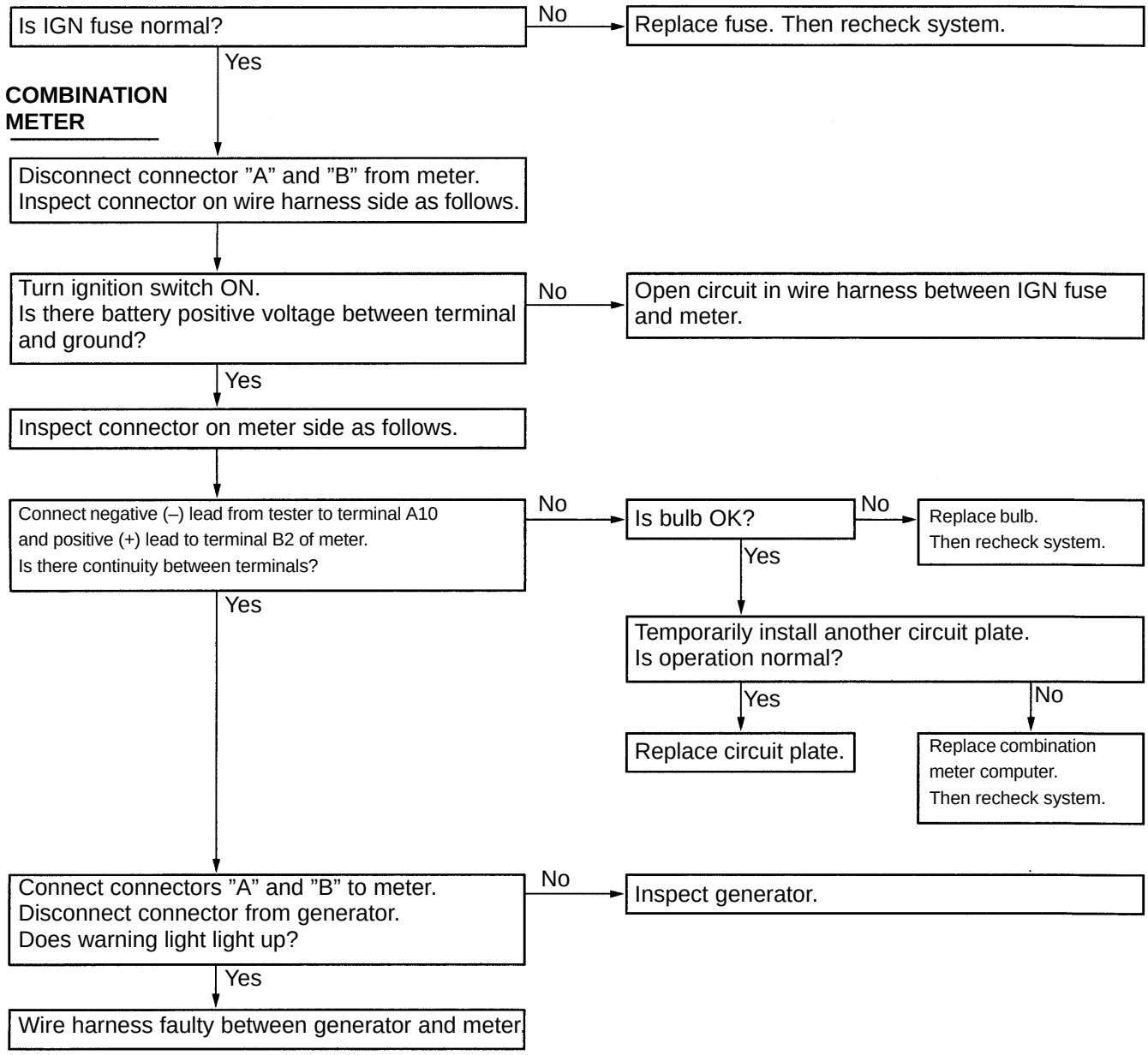
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08448

27	**DISCHARGE WARNING**	**Abnormal operation or warning light does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

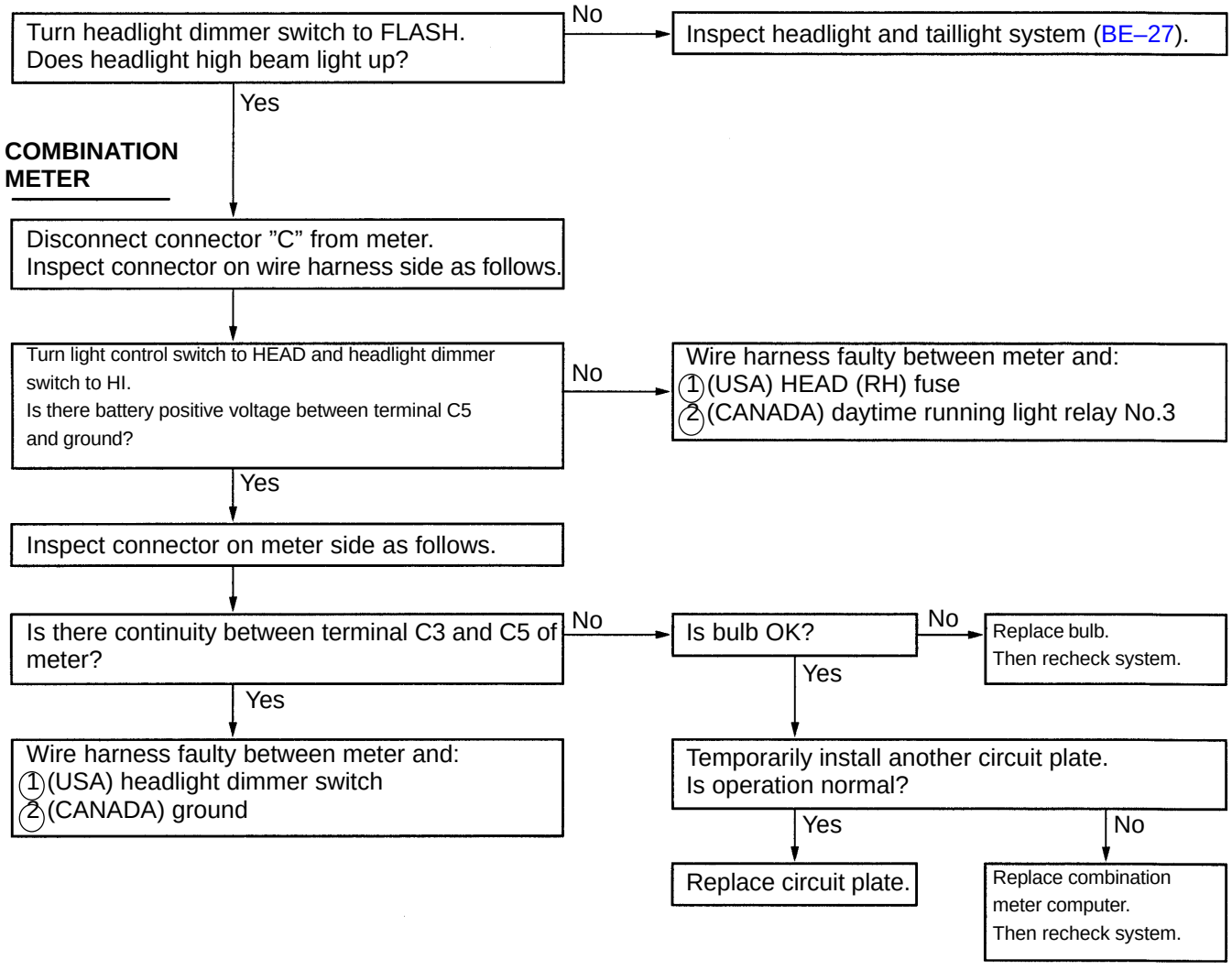


V08449

28	**HIGH BEAM INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

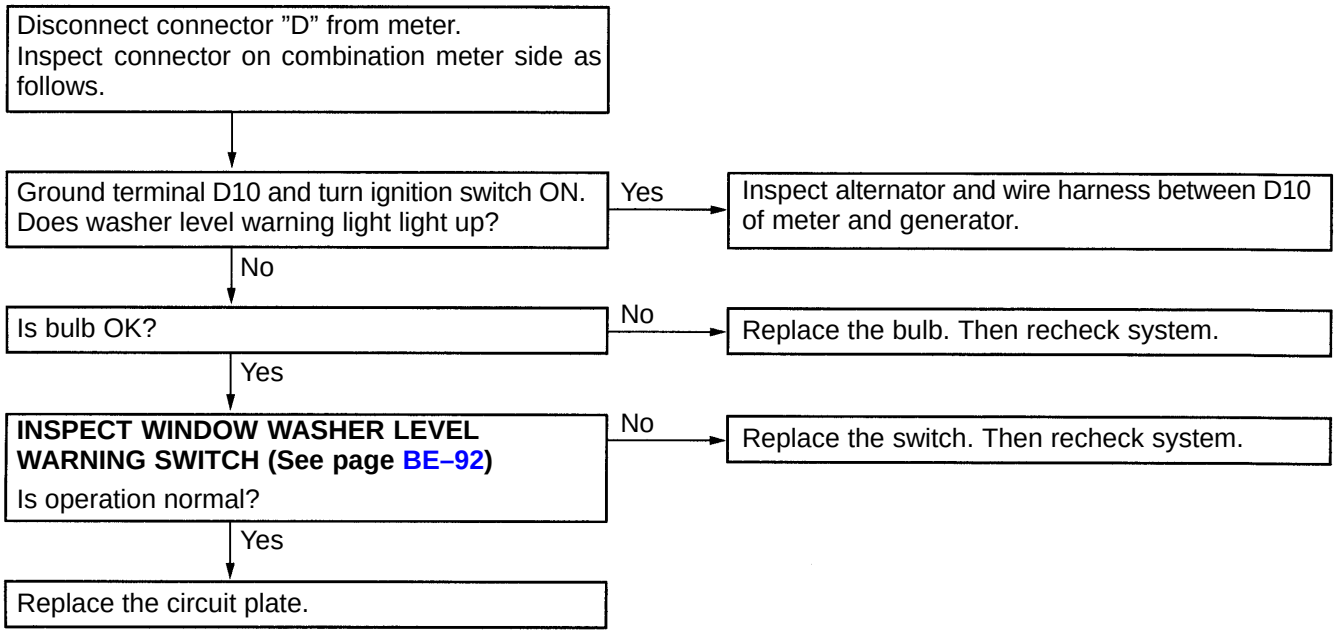
COMBINATION METER



V08450

29	**WINDOW WASHER LEVEL WARNING SWITCH**	**Abnormal operation or indicator does not light up.**

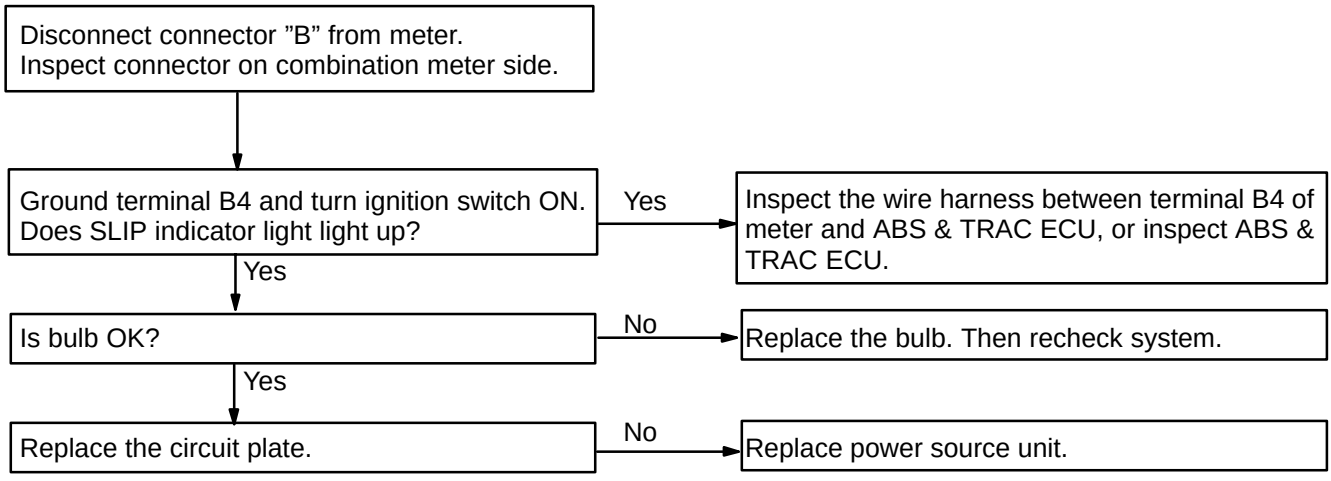
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



V08451

30	**SLIP INDICATOR**	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



31	TAILLIGHT INDICATOR	**Abnormal operation or indicator does not light up.**

HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Turn the light control switch to TAIL.
Does taillight light up?

No → Inspect headlight and taillight system.
(See page BE–27).

Yes

COMBINATION METER

Disconnect connectors "C" from meter.
Inspect connector on wire harness side as follows.

Is there battery positive voltage (0 V ↔ battery positive voltage) between following terminals with light control switch TAIL?
- C5 and ground.

No → Wire harness faulty between meter and:
- Light control switch.
- Taillight Relay, Panel Relay (CANADA)

Yes

Connect connectors "B" to meter.
Disconnect connector "B" from meter.
Inspect connector on combination meter side as follows.

Ground terminal B7 and turn the light control switch to TAIL. Does taillight indicator light up?

No → Is bulb OK?

No → Replace bulb.
Then recheck system.

Yes → Temporarily install another circuit plate.
Is operation normal?

Yes → Replace circuit plate.

No → Replace combination meter computer.
Then recheck system.

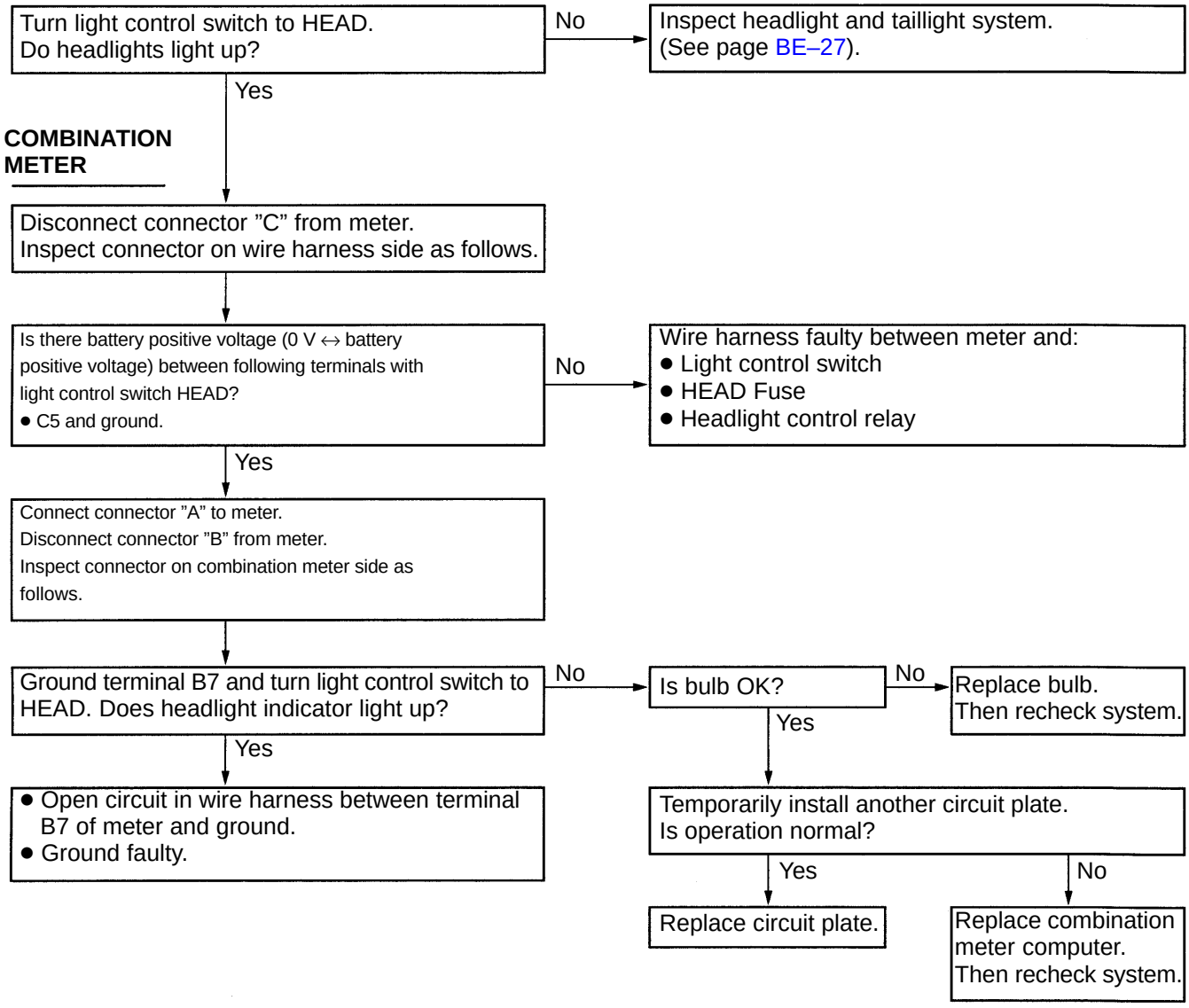
Yes

- Open circuit in wire harness between terminal B7 of meter and ground.
- Ground faulty.

V08452

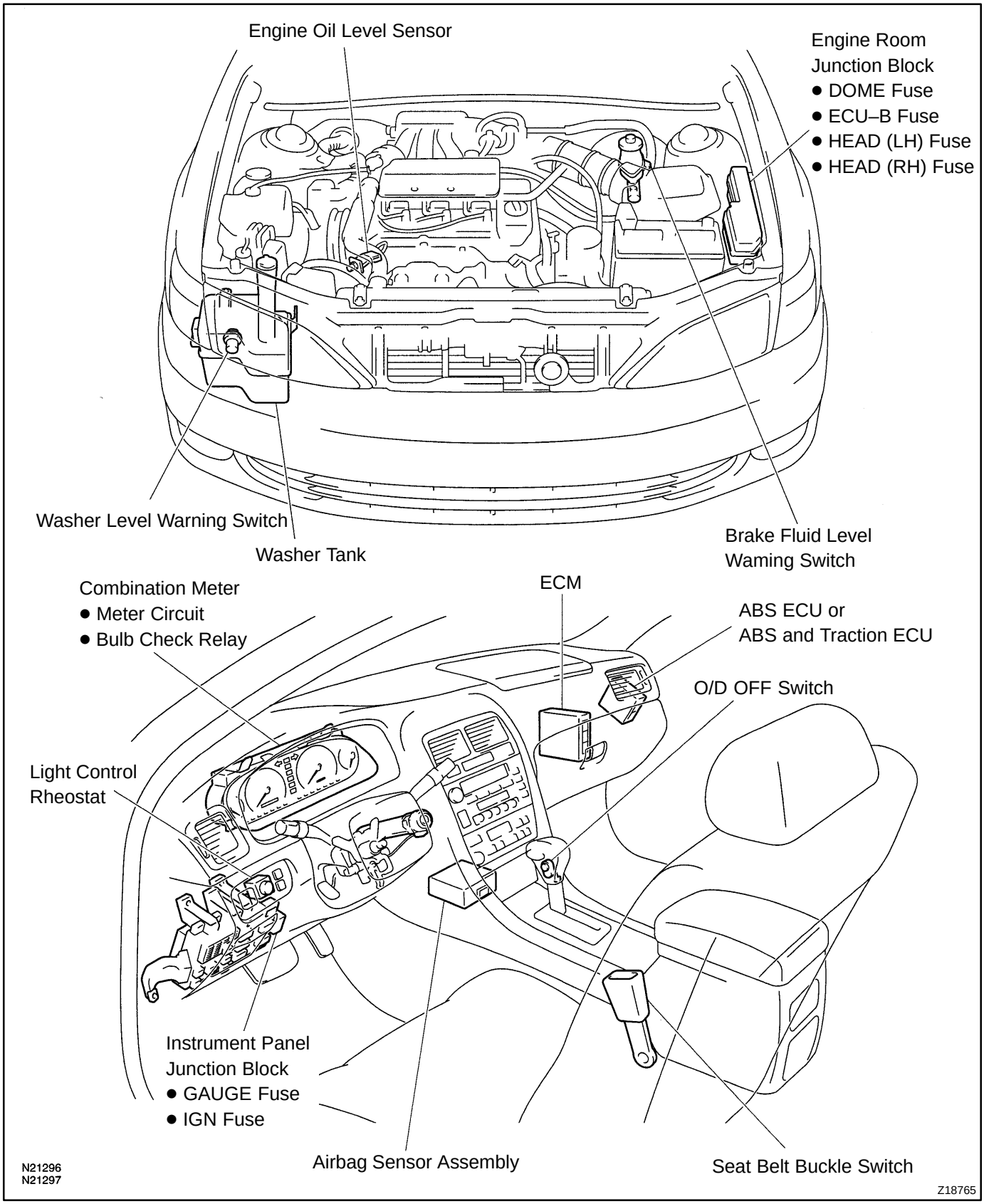
32	HEADLIGHT INDICATOR	Abnormal operation or indicator does not light up.

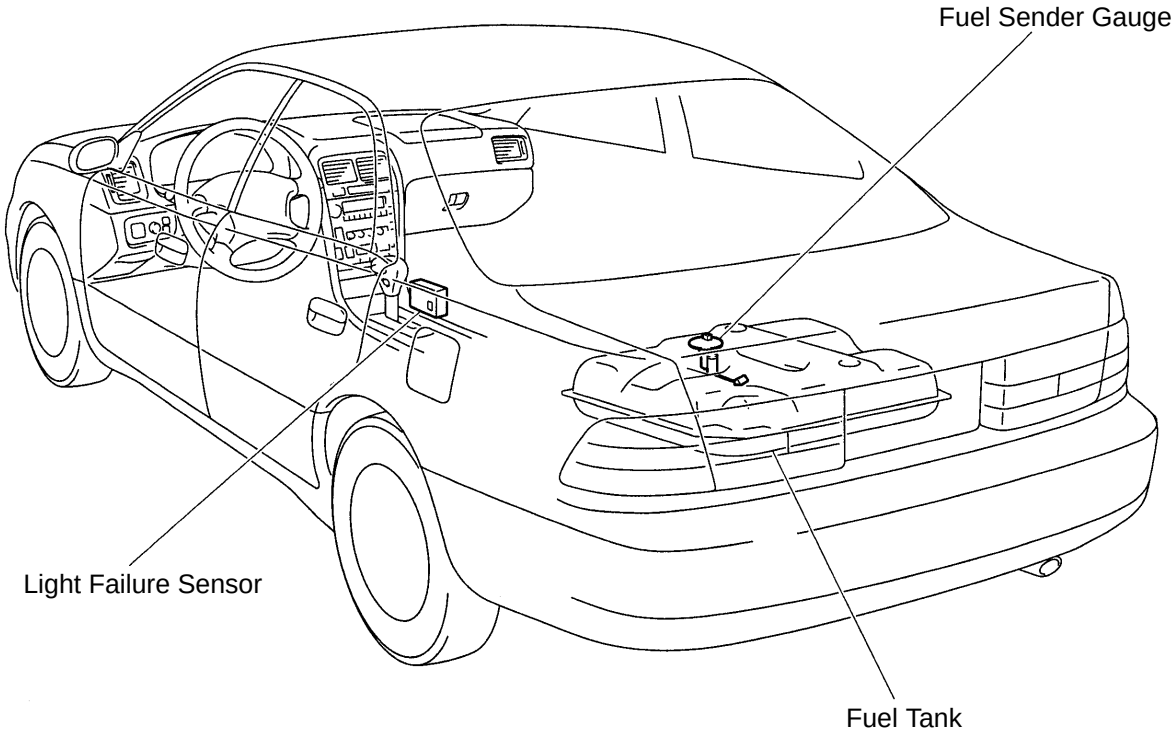
HINT : While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

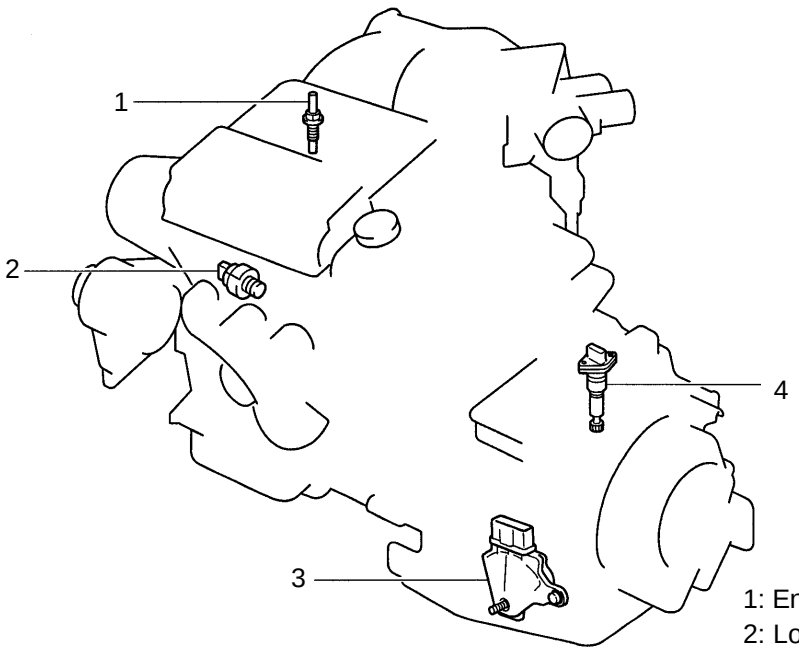


V08453

LOCATION


Engine Oil Level Sensor
Engine Room
Junction Block
● DOME Fuse
● ECU–B Fuse
● HEAD (LH) Fuse
● HEAD (RH) Fuse
Washer Level Warning Switch
Washer Tank
Brake Fluid Level
Waming Switch
Combination Meter
● Meter Circuit
● Bulb Check Relay
ECM
ABS ECU or
ABS and Traction ECU
O/D OFF Switch
Light Control
Rheostat
Instrument Panel
Junction Block
● GAUGE Fuse
● IGN Fuse
Airbag Sensor Assembly
Seat Belt Buckle Switch
N21296
N21297
Z18765





1: Engine Coolant Temperature Sender Gauge
2: Low Oil Pressure Switch
3: Park/Neutral Position Switch
4: Vehicle Speed Sensor

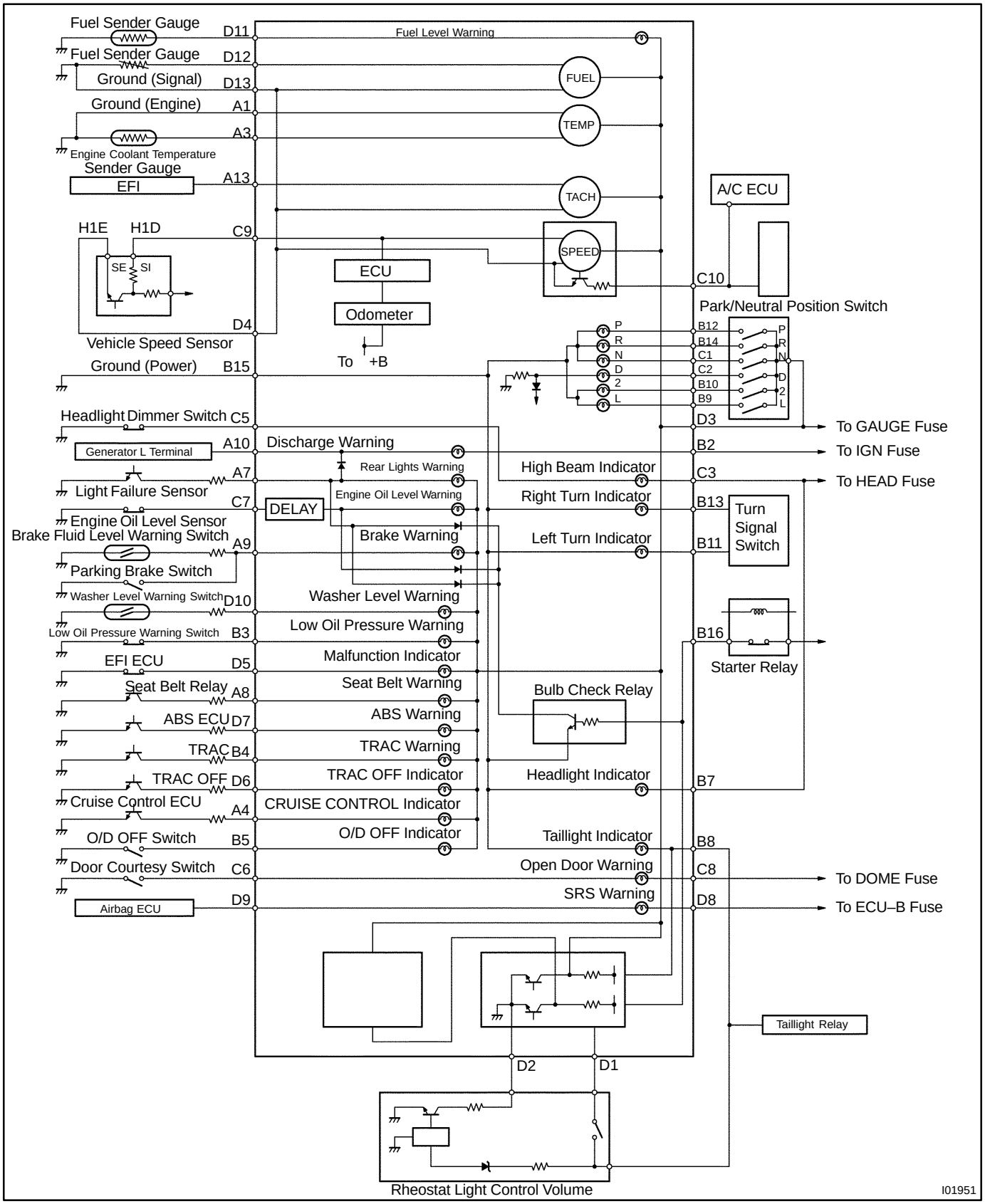
N21298
N21299

Z18766

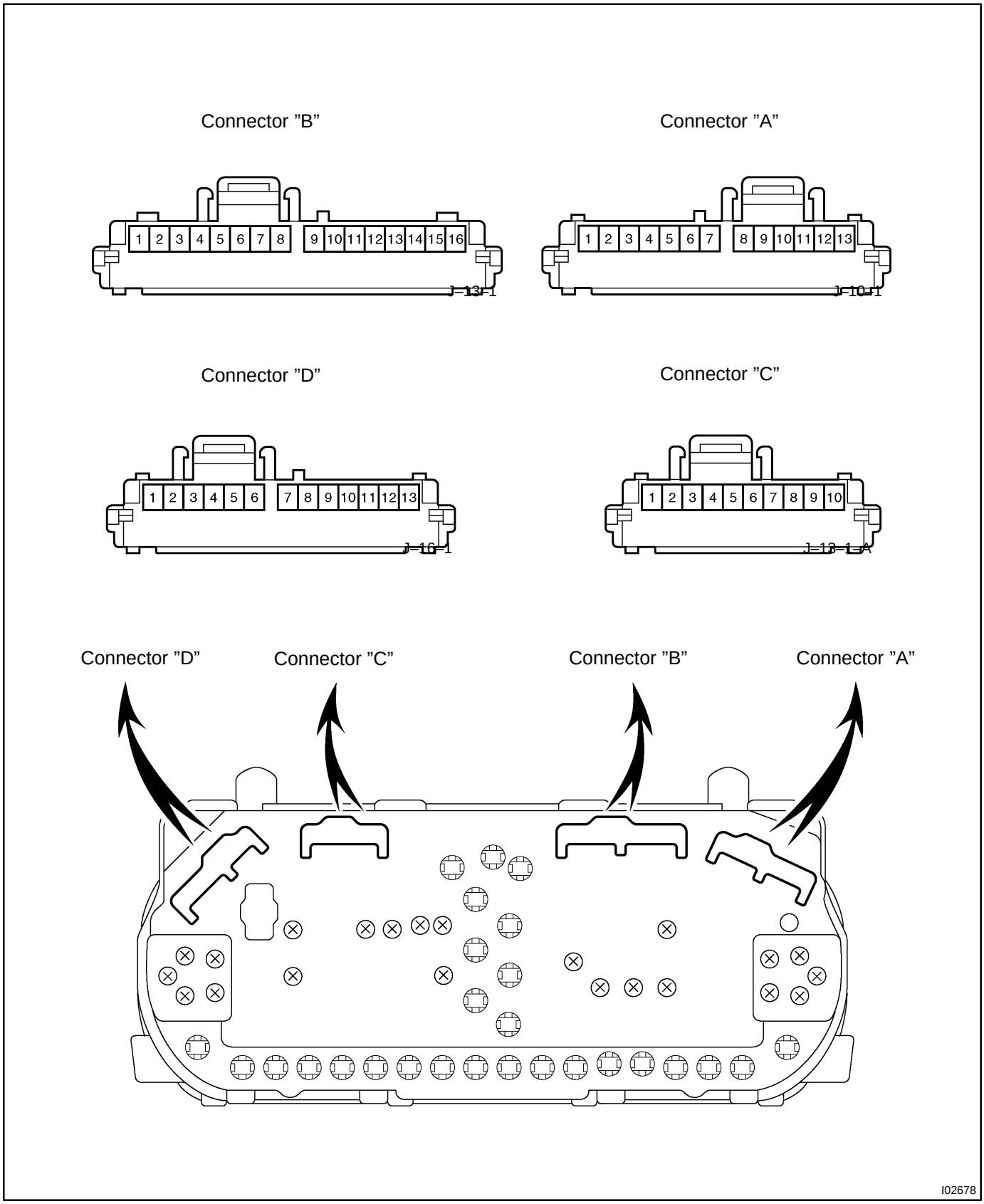
BE05F–05

CIRCUIT

1. WIRING DIAGRAM

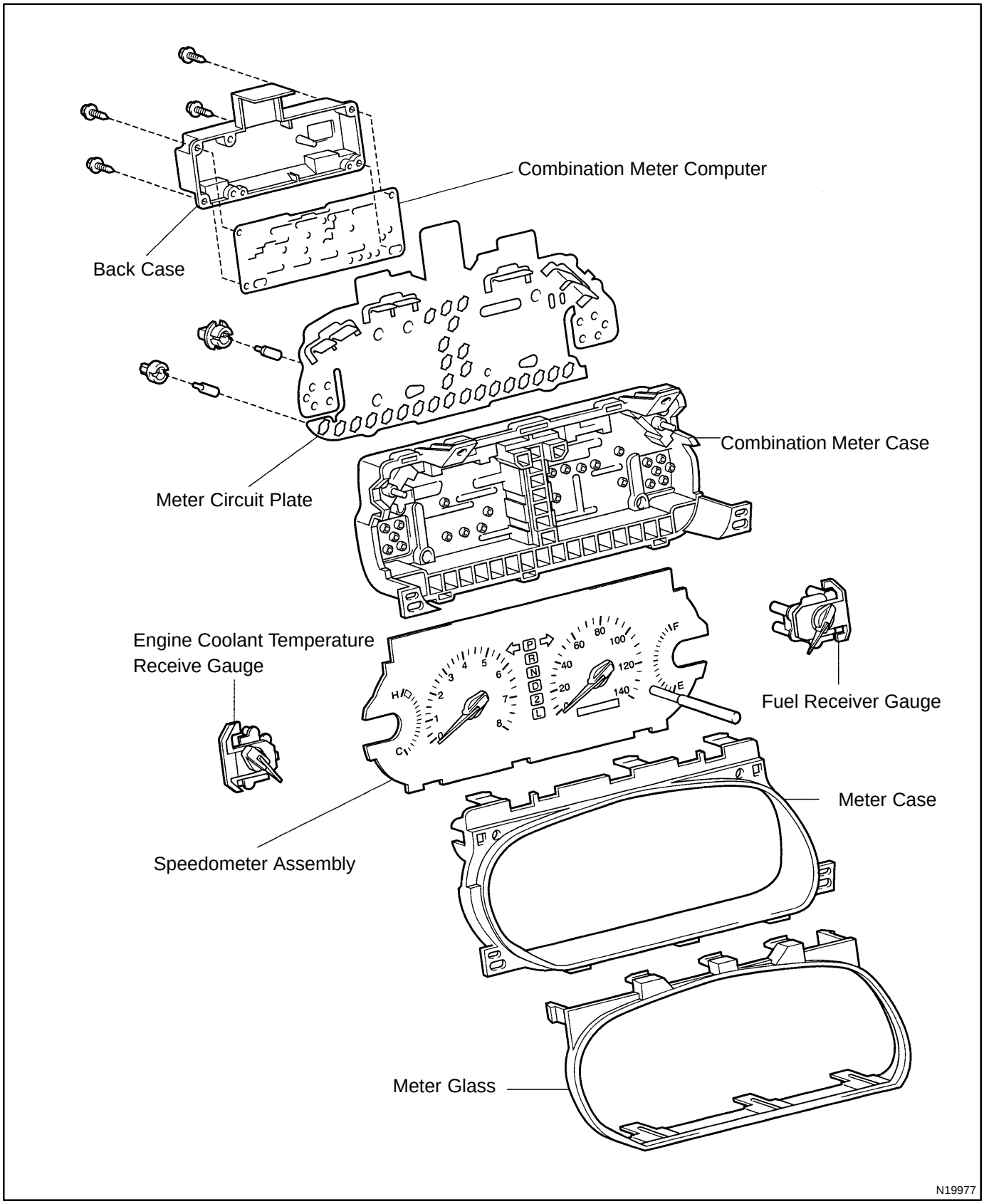


2. CONNECTOR DIAGRAMS



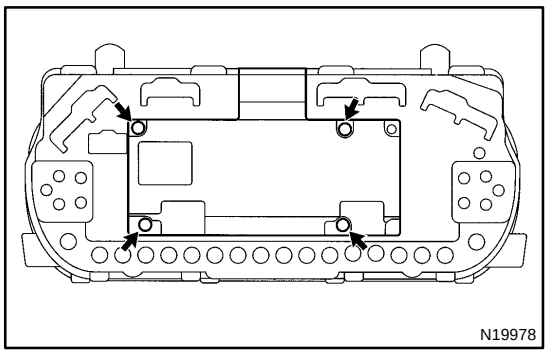
BE05G–01

COMPONENTS



BE05H–01

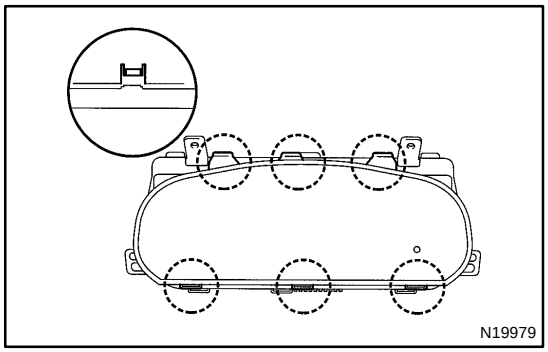
DISASSEMBLY



1. REMOVE BACK COVER

(a) Remove the 4 screws.

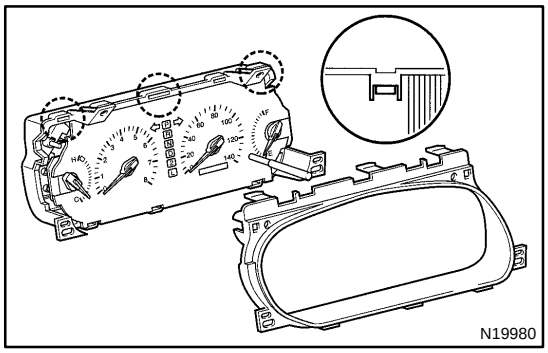
(b) Remove the back cover from the meter case.



2. REMOVE METER GLASS

(a) Remove the 6 claws.

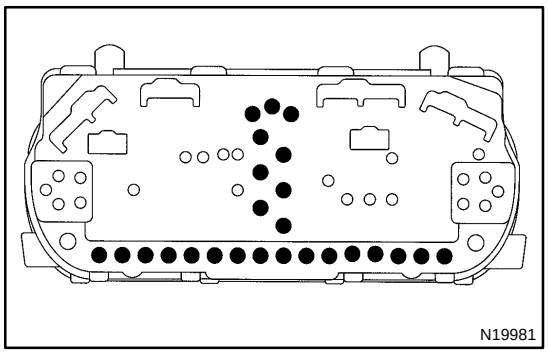
(b) Remove the meter glass from the meter case.



3. REMOVE METER PLATE

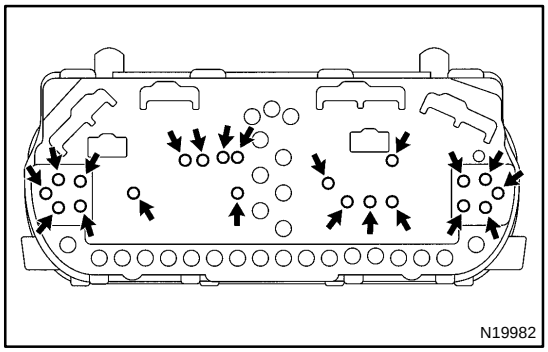
(a) Remove the 3 claws.

(b) Remove the meter plate from the meter case.



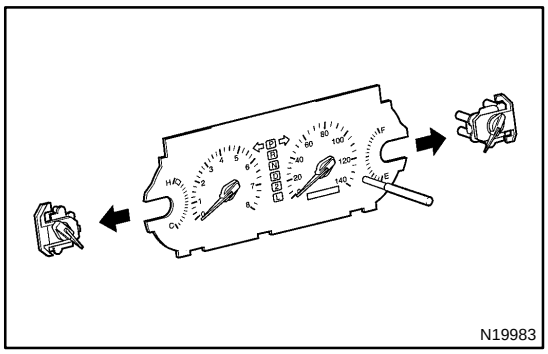
4. REMOVE METER CIRCUIT PLATE

(a) Remove the 27 bulbs.



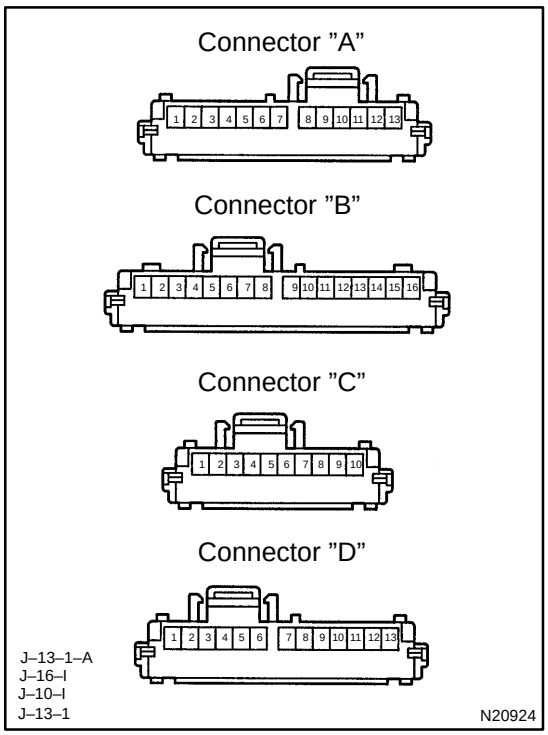
(b) Remove the 22 screws.

(c) Remove the meter circuit plate from the meter case.



5. **REMOVE SPEEDOMETER ASSEMBLY**
6. **REMOVE FUEL GAUGE**
7. **REMOVE ENGINE COOLANT TEMPERATURE GAUGE**

BE05I–03



INSPECTION

1. INSPECT COMBINATION METER WIRING CIRCUIT

Disconnect the connector ”A”, connector ”B”, connector ”C” and connector ”D” from the combination meter and inspect the connectors on the wire harness side.

Park/Neutral Position Switch:

Tester connection	Condition	Specified condition
B12 – Ground	Ignition switch ON and shift lever position ”P”	Battery positive voltage
B14 – Ground	Ignition switch ON and shift lever position ”R”	Battery positive voltage
C1 – Ground	Ignition switch ON and shift lever position ”N”	Battery positive voltage
C2 – Ground	Ignition switch ON and shift lever position ”D”	Battery positive voltage
B10 – Ground	Ignition switch ON and shift lever position ”2”	Battery positive voltage
B9 – Ground	Ignition switch ON and shift lever position ”L”	Battery positive voltage

Turn Signal Switch and Hazard Warning Switch:

Tester connection	Condition	Specified condition
B13 – Ground	Hazard warning switch ON	Battery positive voltage ↔ 0V
B13 – Ground	Ignition switch ON and turn signal switch to ”Right”	Battery positive voltage ↔ 0V
B11 – Ground	Hazard warning switch ON	Battery positive voltage ↔ 0V
B11 – Ground	Ignition switch ON and turn signal switch to ”Left”	Battery positive voltage ↔ 0V

Headlight:

Tester connection	Condition	Specified condition
C3 – C5	Light control switch ”HEAD” (Dimmer switch ”LO”)	No voltage
C3 – C5	Light control switch ”HEAD” (Dimmer switch ”HI” or ”Flash”)	Battery positive voltage

GAUGE Fuse:

Tester connection	Condition	Specified condition
D3 – Ground	Ignition switch position ACC, START	No voltage
D3 – Ground	Ignition switch position ON	Battery positive voltage

IGN Fuse:

Tester connection	Condition	Specified condition
B2 – Ground	*2 Ignition switch position LOCK, ACC, START	No voltage
B2 – Ground	*2 Ignition switch position ON	Battery positive voltage

Fuel Sender Gauge:

Tester connection	Condition	Specified condition
D12 – D13	Float position Full, Approx. 91.1 mm (3.587 in.)	Approx. 4.6V
D12 – D13	Float position 1/2, Approx. 34.2 mm (1.346 in.)	Approx. 2.4V
D12 – D13	Float position Empty, Approx. 30.8 mm (1.213 in.)	Approx. 0.3V
D11 – D12	Ignition switch ON	Approx. 5V

Ground (Signal):

Tester connection	Condition	Specified condition
D13 – Ground	Constant	Continuity

Ground (Engine):

Tester connection	Condition	Specified condition
A1 – Ground	Constant	Continuity

Ground (Power):

Tester connection	Condition	Specified condition
B15 – Ground	Constant	Continuity

Generator ”L” Terminal:

Tester connection	Condition	Specified condition
A10 – Ground	Engine stop	Continuity
A10 – Ground	Engine running	Battery positive voltage

Engine Oil Level Warning Switch:

Tester connection	Condition	Specified condition
C7 – Ground	Oil temperature above approx. 55 ˚C (131 ˚F) and switch position OFF (float down)	No continuity
C7 – Ground	Oil temperature below approx. 55 ˚C (131 ˚F)	Continuity
C7 – Ground	Oil temperature above approx. 55 ˚C (131 ˚F) and switch position ON (float up)	Continuity

DOME fuse:

Tester connection	Condition	Specified condition
C8 – Ground	Constant	Battery positive voltage

Rheostat Light Control:

Tester connection	Condition	Specified condition
D1 – Ground	Light control switch TAIL or HEAD and turn rheostat volume knob.	Voltage changes no voltage or voltage fluctuates

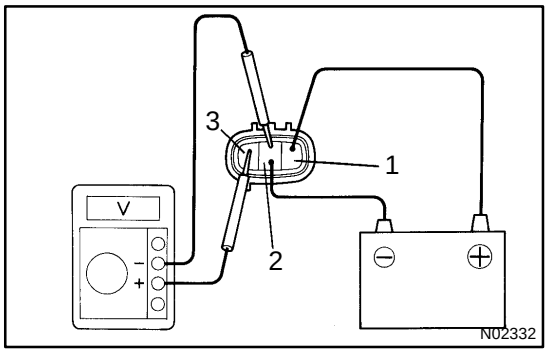
*2 Shift lever position is ”N” or ”P” position.

If circuit is not as specified, refer to BE–60 wiring diagram and inspect the circuit connected to other parts.

2. INSPECT SPEEDOMETER ON–VEHICLE

Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.
HINT:
Tire wear and tire over or under inflation will increase the indication error.
If error is excessive, replace the speedometer.

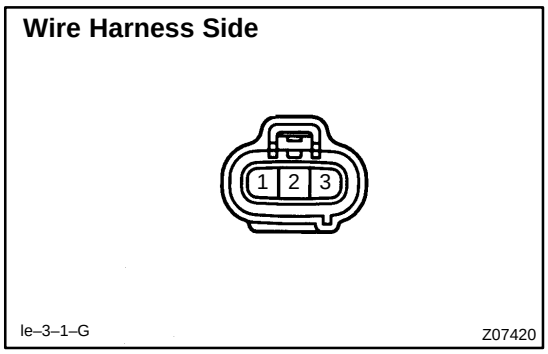
USA (mph)		CANADA (km/h)	
Standard indication	Allowable range	Standard indication	Allowable range
20	18 – 24	20	17 – 24
40	38 – 44	40	38 – 46
60	56 – 66	60	57.5 – 67
80	78 – 88	80	77 – 88
100	98 – 110	100	96 – 109
120	118 – 132	120	115 – 130
		140	134 – 151.5
		160	153 – 173



3. INSPECT VEHICLE SPEED SENSOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and negative (–) lead to terminal 2.
(b) Connect the positive (+) lead from the tester to terminal 3 and the negative (–) lead to terminal 2.
(c) Rotate the shaft.
(d) Check that there is voltage change from approx. 0 V to 11 V or more between terminals 2 and 3.

HINT:
The voltage change should be performed 4 times for every revolution of the speed sensor shaft.
If operation is not as specified, replace the sensor.



4. INSPECT VEHICLE SPEED SENSOR CIRCUIT

Disconnect the connector from sensor and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
1 – Ground	Ignition switch LOCK or ACC	No voltage
1 – Ground	Ignition switch ON	Battery positive voltage

If circuit is not as specified, inspect power source or wire harness.

5. INSPECT TACHOMETER ON–VEHICLE

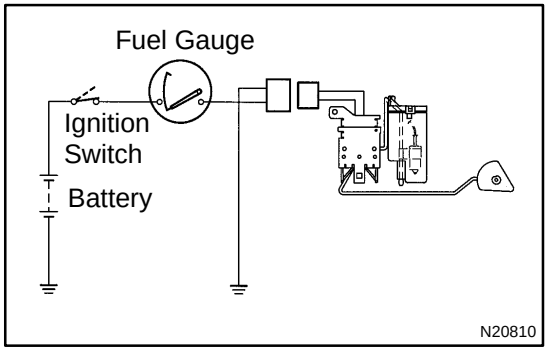
(a) Connect a tune–up test tachometer, and start the engine.

NOTICE:

- **Reversing the connection of the tachometer will damage the transistors and diodes inside.**
- **When removing or installing the tachometer, be careful not to drop or subject it to heavy shocks.**

(b) Compare the tester and tachometer readings.
DC 13.5 V 25 ˚C at (77˚F)

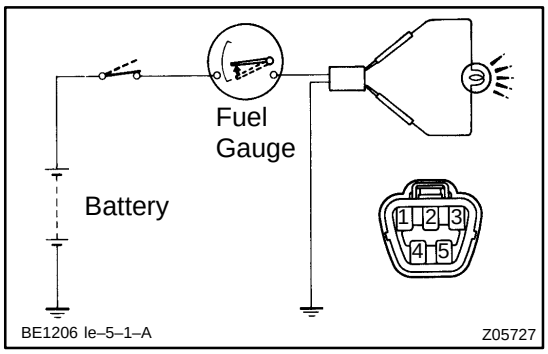
Standard indication	Allowable range
700	630 – 770
1,000	900 – 1,100
2,000	1,850 – 2,150
3,000	2,800 – 3,200
4,000	3,800 – 4,200
5,000	4,800 – 5,200
6,000	5,750 – 6,250
7,000	6,700 – 7,300



6. INSPECT FUEL RECEIVER GAUGE OPERATION

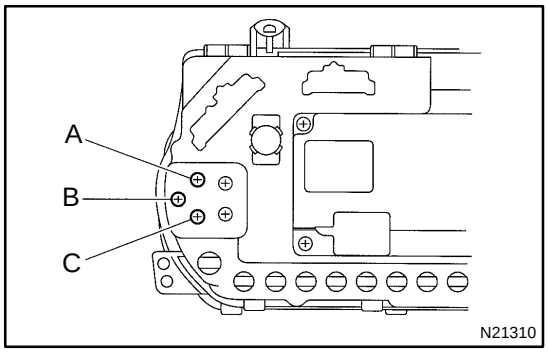
(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON, check that the receiver gauge needle indicates EMPTY.



(c) Connect terminals 2 and 3 on the wire harness side connector through a 3.4–W test bulb.
(d) Turn the ignition switch ON, check that the bulb lights up and the receiver gauge needle moves toward ”E” side.

HINT:
Because of the silicon oil in the gauge, it will take a short time for needle to stabilize.
If operation is not as specified, inspect the receiver gauge resistance.

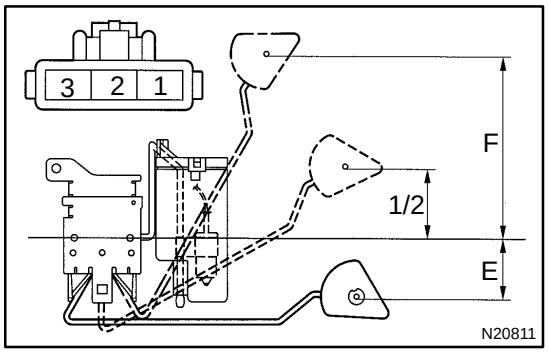


7. INSPECT FUEL RECEIVER GAUGE RESISTANCE

Measure the resistance between terminals.

Tester connection	Resistance (Ω)
A – B	Approx. 270.8
A – C	Approx. 91.3
B – C	Approx. 179.5

If resistance value is not as specified, replace the receiver gauge.

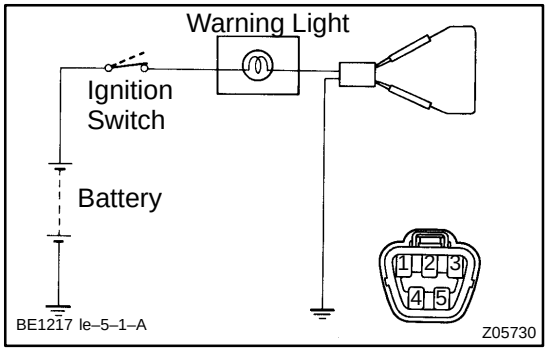


8. INSPECT FUEL SENDER GAUGE RESISTANCE

Measure the resistance between terminals 2 and 3 for each float position.

Float position mm (in.)	Resistance (Ω)
F: Approx. 91.1 (3.587)	Approx. 3.0
1/2: Approx. 34.2 (1.346)	Approx. 31.7
E: Approx. 30.8 (1.213)	Approx. 110.0

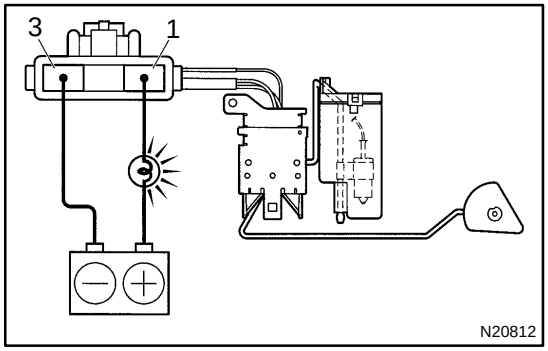
If resistance value is not as specified, replace the sender gauge.



9. INSPECT FUEL LEVEL WARNING LIGHT

(a) Disconnect the connector from the sender gauge.
(b) Connect terminals 1 and 3 on the wire harness side connector.
(c) Turn the ignition switch ON, check that the warning light lights up.

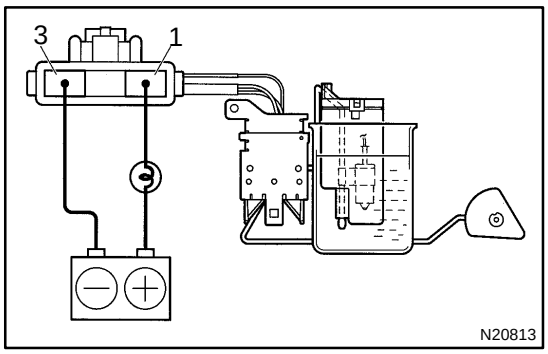
If the warning light does not light up, test the bulb or inspect wire harness.



10. INSPECT FUEL LEVEL WARNING SWITCH

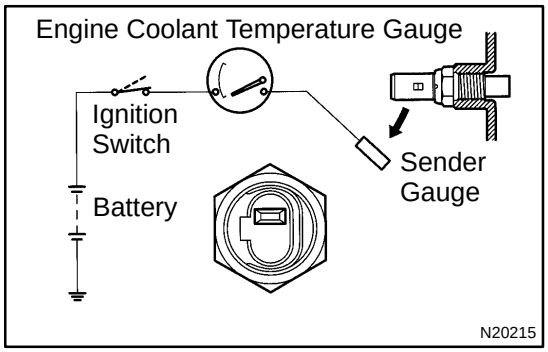
(a) Apply battery positive voltage between terminals 1 and 3 through a 3.4–W test bulb, check that the bulb lights up.

HINT:
It takes a short time for the bulb to light up.



(b) Submerge the switch in fuel, check that the bulb goes out.

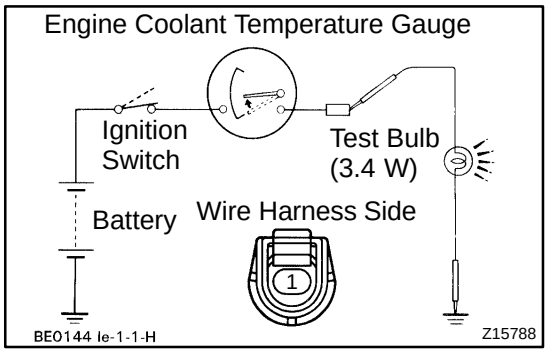
If operation is not as specified, replace the sender gauge.



11. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE OPERATION

(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON and check that the receiver gauge needle indicates COOL.



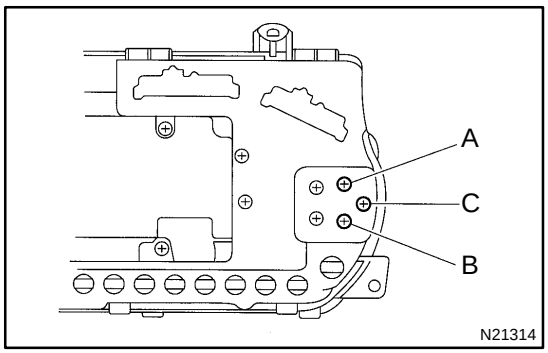
(c) Ground terminal on the wire harness side connector through a 3.4–W test bulb.

(d) Turn the ignition switch ON, and check that the bulb lights up and the receiver gauge needle moves to the hot side.

If operation is as specified, replace the sender gauge.

Then recheck the system.

If operation is not as specified, measure the receiver gauge resistance.



12. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE RESISTANCE

Measure the resistance between terminals.

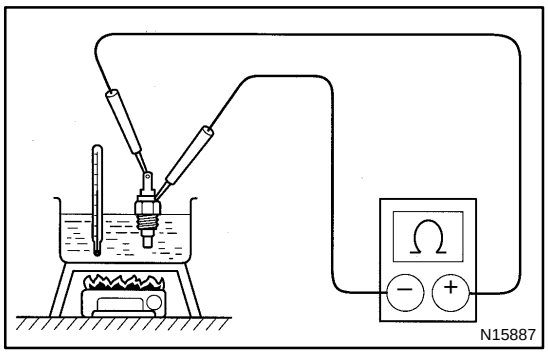
Tester connection	Resistance (Ω)
A – B	Approx. 54.0
A – C	Approx. 175.7
B – C	Approx. 229.7

HINT:

Connect the test leads so that the current from the ohmmeter can flow according to the above order.

This circuit includes the diode.

If resistance value is not as specified, replace the receiver gauge.

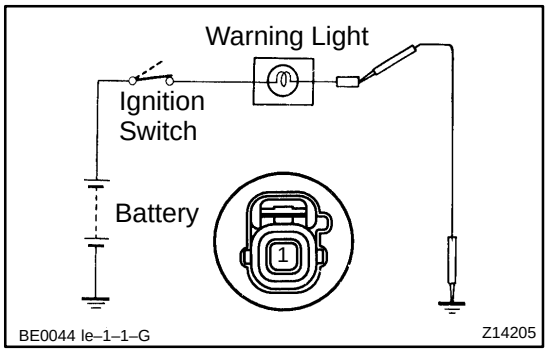


13. INSPECT ENGINE COOLANT TEMPERATURE SENDER GAUGE RESISTANCE

Measure the resistance between the terminal and gauge body.

Temperature ˚C(˚F)	Resistance (Ω)
50 (122.0)	160 – 240
120 (248.0)	17.1 – 21.2

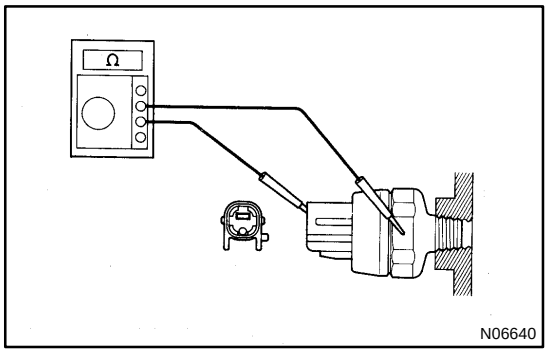
If resistance value is not as specified, replace the engine coolant temperature sender gauge.



14. INSPECT LOW OIL PRESSURE WARNING LIGHT

(a) Disconnect the connector from the warning switch and ground terminal on the wire harness side connector.
(b) Turn the ignition switch ON and check that the warning light lights up.

If the warning light does not light up, test the bulb.

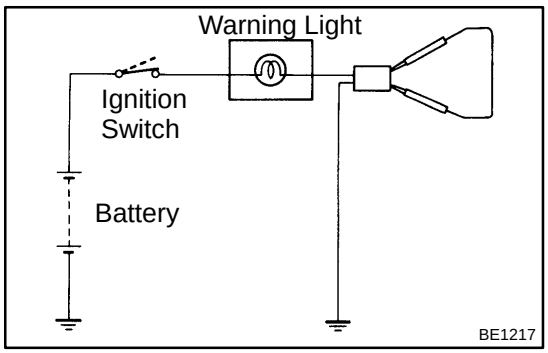


15. INSPECT LOW OIL PRESSURE SWITCH

(a) Disconnect the connector from the switch.
(b) Check that continuity exists between terminal and ground with the engine stopped.
(c) Check that no continuity exists between terminal and ground with the engine running.

HINT:

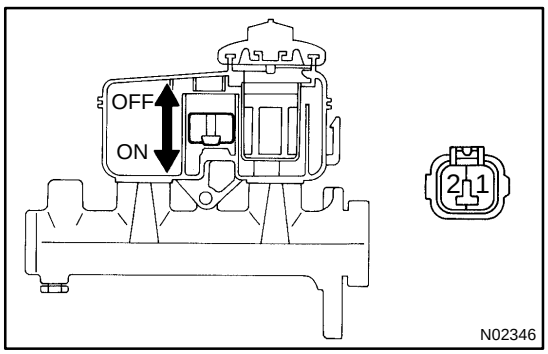
Oil pressure should be over 24.5 kPa (0.25 kgf/cm^2, 3.55 psi).
If operation is not as specified, replace the switch.



16. INSPECT BRAKE SYSTEM WARNING LIGHT

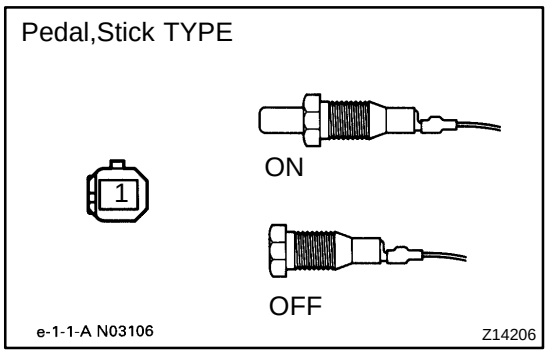
(a) Disconnect the connector from the brake fluid warning switch.
(b) Release the parking brake pedal.
(c) Connect the terminals on the wire harness side of the level warning switch connector.
(d) Start the engine, check that the warning light lights up.

If the warning light does not light up, test the bulb or wire harness.



17. INSPECT BRAKE FLUID LEVEL WARNING SWITCH

(a) Remove the reservoir tank cap and strainer.
(b) Disconnect the connector.
(c) Check that no continuity exists between the terminals with the switch OFF (float up).
(d) Use syphon, etc. to take fluid out of the reservoir tank.
(e) Check that continuity exists between the terminals with the switch ON (float down)



(f) Pour the fluid back in the reservoir tank.

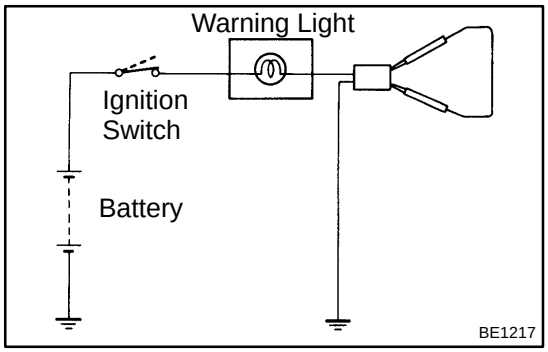
If operation is not as specified, replace the switch.

18. INSPECT PARKING BRAKE SWITCH

(a) Check that continuity exists between the terminal and switch body with the switch ON (switch pin released).

(b) Check that no continuity exists between the terminal and switch body with the switch OFF (switch pin pushed in).

If operation is not as specified, replace the switch or inspect ground point.



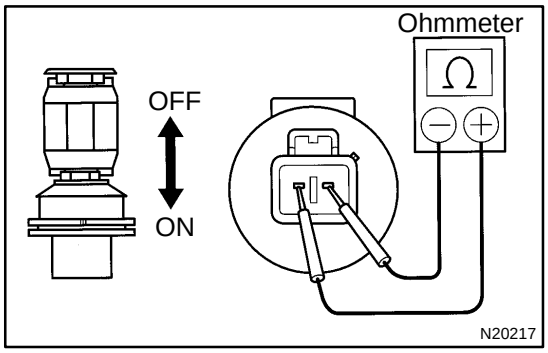
19. INSPECT WASHER LEVEL WARNING LIGHT

(a) Disconnect the connectors from the level warning switch and parking brake switch.

(b) Connect terminals on the wire harness side connector of the level warning switch connector.

(c) Remove the GAUGE fuse and turn the ignition switch ON, and check that the warning light comes on.

If the warning light does not light up, test the bulb.

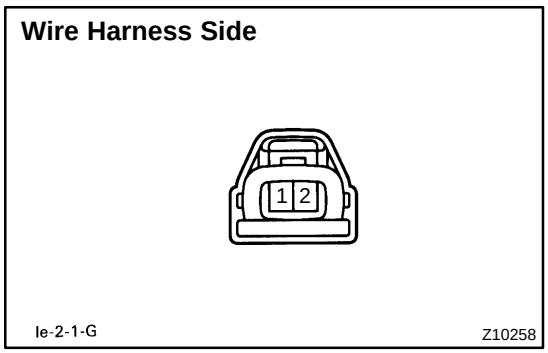


20. INSPECT WASHER LEVEL WARNING SWITCH

(a) Check that no continuity exists between terminals with the switch OFF (float up).

(b) Check that continuity exists between terminals with the switch ON (float down).

If operation is not as specified, replace the switch.

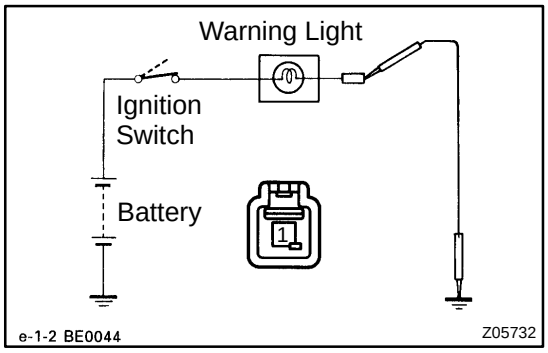


21. INSPECT WINDOW WASHER LEVEL WARNING SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

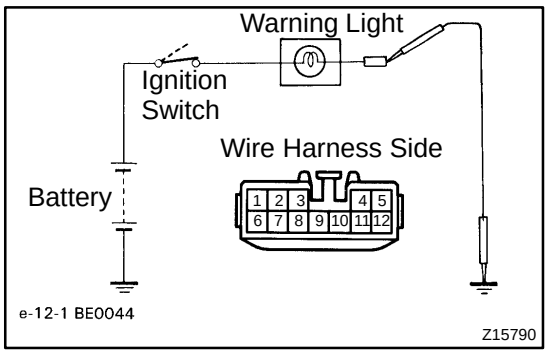
If continuity is not as specified, inspect the wire harness or ground point.



22. INSPECT OPEN DOOR WARNING LIGHT

Disconnect the connector from the door courtesy switch and ground terminal 1 on the wire harness side, and check that the warning light lights up.

If the warning light does not light up, inspect the bulb or wire harness.

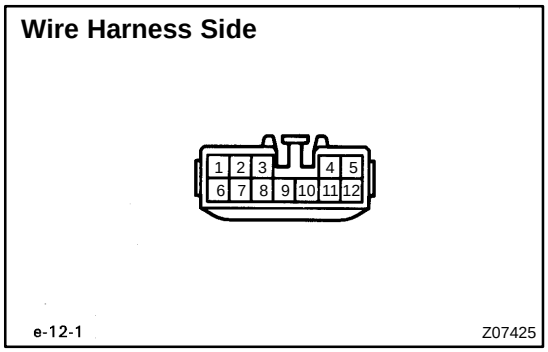


23. INSPECT WARNING LIGHT

(a) Disconnect the connector from the light failure sensor and ground terminal 4 on the wire harness side connector.

(b) Start the engine, check that the warning light lights up.

If the warning light does not light up, test the bulb or inspect wire harness.



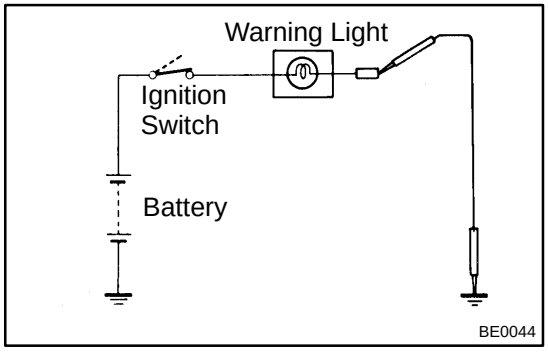
24. INSPECT LIGHT FAILURE SENSOR CIRCUIT

Disconnect the connector from the sensor and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity*
2 – Ground	Constant	Continuity*
9 – Ground	Constant	Continuity*
10 – Ground	Constant	Continuity*
11 – Ground	Constant	Continuity*
12 – Ground	Constant	Continuity*
3 – Ground	Light control switch OFF	No voltage
3 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
4.8 – Ground	Ignition switch LOCK or ACC	No voltage
4.8 – Ground	Ignition switch ON	Battery positive voltage
7 – Ground	Stop light switch OFF	No voltage
7 – Ground	Stop light switch ON	Battery positive voltage

*: There is resistance because this circuit is grounded through the bulb.

If the circuit is as specified, replace the sensor. If the circuit is not as specified, inspect the circuits connected to other parts.



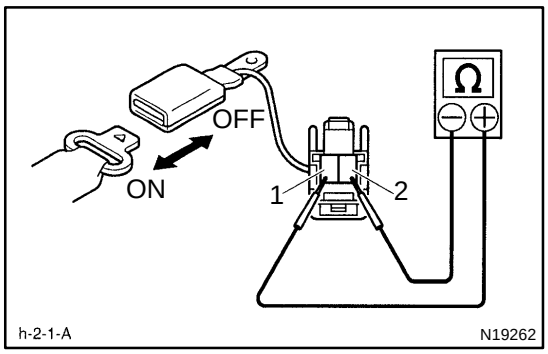
25. INSPECT SEAT BELT WARNING LIGHT

(a) Remove the integration relay from the instrument panel junction block.

(b) Ground terminal 2 on the integration relay with the connectors still connected.

(c) Turn the ignition switch ON and check that the warning light lights up.

If the warning light does not light up, inspect the bulb or wire harness.

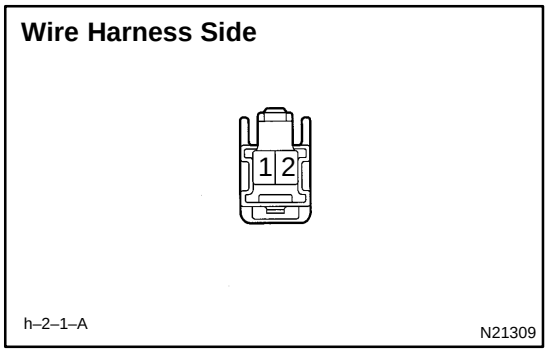


26. INSPECT BUCKLE SWITCH CONTINUITY

(a) Check that continuity exists between terminals 1 and 2 on the switch side connector with the switch ON (belt fastened).

(b) Check that no continuity exists between terminals 1 and 2 on the switch side connector with the switch OFF (belt unfastened).

If operation is not as specified, replace the front seat inner belt.

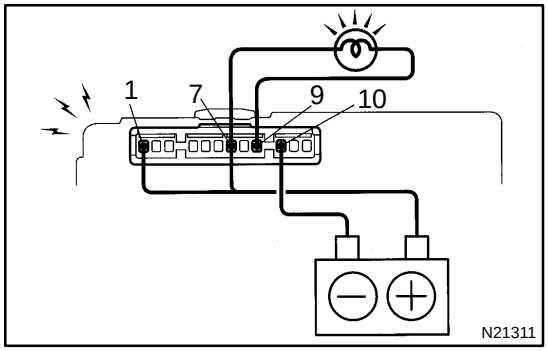


27. INSPECT BUCKLE SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
–	Turn the ignition switch ON	Chime sounds for 4 – 8 sec.
–	Ground terminal 1 and turn the ignition switch ON	No chime sound

If the circuit is not as specified, inspect the circuits connected to other parts.



28. INSPECT INTEGRATION RELAY SEAT BELT WARNING SYSTEM OPERATION

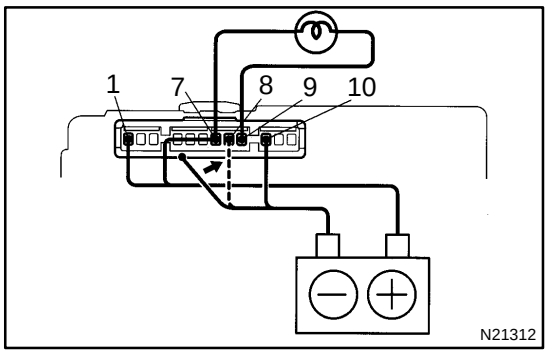
(a) Connect the positive (+) lead from the battery to terminals 1 and 7.

(b) Connect the terminal 7 to terminal 9 through the 3.4 W test bulb.

(c) Connect the negative (–) lead from the battery to terminal 10.

(d) Check that the bulb lights and the buzzer sounds for 4 to 8 seconds.

(e) Return to step (a) and operate the chime again.



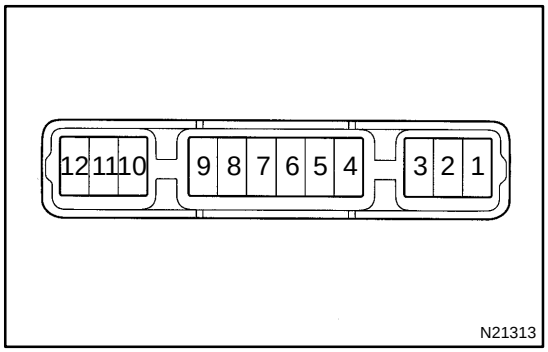
(f) Connect the negative (–) lead from the battery to terminal 8.

(g) Check that the buzzer stops sounding.

HINT:

Check the buzzer within a period of 4 to 8 seconds.

If operation is not as specified, replace the relay.



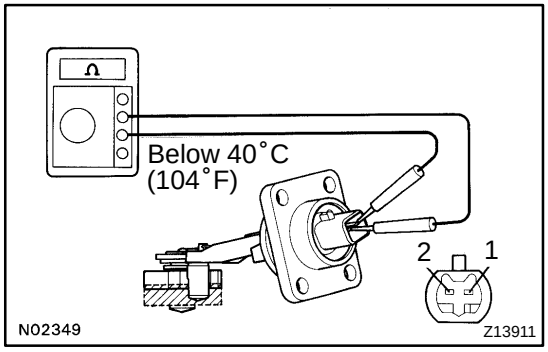
29. Seat belt warning : INSPECT INTEGRATION RELAY CIRCUIT

Remove the relay from the junction block No.1 and inspect the connectors on the junction block side.

Tester connection	Condition	Specified condition
8 – Ground	Driver's buckle switch OFF (Seat best unfastened)	No continuity
8 – Ground	Driver's buckle switch ON (Seat best fastened)	Continuity
10 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage
7 – Ground 9 – Ground	Ignition switch position OFF or ACC	No voltage
7 – Ground 9 – Ground	Ignition switch position ON	Battery positive voltage

If the circuit is as specified, try to replace the relay with a new one.

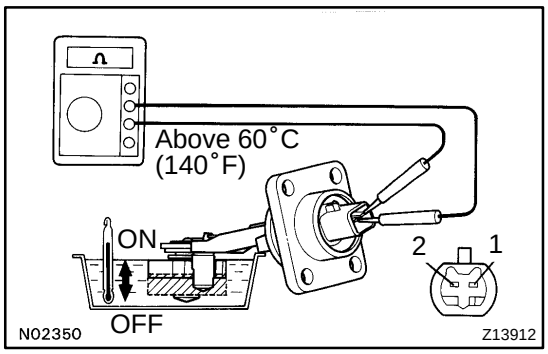
If the circuit is not as specified, inspect the circuits connected to other parts.



30. INSPECT ENGINE OIL LEVEL WARNING SWITCH CONTINUITY

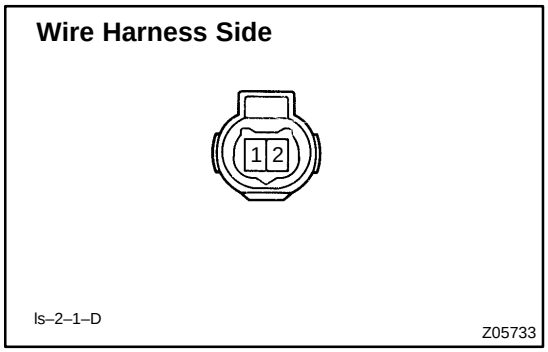
(a) Check that continuity exists between terminal with the switch in each position.

(b) Heat the switch to above 60˚C (140˚F) in an oil bath.



(c) Check that continuity exists between terminals with the switch ON (float up).
(d) Check that no continuity exists between terminals with the switch OFF (float down).

If operation is not as specified, replace the switch.

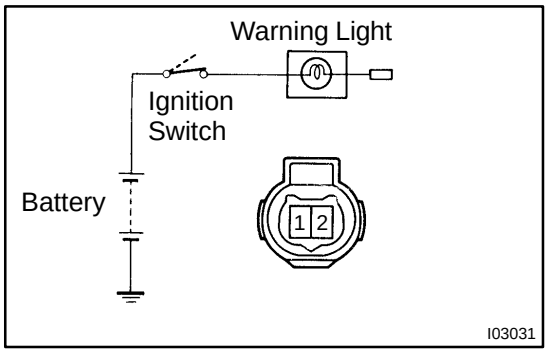


31. INSPECT ENGINE OIL LEVEL WARNING SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

If continuity is not as specified, inspect the wire harness or ground point.

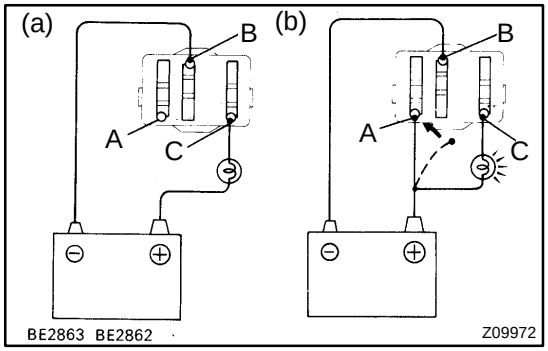


32. INSPECT ENGINE OIL LEVEL WARNING LIGHT

(a) Disconnect the connector from the switch.
(b) Turn the IG switch ON, the warning light lights up.
(c) The warning light lights up after 40 sec. from the engine has started.

If the warning light does not light up, inspect bulb or wire harness.

33. INSPECT LIGHT CONTROL RHEOSTAT
(See page BE–43)



34. INSPECT BULB CHECK RELAY OPERATION

(a) Connect the positive (+) lead from the battery to terminal C through a 1.4–W test bulb and the negative (–) lead to terminal B, check that the test bulb does not light up.
(b) Connect the positive (+) lead from the battery to terminal A and check that the test bulb lights up.

If operation is not as specified, replace the relay.

BE05J–01

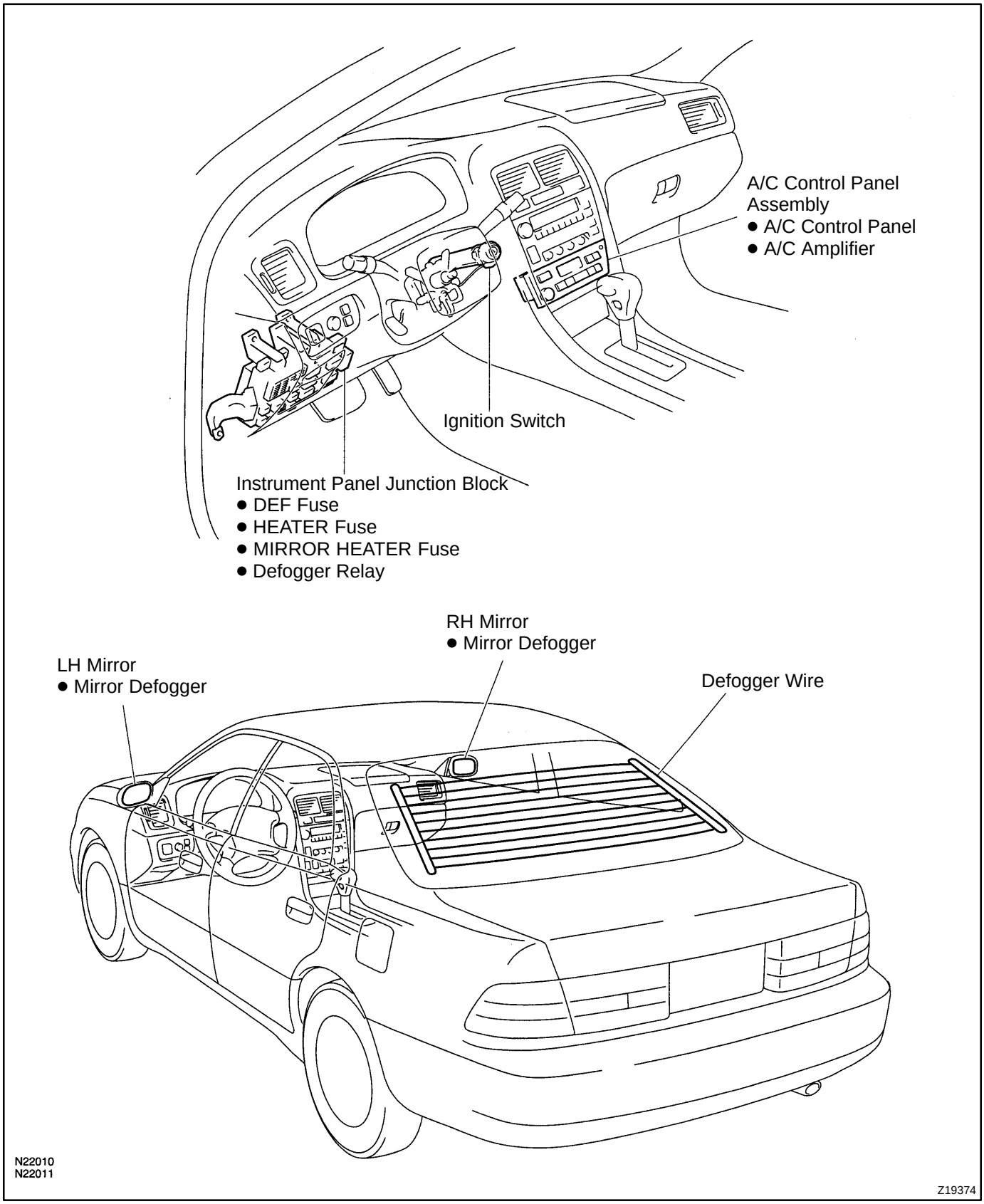
REASSEMBLY

Reassembly is in the reverse of the disassembly(See page BE–90).

DEFOGGER SYSTEM

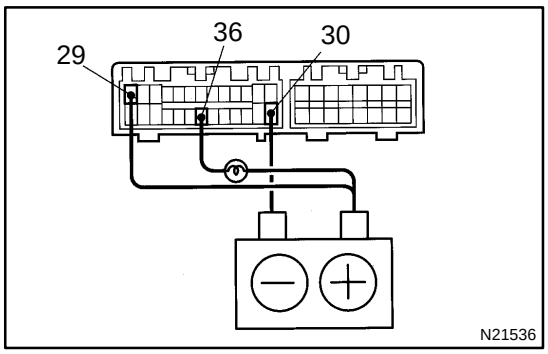
LOCATION

BE05K–04



BE05L–03

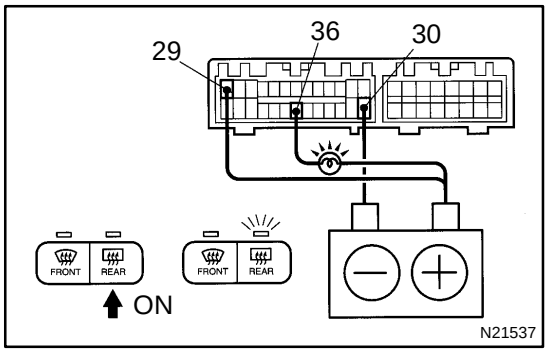
INSPECTION



1. A/C control panel assembly:
INSPECT DEFOGGER SWITCH OPERATION

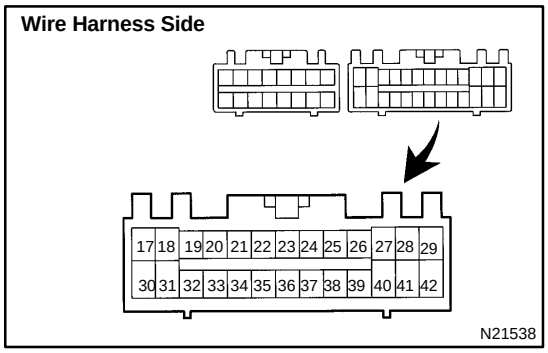
(a) Connect the positive (+) lead from the battery to terminal 29 and negative (–) lead to terminal 30.

(b) Connect the positive (+) lead from the battery to terminal 36 through a 1.4 W test bulb.



(c) Turn the defogger switch ON and check that the test bulb and indicator light turn ON, then turn OFF after approx. 15 minutes.

If operation is not as specified, proceed to inspect the A/C control assembly.
(See page AC–105)

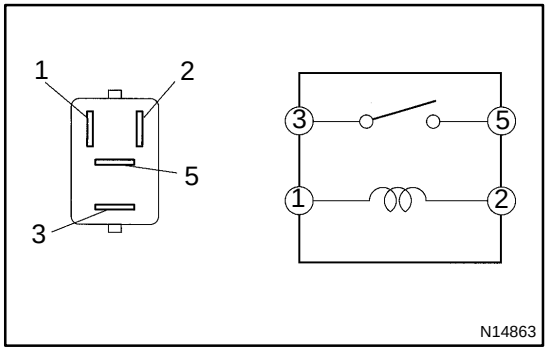


2. INSPECT DEFOGGER SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on wire harness side.

Tester connection	Condition	Specified condition
30 – Ground	Constant	Continuity
29 – Ground	Ignition switch position ACC or LOCK	No voltage
29 – Ground	Ignition switch position ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

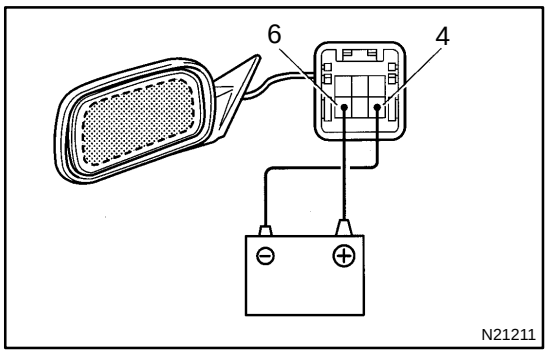


3. INSPECT DEFOGGER RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

4. INSPECT DEFOGGER RELAY CIRCUIT
(See page BE–11)



5. INSPECT MIRROR DEFOGGER OPERATION

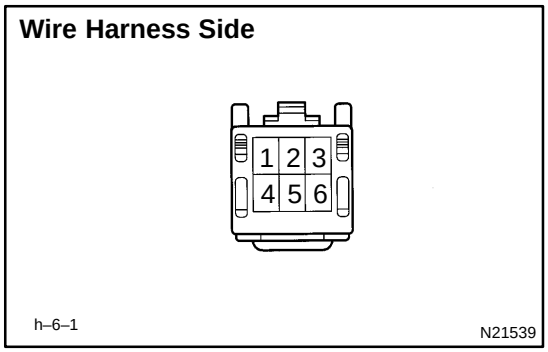
(a) Connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 4.

(b) Check that the mirror becomes warm.

HINT:

It will take a short time for the mirror to become warm.

If the mirror does not become warm, replace the mirror assembly.

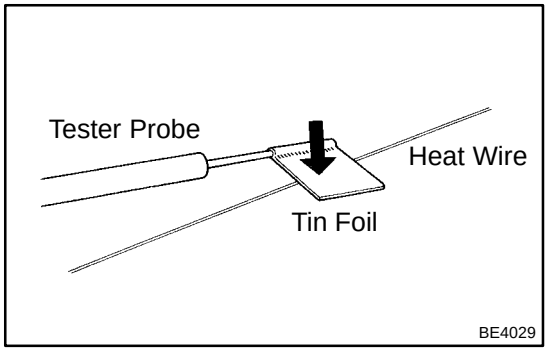


6. INSPECT MIRROR DEFOGGER CIRCUIT

Disconnect the connector from the outside mirror and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
4 – Ground	Constant	Continuity
6 – Ground	Ignition switch position ON (Defogger switch OFF)	No voltage
6 – Ground	Ignition switch position ON (Defogger switch ON)	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



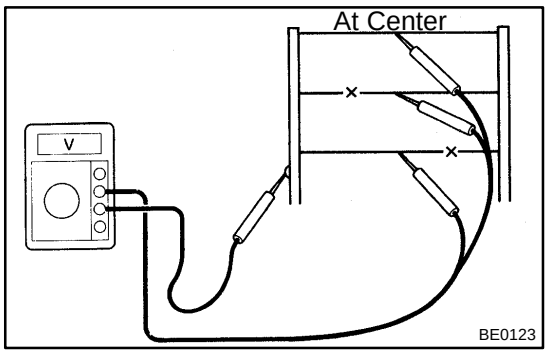
7. INSPECT DEFOGGER WIRE

NOTICE:

- **When cleaning the glass, use a soft, dry cloth, and wipe the glass in the direction of the wire. Take care not to damage the wires.**
- **Do not use detergents or glass cleaners with abrasive ingredients.**
- **When measuring voltage, wind a piece of tin foil around the top of the negative probe and press the foil against the wire with your finger, as shown.**

(a) Turn the ignition switch ON.

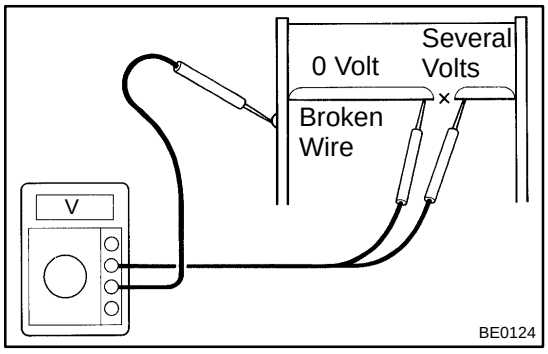
(b) Turn the defogger switch ON.



(c) Inspect the voltage at the center of each heat wire.

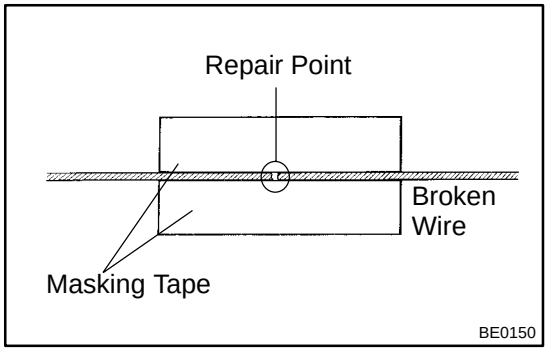
Voltage	Criteria
Approx. 5V	Okay (No break in wire)
Approx. 10V or 0V	Broken wire

HINT:
If there is approximately 10 V, the wire is broken between the center of the wire and the positive (+) end. If there is no voltage, the wire is broken between the center of the wire and ground.



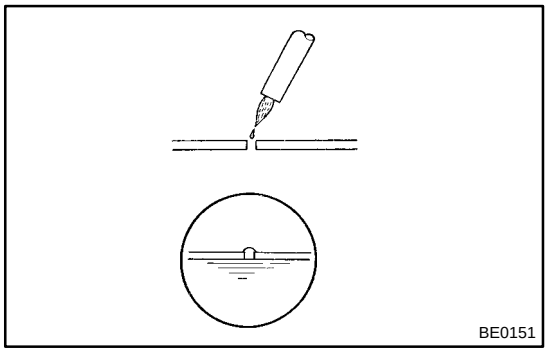
(d) Place the voltmeter positive (+) lead against the defogger positive (+) terminal.
(e) Place the voltmeter negative (–) lead with the foil strip against the heat wire at the positive (+) terminal end and slide it toward the negative (–) terminal end.
(f) The point where the voltmeter deflects from zero to several V is the place where the heat wire is broken.

HINT:
If the heat wire is not broken, the voltmeter indicates 0 V at the positive (+) end of the heat wire but gradually voltage increases to approx. 12 V as the meter probe moves to the other end.



8. IF NECESSARY, REPAIR DEFOGGER WIRE

(a) Clean the broken wire tips with grease, wax and silicone remover.
(b) Place the masking tape along both sides of the wire for repair.
(c) Thoroughly mix the repair agent (Dupont paste No. 4817).

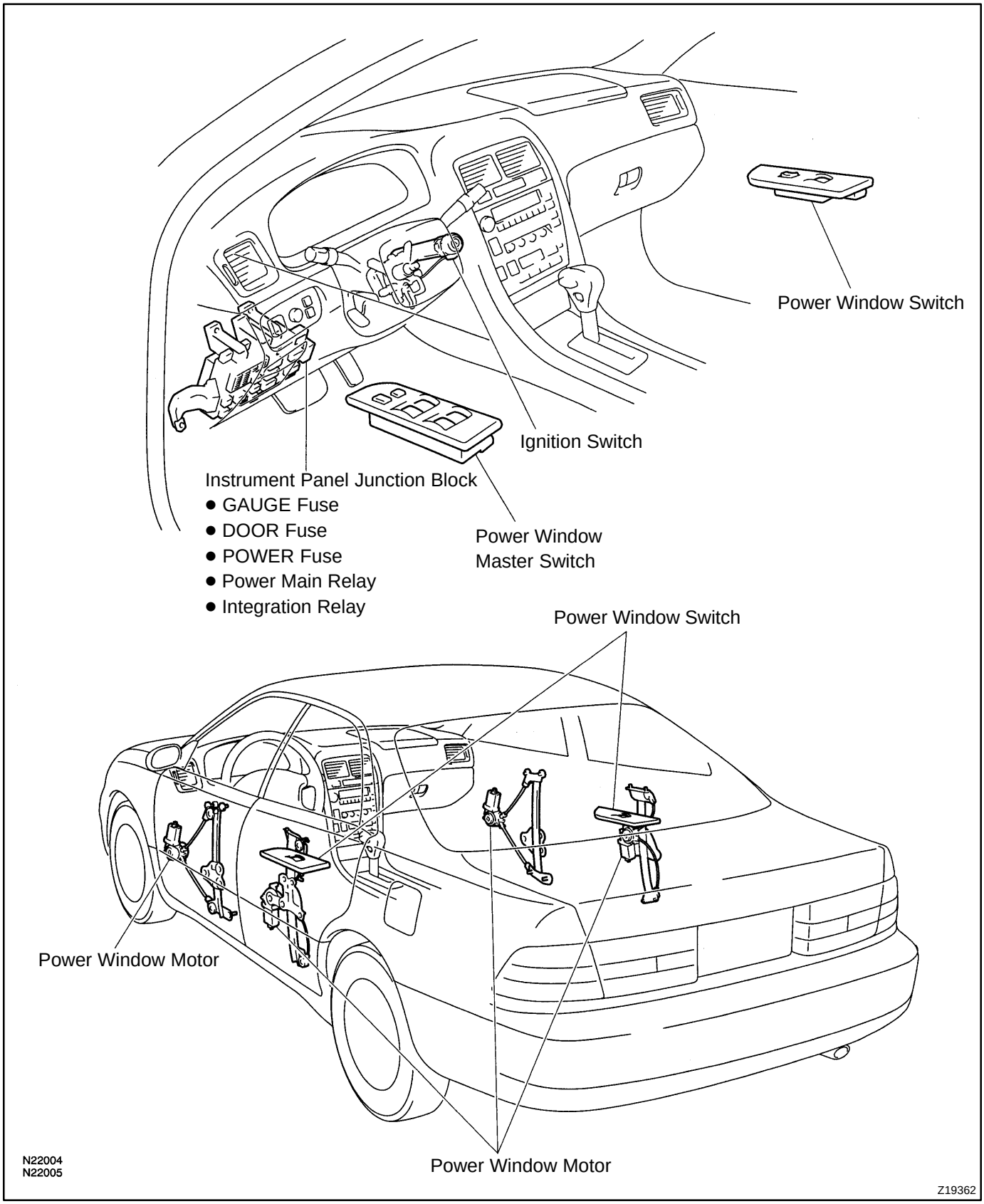


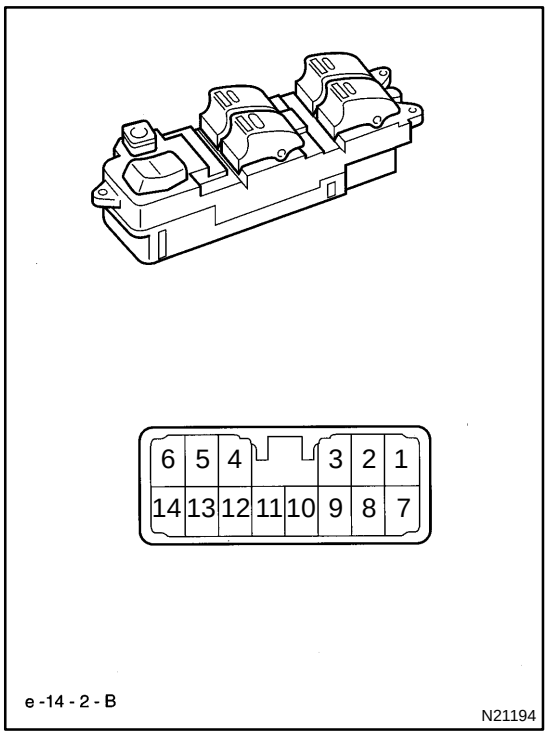
(d) Using a fine tip brush, apply a small amount of the agent to the wire.
(e) After a few minutes, remove the masking tape.
(f) Do not repair the defogger wire for at least 24 hours.

POWER WINDOW CONTROL SYSTEM

LOCATION

BE05M–01





BE05N–02

INSPECTION

1. INSPECT POWER WINDOW MASTER SWITCH CONTINUITY

(a) Inspect the front driver's switch.

Window unlock:

Switch position	Tester connection	Specified condition
UP	1 – 13 6 – 7	Continuity
OFF	1 – 6 – 13	Continuity
DOWN	1 – 6 7 – 13	Continuity

Window lock:

Switch position	Tester connection	Specified condition
UP	1 – 13 6 – 7	Continuity
OFF	1 – 6 – 13	Continuity
DOWN	1 – 6 7 – 13	Continuity

If continuity is not as specified, replace the master switch.

(b) Inspect the front passenger's switch.

Window unlock:

Switch position	Tester connection	Specified condition
UP	1 – 5 7 – 12	Continuity
OFF	1 – 5 – 12	Continuity
DOWN	1 – 12 5 – 7	Continuity

Window lock:

Switch position	Tester connection	Specified condition
UP	7 – 12	Continuity
OFF	5 – 12	Continuity
DOWN	5 – 7	Continuity

If continuity is not as specified, replace the master switch.

(c) Inspect the rear left switch.

Window unlock:

Switch position	Tester connection	Specified condition
UP	1 – 9 7 – 10	Continuity
OFF	1 – 9 – 10	Continuity
DOWN	1 – 10 7 – 9	Continuity

Window lock:

Switch position	Tester connection	Specified condition
UP	7 – 10	Continuity
OFF	9 – 10	Continuity
DOWN	7 – 9	Continuity

If continuity is not as specified, replace the master switch.

(d) Inspect the rear right switch.

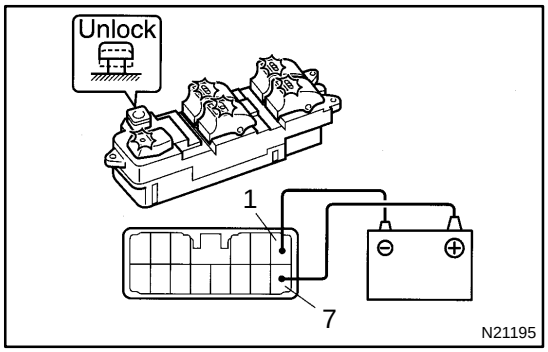
Window unlock:

Switch position	Tester connection	Specified condition
UP	1 – 14 7 – 11	Continuity
OFF	1 – 11 – 14	Continuity
DOWN	1 – 11 7 – 14	Continuity

Window lock:

Switch position	Tester connection	Specified condition
UP	7 – 11	Continuity
OFF	11 – 14	Continuity
DOWN	7 – 14	Continuity

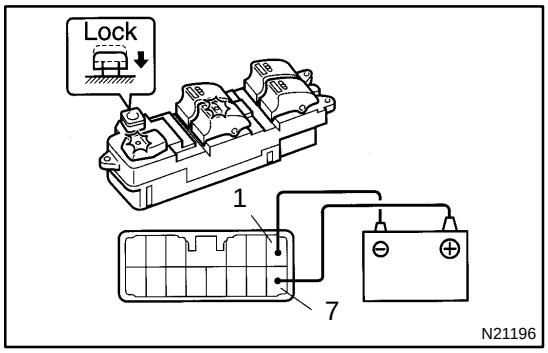
If continuity is not as specified, replace the master switch.



2. INSPECT POWER WINDOW MASTER SWITCH ILLUMINATION

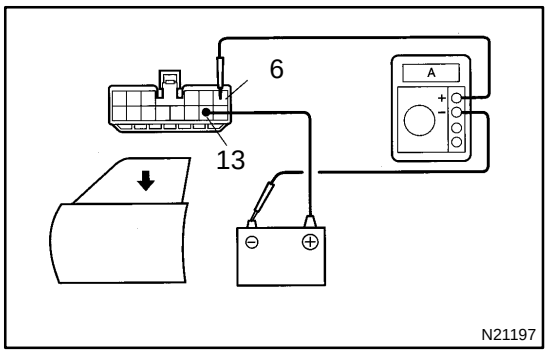
(a) Set the window lock switch to the unlock position.

(b) Connect the positive (+) lead from the battery to terminal 7 and the negative (–) lead to terminal 1, and check that all the illuminations light up.



(c) Set the window lock switch to the lock position, check that all the passenger's power window switch illuminations go out.

If operation is not as specified, replace the master switch.



3. INSPECT ONE TOUCH POWER WINDOW SYSTEM/ CURRENT OF CIRCUIT (Using an ammeter)

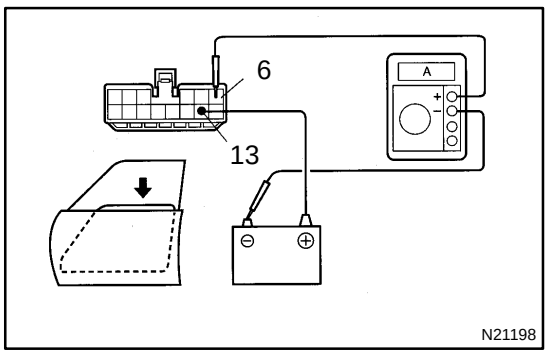
(a) Disconnect the connector from the master switch.

(b) Connect the positive (+) lead from the ammeter to terminal 6 on the wire harness side connector and the negative (–) lead to negative (–) terminal of the battery.

(c) Connect the positive (+) lead from the battery to terminal 13 on the wire harness side connector.

(d) As the window goes down, check that the current flow is approximately 7 A.

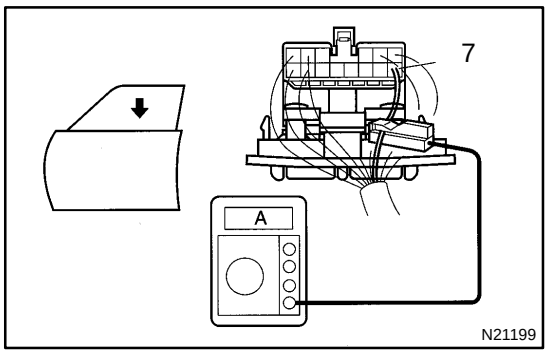
(e) Check that the current increases up to approximately 14.5 A or more when the window stops going down.



HINT:

The circuit breaker opens some 4 – 40 seconds after the window stops going down, so that check must be made before the circuit breaker operates.

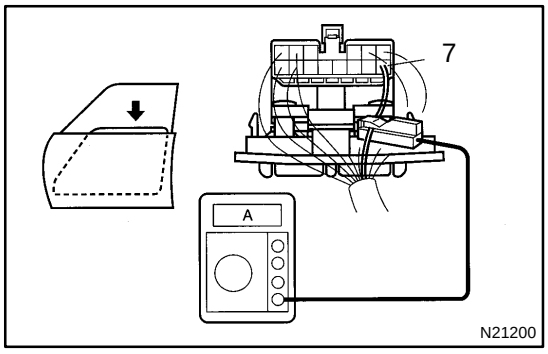
If the operation is as specified, replace the master switch.

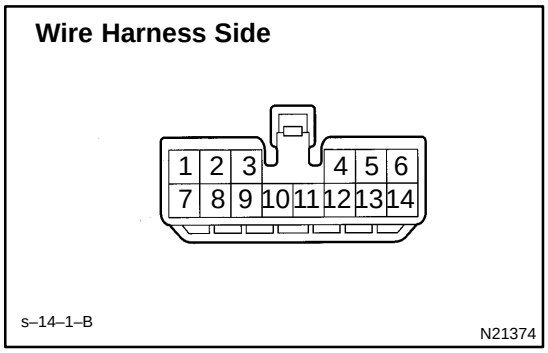


4. INSPECT ONE TOUCH POWER WINDOW SYSTEM/ CURRENT OF CIRCUIT (Using an ammeter with a current–measuring probe)

(a) Remove the master switch with connector connected.
(b) Attach a current–measuring probe to terminal 7 of the wire harness.
(c) Turn the ignition switch ON and set the power window switch in the down position.
(d) As the window goes down, check that the current flow is approximately 7 A.
(e) Check that the current increases up to approximately 14.5 A or more when the window stops going down.

HINT:
The circuit breaker opens some 4 – 40 seconds after the window stops going down, so that check must be made before the circuit breaker operates.
If operation is as specified, replace the master switch.



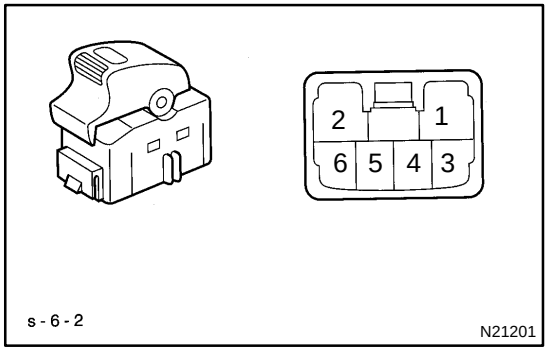


5. INSPECT POWER WINDOW MASTER SWITCH CIRCUIT

Disconnect the connector from the master switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
7 – Ground	Ignition switch position LOCK or ACC	*No voltage
7 – Ground	Ignition switch position ON	Battery positive voltage

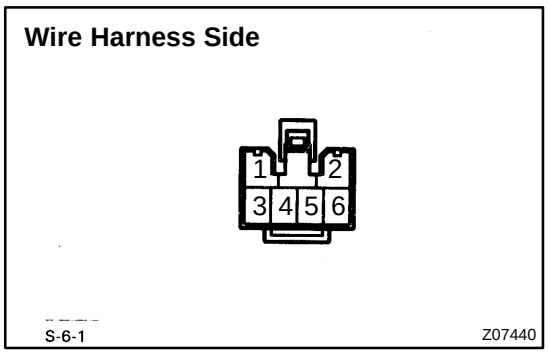
* Exceptions: During 60 seconds after the ignition switch is turned ON → OFF (ACC) or until driver or a passenger's door is opened after the ignition switch is turned ON → OFF (ACC).
If the circuit is not as specified, inspect the circuits connected to other parts.



6. INSPECT POWER WINDOW SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
UP	1 – 3 2 – 5	Continuity
OFF	1 – 3 2 – 4	Continuity
DOWN	2 – 4 3 – 5	Continuity

If continuity is not as specified, replace the switch.



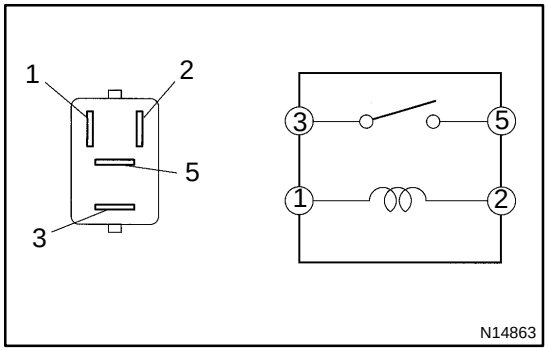
7. INSPECT POWER WINDOW SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Ignition switch position ON and master switch position OFF	No voltage
1 – Ground	Ignition switch positrion ON and master switch position DOWN	Battery positive voltage
4 – Ground	Ignition switch position ON and master switch position OFF	No voltage
4 – Ground	Ignition switch position ON and master switch position UP	Battery positive voltage
5 – Ground	Ignition switch position LOCK or ACC	*No voltage
5 – Ground	Ignition switch position ON	Battery positive voltage

*Exceptions: During 60 seconds period after the ignition switch is turned ON → OFF (ACC) or until driver or a passenger's door is opened after the ignition switch is turned ON → OFF (ACC).

If the circuit is not as specified, inspect the circuits connected to other parts.

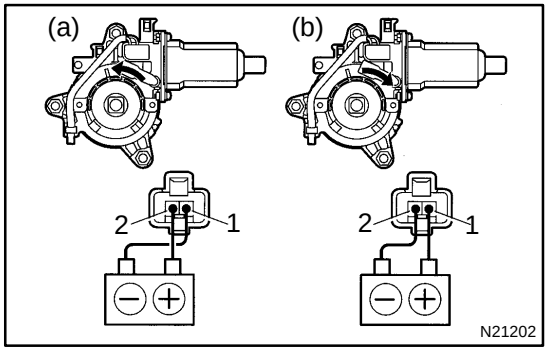


8. INSPECT POWER MAIN RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

9. INSPECT POWER MAIN RELAY CIRCUIT
(See page BE–11)

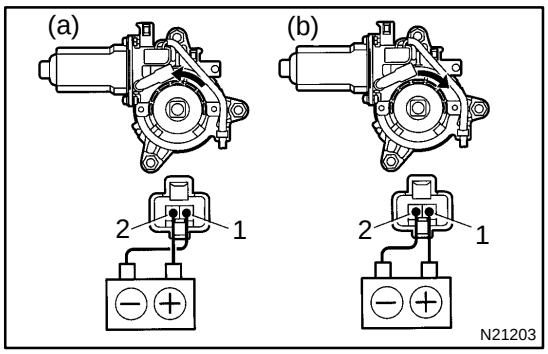


10. Driver's Door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

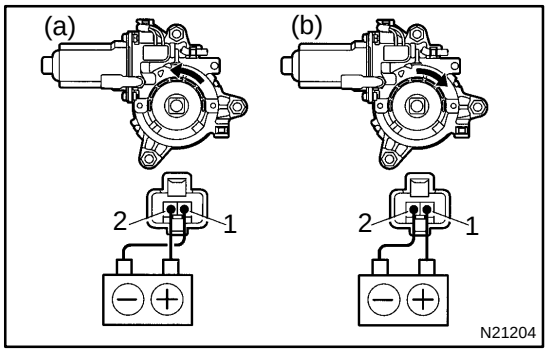


11. Front Passenger's Door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

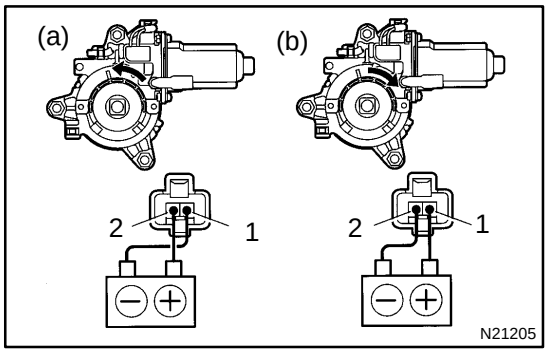


12. Rear Left Side Door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

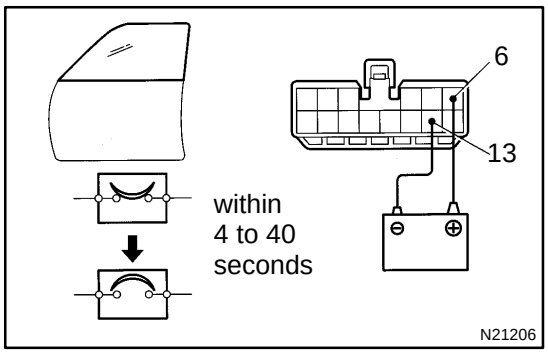


13. Rear Right Side Door:
INSPECT POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the motor.

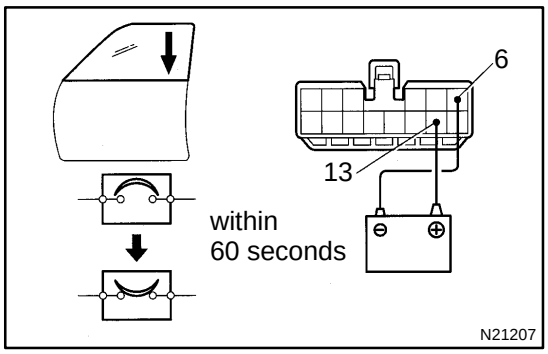


14. Driver's Door:
INSPECT POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

(a) Disconnect the connector from the master switch.

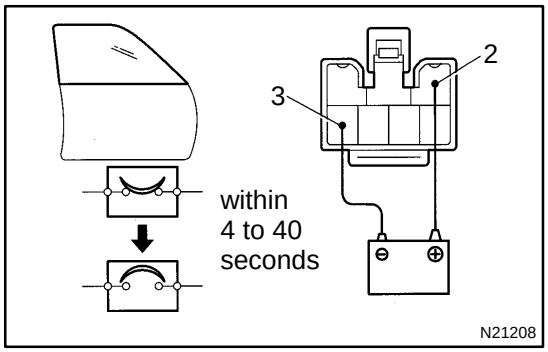
(b) Connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 13 on the wire harness side connector and raise the window to full closed position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within approximately 4 to 40 seconds.



(d) Reverse the polarity, check that the window begins to descend within approximately 60 seconds.

If operation is not as specified, replace the motor.

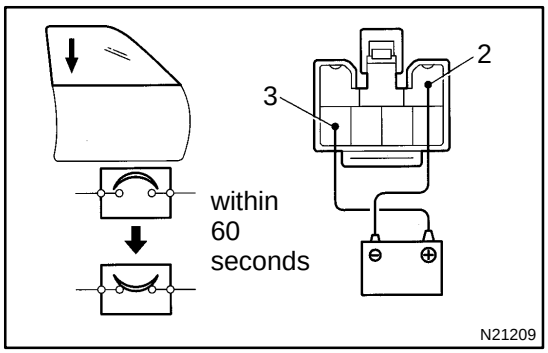


15. Front Passenger's Door Motor:
INSPECT POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

(a) Disconnect the connector from the power window switch.

(b) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3 on the wire harness side connector, and raise the window to full closed position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within approximately 4 to 40 seconds.



(d) Reverse the polarity, check that the window begins to descend within approximately 60 seconds.

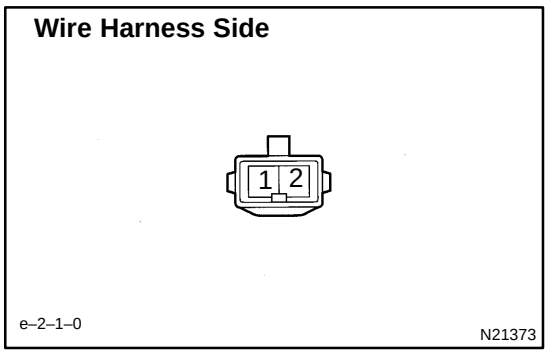
If operation is not as specified, replace the motor.

16. Rear Left Side Door:
INSPECT POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

See step of Front Passenger Door Motor.

17. Rear Right Side Door:
INSPECT POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

See step of Front Passenger Door Motor.



18. INSPECT POWER WINDOW MOTOR CIRCUIT

(a) Disconnect the connector from the motor.

(b) Connect the connector to the master switch and power window switch.

(c) Inspect the connector on the wire harness side.

Driver's Door Motor

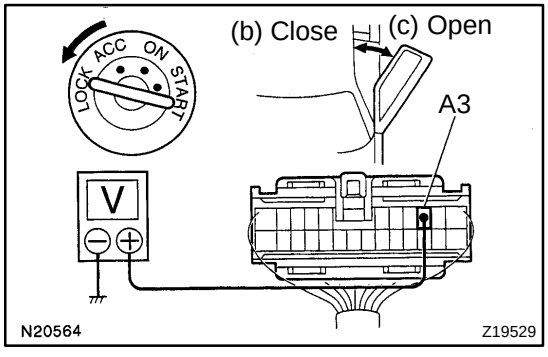
Tester connection	Condition	Specified condition
1 – Ground	*Master switch position DOWN or OFF	No voltage
1 – Ground	*Master switch position UP	Battery positive voltage
2 – Ground	*Master switch position UP or OFF	No voltage
2 – Ground	*Master switch position DOWN	Battery positive voltage

Except Driver's Door Motor

Tester connection	Condition	Specified condition
1 – Ground	*Master switch position UP or OFF	No voltage
1 – Ground	*Master switch position DOWN	Battery positive voltage
1 – Ground	*Power window switch position UP or OFF	No voltage
1 – Ground	*Power window switch position DOWN	Battery positive voltage
2 – Ground	*Master switch position DOWN or OFF	No voltage
2 – Ground	*Master switch position UP	Battery positive voltage
2 – Ground	*Power window switch position DOWN or OFF	No voltage
2 – Ground	*Power window switch position UP	Battery positive voltage

*: Set the window lock switch to the unlock position.(except driver's door motor)

If the circuit is not as specified, inspect the circuits connected to other parts.



19. Key–Off Power Window Signal: INSPECT INTEGRATION RELAY OPERATION

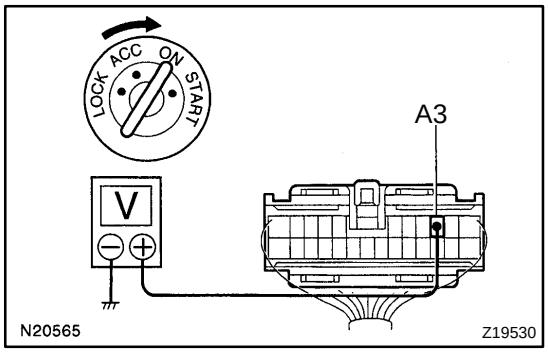
HINT:

When the relay circuit is as specified, inspect the key–off power window signal.

(a) Connect the positive (+) lead from the voltmeter to terminal A3 and the negative (–) lead to body ground.

(b) Close the door with ignition switch turned to LOCK or ACC, and check that the meter needle indicates battery positive voltage.

(c) Open the door and check that the meter needle indicates 0 V.



(d) Turn the ignition switch ON and check that the meter needle indicates battery positive voltage again.

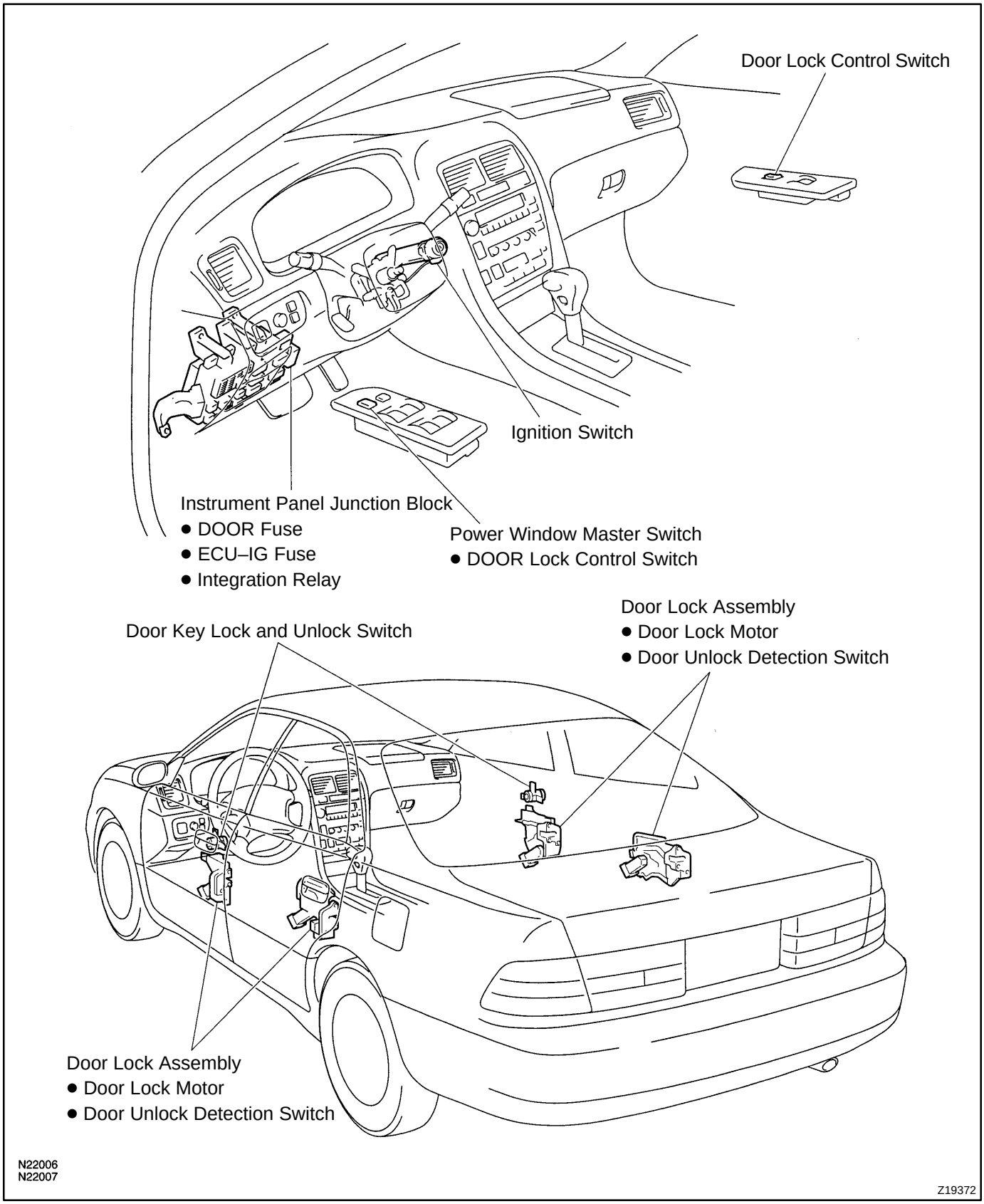
If operation is not as specified, replace the relay.

20. INSPECT INTEGRATION RELAY CIRCUIT
(See page BE–20)

POWER DOOR LOCK CONTROL SYSTEM

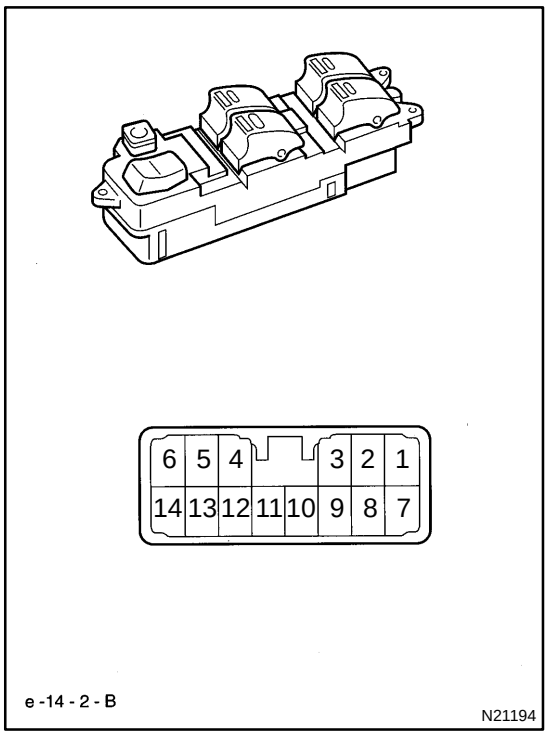
BE05O–01

LOCATION



BE05P–01

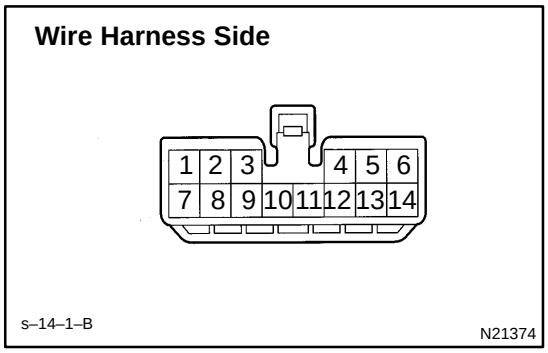
INSPECTION



1. Master Switch:
INSPECT DRIVER'S DOOR LOCK CONTROL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	1 – 4	Continuity
OFF	–	No continuity
UNLOCK	1 – 3	Continuity

If continuity is not as specified, replace the switch.

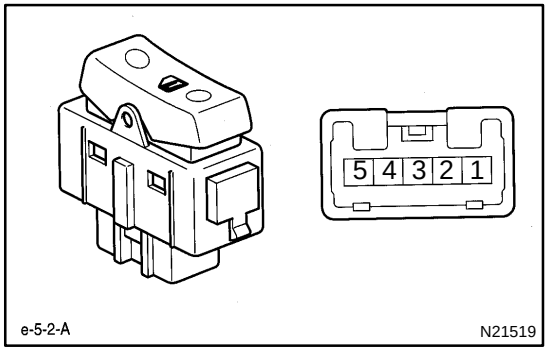


2. Master Switch:
INSPECT DRIVER'S DOOR LOCK CONTROL SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
3 – Ground	Constant	Battery positive voltage
4 – Ground	Constant	Battery positive voltage

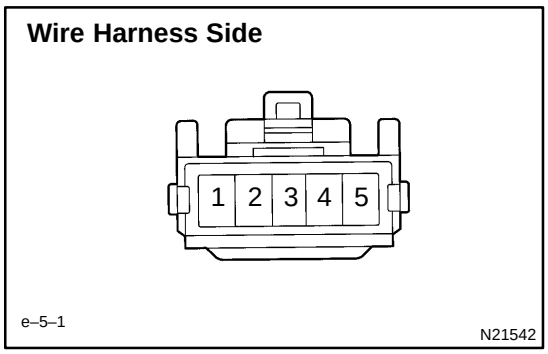
If the circuit is not as specified, inspect the circuits connected to other parts.



3. INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	2 – 3	Continuity
OFF	–	No continuity
UNLOCK	1 – 2	Continuity

If continuity is not as specified, replace the switch.

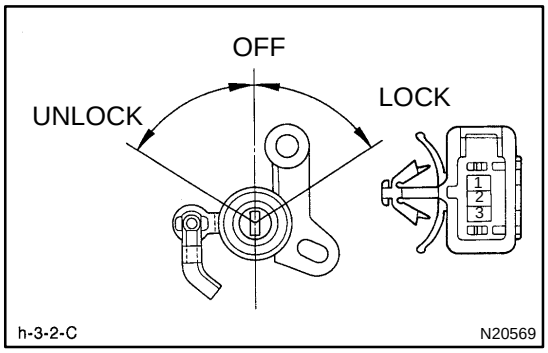


4. INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage
3 – Ground	Constant	Battery positive voltage
4 – Ground	Ignition switch position LOCK or ACC	No voltage
4 – Ground	Ignition switch position ON	Battery positive voltage

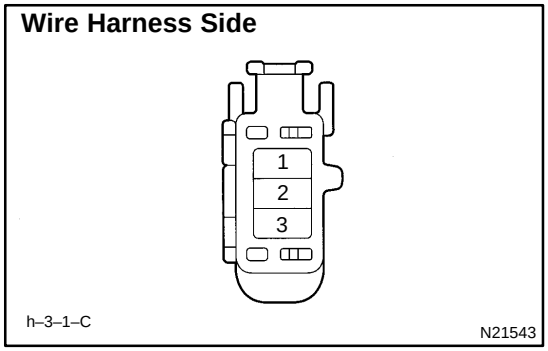
If the circuit is not as specified, inspect the circuits connected to other parts.



5. INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	1 – 2	Continuity
OFF	–	No continuity
UNLOCK	1 – 3	Continuity

If continuity is not as specified, replace the switch.

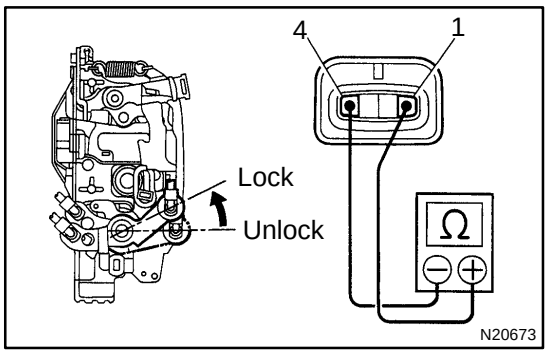


6. INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
2 – Ground	Constant	Battery positive voltage
3 – Ground	Constant	Battery positive voltage

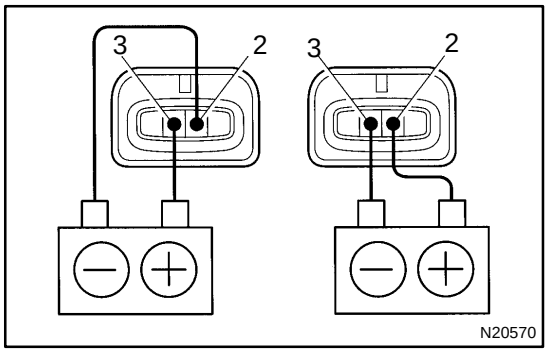
If the circuit is not as specified, inspect the circuits connected to other parts.



7. INSPECT DOOR UNLOCK DETECTION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Door Lock set to LOCK)	–	No continuity
ON (Door Lock set to UNLOCK)	1 – 4	Continuity

If continuity is not as specified, replace the switch.

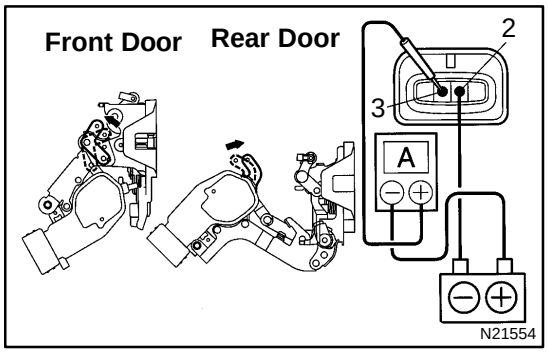


8. INSPECT MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 2, and check that the door lock link moves to UNLOCK position.

(b) Reverse the polarity and check that the door lock link moves to LOCK position.

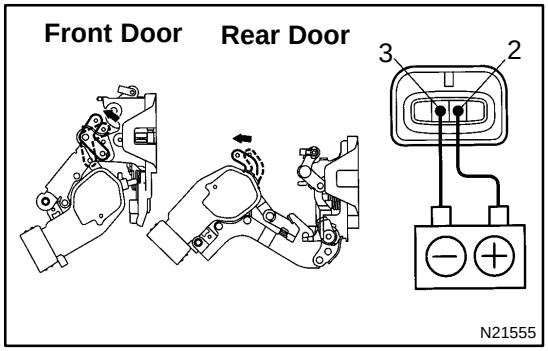
If operation is not as specified, replace the door lock assembly.



9. INSPECT PTC THERMISTOR OPERATION (Using an ammeter)

(a) Connect the positive (+) lead from the battery to terminal 3.

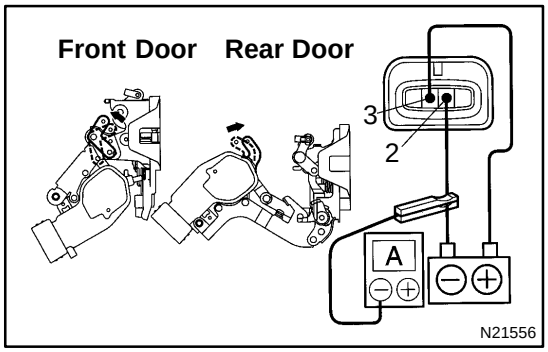
(b) Connect the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to battery negative (–) terminal, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



(c) Disconnect the leads from terminals.

(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 3, and check that the door lock moves to the LOCK position.

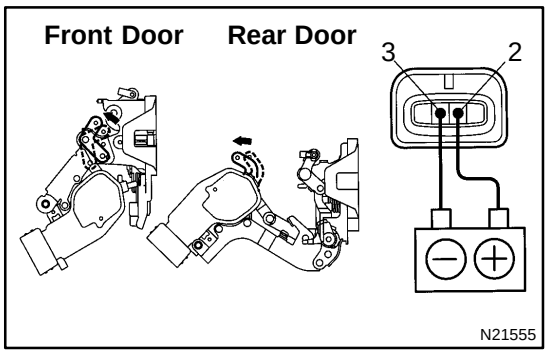
If operation is not as specified, replace the door lock assembly.



10. INSPECT PTC THERMISTOR OPERATION (Using an ammeter with a current–measuring probe)

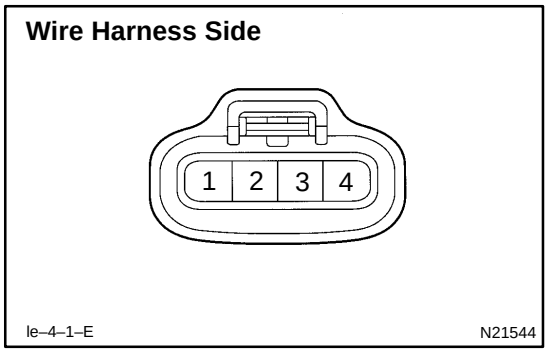
(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 2.

(b) Attach a current–measuring probe to either the positive (+) lead or the negative (–) lead, and check that the current changes from approximately 3.2 A to less than 0.5 A within 20 to 70 seconds.



(c) Disconnect the leads from terminals.
(d) Approximately 60 seconds later, reverse the polarity, and check that the door lock moves to the LOCK position.

If operation is not as specified, replace the door lock assembly.

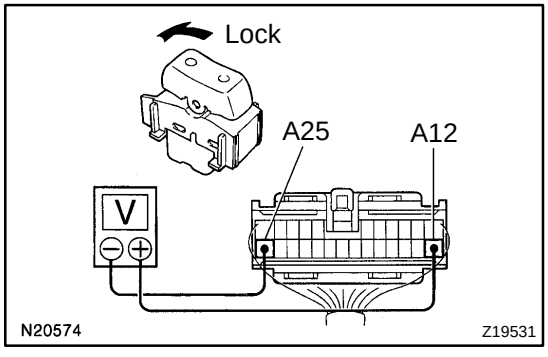


11. INSPECT DOOR LOCK ASSEMBLY CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
4 – Ground	Constant	Continuity
1 – Ground 3 – Ground	Door lock manual switch OFF or LOCK	No voltage
1 – Ground 3 – Ground	Door lock manual switch UNLOCK	Battery positive voltage
2 – Ground	Door lock manual switch OFF or UNLOCK	No voltage
2 – Ground	Door lock manual switch LOCK	Battery positive voltage

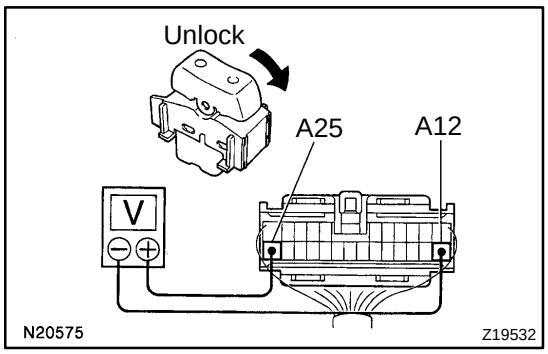
If the circuit is not as specified, inspect the circuits connected to other parts.



12. Door Lock Signal: INSPECT INTEGRATION RELAY OPERATION

HINT:
When the relay circuit is as specified, inspect the door lock signal.

(a) Connect the positive (+) lead from the voltmeter to terminal A12 and the negative (–) lead to terminal A25.
(b) Set the door lock control switch to UNLOCK and check that the voltage rises from 0 V to battery positive voltage for approximately 0.2 seconds.



(c) Reverse the polarity of the voltmeter leads.
(d) Set the door lock control switch to LOCK and check that the voltage rises from 0 V to battery positive voltage for approximately 0.2 seconds.

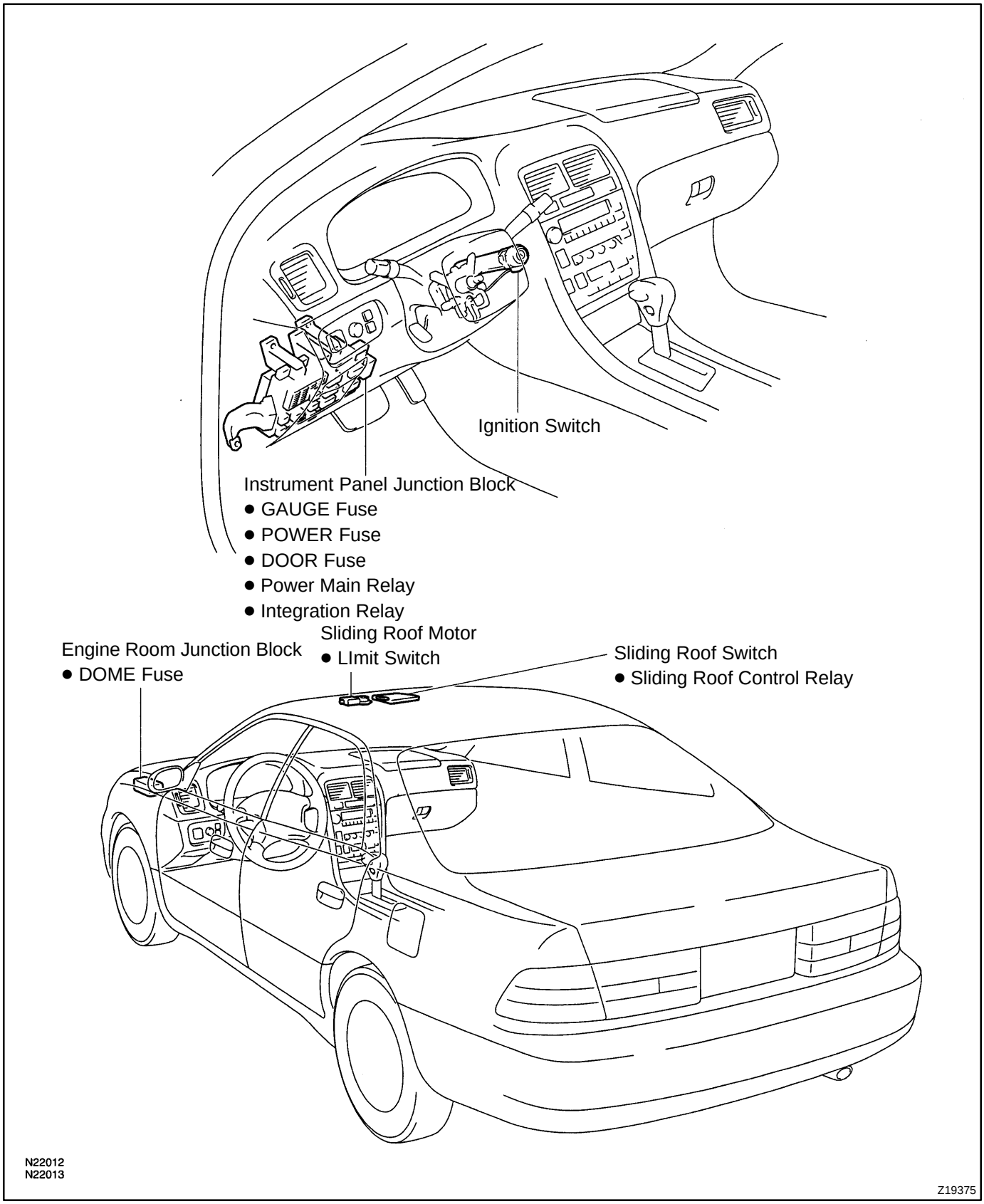
If operation is not as specified, replace the relay.

13. INSPECT INTEGRATION RELAY CIRCUIT
(See page BE–20)

SLIDING ROOF SYSTEM

LOCATION

BE05Q–01

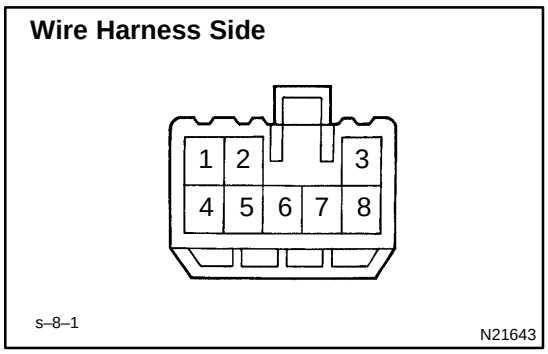


BE05R–01

INSPECTION

1. INSPECT SLIDING ROOF CONTROL RELAY AND SWITCH CIRCUIT

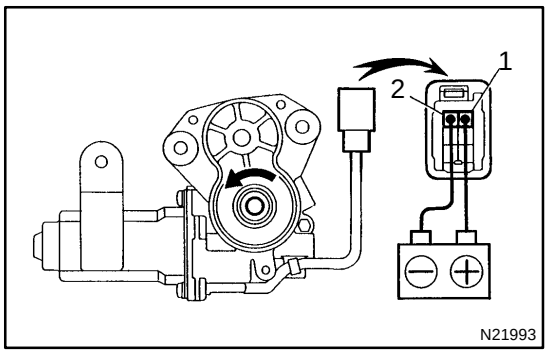
Disconnect the connector from the relay and switch and inspect the connector on the wire harness side, as shown in the chart.



Tester connection	Condition	Specified condition
1 – 5	Constant	Continuity
2 – Ground	Constant	Continuity
3 – Ground	No.1 limit switch OFF (Sliding roof closed)	No continuity
3 – Ground	No.1 limit switch ON (Sliding roof opened)	Continuity
7 – Ground	No.2 limit switch OFF (Sliding roof tilted up or open approx. 200 mm (7.87 in.))	No continuity
7 – Ground	No.2 limit switch ON (Except for conditions mentioned above)	Continuity
4 – Ground	Ignition switch LOCK or ACC	*No voltage
	Ignition switch ON	Battery positive voltage

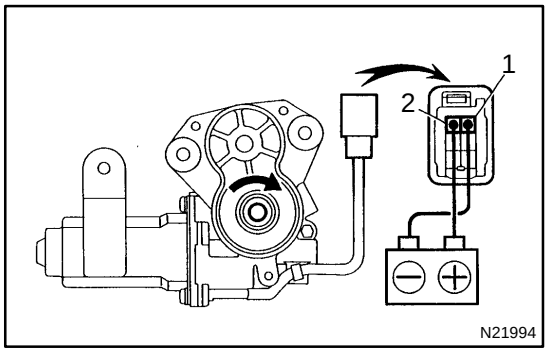
*Exceptions: For 60 seconds after the ignition switch is turned ON → OFF (ACC) or until driver or passenger door is opened after the ignition switch is turned ON → OFF (ACC).

If the circuit is as specified, replace the relay and switch.



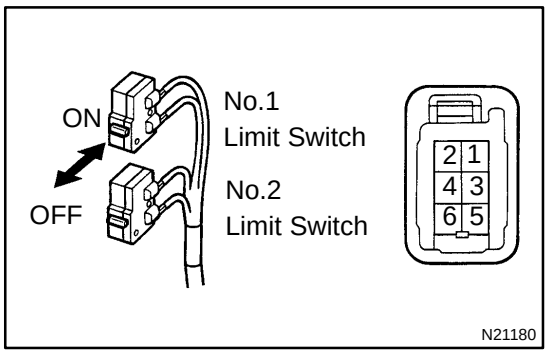
2. INSPECT SLIDING ROOF MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise (moves of the close and up side).



(b) Reverse the polarity, check that the motor turns clockwise. (moves of the open and down side).

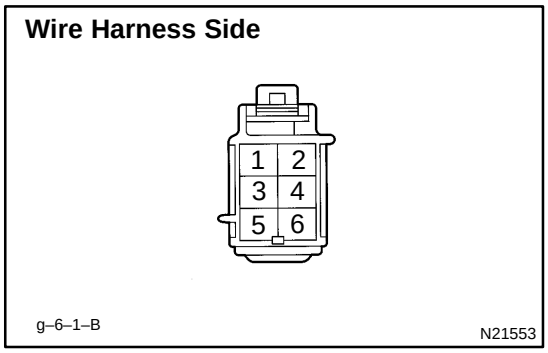
If operation is not as specified, replace the motor.



3. INSPECT SLIDING ROOF LIMIT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
No.1 limit switch OFF (SW pin released)	4 – 5	No continuity
No.1 limit switch ON (SW pin pushed in)	4 – 5	Continuity
No.2 limit switch OFF (SW pin released)	4 – 6	No continuity
No.2 limit switch ON (SW pin pushed in)	4 – 6	Continuity

If continuity is not as specified, replace the switch.

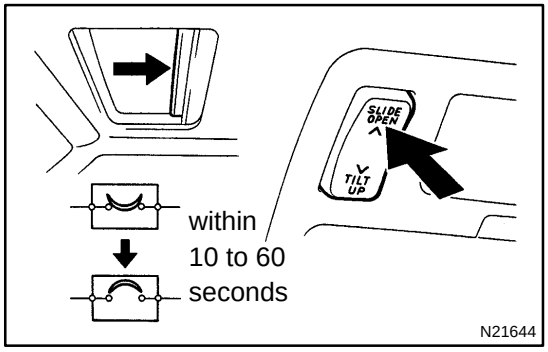


4. INSPECT SLIDING ROOF MOTOR AND LIMIT SWITCH CIRCUIT

Disconnect the connector from the limit switch and inspect the connector on the wire harness side.

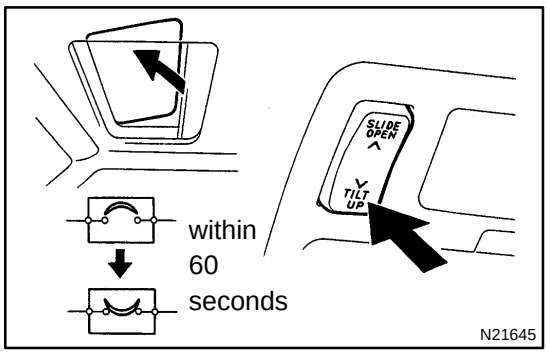
Tester connection	Condition	Specified condition
3 – Ground	Constant	Continuity
4 – Ground	Constant	Continuity

If the circuit is not as specified, inspect the circuits connected to other parts.



5. INSPECT CIRCUIT BREAKER OPERATION

(a) With the sliding roof in the fully opened position, hold the sliding roof switch in ”OPEN” position and check that there is a circuit breaker operation noise within 10 to 60 seconds.



(b) With the sliding roof in fully opened position, hold the sliding roof switch in "TILT UP" position and check that the sliding roof begins to close within 60 seconds.

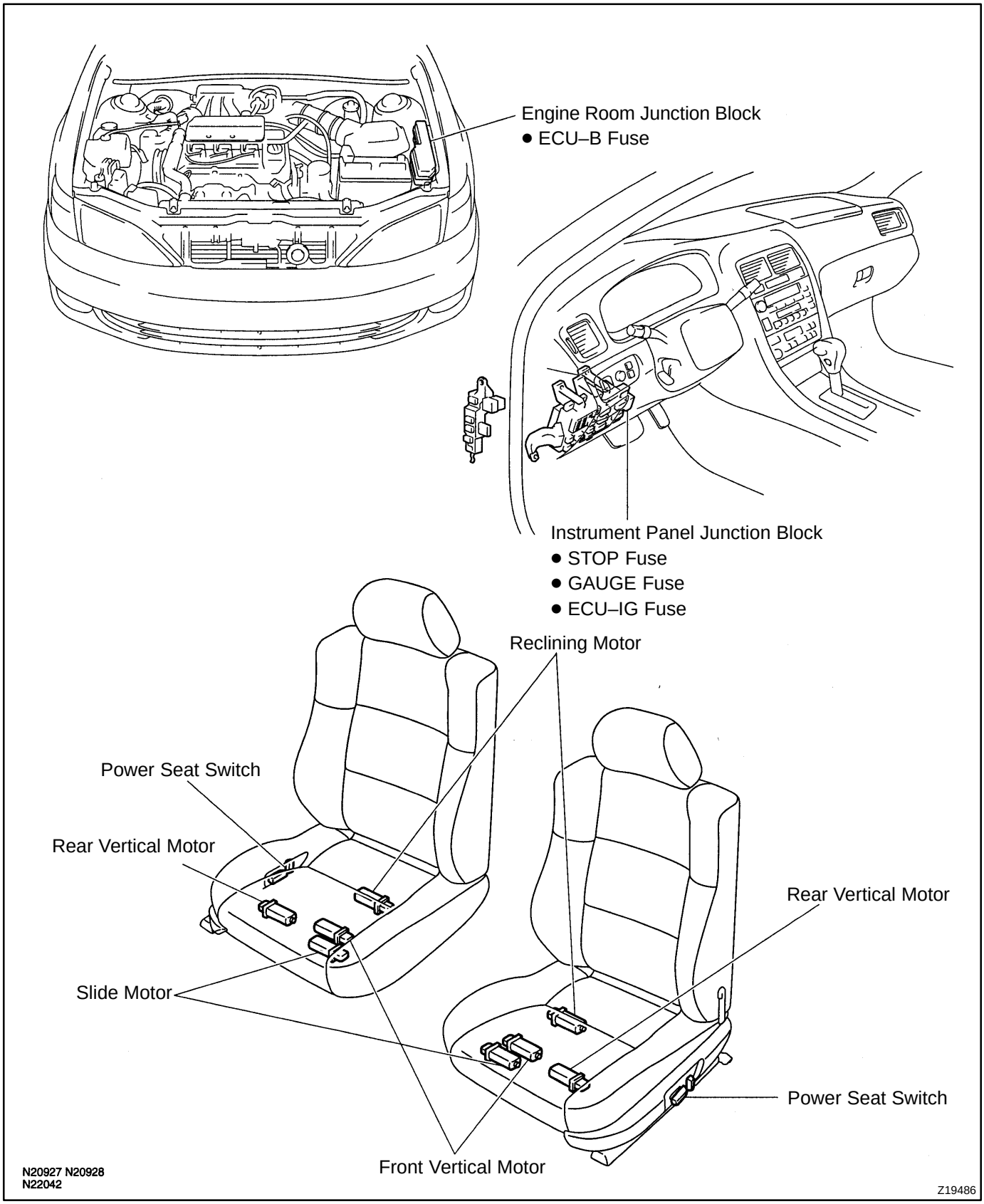
If operation is not as specified, replace the motor.

6. INSPECT KEY–OFF SLIDING ROOF OPERATION
(See integration relay circuit on page BE–20)

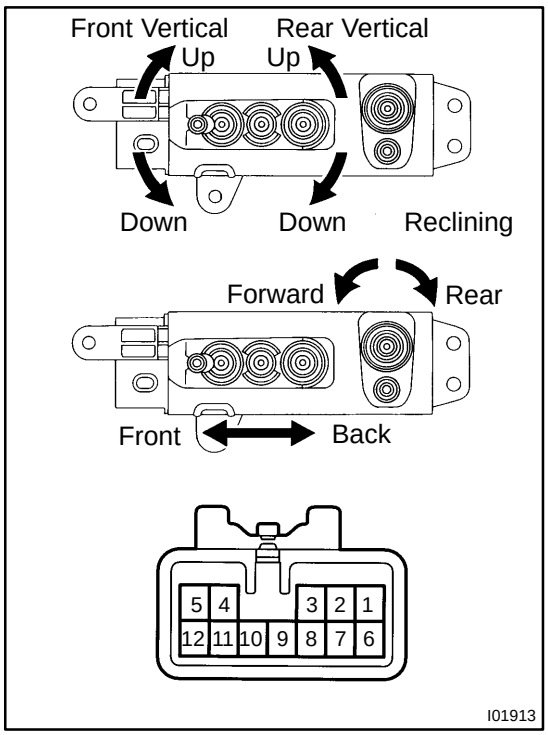
POWER SEAT CONTROL SYSTEM

BE05S–01

LOCATION



BE05T–03



INSPECTION

1. INSPECT DRIVER'S POWER SEAT SWITCH CONTINUITY

Slide Switch:

Switch position	Tester connection	Specified condition
FRONT	4 – 7 8 – 11	Continuity
OFF	4 – 7 – 8	Continuity
BACK	4 – 11 7 – 8	Continuity

Front vertical switch:

Switch position	Tester connection	Specified condition
UP	7 – 9 10 – 11	Continuity
OFF	7 – 9 – 10	Continuity
DOWN	7 – 10 9 – 11	Continuity

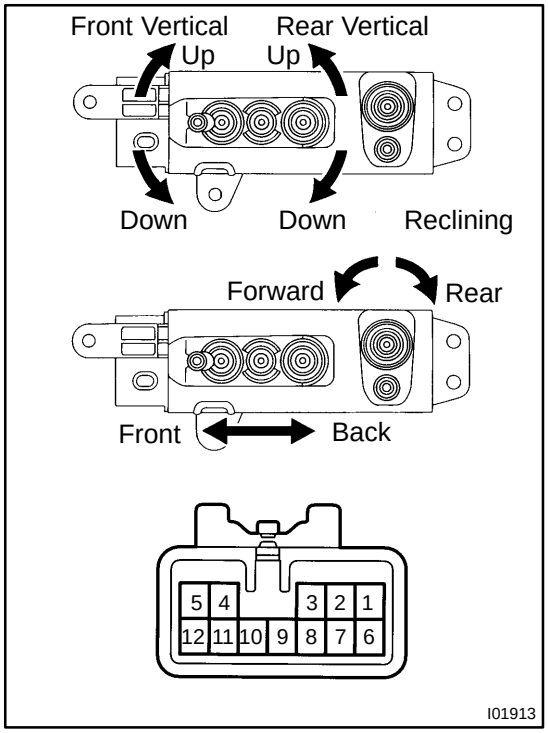
Rear vertical switch:

Switch position	Tester connection	Specified condition
UP	2 – 11 3 – 7	Continuity
OFF	2 – 3 – 7	Continuity
DOWN	2 – 7 3 – 11	Continuity

Reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 – 11 5 – 7	Continuity
OFF	1 – 5 – 7	Continuity
REAR	1 – 7 5 – 11	Continuity

If continuity is not as specified, replace the switch.



2. INSPECT PASSENGER'S POWER SEAT SWITCH CONTINUITY

Slide switch:

Switch position	Tester connection	Specified condition
FRONT	4 – 7 8 – 11	Continuity
OFF	4 – 7 – 8	Continuity
BACK	4 – 11 7 – 8	Continuity

Front vertical switch:

Switch position	Tester connection	Specified condition
UP	7 – 10 9 – 11	Continuity
OFF	7 – 9 – 11	Continuity
DOWN	7 – 11 9 – 10	Continuity

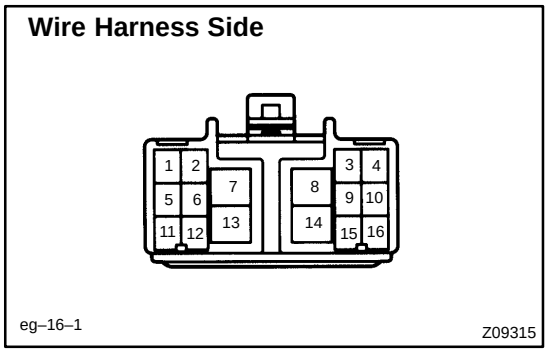
Rear vertical switch:

Switch position	Tester connection	Specified condition
UP	2 – 7 3 – 11	Continuity
OFF	2 – 3 – 7	Continuity
DOWN	2 – 11 3 – 7	Continuity

Reclining switch:

Switch position	Tester connection	Specified condition
FORWARD	1 – 11 5 – 7	Continuity
OFF	1 – 5 – 7	Continuity
REAR	1 – 7 5 – 11	Continuity

If continuity is not as specified, replace the switch.



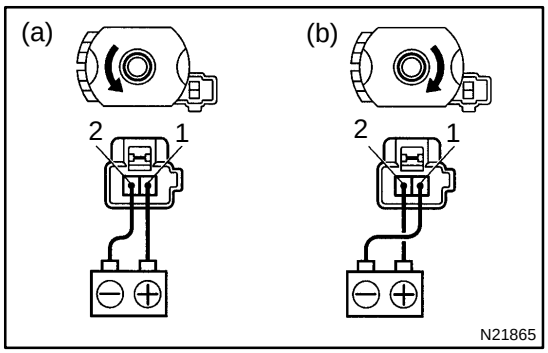
3. INSPECT POWER SEAT SWITCH CIRCUIT

(a) Disconnect the switch connector and connect the seat wire harness to the floor wire harness.

(b) Inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
7 – Ground	Constant	Continuity
11 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.

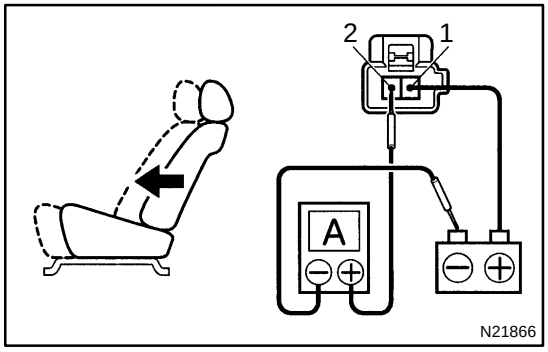


4. INSPECT SLIDE MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

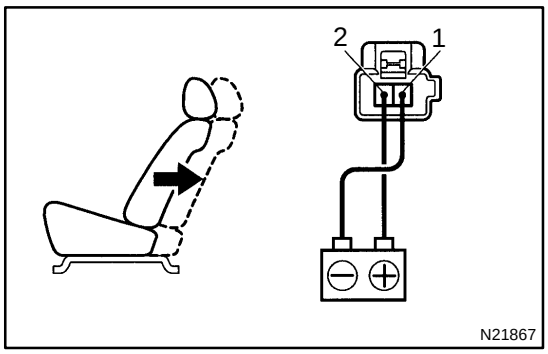
If operation is not as specified, replace the seat adjuster.



5. INSPECT SLIDE MOTOR PTC THERMISTOR OPERATION

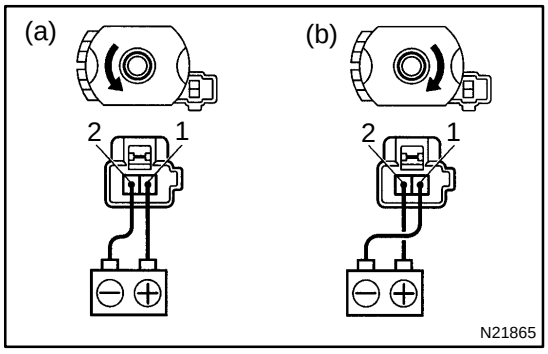
(a) Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to the battery negative (–) terminal, then move the seat cushion to the front position.

(b) Continue to apply voltage, check that current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the leads from terminals.
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the seat cushion begins to move backwards.

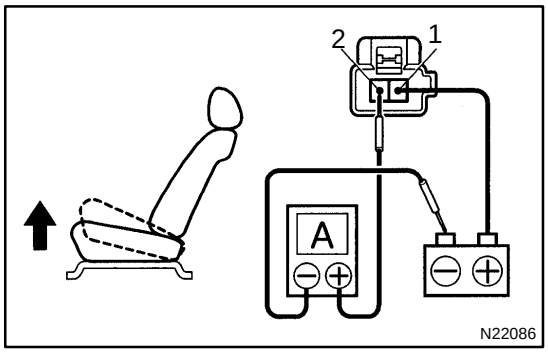
If operation is not as specified, replace the seat adjuster.



6. INSPECT FRONT VERTICAL MOTOR OPERATION

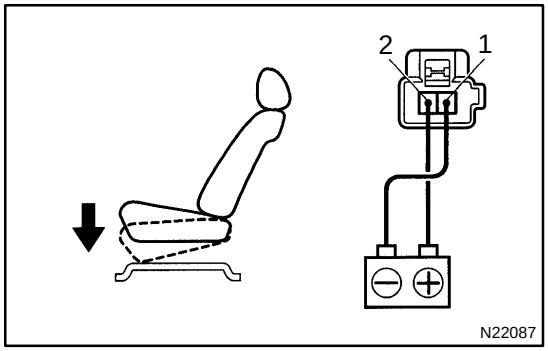
(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.
(b) Reverse the polarity, check that the motor turns clockwise.

If operation is not as specified, replace the seat adjuster.



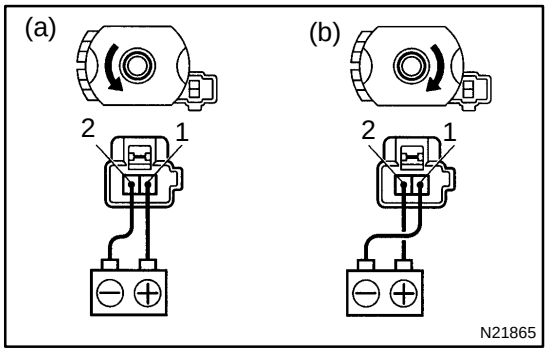
7. INSPECT FRONT VERTICAL MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to the battery negative (–) terminal, then move the seat cushion to the highest position.
(b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the leads from the terminals.
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the seat cushion begins to descend.

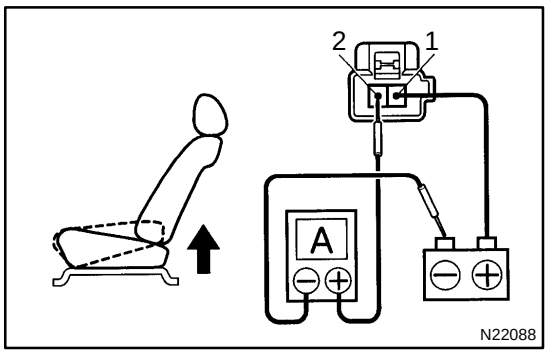
If operation is not as specified, replace the seat adjuster.



8. INSPECT REAR VERTICAL MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.
(b) Reverse the polarity, check that the motor turns clockwise.

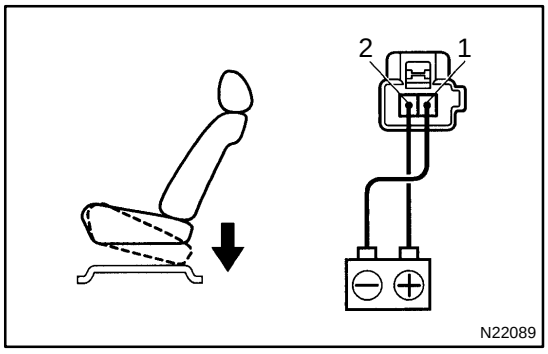
If operation is not as specified, replace the seat adjuster.



9. INSPECT REAR VERTICAL MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 2 and the negative (–) lead to the battery negative (–) terminal, then move the seat cushion to the highest position.

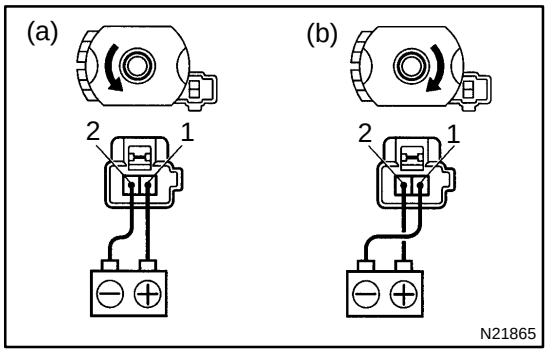
(b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the leads from the terminals.

(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, check that the seat cushion begins to descend.

If operation is not as specified, replace the seat adjuster.

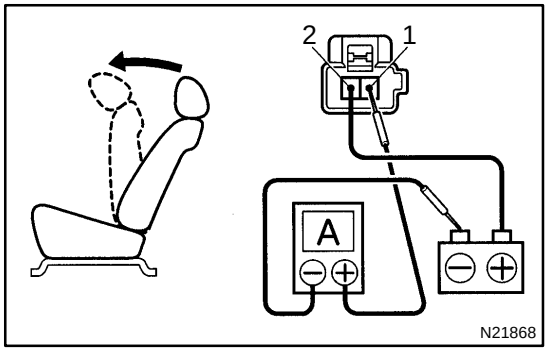


10. INSPECT RECLINING MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

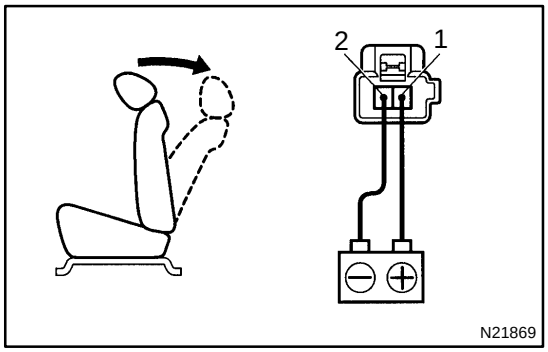
If operation is not as specified, replace the seat adjuster.



11. INSPECT RECLINING MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2, the positive (+) lead from the ammeter to terminal 1 and the negative (–) lead to the battery negative (–) terminal, then recline the seat back to the most forward position.

(b) Continue to apply voltage, check that the current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the leads from the terminals.

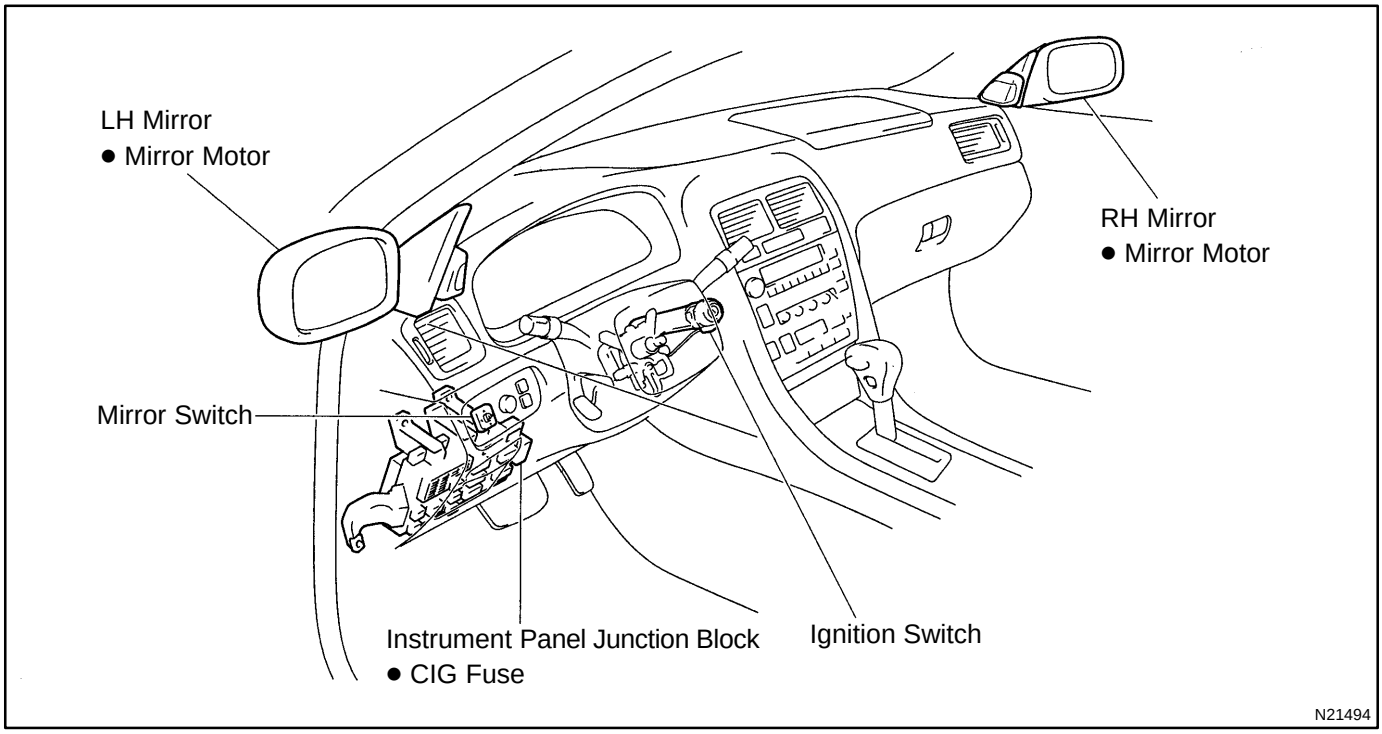
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the seat back starts to fall backward.

If operation is not as specified, replace the seat adjuster.

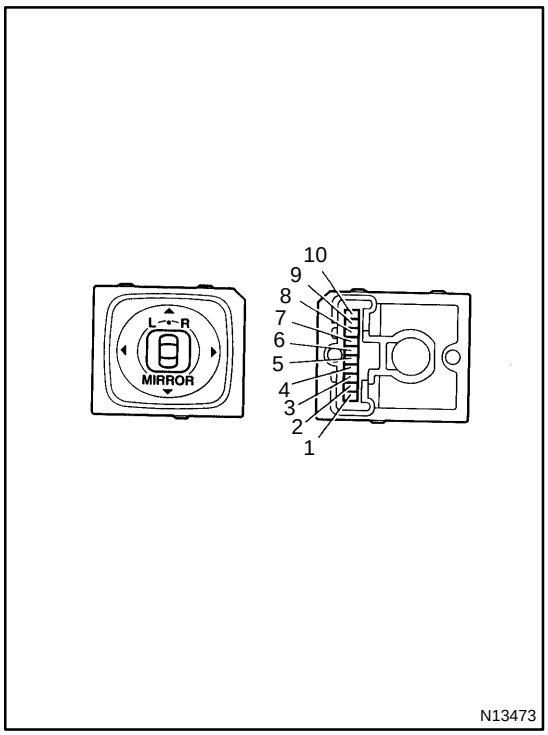
POWER MIRROR CONTROL SYSTEM

BE05U–01

LOCATION



BE05V–01



INSPECTION

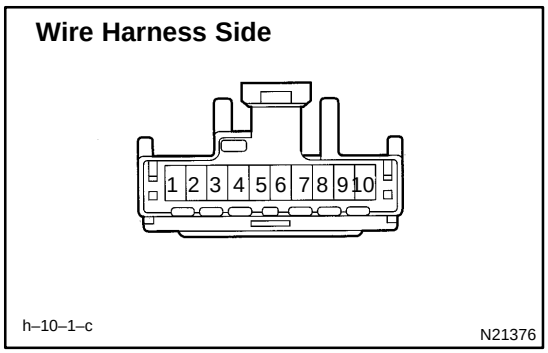
1. Master switch left side:
INSPECT MIRROR SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
UP	3 – 4 7 – 8	Continuity
DOWN	3 – 8 4 – 7	Continuity
LEFT	4 – 9 7 – 8	Continuity
RIGHT	4 – 7 8 – 9	Continuity

2. Master switch right side:
INSPECT MIRROR SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
UP	2 – 4 1 – 7 – 8	Continuity
DOWN	4 – 7 1 – 2 – 8	Continuity
LEFT	4 – 10 1 – 7 – 8	Continuity
RIGHT	4 – 7 1 – 8 – 10	Continuity

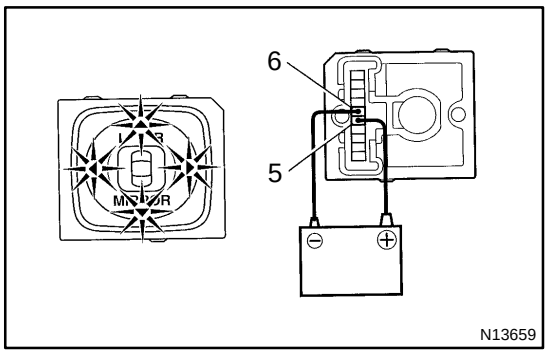
If continuity is not as specified, replace the switch.
If continuity is as specified. inspect the switch circuit.



3. INSPECT MIRROR SWITCH CIRCUIT
Disconnect the connector from the switch and inspect the connector on the wire harness side.

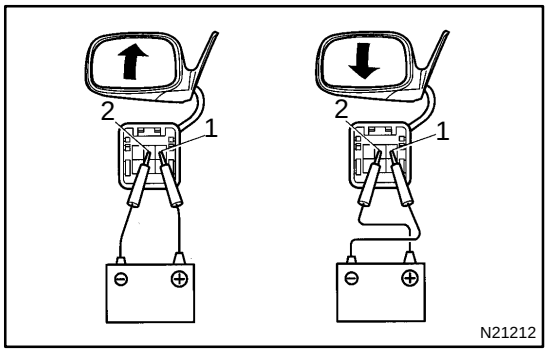
Tester connection	Condition	Specified condition
8 – Ground	Constant	Continuity
4 – Ground	Ignition switch position LOCK	No voltage
4 – Ground	Ignition switch position ACC or ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



4. INSPECT INDICATOR LIGHT OPERATION

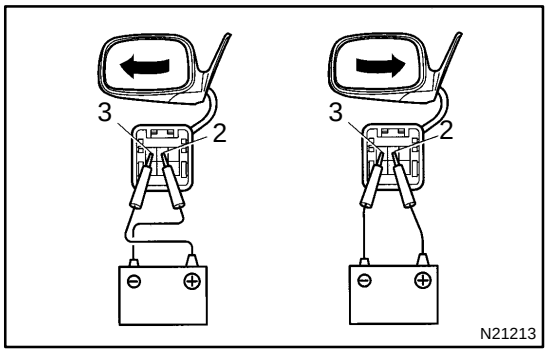
Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 6, and check that the indicator light does not light up, replace the switch.



5. INSPECT MIRROR MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the mirror turns upward.

(b) Reverse the polarity, and check that the mirror turns downward.



(c) Connect the positive (+) lead from the battery to terminal 3 and the negative (–) lead to terminal 2, and check that the mirror turns to the left side.

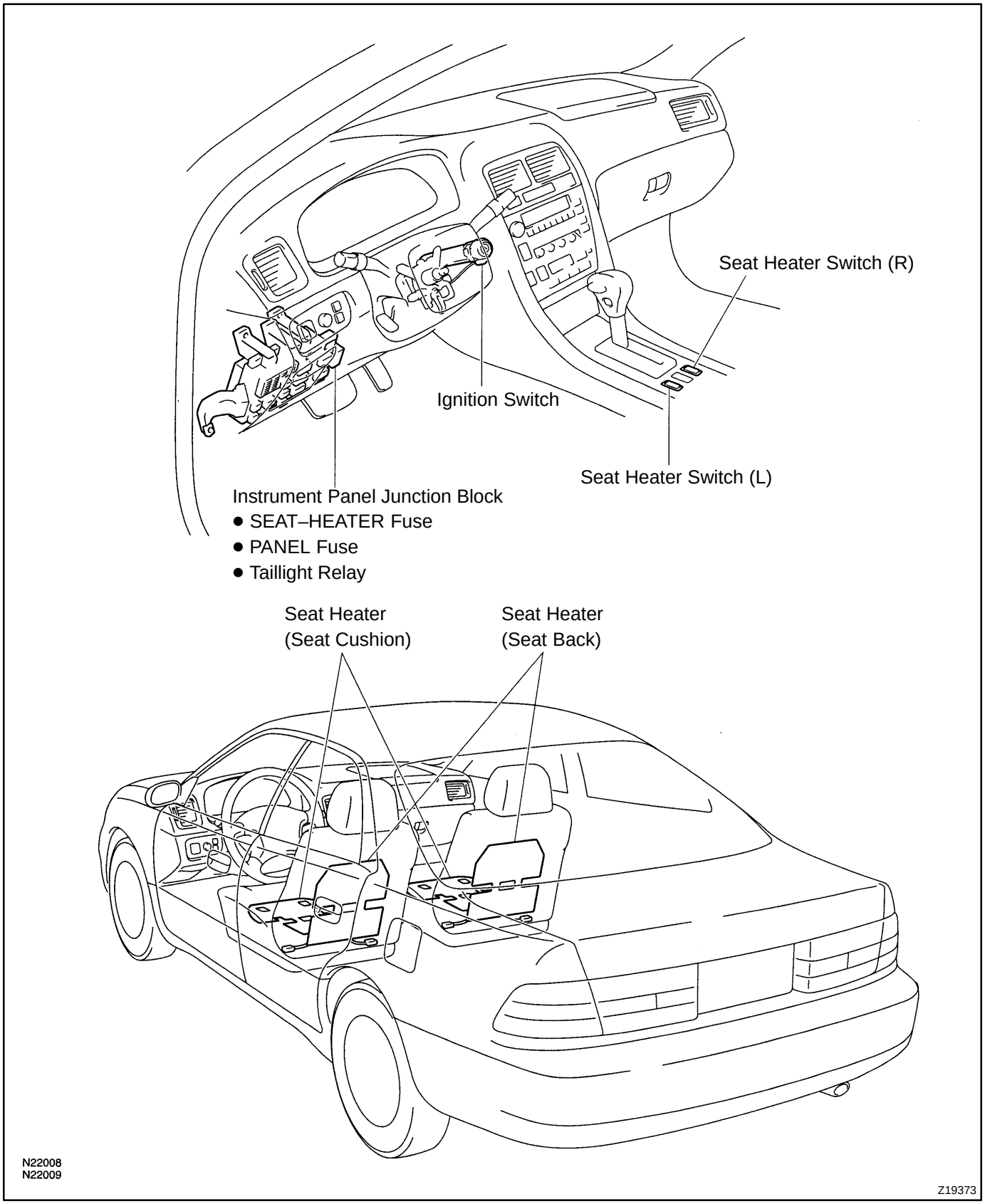
(d) Reverse the polarity, and check that the mirror turns to the right side.

If operation is not as specified, replace the mirror.

SEAT HEATER SYSTEM

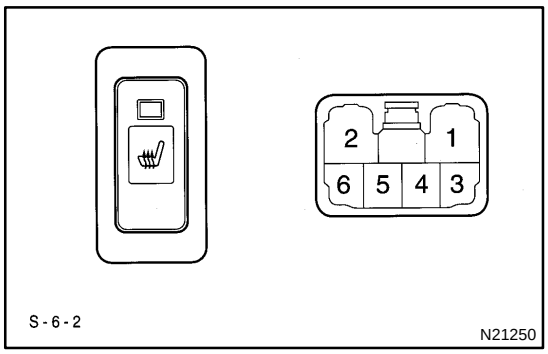
LOCATION

BE05W–01



BE05X–01

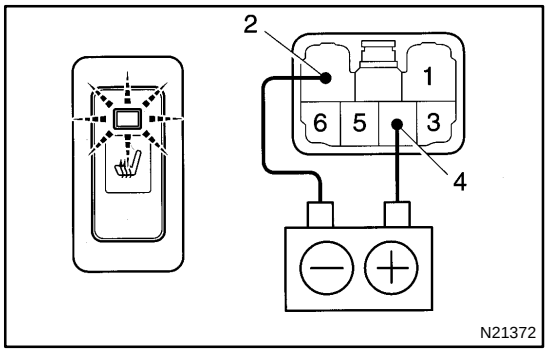
INSPECTION



1. INSPECT SEAT HEATER SWITCH CONTINUITY

Condition	Tester connection	Specified condition
OFF	2 – 6	Continuity
ON	2 – 4 – 6	Continuity
Illumination circuit	1 – 3	Continuity

If continuity is not as specified, replace the switch or bulb.

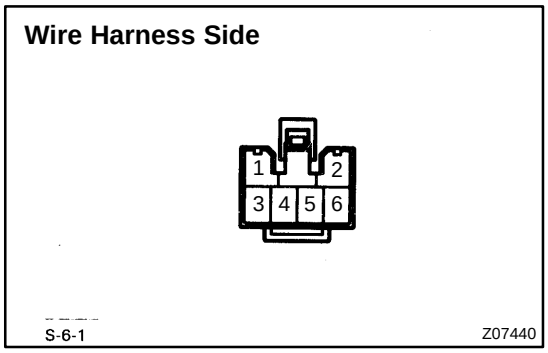


2. INSPECT SEAT HEATER SWITCH INDICATOR

(a) Connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to terminal 2.

(b) Push the switches, check that the indicator lights up.

If operation is not as specified, replace the switch and inspect the circuits connected to other parts.



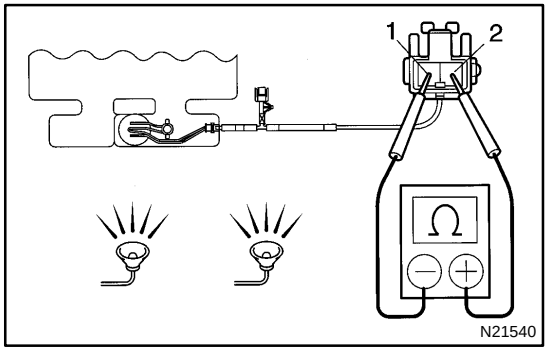
3. INSPECT SEAT HEATER SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Constant	*Continuity
6 – Ground	Constant	*Continuity
4 – Ground	Ignition switch position LOCK or ACC	No voltage
4 – Ground	Ignition switch position ON	Battery positive voltage

*: There is resistance because this circuit is grounded through the resistance.

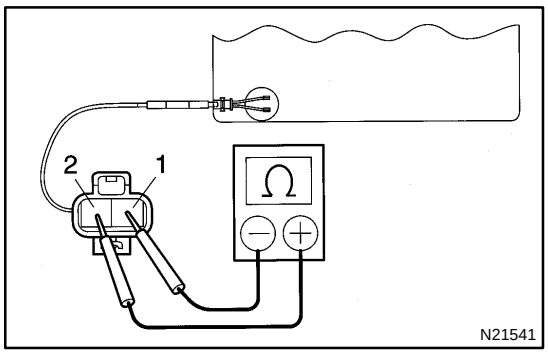
If the circuit is not as specified, inspect the circuits connected to other parts.



4. INSPECT SEAT CUSHION CONTINUITY

(a) Heat the 2 thermostats with light. Check that there is no continuity above 45˚C (113˚F) between terminals 1 and 2.

(b) Cool the 2 thermostats below 15˚C (59˚F). Check that there is continuity between terminals 1 and 2.



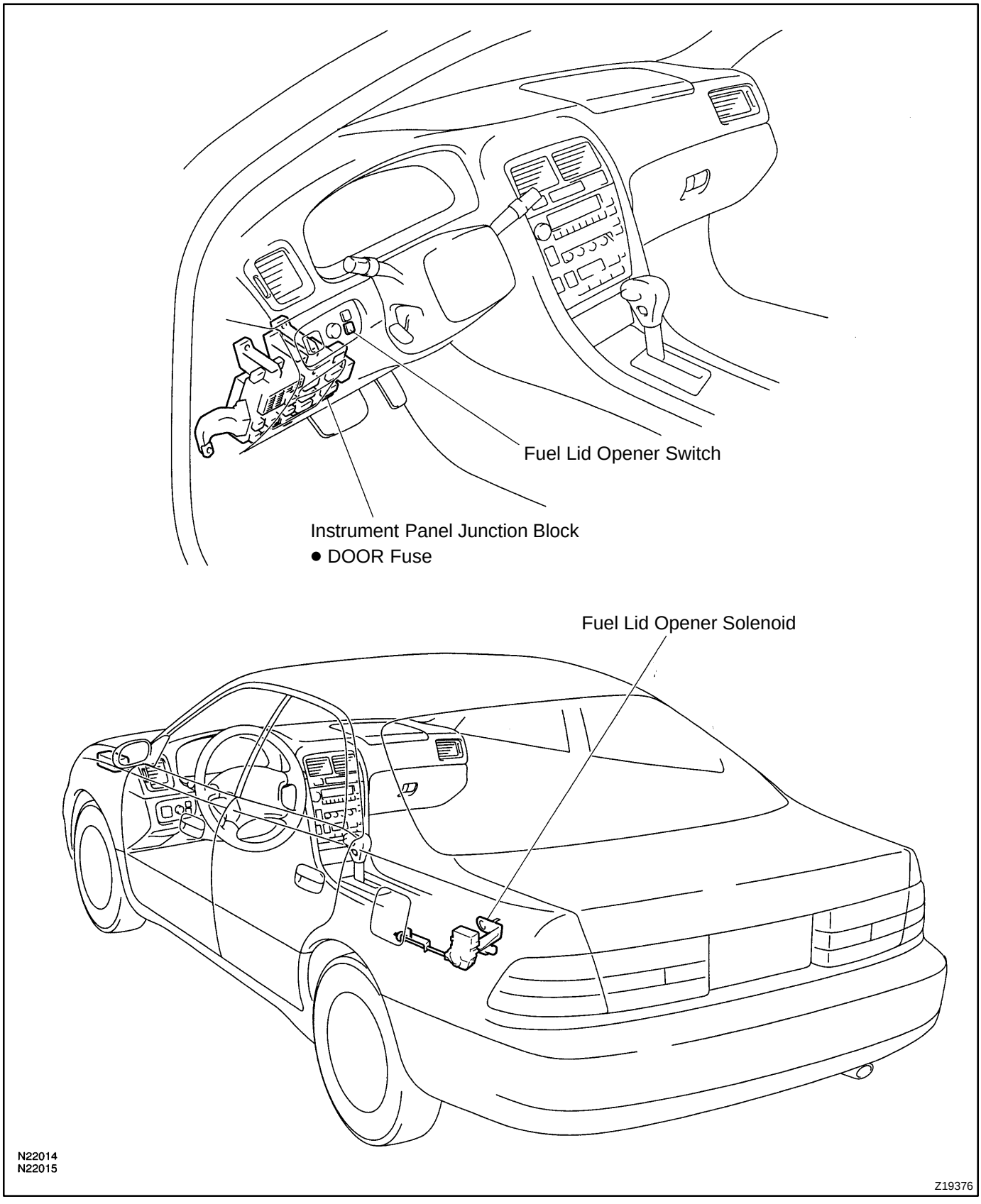
5. INSPECT SEAT BACK CONTINUITY

Check that there is continuity between terminals 1 and 2.
If continuity is not as specified, replace the seat back pad.

FUEL LID OPENER SYSTEM

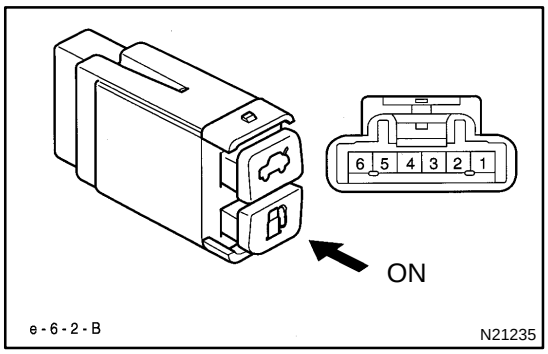
LOCATION

BE05Y–01



BE05Z–01

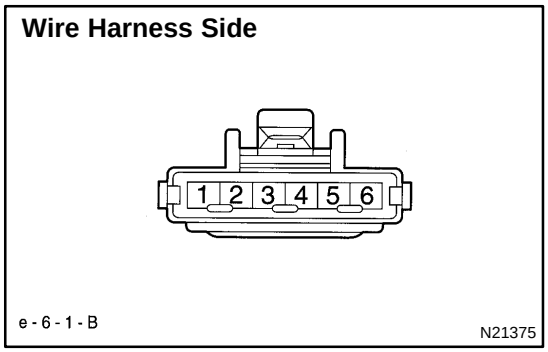
INSPECTION



1. INSPECT FUEL LID OPENER SWITCH CONTINUITY

(a) Check that continuity exists between terminals 2 and 3 with the switch ON.
(Switch button pushed)

(b) Check that no continuity exists between terminals 2 and 3 with the switch OFF.
(Switch button released)

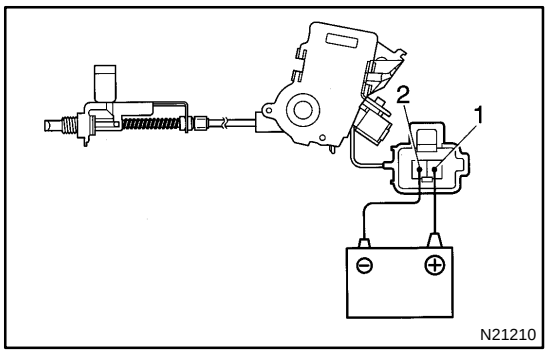


2. INSPECT FUEL LID OPENER SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
3 – Ground	Constant	Battery positive voltage

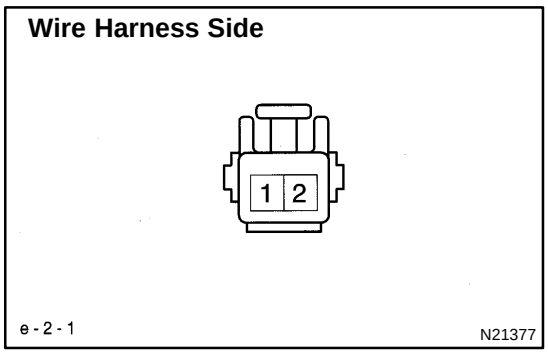
If the circuit is not specified, inspect power source or wire harness.



3. INSPECT FUEL LID OPENER SOLENOID OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, and check that the solenoid operates in the open direction.

If operation is not as specified, replace the solenoid.



4. INSPECT FUEL LID OPENER SOLENOID CIRCUIT

Disconnect the connector from the solenoid and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Fuel lid opener switch OFF	No voltage
1 – Ground	Fuel lid opener switch ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

AUDIO SYSTEM

BE060–01

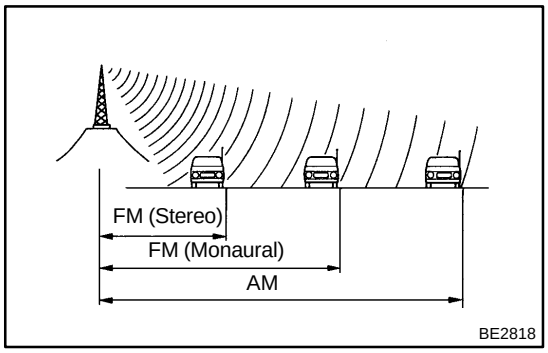
DESCRIPTION

1. RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows:

Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM		FM	
Modulation method	Amplitude modulation			Frequency modulation	

LF: Low frequency MF: Medium Frequency HF: High Frequency VHF: Very High Frequency

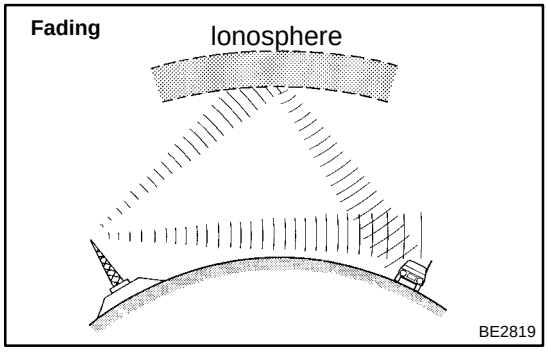


2. SERVICE AREA

There are great differences in the size of the service area for AM and FM monaural. Sometimes FM stereo broadcasts cannot be received even through AM can be received in very clearly.
Not only does FM stereo have the smallest service area, but it also picks up static and other types of interference (”noise”) easily.

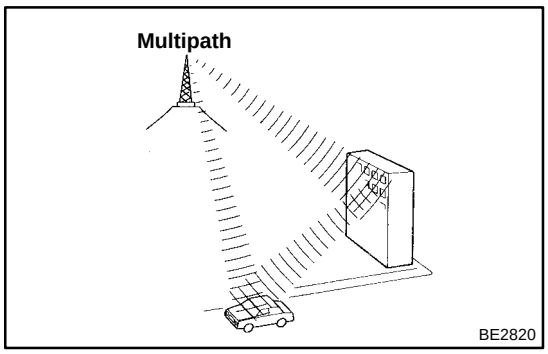
3. RECEPTION PROBLEMS

Besides the problem of static, there are also the problems called ”fading”, ”multipath” and ”fade out”. These problems are caused not by electrical noise but by the nature of the radio waves themselves.



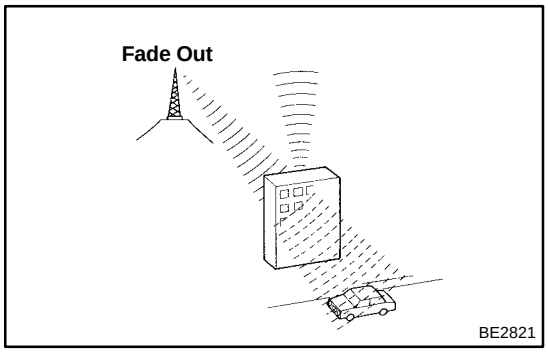
(a) Fading

Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals from the same transmitter that reach the vehicle’s antenna directly. This type of interference is called ”fading”.



(b) Multipath

One type of interference caused by the bounce of radio waves off of obstructions is called ”multipath”. Multipath occurs when a signal from the broadcast transmitter antenna bounces off buildings and mountains and interferes with the signal that is received directly.



(c) Fade Out

Because FM radio waves are of higher frequencies than AM radio waves, they bounce off buildings, mountains, and other obstructions. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind a building or other obstruction. This is called ”fade out”.

4. NOISE PROBLEMS

(a) Questionnaire for noise:

It is very important for noise troubleshooting to have good understanding of the claims from the customers, so that make the best use of following questionnaire and diagnose the problem accurately.

AM	Noise occurs at a specific place.	Strong possibility of foreign noise.
	Noise occurs when listening to faint broadcasting.	There is a case that the same program is broadcasted from each local station and that may be the case you are listening different station if the program is the same.
	Noise occurs only at night.	Strong possibility of the beat from a distant broadcasting.
FM	Noise occurs while driving and at a specific place.	Strong possibility of multipath noise and fading noise caused by the changes of FM waves.

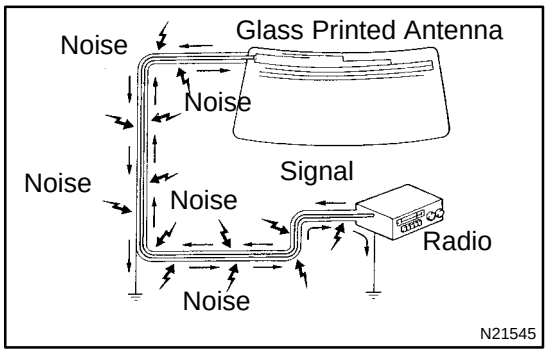
HINT:

In the case that the noise occurrence condition does not meet any of the above questionnaire, check based on the ”Trouble Phenomenon”.

Refer to above descriptions for multipath and fading.

(b) Matters that require attention when checking:

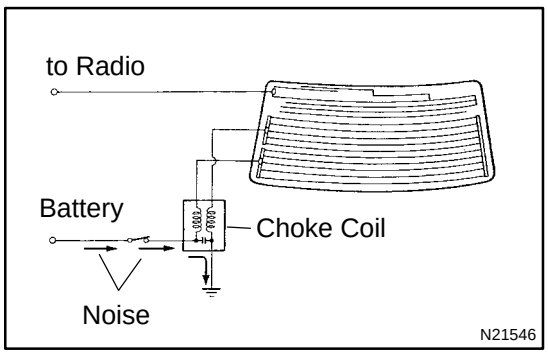
- Noise coming into the radio usually has no harm for practical use as the noise protection is taken and it is hardly thinkable for an extremely loud noise to come in. When extremely loud noise comes into the radio, check if the grounding is normal where the antenna is installed.
- Check if all the regular noise prevention parts are properly installed and if there is any installation of non–authorized parts and non–authorized wiring.
- If you leave the radio under out of tune (not tuning), it is easy to diagnose the phenomenon as noise occurs frequently.



(c) Antenna and noise:

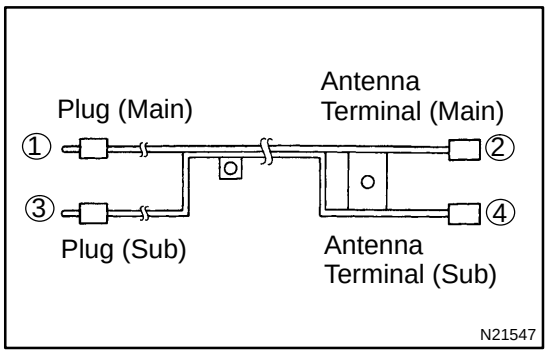
Electronic signal received by the antenna will reach to the radio transmitting through the core wire of the coaxial cable. Any noise wave other than radio wave is mixed into this core wire, that naturally causes noise in the radio and poor sound quality. In order to prevent these noises from mixing into the radio, the core wire inside the coaxial cable is covered with a mesh wire called shield wire. This shield wire shelters the noise and transmits it to the ground, thus preventing noise from mixing in.

If this shield wire has grounding failure, that causes noise.



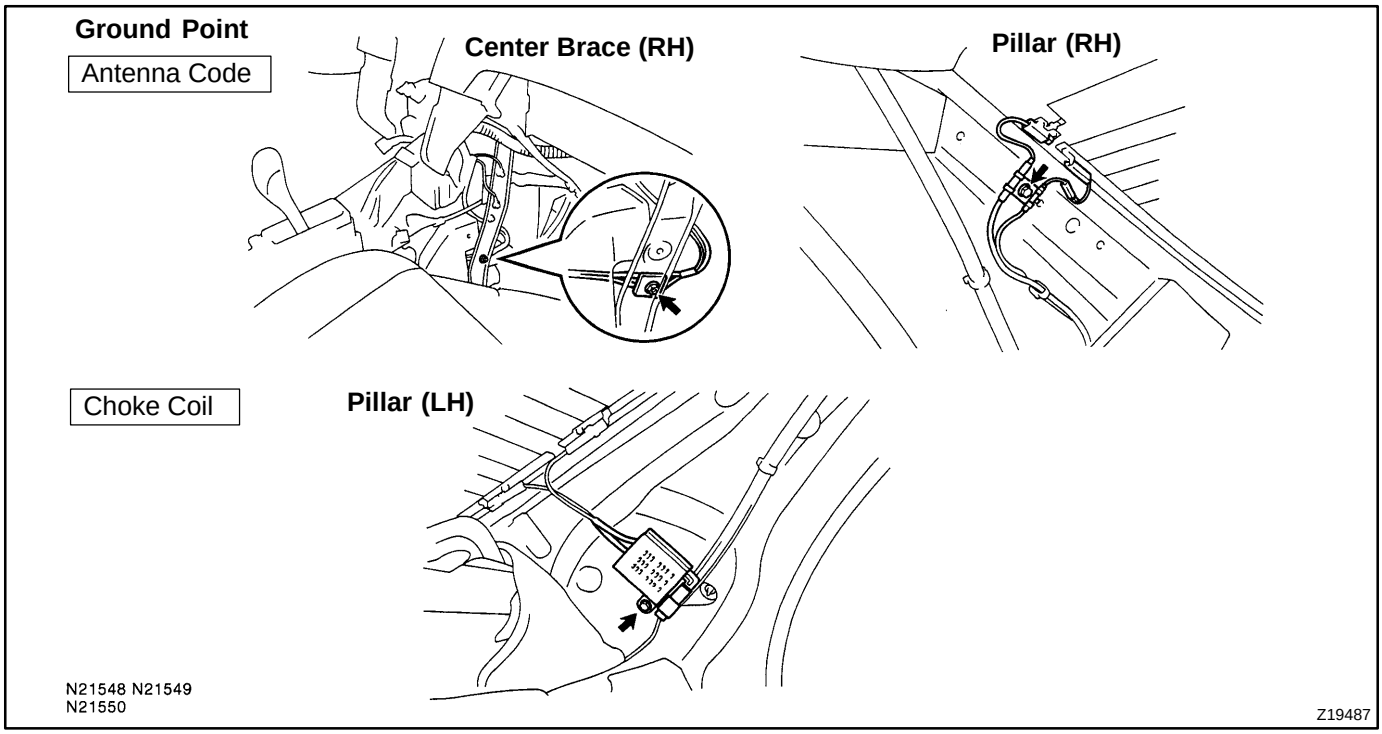
(d) Choke coil and noise:

The choke coil is connected in the rear window defogger circuit. This is connected so to prevent noise from mixing into the radio by making the noise current included in the power source of the rear window defogger flow to the ground.



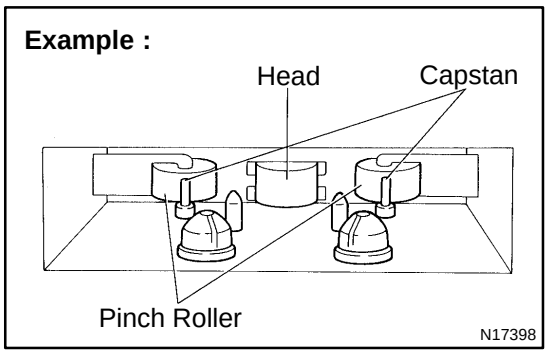
(e) Antenna code continuity check and grounding point:
HINT:
During troubleshooting, in case that the antenna code continuity check, grounding check and grounding check of the choke coil are needed, please check refering to the following illustration.

Terminal connection	Normal condition
(1) ↔ (2)	Continuity
(3) ↔ (4)	No continuity



5. COMPACT DISC PLAYER

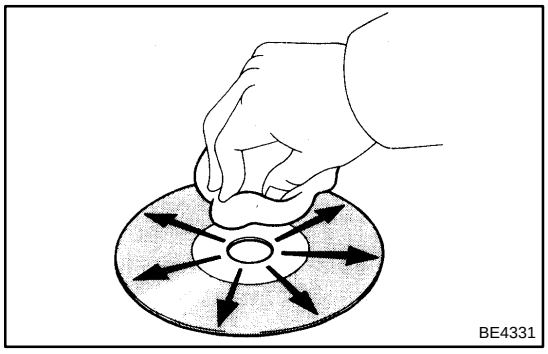
Compact Disc (hereafter called ”CD”) Players use a laser beam pick–up to read the digital signals recorded on the CD and reproduce analog signals of the music, etc. There are 4.7 in. (12 cm) and 3.2 in. (8 cm) discs in the CD player.
HINT:
Never attempt to disassemble or oil any part of the player unit. Do not insert any object other than a disc into the magazine.
NOTICE:
CD players use an invisible laser beam which could cause hazardous radiation exposure. Be sure to operate the player correctly as instructed.



6. Tape Player/Head Cleaning:
MAINTENANCE

(a) Raise the cassette door with your finger.
Next, using a pencil or similar object, push in the guide.

(b) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.



7. CD Player/Disc Cleaning:
MAINTENANCE

If the disc gets dirty, clean the disc by wiping the surface from the center to outside in the radial directions with a soft cloth.

NOTICE:

Do not use a conventional record cleaner or anti–static preservative.

BE061–01

TROUBLESHOOTING

NOTICE:

When replacing the internal mechanism (computer part) of the audio system, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement part (spare part).

HINT:

This inspection procedure is a simple troubleshooting which should be carried out on the vehicle during system operation and was prepared on the assumption of system component troubles (except for the wires and connectors, etc.).

Always inspect the trouble taking the following items into consideration.

Open or short circuit of the wire harness

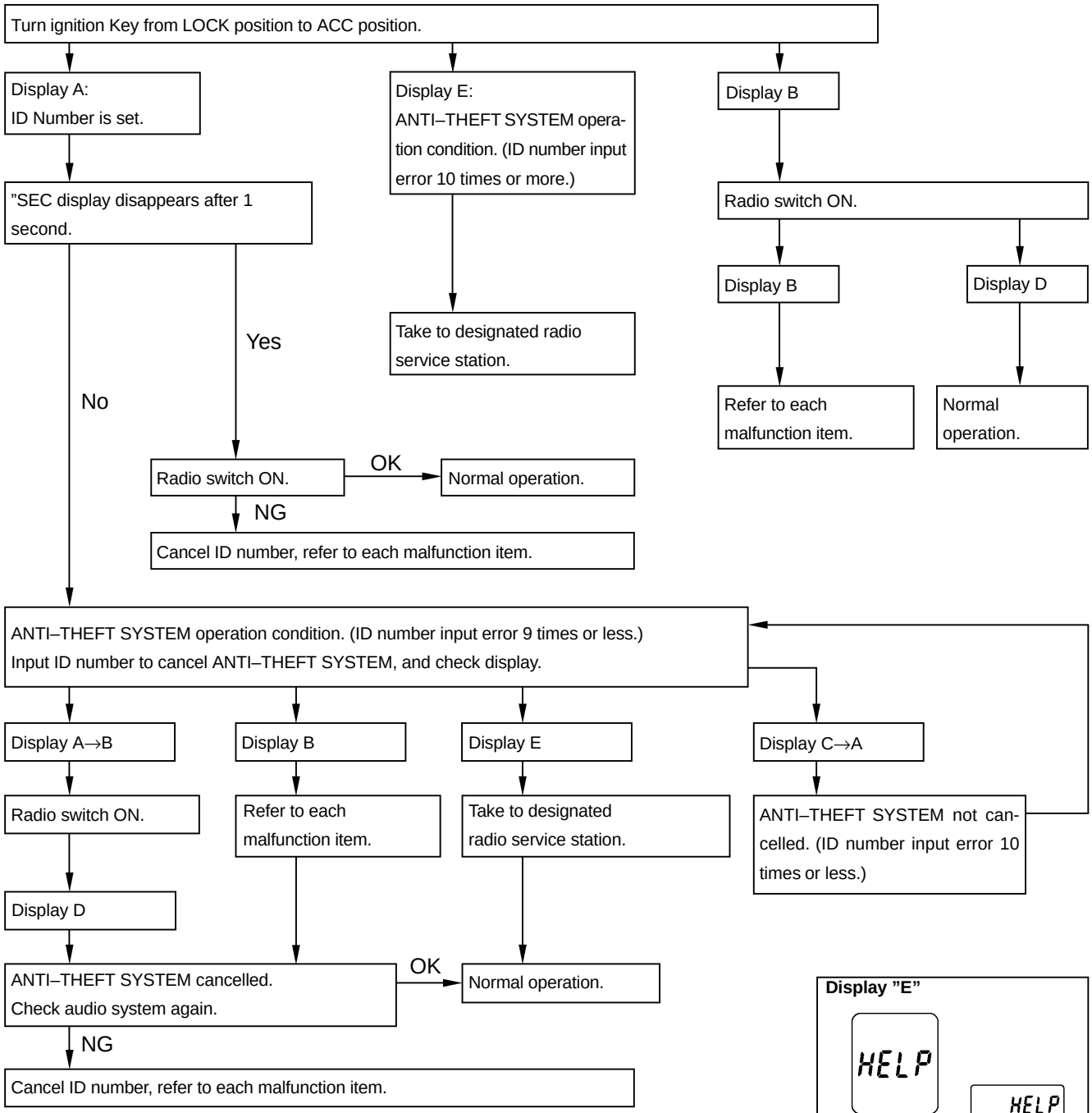
Connector or terminal connection fault

For audio systems with anti–theft system, troubleshooting items marked (*) indicate that ”Troubleshooting for ANTI–THEFT SYSTEM” should be carried out first.

	Problem	No.
Radio	Radio not operating when power switch turned to ’ON’.	1
	Display indicates when power switch turned to ’ON’, but no sound (including ’noise’) is produced.	2
	Noise present, but AM – FM not operating.	3
	Any speaker does not work.	4
	Either AM or FM does not work.	5
	Few preset turning bands.	5
	Reception poor.	6
	Sound quality poor.	7
	Preset memory disappears.	8
Tape Player	Cassette tape cannot be inserted.	9
	Cassette tape inserts, but no power.	10
	Power coming in, but tape player not operating.	11
	Any speaker does not work.	12
	Sound quality poor.	13
	Tape jammed, malfunction with tape speed or auto–reverse.	14
	Cassette tape will not eject.	15
CD Player	CD cannot be inserted.	16
	CD inserted, but no power.	17
	Power coming in, but CD player not operating.	18
	Sound jumps.	19
	Sound quality poor (Volume faint).	20
	Any speaker does not work.	21
	CD will not be ejected.	22
Noise	Noise occurs	23
	Noise produced by vibration or shock while driving.	24
	Noise produced when engine starts.	25

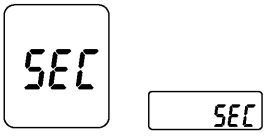
The term ”AM” includes LW,MW and SW, and the term ”FW” includes UKW.

Troubleshooting for ANTI–THEFT SYSTEM



Liquid Crystal Display (LCD) or VFD for Audio System

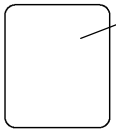
Display "A"



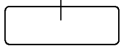
2 DIN Type

1 DIN Type

Display "B"

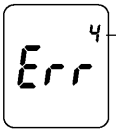


2 DIN Type

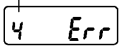


1 DIN Type

Display "C"



2 DIN Type



1 DIN Type

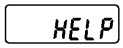
Display "D" Example:

2 DIN Type

1 DIN Type

Display "E"

2 DIN Type



1 DIN Type

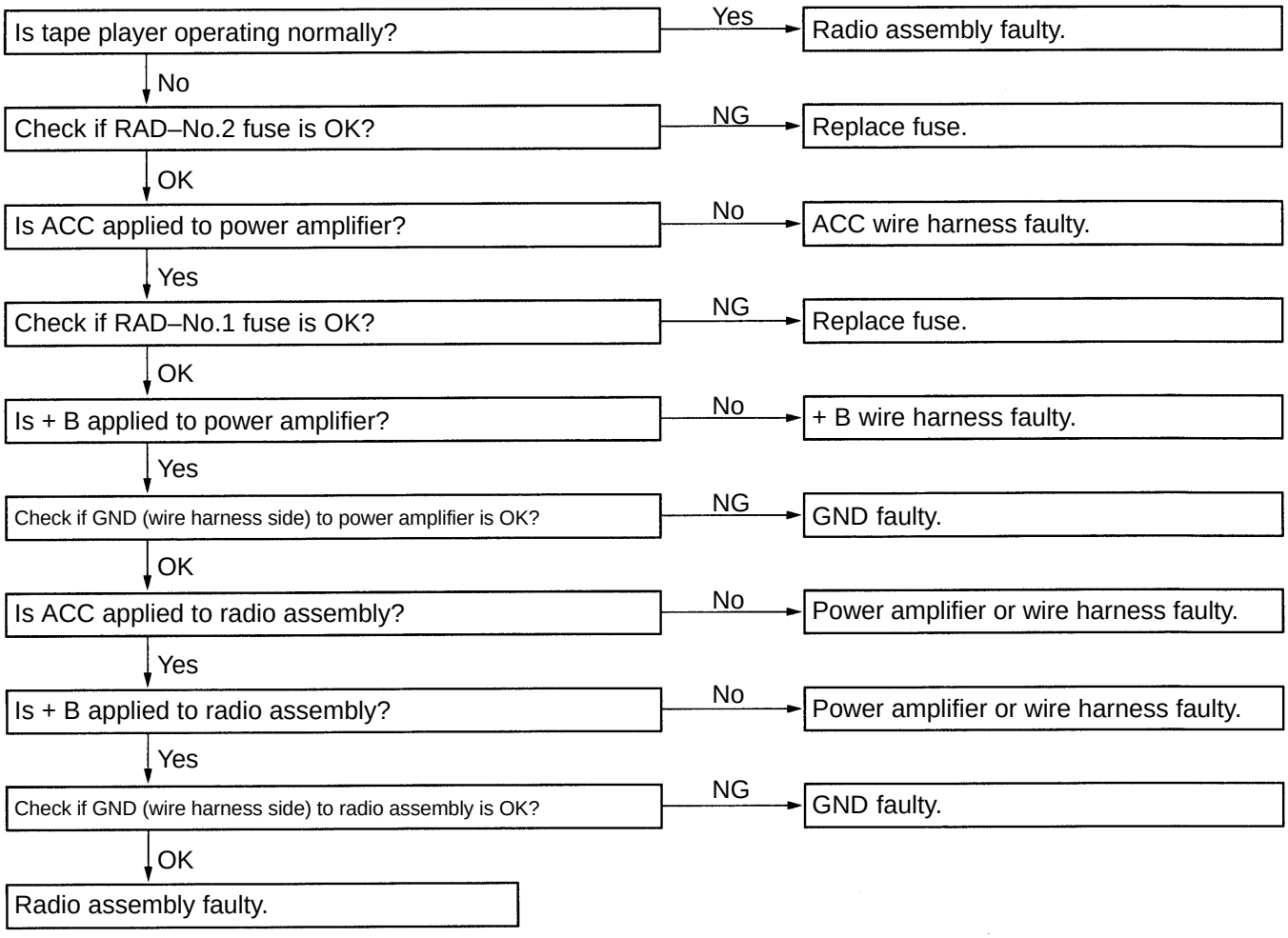
HINT:

- Refer to Owner's Manual for operation details of ANTI–THEFT SYSTEM.
- When the ID number has been cancelled, reset the same number after completing the operation, or inform the customer that it has been cancelled.

V08418

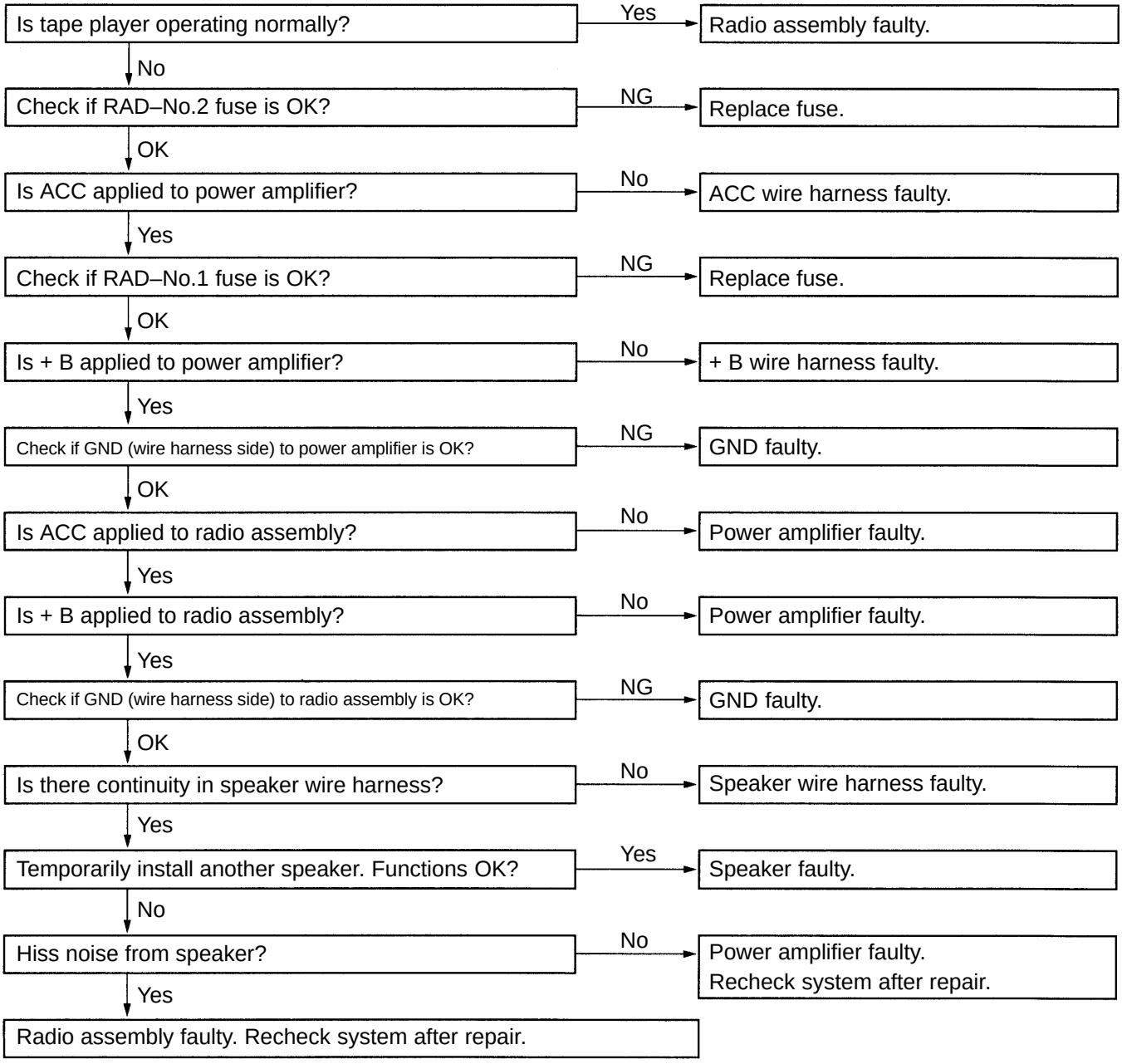
*

1	Radio	RADIO NOT OPERATING WHEN POWER SWITCH TURNED TO "ON"



V08480

2	Radio	DISPLAY INDICATES WHEN POWER SWITCH TURNED TO "ON", BUT NO SOUND (INCLUDING "NOISE") IS PRODUCED



V08481

3	Radio	NOISE PRESENT, BUT AM–FM NOT OPERATING

Go to No.25

If radio side faulty. → Radio faulty.

4	Radio	ANY SPEAKER DOSE NOT WORK

Is tape player operating normally? Yes → Radio assembly faulty.

No

Is hiss noise produced by non–functioning speaker? Yes → Radio assembly faulty. Recheck system after repair.

No

Is there continuity in speaker wire harness? No → Speaker wire harness faulty.

Yes

Temporarily install another speaker? Functions OK? Yes → Speaker faulty.

No

Power amplifier faulty. Recheck system after repair.

5	Radio	EITHER AM OR FM DOES NOR WORK FEW PRESET TUNING BANDS

Problem with radio wave signals or location? Yes → Poor signals, poor location.

No

Are both AM and FM defective? Yes → Radio assembly faulty.

No

Is power for the antenna being output from the radio assembly? No → Radio assembly faulty.

Yes

Go to No.16

Is tape player operating normally? Yes → Radio assembly faulty.

No

Temporarily install another speaker. Functions OK? Yes → Speaker faulty.

No

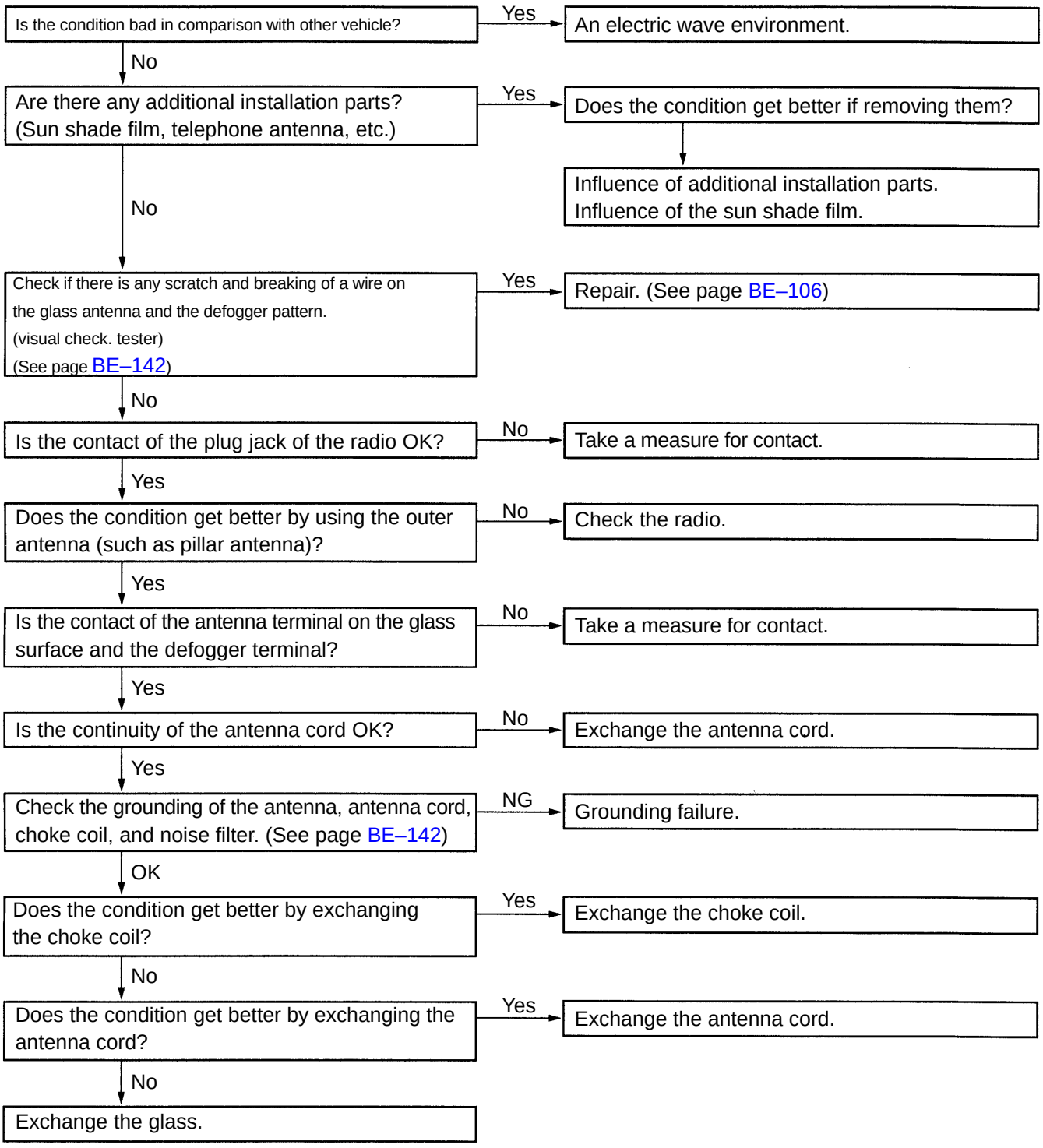
Hiss noise from speaker? No → Power amplifier faulty. Recheck system after repair.

Yes

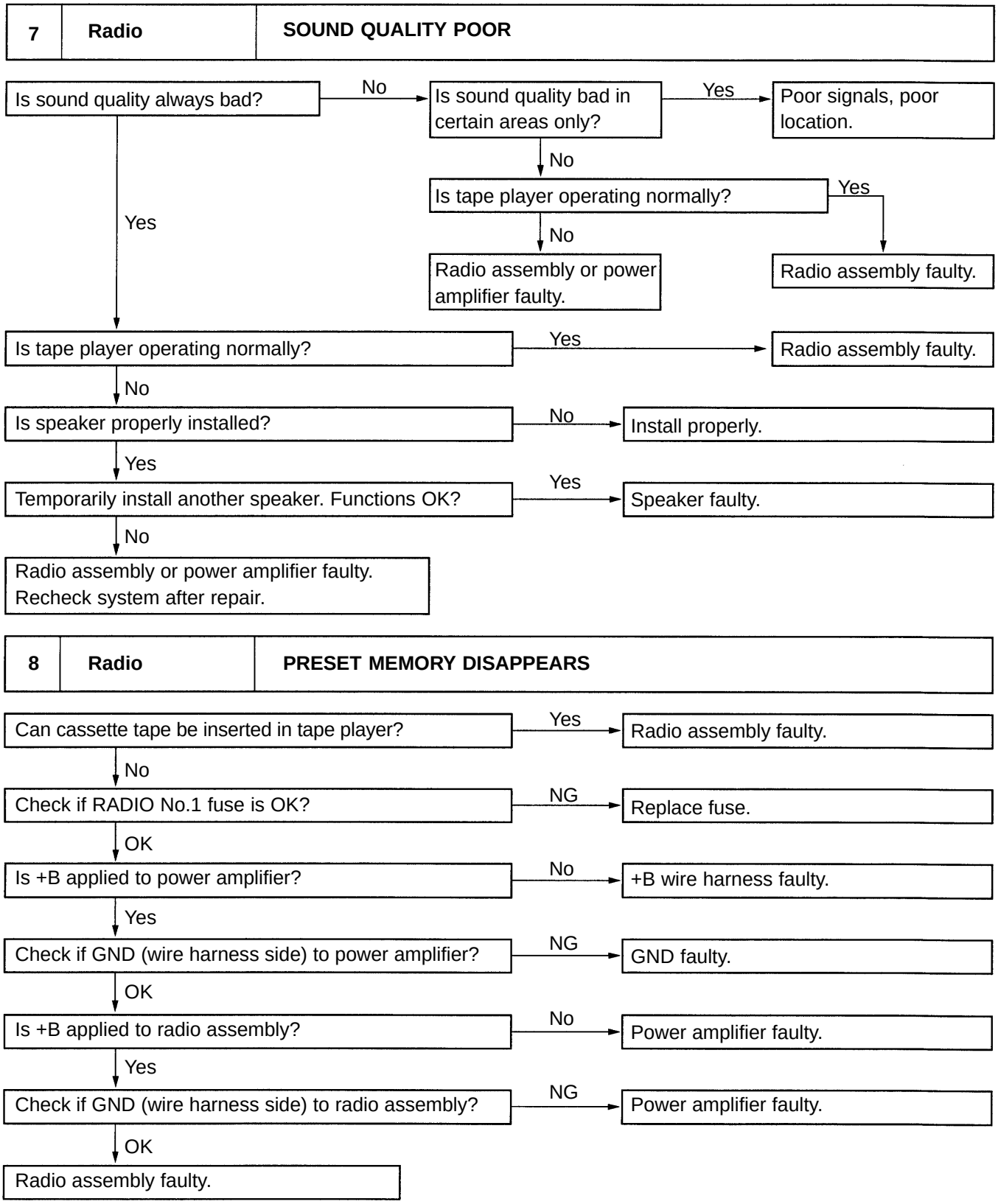
Radio assembly faulty. Recheck system after repair.

V08482

6	Radio	POOR RECEPTION

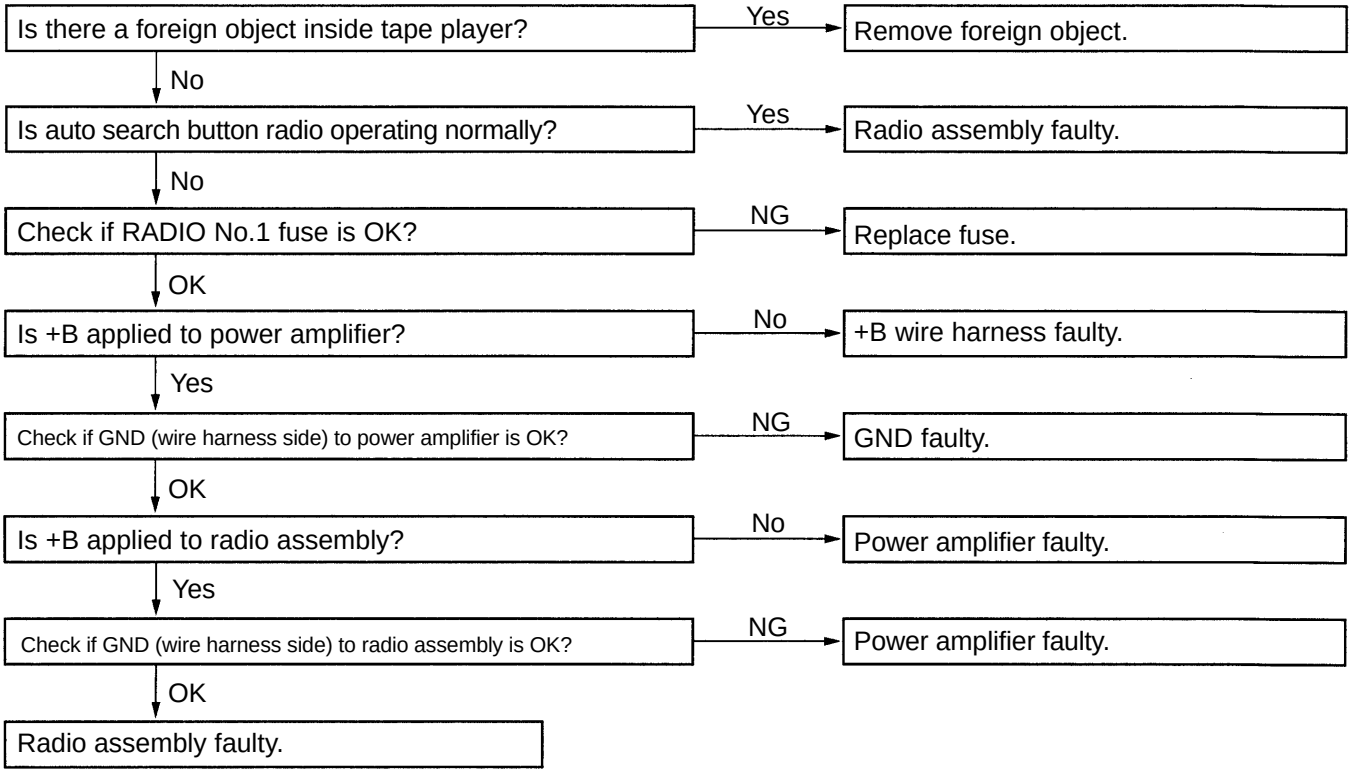


V08549

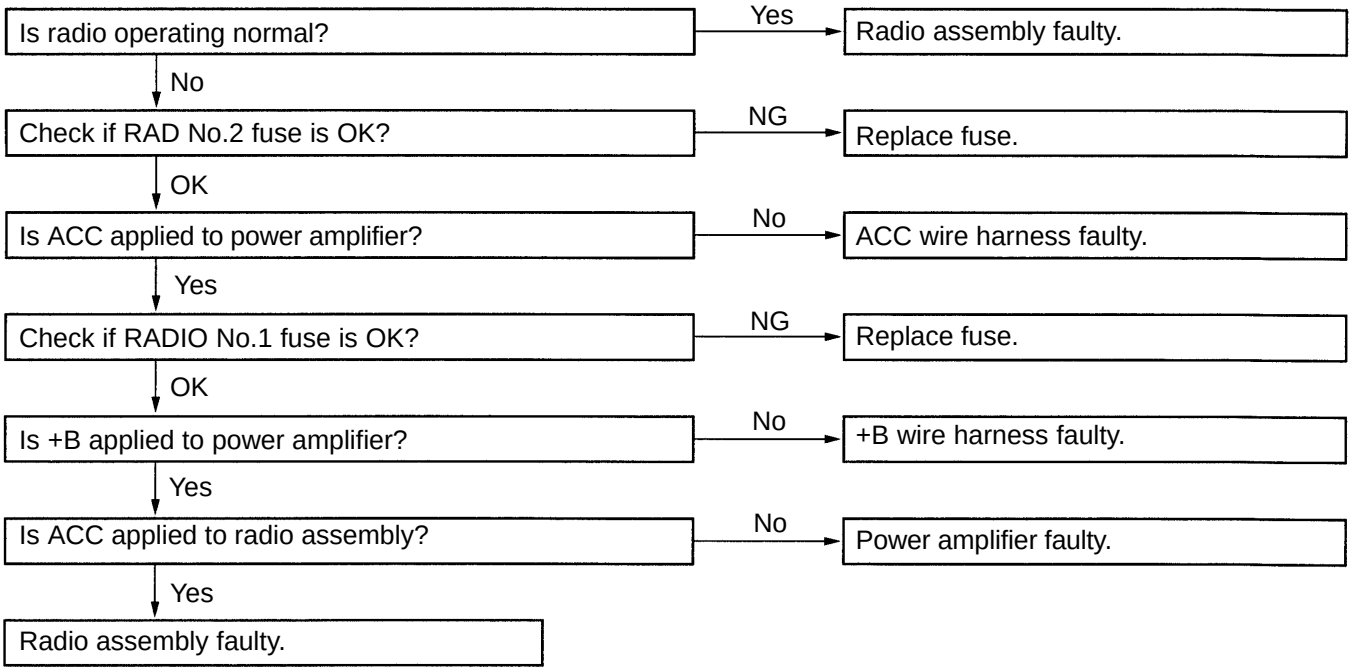

7
Radio
SOUND QUALITY POOR
Is sound quality always bad?
No
Is sound quality bad in certain areas only?
Yes
Poor signals, poor location.
No
Is tape player operating normally?
Yes
Radio assembly faulty.
No
Radio assembly or power amplifier faulty.
Yes
Is tape player operating normally?
Yes
Radio assembly faulty.
No
Is speaker properly installed?
No
Install properly.
Yes
Temporarily install another speaker. Functions OK?
Yes
Speaker faulty.
No
Radio assembly or power amplifier faulty.
Recheck system after repair.
8
Radio
PRESET MEMORY DISAPPEARS
Can cassette tape be inserted in tape player?
Yes
Radio assembly faulty.
No
Check if RADIO No.1 fuse is OK?
NG
Replace fuse.
OK
Is +B applied to power amplifier?
No
+B wire harness faulty.
Yes
Check if GND (wire harness side) to power amplifier?
NG
GND faulty.
OK
Is +B applied to radio assembly?
No
Power amplifier faulty.
Yes
Check if GND (wire harness side) to radio assembly?
NG
Power amplifier faulty.
OK
Radio assembly faulty.

V08483

9	Tape Player	CASSETTE TAPE CANNOT BE INSERTED

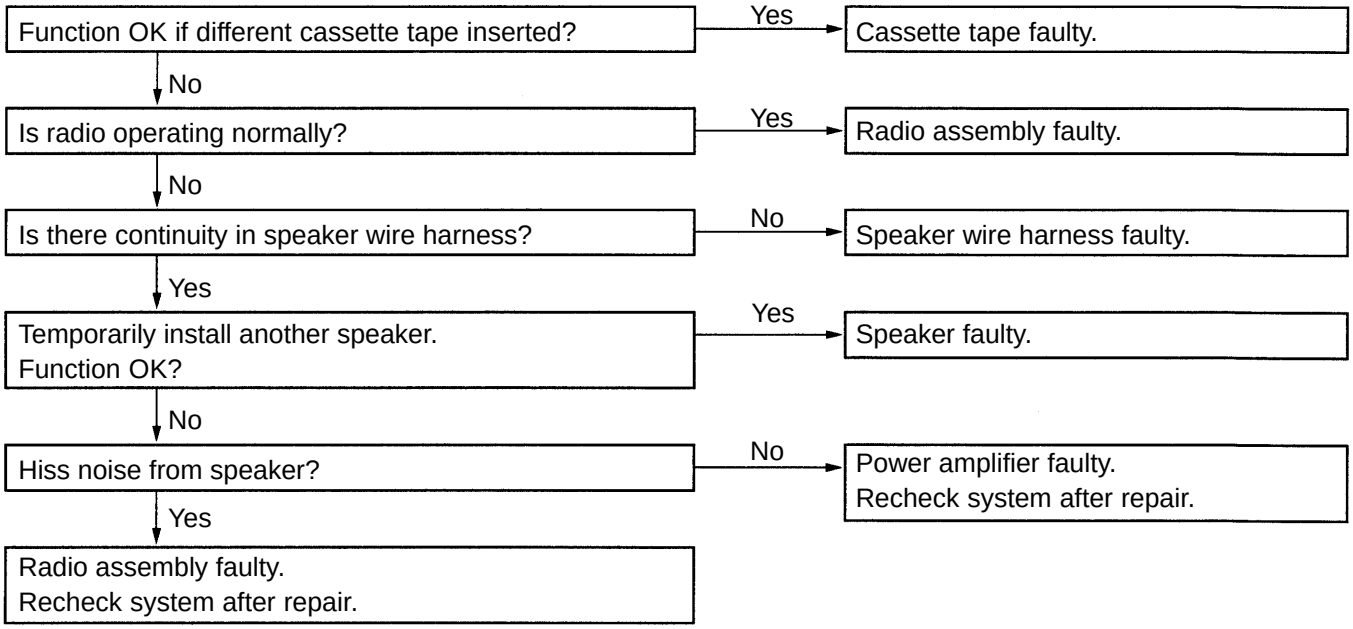


10	Tape Player	CASSETTE TAPE INSERTED, BUT NO POWER

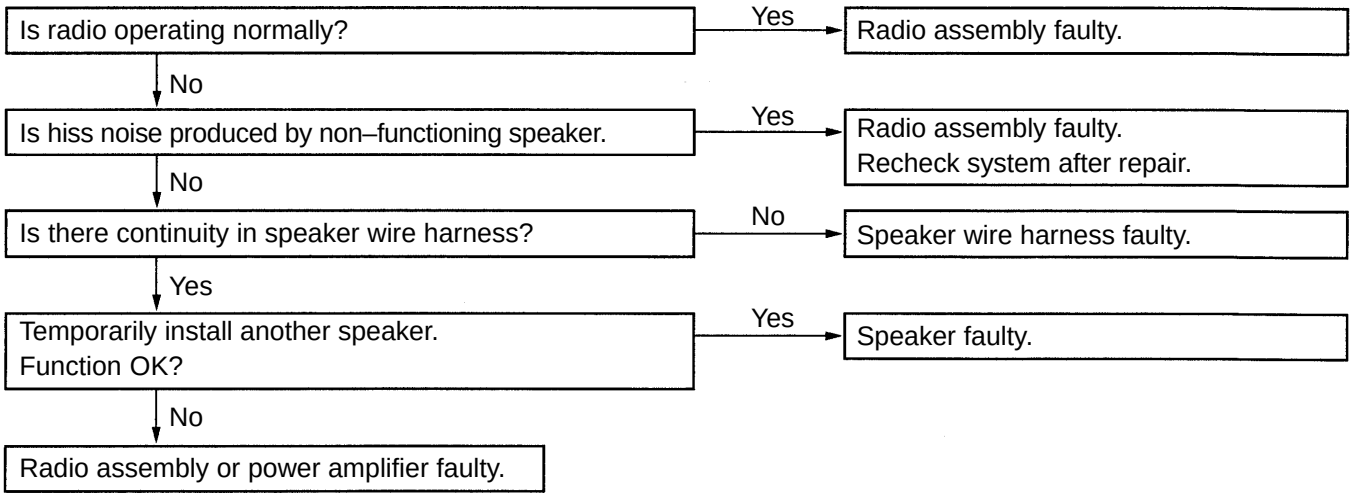


V08484

11	Tape Player	POWER COMING IN, BUT TAPE PLAYER NOT OPERATING



12	Tape Player	EITHER SPEAKER DOES NOT WORK



V08485

13	Tape Player	SOUND QUALITY POOR (VOLUME FAINT)

Function OK if different cassette tape inserted?
- Yes → Cassette tape faulty.
- No → Operates normally after cleaning the heads?
  - Yes → Head dirty.
  - No → Is radio operating normally?
    - Yes → Radio assembly faulty.
    - No → Is speaker properly installed?
      - No → Install properly.
      - Yes → Temporarily install another speaker. Function OK?
        - Yes → Speaker faulty.
        - No → Radio assembly faulty.

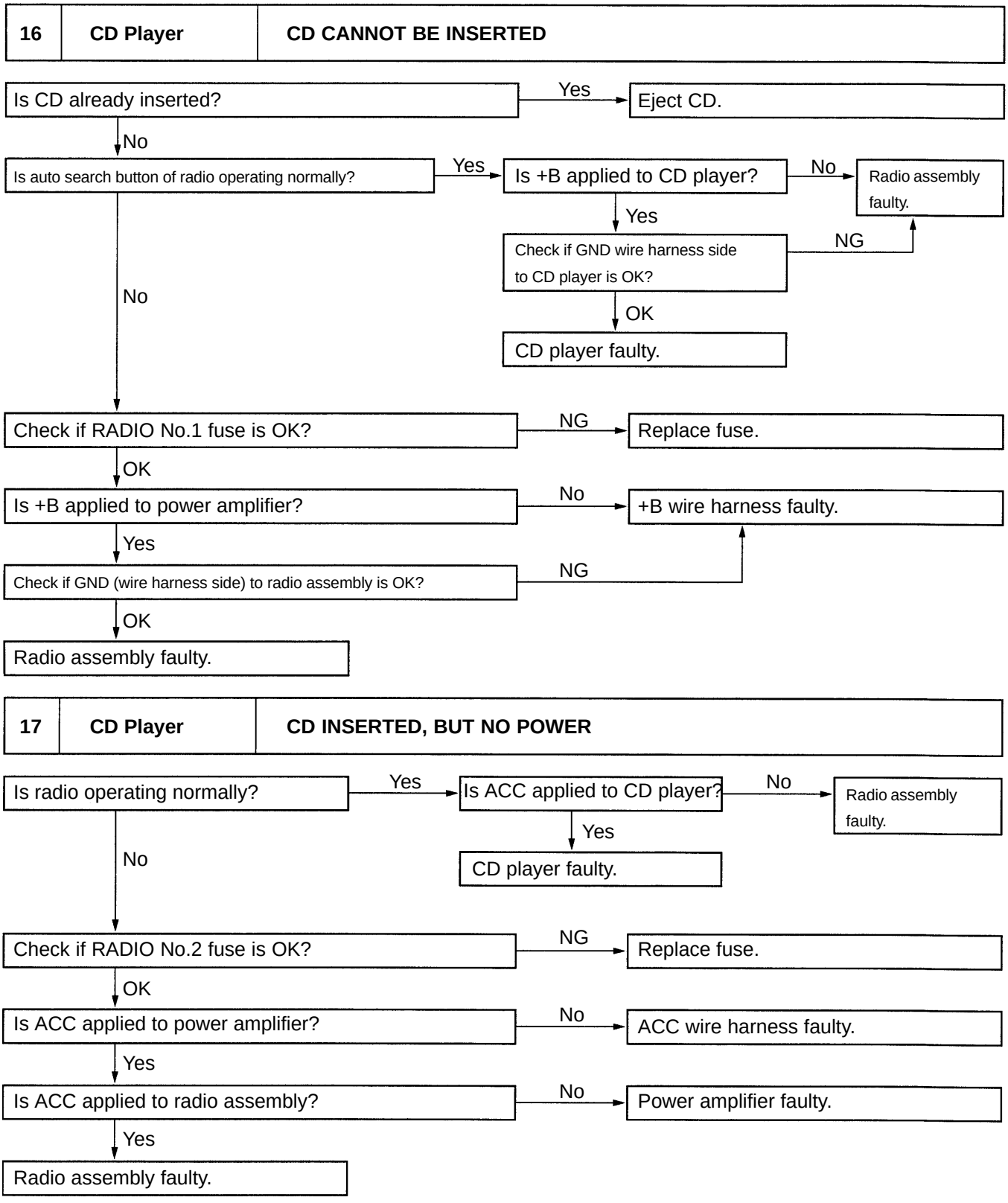
14	Tape Player	TAPE JAMMED MALFUNCTION WITH TAPE SPEED OR AUTO–REVERSE

Function OK if different tape (less than 120 mins.) is inserted?
- Yes → Cassette tape faulty.
- No → Is there a foreign object inside tape player?
  - Yes → Remove foreign object.
  - No → Operates normally after cleaning the heads?
    - Yes → Head dirty.
    - No → Radio assembly faulty.

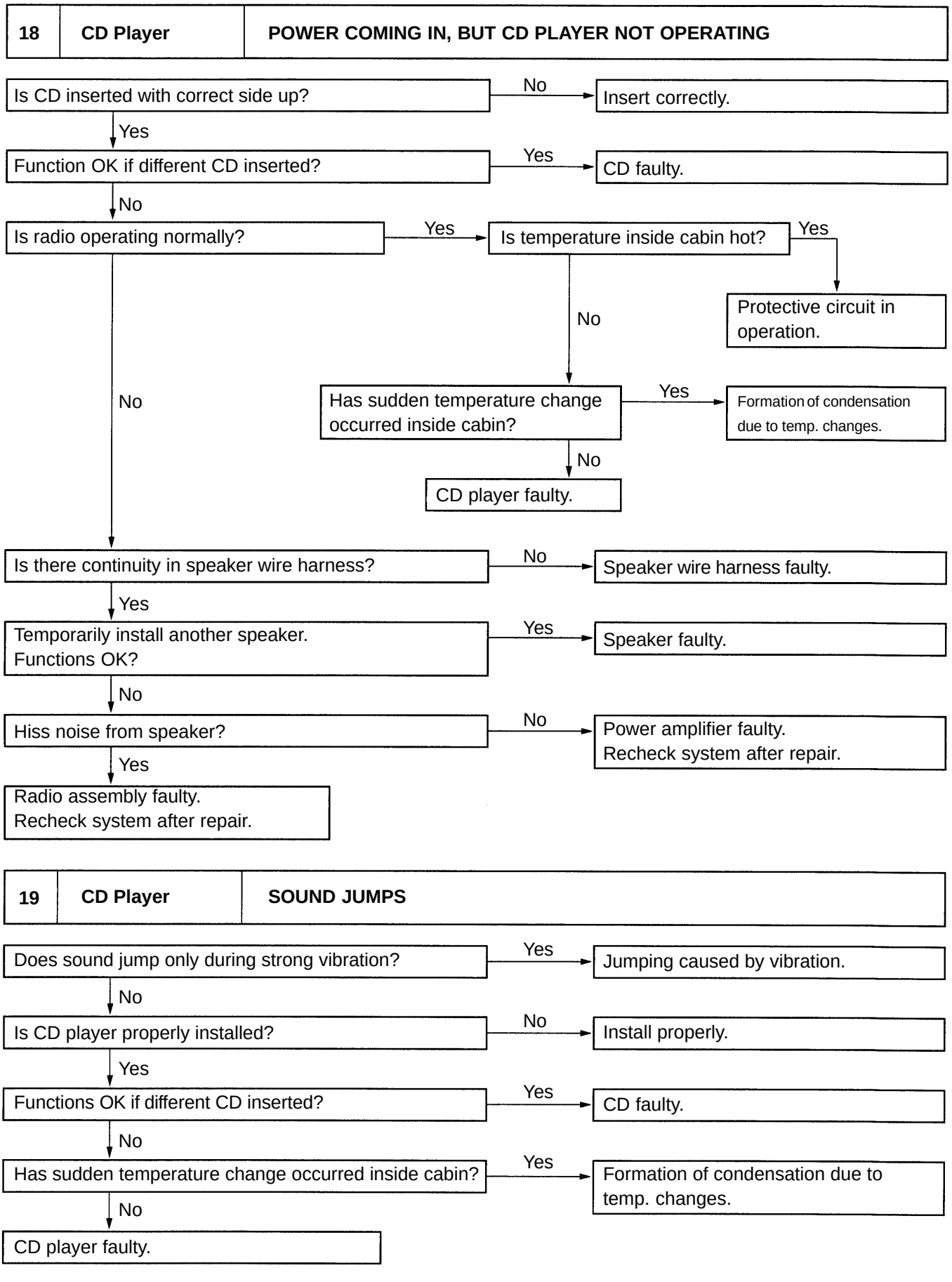
15	Tape Player	CASSETTE TAPE WILL NOT EJECTED

Is tape player operating normally?
- No → Cassette tape jammed.
- Yes → Is auto search button of radio operating normally?
  - Yes → Radio assembly faulty.
  - No → Check if RADIO No.1 fuse is OK?
    - NG → Replace fuse.
    - OK → Is –B applied to power amplifier?
      - No → +B wire harness faulty.
      - Yes → Is +B applied to radio assembly?
        - No → Power amplifier faulty.
        - Yes → Radio assembly faulty.

V08486

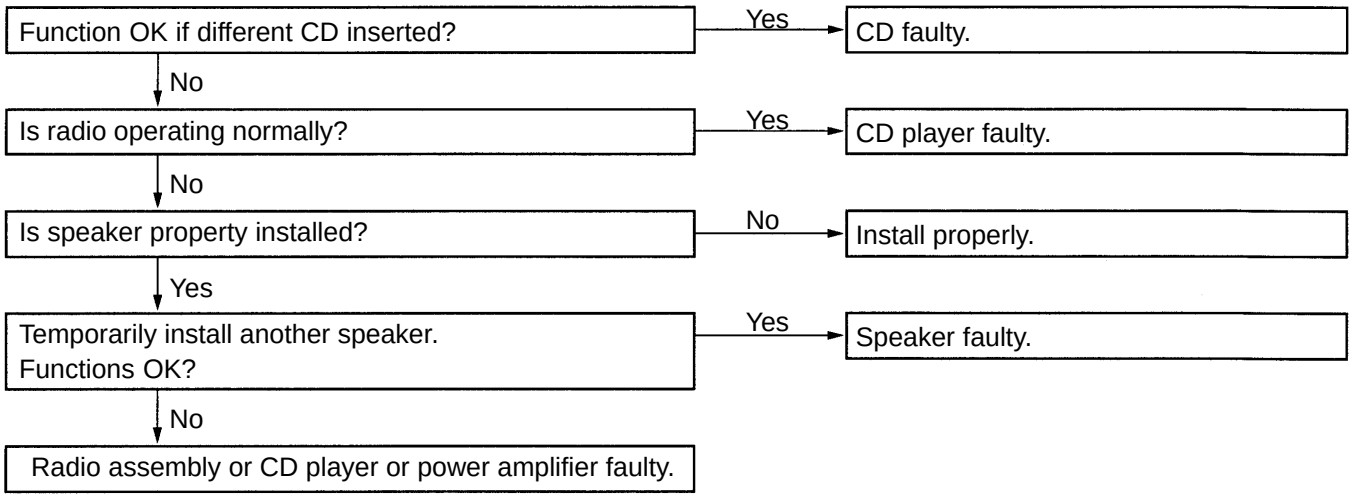

16
CD Player
CD CANNOT BE INSERTED
Is CD already inserted?
Yes
Eject CD.
No
Is auto search button of radio operating normally?
Yes
Is +B applied to CD player?
No
Radio assembly faulty.
Yes
Check if GND wire harness side to CD player is OK?
NG
OK
CD player faulty.
No
Check if RADIO No.1 fuse is OK?
NG
Replace fuse.
OK
Is +B applied to power amplifier?
No
+B wire harness faulty.
Yes
Check if GND (wire harness side) to radio assembly is OK?
NG
OK
Radio assembly faulty.
17
CD Player
CD INSERTED, BUT NO POWER
Is radio operating normally?
Yes
Is ACC applied to CD player?
No
Radio assembly faulty.
Yes
CD player faulty.
No
Check if RADIO No.2 fuse is OK?
NG
Replace fuse.
OK
Is ACC applied to power amplifier?
No
ACC wire harness faulty.
Yes
Is ACC applied to radio assembly?
No
Power amplifier faulty.
Yes
Radio assembly faulty.

V08487

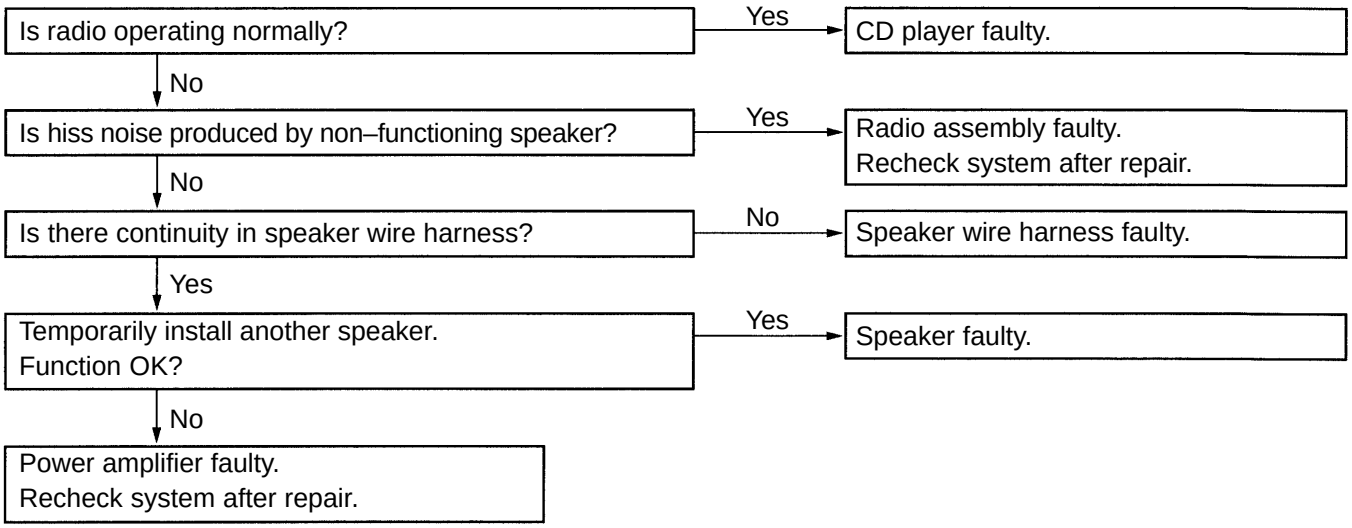

18
CD Player
POWER COMING IN, BUT CD PLAYER NOT OPERATING
Is CD inserted with correct side up?
No
Insert correctly.
Yes
Function OK if different CD inserted?
Yes
CD faulty.
No
Is radio operating normally?
Yes
Is temperature inside cabin hot?
Yes
Protective circuit in operation.
No
Has sudden temperature change occurred inside cabin?
Yes
Formation of condensation due to temp. changes.
No
CD player faulty.
No
Is there continuity in speaker wire harness?
No
Speaker wire harness faulty.
Yes
Temporarily install another speaker. Functions OK?
Yes
Speaker faulty.
No
Hiss noise from speaker?
No
Power amplifier faulty. Recheck system after repair.
Yes
Radio assembly faulty. Recheck system after repair.
19
CD Player
SOUND JUMPS
Does sound jump only during strong vibration?
Yes
Jumping caused by vibration.
No
Is CD player properly installed?
No
Install properly.
Yes
Functions OK if different CD inserted?
Yes
CD faulty.
No
Has sudden temperature change occurred inside cabin?
Yes
Formation of condensation due to temp. changes.
No
CD player faulty.

V08550

20	CD Player	SOUND QUALITY POOR (VOLUME FAINT)

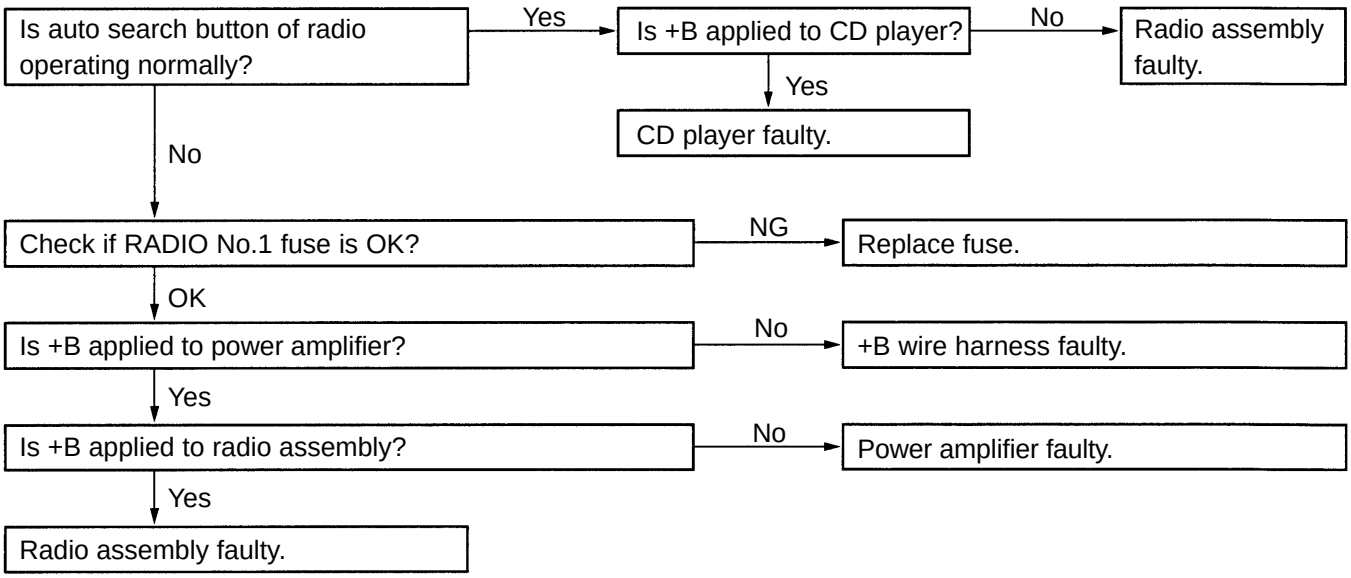


21	CD Player	EITHER SPEAKER DOES NOT WORK



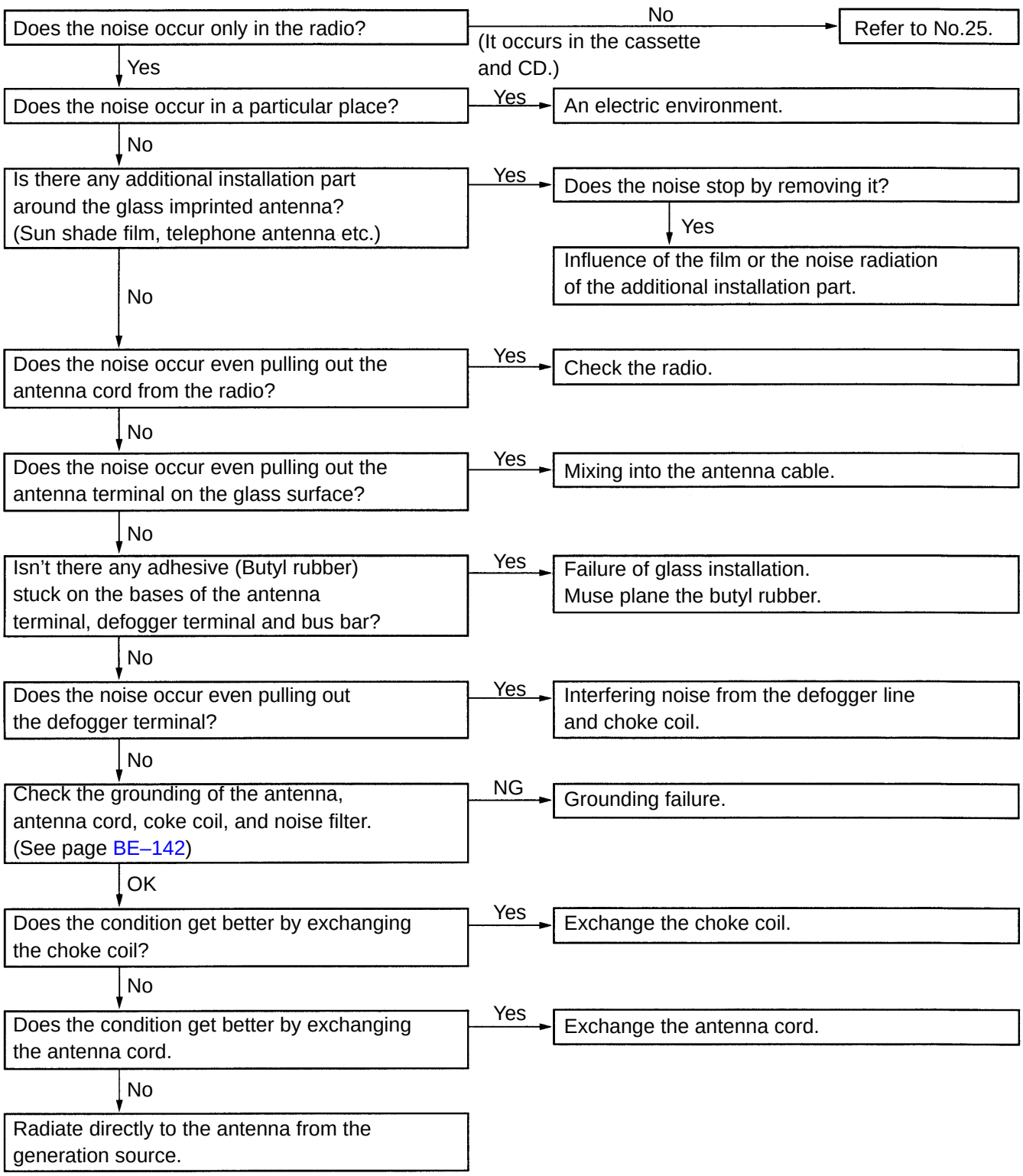
V08551

22	CD Player	CD WILL NOT BE EJECTED

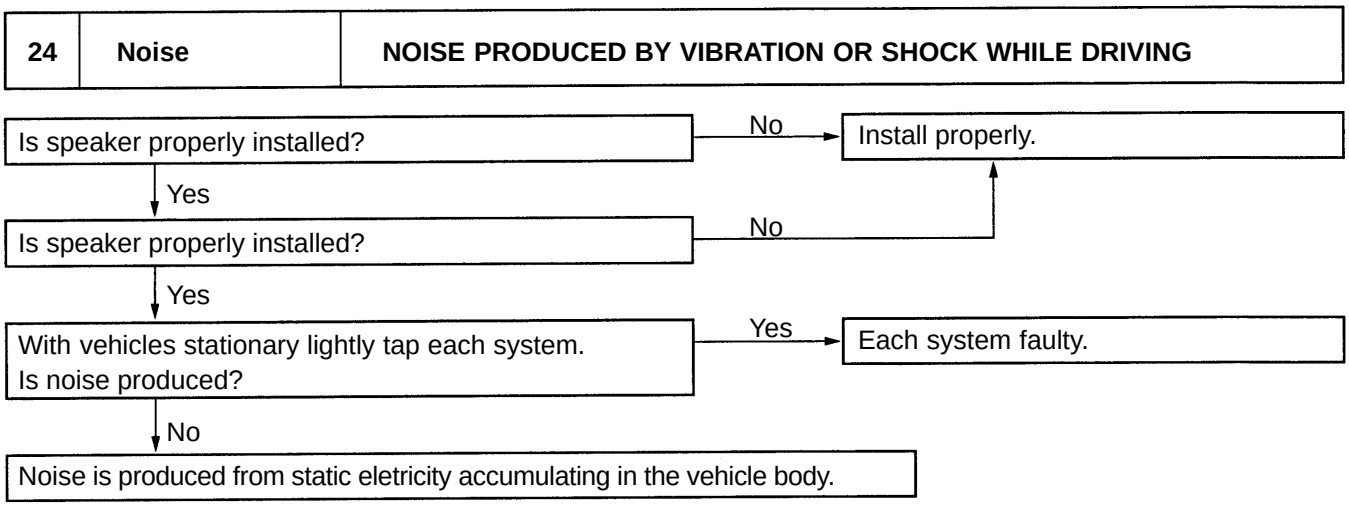


V08488

23	Noise	NOISE OCCURS

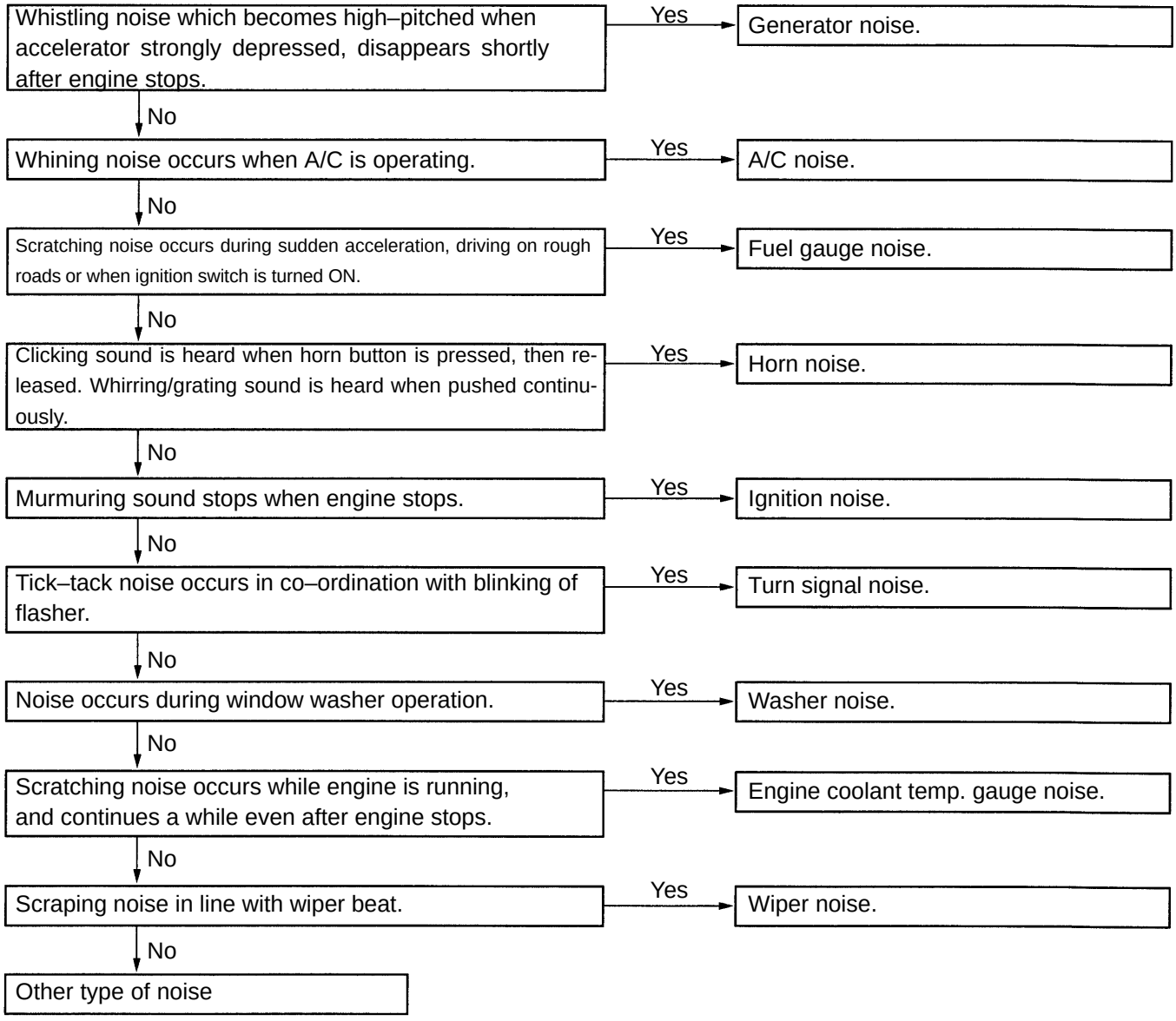


V08552


24
Noise
NOISE PRODUCED BY VIBRATION OR SHOCK WHILE DRIVING
Is speaker properly installed?
No
Install properly.
Yes
Is speaker properly installed?
No
Yes
With vehicles stationary lightly tap each system.
Is noise produced?
Yes
Each system faulty.
No
Noise is produced from static eletricity accumulating in the vehicle body.

V08553

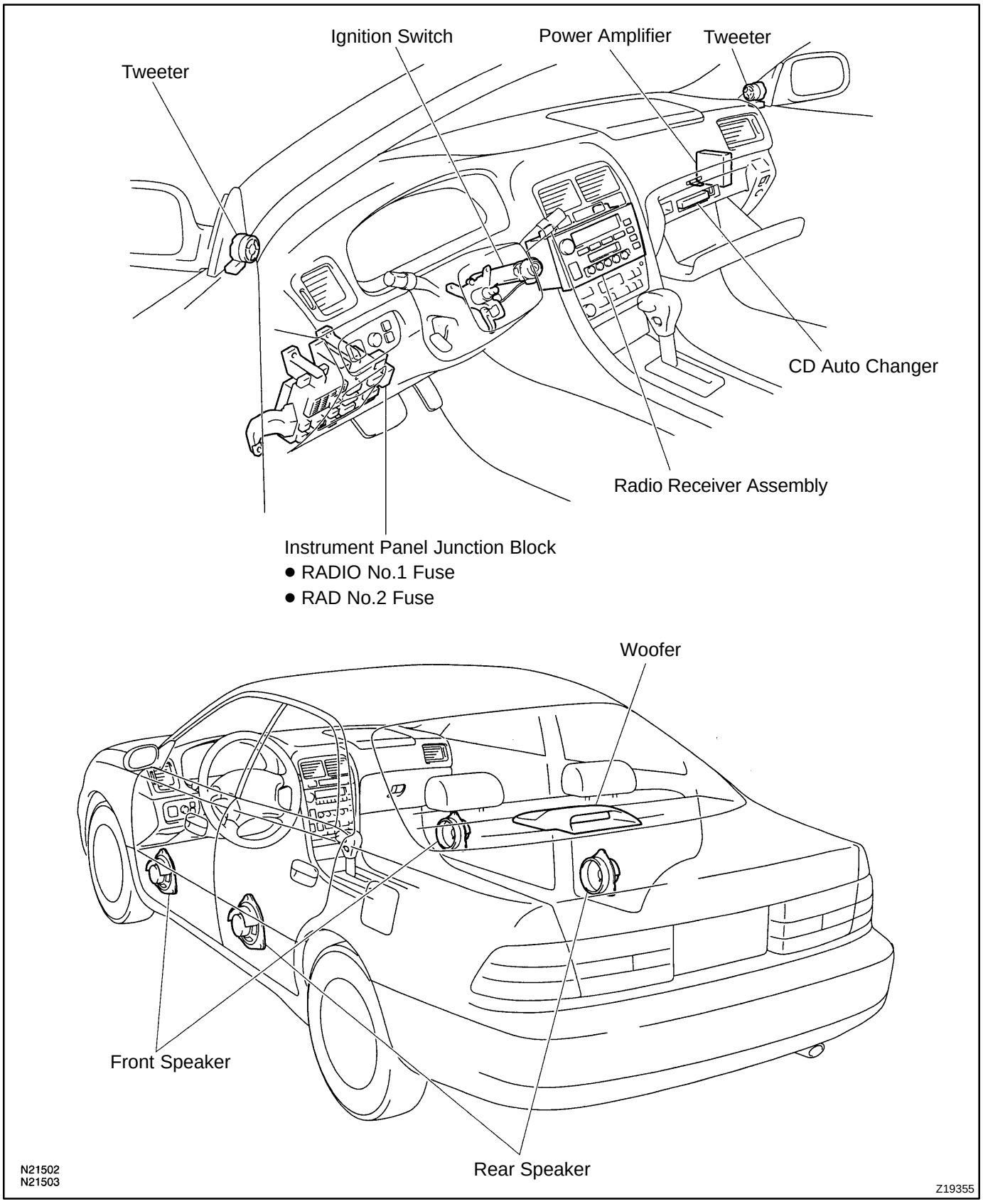
25	Noise	NOISE PRODUCED WHEN ENGINE STARTS



V08554

BE062–01

LOCATION

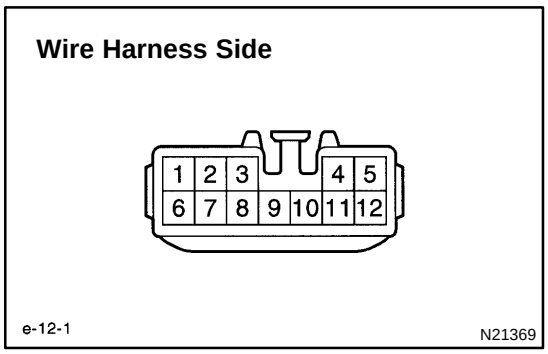


BE063–01

INSPECTION

1. INSPECT CD AUTO CHANGER CIRCUIT

Disconnect connectors from CD auto changer and inspect the connector on the wire harness side.



Tester connection	Condition	Specified condition
8 – Ground	Constant	Continuity
5 – Ground	Constant	Battery positive voltage
12 – Ground	Ignition switch LOCK	No voltage
12 – Ground	Ignition switch ACC or ON	Battery positive voltage

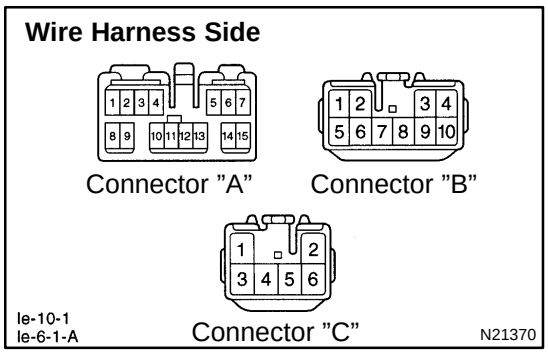
If the circuit is not as specified, inspect the circuits connected to other parts.

HINT:

- Check the wire harness between the radio receiver assembly and the CD auto changer.
- Since the signals to and from the MUTE, R^-, R^+, L^-, L^+, TX^- and TX^+ terminals are serial signals, they cannot ordinarily be measured with a tester.

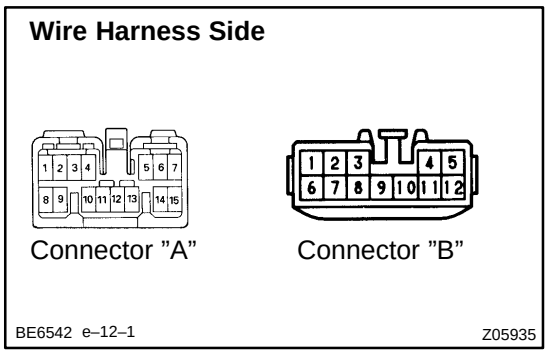
2. INSPECT POWER AMPLIFIER CIRCUIT

Disconnect the connector from power amplifier and inspect the connector on the wire harness side.



Tester connection	Condition	Specified condition
C7 – Ground	Constant	Continuity
C3 – Ground	Ignition switch LOCK	No voltage
C3 – Ground	Ignition switch ACC or ON	Battery positive voltage
C4 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



3. INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT

Disconnect the connectors from the radio receiver assembly, and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
A4 – Ground	Constant	Battery positive voltage
A3 – Ground	Ignition switch LOCK	No voltage
A3 – Ground	Ignition switch ACC or ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

HINT:

Check the wire harness between radio receiver assembly and the CD auto changer, between radio receiver assembly and power amplifier.

4. INSPECT GLASS IN PRINTED ANTENNA

(Use same procedure as for ”INSPECT DEFOGGER WIRES” on page BE–126.)

5. REPAIR GLASS PRINTED ANTENNA

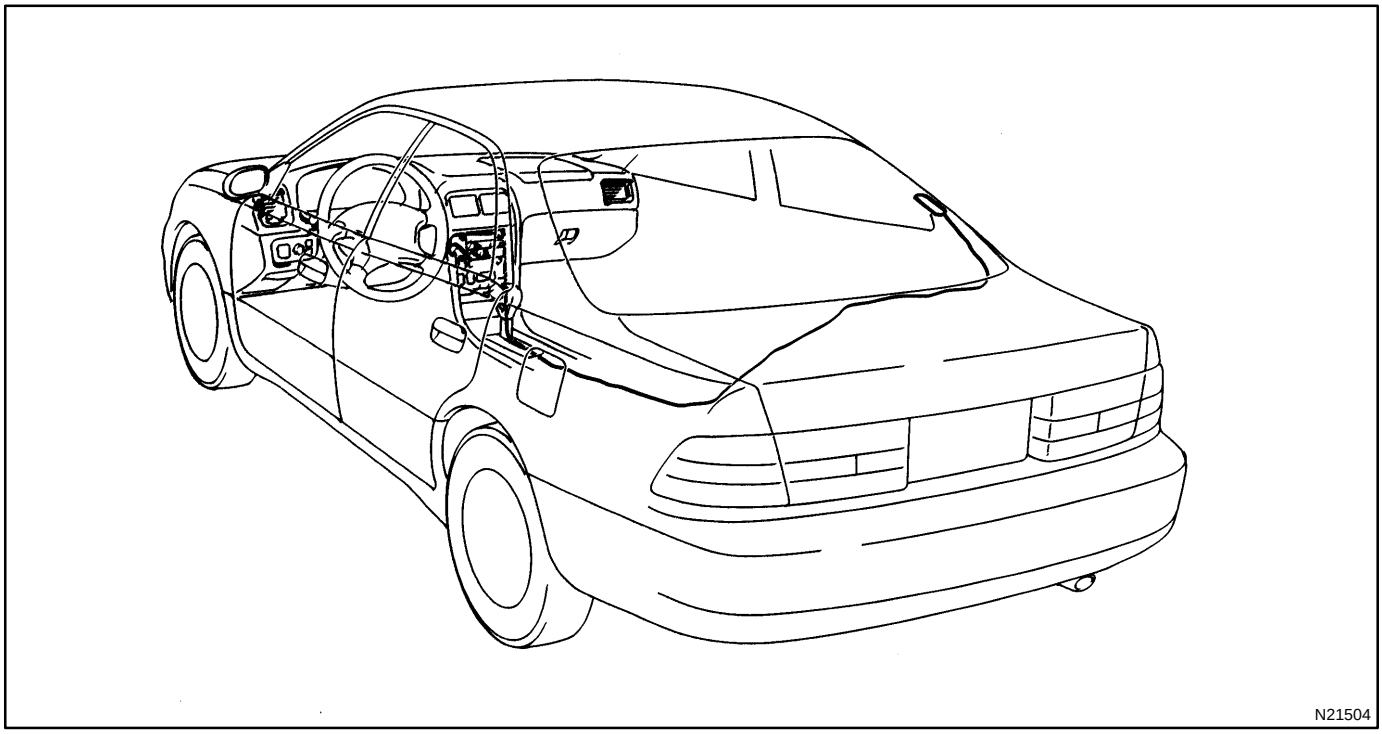
(Use same procedure as for ”REPAIR DEFOGGER WIRES” on page BE–127.)

ANTENNA CORD

BE064–01

REMOVAL

REMOVE ANTENNA CORD



(a) Remove the following parts:
- Instrument panel assembly
- Console box
- Rear seat
- Right rear poller garnish
- Package tray trim
- Room partition trim

HINT:
See BO section

(b) Remove antenna cord from glass printed antenna.
(c) Disconnect the connectors shown in the illustration.
(d) Remove the clips and antenna cord assembly.

BE065–01

INSTALLATION

Installation is in the reverse order of removal (See page BE–167).

CLOCK

TROUBLESHOOTING

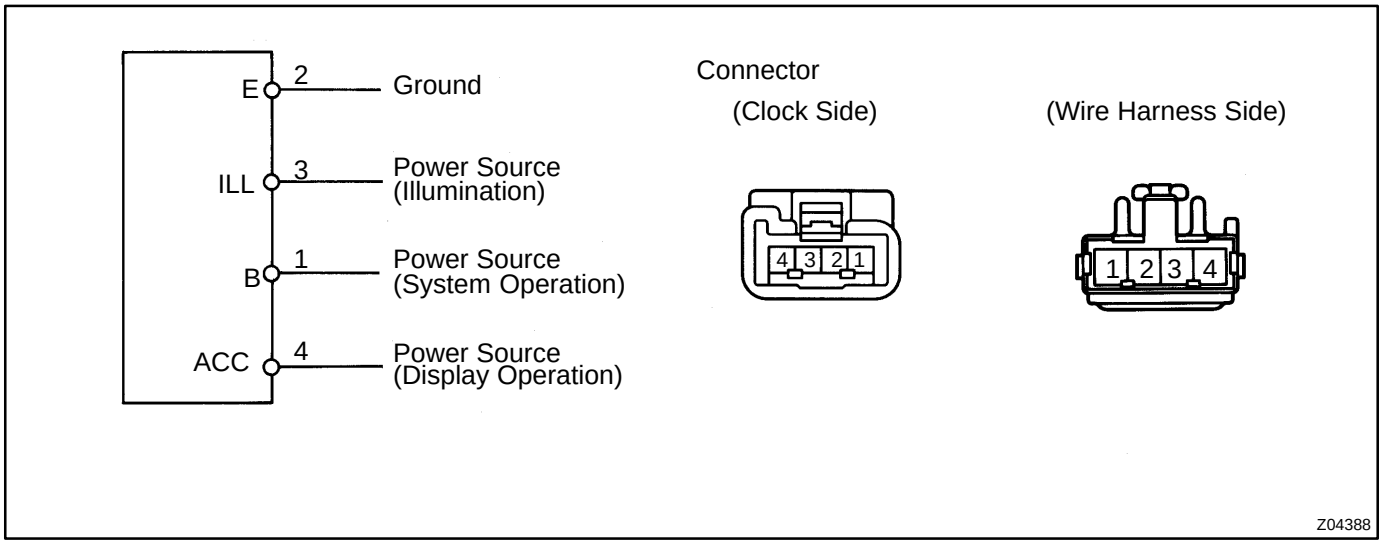
BE066–01

HINT:

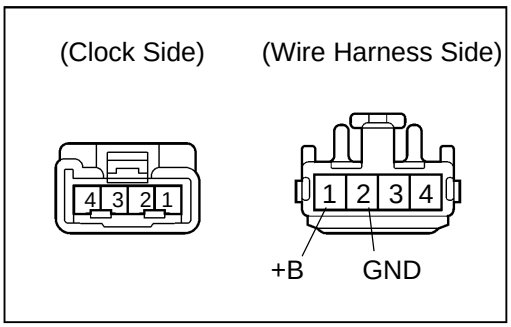
Troubleshoot the clock according to the table below.

Clock will not operate	1
Clock loses or gains time	2

± 1.5 seconds / day



1	CLOCK WILL NOT OPERATE



(a) Check that the battery positive voltage is 10 –14 V.
If voltage is not as specified, replace the battery.

(b) Check that the DOME fuse is not blown.
If the fuse is blown, replace the fuse and check for short circuit.

(c) Troubleshoot the clock as follows.
HINT:
Inspect the connector on the wire harness side.

Is there battery voltage between terminal +B and body ground?
- No → Open or short circuit in wire harness between terminal +B and DOME fuse.
- Yes ↓

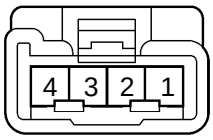
Does continuity exist between terminal GND and body ground?
- No → Open circuit in wire harness between terminal GND and body ground.
- Yes ↓

Replace clock.

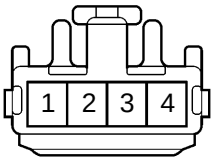
I01417

2	CLOCK LOSES OR GAINS TIME

(Clock Side)



(Wire Harness Side)



(a) Check that the battery positive voltage is 10–16 V.
If voltage is not as specified, replace the battery.

(b) Inspect the error of the clock.
Allowable error (per day): ± 1.5 sec.
If the error exceeds the allowable error, replace the clock.

(c) Check that the clock adjusting button is caught in position, and does not return.
If the button is not returned, repair or replace the clock.

(d) Troubleshoot the clock as follows.
HINT:
Inspect the connector on the wire harness side.

Is there 10 – 16 V between terminal +B and body ground?

Below 10V → Detect cause and repair, or recharge battery.

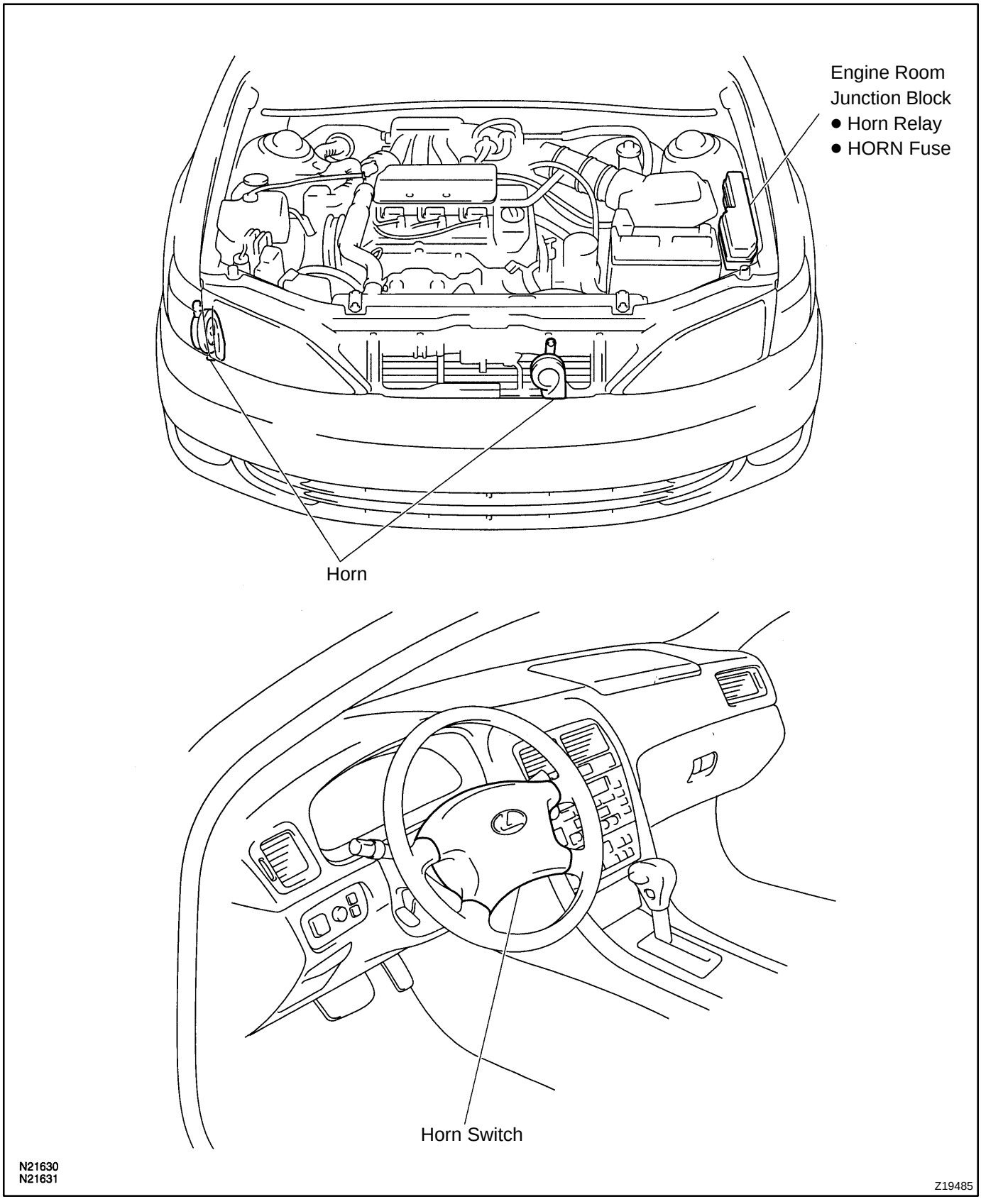
Yes ↓

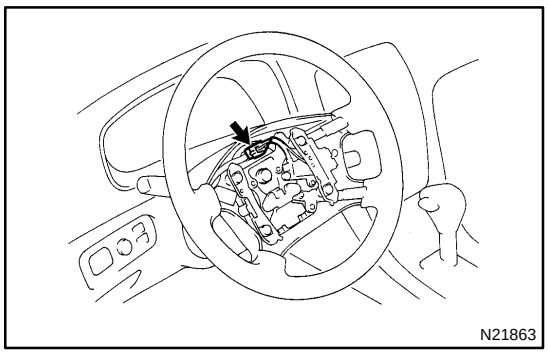
Adjust or replace clock.

I01418

HORN SYSTEM
LOCATION

BE067–01




N21863

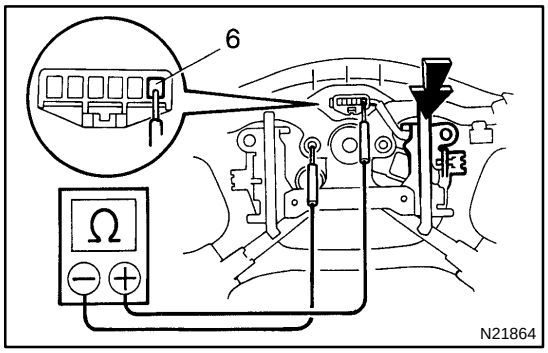
INSPECTION

1. INSPECT HORN SWITCH

(a) Disconnect the negative (–) terminal from the battery.
(b) Remove the left and right covers from the steering wheel.
(c) Using a torx socket wrench, loosen the 2 bolts.
(d) Pull up the horn pad and place it on the steering column, as shown.

HINT:
Do not disconnect the connector from the horn pad.

(e) Disconnect the connector from the slip ring. BE068–03

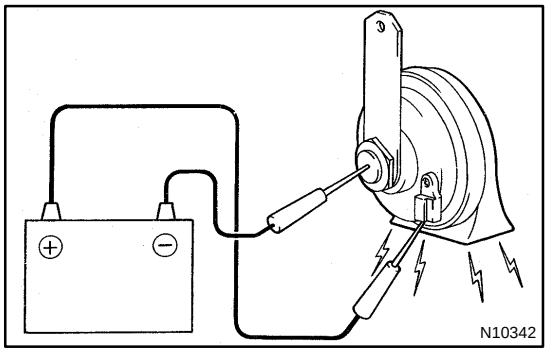


N21864

(f) Check that no continuity exists between terminal 6 of the connector and body ground.
(g) Check that continuity exists between terminal 6 of the connector and body ground when the horn contact plate is pressed against the steering spoke assembly.

If continuity is not as specified, repair or replace the steering wheel or wire harness as necessary.

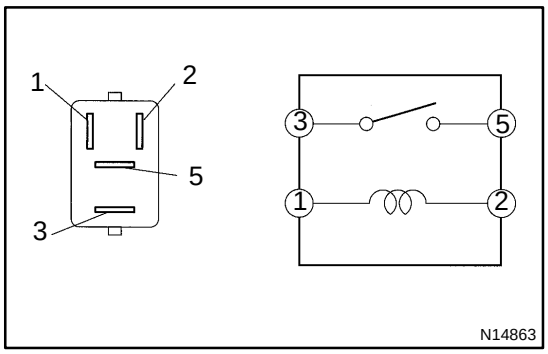
(h) Install the horn pad in place and using a torx socket wrench, torque the 2 bolts.
Torque: 7.1 N·m (72 kgf·cm, 62 in.·lbf)
(i) Install the left and right covers.
(j) Connect the negative (–) terminal to the battery.


N10342

2. INSPECT HORN OPERATION

Connect the positive (+) lead from the battery to the terminal and negative (–) lead to the horn body and check that the horn blows.

If operation is not as specified, replace the horn.



3. INSPECT HORN RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 5	Continuity

If continuity is not as specified, replace the relay.

BRAKE SYSTEM

BR061–01

PRECAUTION

1. **Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts have the same part number or equivalent.**
2. **It is very important to keep parts and the area clean when repairing the brake system.**
3. **If the vehicle is equipped with a mobile communication system, refer to the precautions in the IN section.**

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

BR062–01

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Lower pedal or spongy pedal	1. Brake system (Fluid leaks)	DI–269 DI–321
	2. Brake system (Air in)	BR–4
	3. Piston seals (Worn or damaged)	BR–26 BR–35
	4. Master cylinder (Faulty)	BR–12
	5. Booster push rod (Out of adjustment)	BR–22
Brake drag	1. Brake pedal freeplay (Minimal)	BR–6
	2. Parking brake pedal travel (Out of adjustment)	BR–8
	3. Parking brake wire (Sticking)	–
	4. Rear brake shoe clearance (Out of adjustment)	BR–44
	5. Pad (Cracked or distorted)	BR–23 BR–32
	6. Piston (Stuck)	BR–26 BR–35
	7. Piston (Frozen)	BR–26 BR–35
	8. Tension or return spring (Faulty)	BR–41
	9. Booster push rod (Out of adjustment)	BR–22
	10. Vacuum leaks for booster system	BR–20
	11. Master cylinder (Faulty)	BR–12
Brake pull	1. Piston (Stuck)	BR–26 BR–35
	2. Pad (Oily)	BR–23 BR–32
	3. Piston (Frozen)	BR–26 BR–35
	4. Disc (Scored)	BR–26 BR–35
	5. Pad (Cracked or distorted)	BR–23 BR–32
Hard pedal but brake inefficient	1. Brake system (Fluid leaks)	DI–269 DI–321
	2. Brake system (Air in)	BR–4
	3. Piston (Stuck)	BR–26 BR–35
	4. Pad (Cracked or distorted)	BR–23 BR–32
	5. Pad (Oily)	BR–23 BR–32
	6. Pad (Glazed)	BR–23 BR–32
	7. Disc (Scored)	BR–26 BR–35
	8. Booster push rod (Out of adjustment)	BR–22
	9. Vacuum leaks for booster system	BR–20

Symptom	Suspect Area	See page
Noise from brake	1. Pad (Cracked or distorted)	BR–23 BR–32
	2. Installation bolt (Loosen)	BR–26 BR–35
	3. Disc (Scored)	BR–26 BR–35
	4. Pad support plate (Loosen)	BR–23 BR–32
	5. Sliding pin (Worn)	BR–26 BR–35
	6. Pad (Dirty)	BR–23 BR–32
	7. Pad (Glazed)	BR–23 BR–32
	8. Tension or return spring (Faulty)	BR–41
	9. Anti–squeal shim (Damage)	BR–23 BR–32
	10. Hold–down spring (Damage)	BR–41

BRAKE FLUID

BR063–01

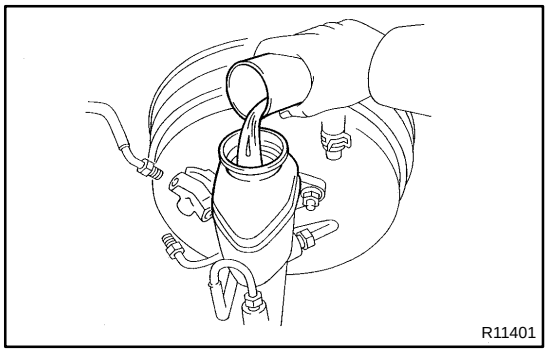
BLEEDING

HINT:

If any work is done on the brake system or if air is suspected in the brake lines, bleed the system of air.

NOTICE:

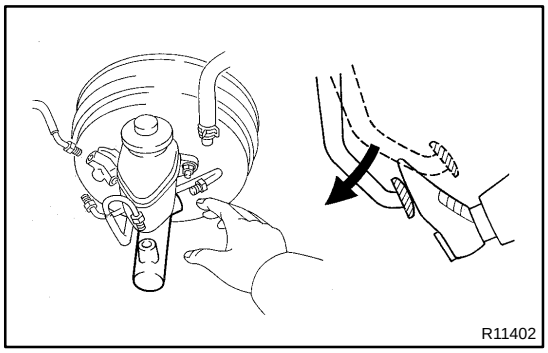
Do not let brake fluid remain on a painted surface. Wash it off immediately.



1. FILL BRAKE RESERVOIR WITH BRAKE FLUID

Check the fluid level in the reservoir after bleeding each wheel. Add fluid, if necessary.

Fluid: SAEJ1703 or FMVSS No.116 DOT 3



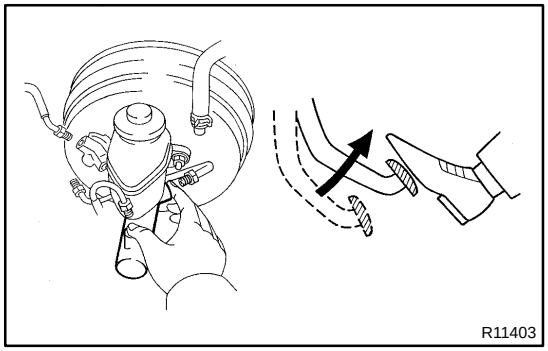
2. BLEED MASTER CYLINDER

HINT:

If the master cylinder has been disassembled or if the reservoir becomes empty, bleed the air from the master cylinder.

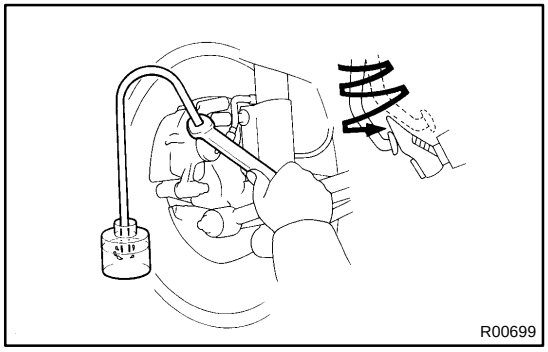
(a) Disconnect the brake lines from the master cylinder.

(b) Slowly depress the brake pedal and hold it.



(c) Block off the outlet plugs with your fingers, and release the brake pedal.

(d) Repeat (b) and (c) 3 or 4 times.



3. CONNECT VINYL TUBE TO BRAKE CALIPER BLEEDER PLUG

Insert the other end of the tube in a half–full container of brake fluid.

NOTICE:

Bleed air of the rear brake first. If front brake is bled first, rear brake air cannot be bled.

4. BLEED BRAKE LINE

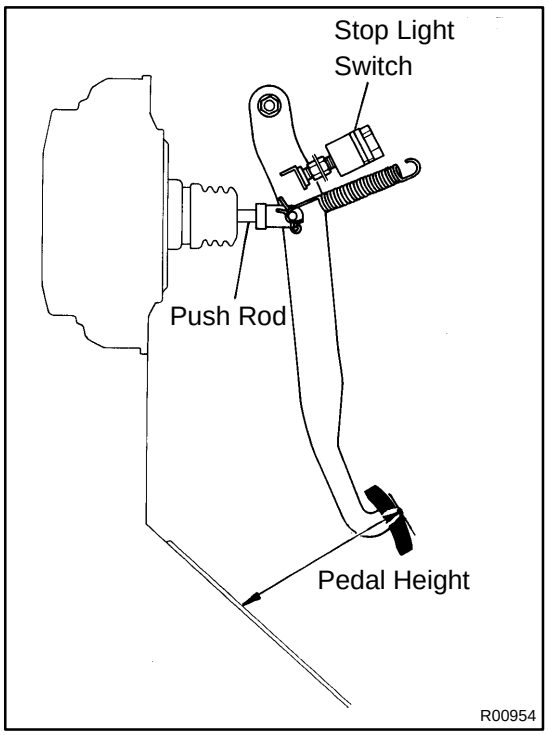
(a) Slowly depress the brake pedal several times.

(b) While an assistant depresses the pedal, loosen the bleeder plug until fluid starts to run out. Then tighten the bleeder plug.

(c) Repeat this procedure until there are no more air bubbles in the fluid.

Torque: (Bleeder plug)
8.3 N·m (85 kgf·cm, 74 in.·lbf)

5. REPEAT PROCEDURE FOR EACH WHEEL



BRAKE PEDAL

BR064–01

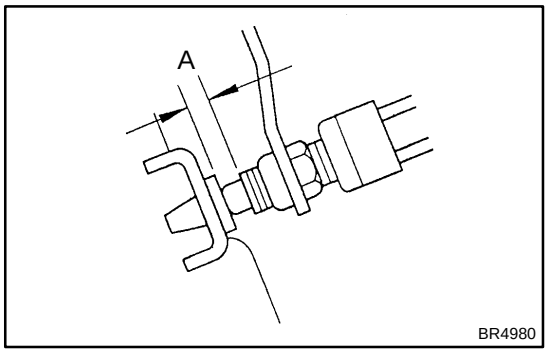
ON–VEHICLE INSPECTION

1. CHECK PEDAL HEIGHT

Pedal height from asphalt sheet:
152.0 – 162.0 mm (5.984 – 6.378 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

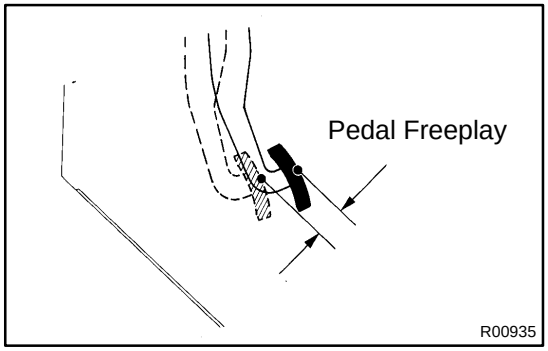
(a) Disconnect the connector from the stop light switch.
(b) Loosen the stop light switch lock nut and remove the stop light switch.
(c) Loosen the push rod lock nut.
(d) Adjust the pedal height by turning the pedal push rod.
(e) Tighten the push rod lock nut.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)
(f) Install the stop light switch and turn it until it lightly contacts the pedal stopper.
(g) Turn the stop light switch back one turn.



(h) Check the clearance (A) between the stop light switch and pedal.
Clearance: 0.5 – 2.4 mm (0.020 – 0.094 in.)
(i) Tighten the stop light switch lock nut.
(j) Connect the connector to the stop light switch.
(k) Check that the stop lights come on when the brake pedal is depressed, and go off when the brake pedal is released.
(l) After adjusting the pedal height, check the pedal freeplay.

HINT:

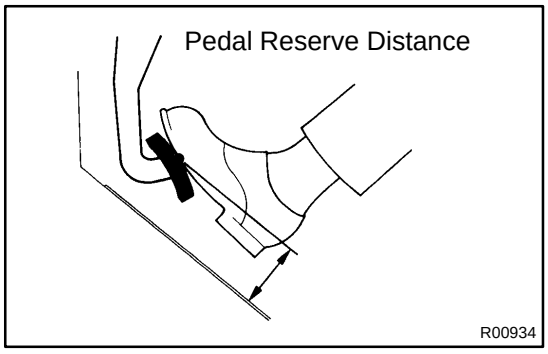
If clearance (A) between the stop light switch and the pedal stopper has been adjusted correctly, the pedal freeplay will meet the specifications.



3. CHECK PEDAL FREEPLAY

(a) Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.
(b) Push in the pedal by hand until the resistance begins to be felt, then measure the distance.
Pedal freeplay:
1 – 6 mm (0.04 – 0.24 in.)

HINT:
The freeplay to the 1st resistance is due to the play between the clevis and pin. This is magnified up to 1 – 6 mm (0.04 – 0.24 in.) at the pedal.
If incorrect, check the stop light switch clearance. If the clearance is OK, then troubleshoot the brake system.



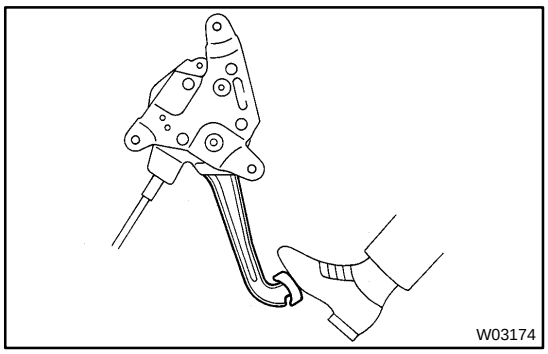
4. CHECK PEDAL RESERVE DISTANCE

(a) Release the parking brake.

(b) With the engine running, depress the pedal and measure the pedal reserve distance, as shown.

Pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110.2 lbf): More than 70 mm (2.76 in.)

If the reserve distance is incorrect, troubleshoot the brake system.



PARKING BRAKE PEDAL

BR065–01

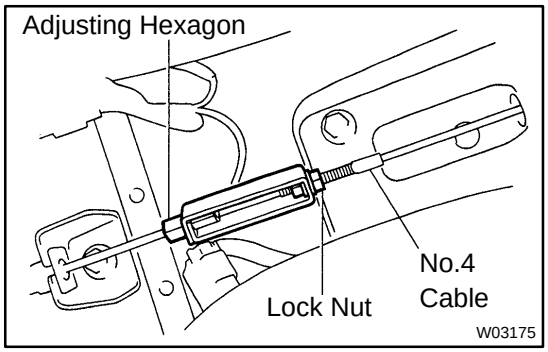
ON–VEHICLE INSPECTION

1. CHECK PARKING BRAKE PEDAL TRAVEL

Slowly depress the parking brake pedal all the way, and count the number of clicks.

Parking brake pedal travel at 294 N (30 kgf, 66 lbf): 3 – 6 clicks

If incorrect, adjust the parking brake.



2. IF NECESSARY, ADJUST PARKING BRAKE PEDAL TRAVEL

HINT:

Before adjusting the parking brake, make sure that the rear brake shoe clearance has been adjusted.

For shoe clearance adjustment, see step 1 on page BR–44.

(a) Remove the console upper panel and console box.

(b) Confirm that the parking pedal is released.

(c) Hold the screw end of No.4 cable not to rotate.

(d) Loosen the lock nut.

(e) Hold the parking brake cable and turn the adjusting hexagon until the pedal travel is correct.

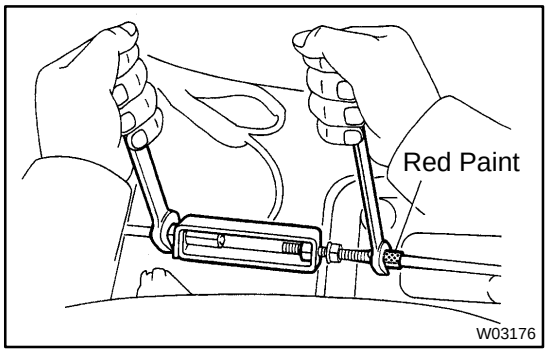
NOTICE:

To prevent the parking brake cable from twisting, must always keep the red–painted surface up.

(f) Holding the adjusting hexagon, tighten the lock nut.

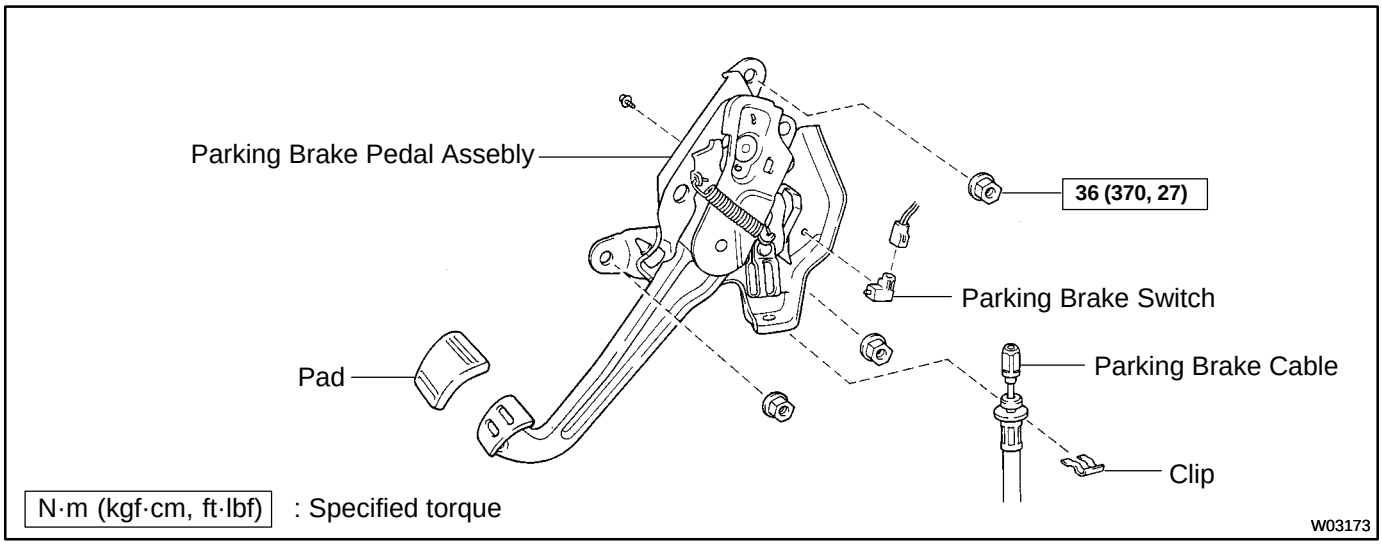
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(g) Install the console box and console upper panel.



BR066–03

COMPONENTS



BR067–01

REMOVAL

1. RELEASE PARKING BRAKE PEDAL

2. DISCONNECT PARKING BRAKE SWITCH CONNECTOR

3. REMOVE PARKING BRAKE PEDAL ASSEMBLY

Remove the 3 nuts and parking brake pedal assembly.

Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)

4. DISCONNECT PARKING BRAKE WIRE

Remove clip and disconnect the parking brake wire.

5. REMOVE PARKING BRAKE SWITCH

Remove the screw and parking brake switch.

BR068–01

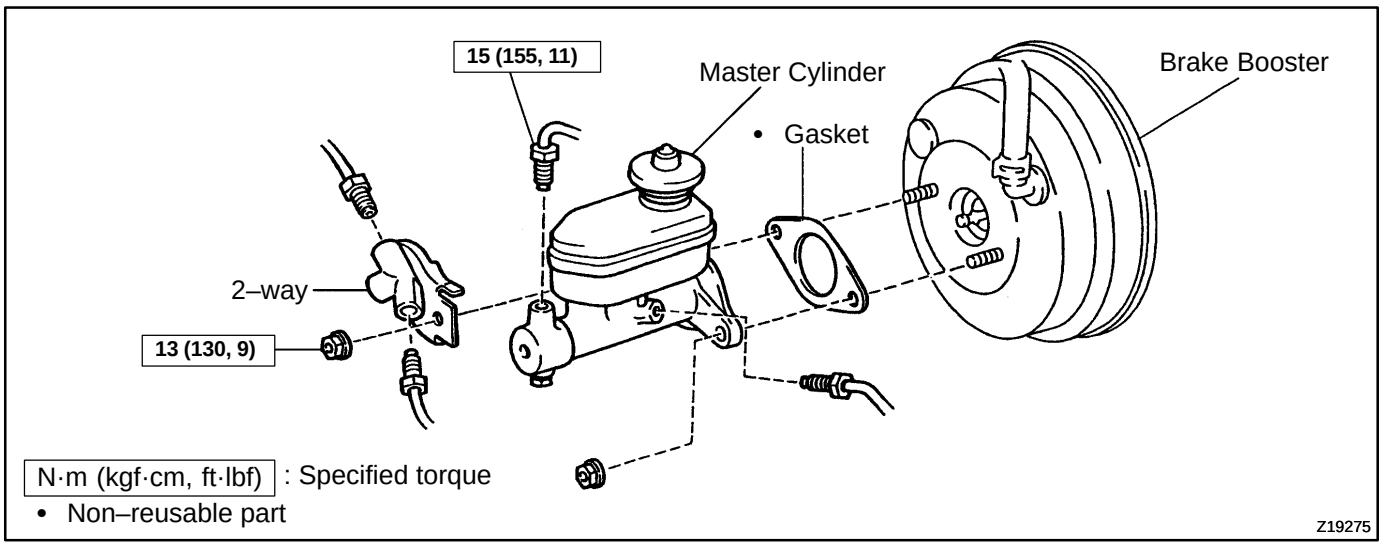
INSTALLATION

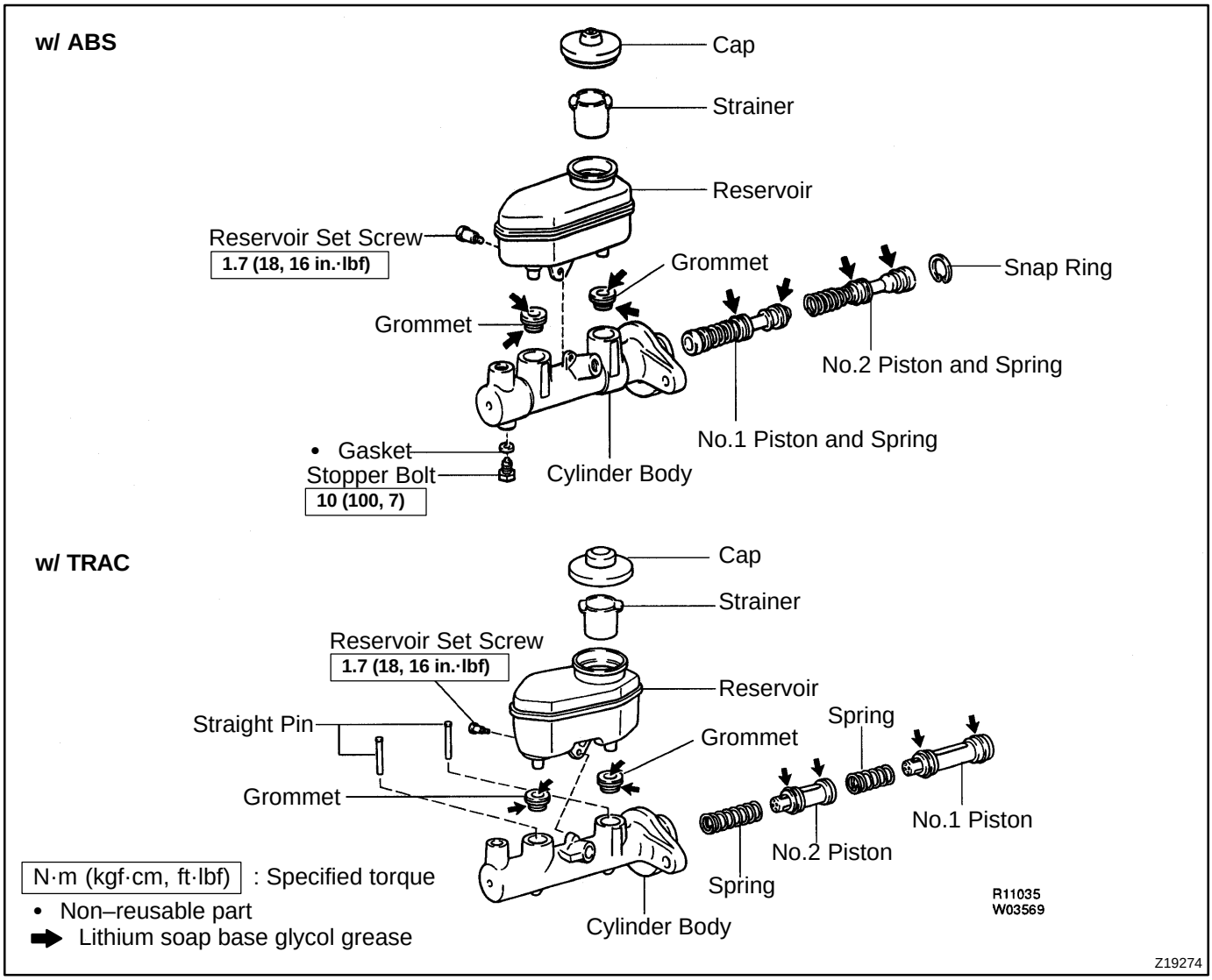
Installation is in the reverse order of removal (See page BR–10).

BRAKE MASTER CYLINDER

COMPONENTS

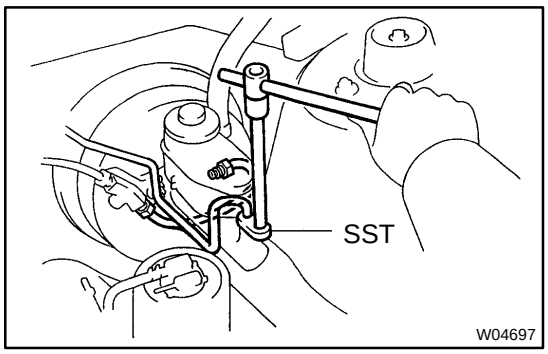
BR069–04





BR06A–01

REMOVAL



1. DISCONNECT LEVEL WARNING SWITCH CONNECTOR

2. TAKE OUT FLUID WITH SYRINGE

NOTICE:

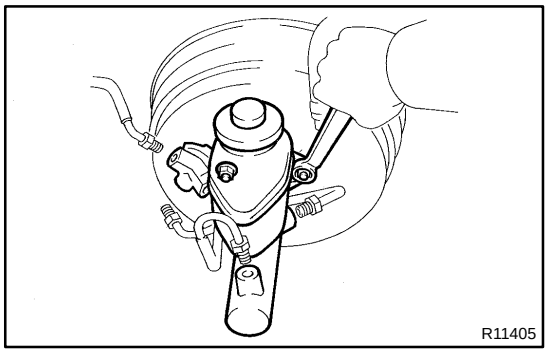
Do not let brake fluid remain on a painted surface. Wash it off immediately.

3. DISCONNECT BRAKE LINES

Using SST, disconnect the 5 brake lines.

SST 09023–00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)



4. REMOVE MASTER CYLINDER

Remove the 2 nuts, and pull out the 2–way, master cylinder and gasket.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

BR06B–01

DISASSEMBLY

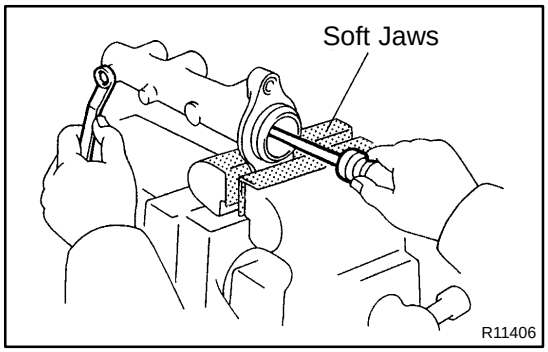
1. REMOVE RESERVOIR

(a) Remove the set screw and pull out the reservoir.
Torque: 1.7 N·m (18 kgf·cm, 16 in.·lbf)

(b) Remove the cap and strainer from the reservoir.

2. REMOVE 2 GROMMETS

3. w/ ABS:
PLACE CYLINDER IN VISE



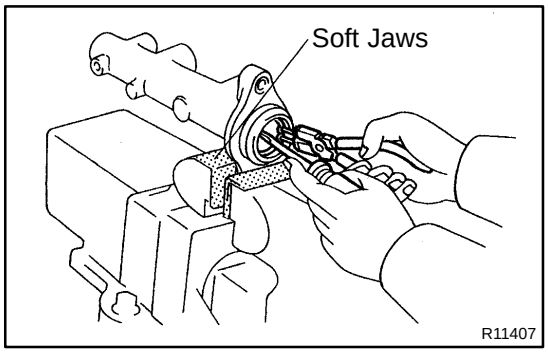
4. REMOVE PISTON STOPPER BOLT

Using a screwdriver, push the pistons in all the way and remove the piston stopper bolt and gasket.

HINT:

Tape the screwdriver tip before use.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



5. REMOVE 2 PISTONS AND SPRINGS

(a) Push in the piston with a screwdriver and remove the snap ring with snap ring pliers.

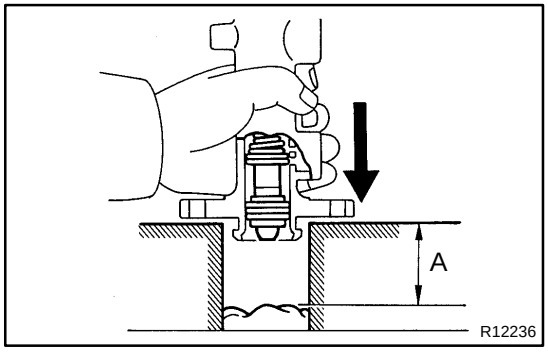
HINT:

Tape the screwdriver tip before use.

(b) Remove the No.1 piston and spring by hand, pulling straight out, not at an angle.

NOTICE:

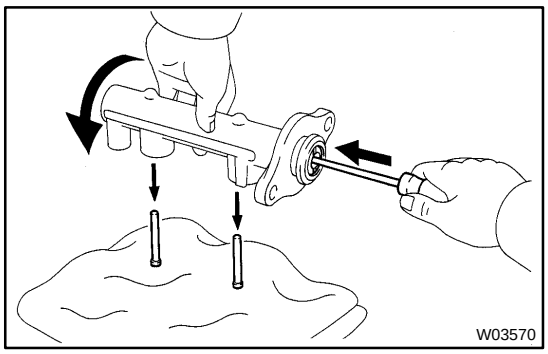
- **If pulled out and installed at an angle, there is a possibility that the cylinder bore could be damaged.**
- **At the time reassembly, be careful not to damage the rubber lips on the pistons.**



(c) Place a rag and 2 wooden blocks on the work table, and lightly tap the cylinder flange against the block edges until the No.2 piston drops out of the cylinder.

HINT:

Make sure that the distance (A) from the rag to the top of the blocks is at least 100 mm (3.94 in.).



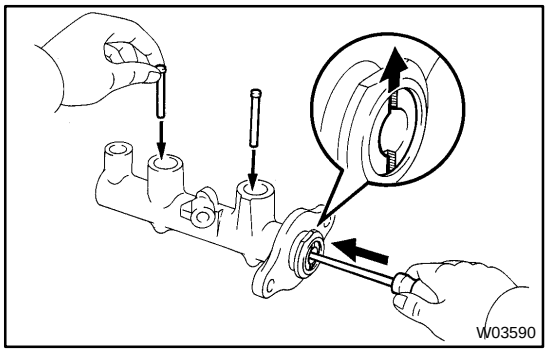
6. w/ TRAC:
REMOVE 2 PISTONS AND SPRINGS

(a) Push in the piston with a screwdriver, and remove the 2 straight pins by turning over the cylinder body.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 pistons and springs by hand, pulling straight out, not at angle.



NOTICE:

- **If pulled out and installed at an angle, there is a possibility that the cylinder bore could be damaged.**
- **At the time of reassembly, be careful not to damage the rubber lips on the pistons.**

HINT:

At the time of reassembly, insert the pistons with elliptic hole facing vertically.

BR06C–01

INSPECTION

HINT:

Clean the disassembled parts with compressed air.

1. INSPECT CYLINDER BORE FOR RUST OR SCORING

2. INSPECT CYLINDER FOR WEAR OR DAMAGE

If necessary, clean or replace the cylinder.

BR06D–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR–14).

NOTICE:

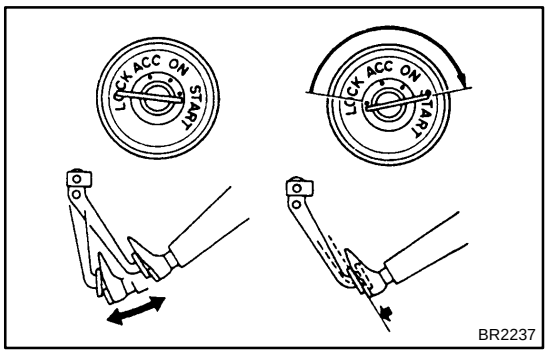
Apply lithium soap base glycol grease to the rubber parts indicated by the arrows (See page BR–12).

BR06E–01

INSTALLATION

Installation is in the reverse order of removal (See page BR–13).

1. **BEFORE INSTALLATION, ADJUST LENGTH OF BRAKE BOOSTER PUSH ROD (See page BR–22)**
2. **AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR–4)**
3. **CHECK FOR LEAKS, CHECK AND ADJUST BRAKE PEDAL (See page BR–6)**



BRAKE BOOSTER ASSEMBLY

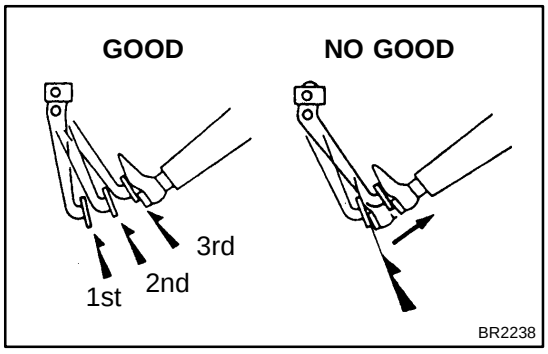
BR06F–01

ON–VEHICLE INSPECTION

1. OPERATING CHECK

(a) Depress the brake pedal several times with the engine off and check that there is no change in the pedal reserve distance.

(b) Depress the brake pedal and start the engine. If the pedal goes down slightly, operation is normal.



2. AIR TIGHTNESS CHECK

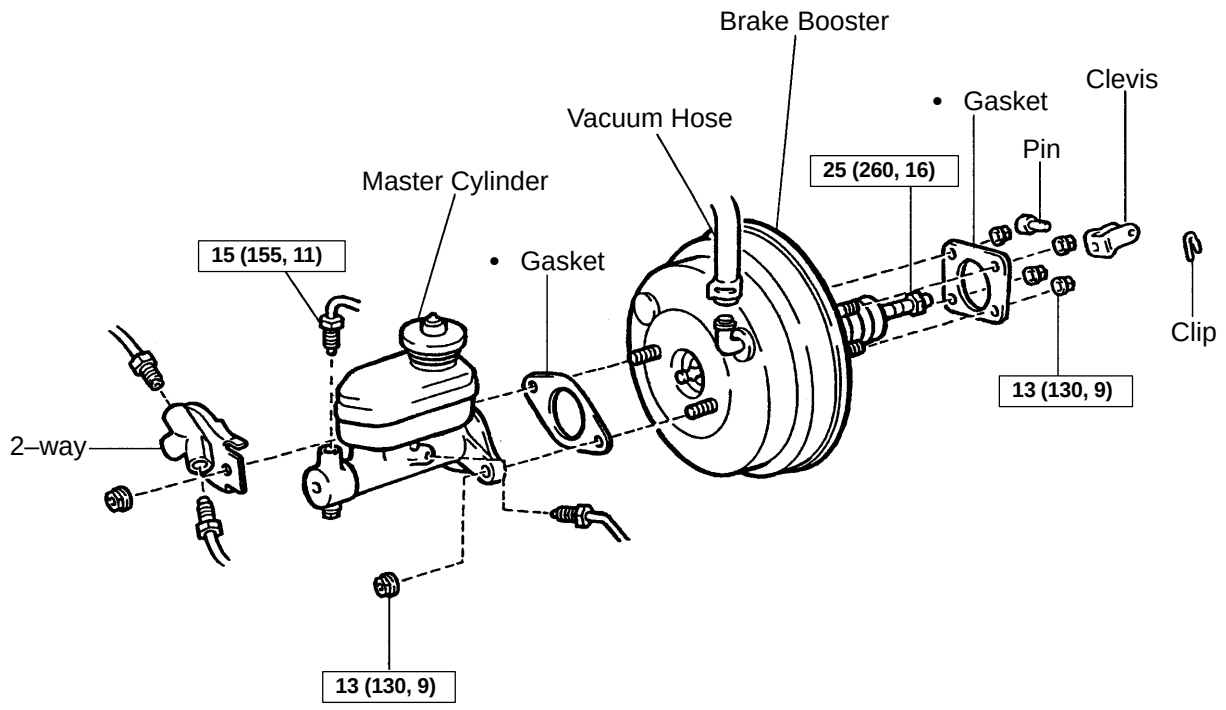
(a) Start the engine and stop it after 1 or 2 minutes. Depress the brake pedal several times slowly.

If the pedal goes down farthest the 1st time, but gradually rises after the 2nd or 3rd time, the booster is air tight.

(b) Depress the brake pedal while the engine is running, and stop the engine with the pedal depressed. If there is no change in the pedal reserve travel after holding the pedal for 30 seconds, the booster is air tight.

BR06G–04

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

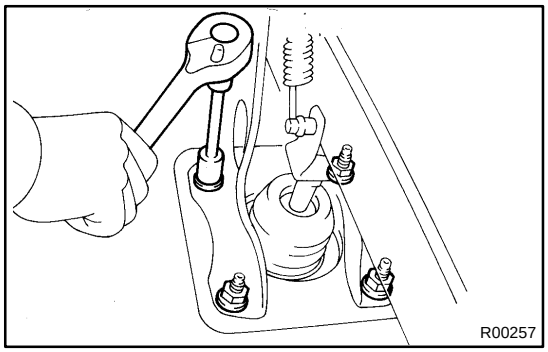
• Non–reusable part

Z19273

BR06H–01

REMOVAL

1. **REMOVE AIR CLEANER COVER WITH AIR CLEANER HOSE**
2. **REMOVE MASTER CYLINDER (See page BR–13)**
3. **REMOVE CHARCOAL CANISTER**
4. **DISCONNECT VACUUM HOSE FROM BRAKE BOOSTER**
5. **REMOVE PEDAL RETURN SPRING**
6. **REMOVE CLIP AND CLEVIS PIN**



7. **REMOVE BRAKE BOOSTER, GASKET AND CLEVIS**

(a) Remove the 4 nuts and clevis.

(b) Pull out the brake booster and gasket.

BR06I–05

INSTALLATION

1. INSTALL BRAKE BOOSTER

(a) Install the booster and a new gasket.

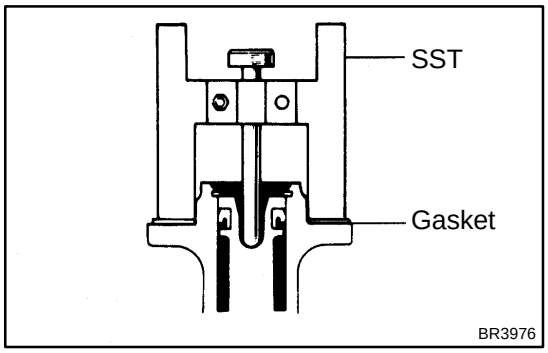
(b) Install the clevis to the operating rod.

(c) Install and torque the booster installation nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(d) Install the clevis, and torque the lock nut.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)

(e) Install the clevis pin into the clevis and brake pedal, and install the clip to the clevis pin.

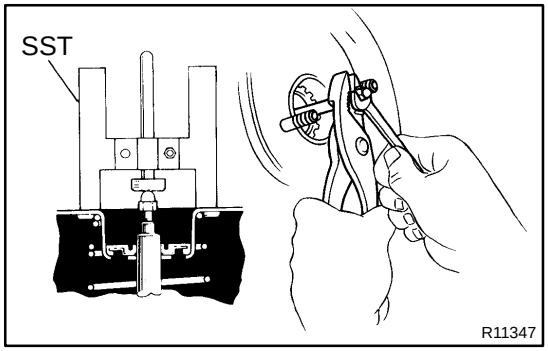
(f) Install the pedal return spring.



2. ADJUST LENGTH OF BOOSTER PUSH ROD

(a) Install a new gasket on the master cylinder.

(b) Set the SST on the gasket, and lower the pin until its tip slightly touches the piston.
SST 09737–00010



(c) Turn the SST upside down, and set it on the booster.
SST 09737–00010

(d) Measure the clearance between the booster push rod and pin head (SST).
Clearance: 0 mm (0 in.)

(e) Adjust the booster push rod length until the push rod lightly touches the pin head.

3. INSTALL CHARCOAL CANISTER TO ORIGINAL POSITION

4. INSTALL MASTER CYLINDER (See page BR–18)

5. INSTALL AIR CLEANER COVER WITH AIR CLEANER HOSE

6. CONNECT VACUUM HOSE TO BRAKE BOOSTER

7. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR–4)

8. CHECK FOR FLUID LEAKAGE

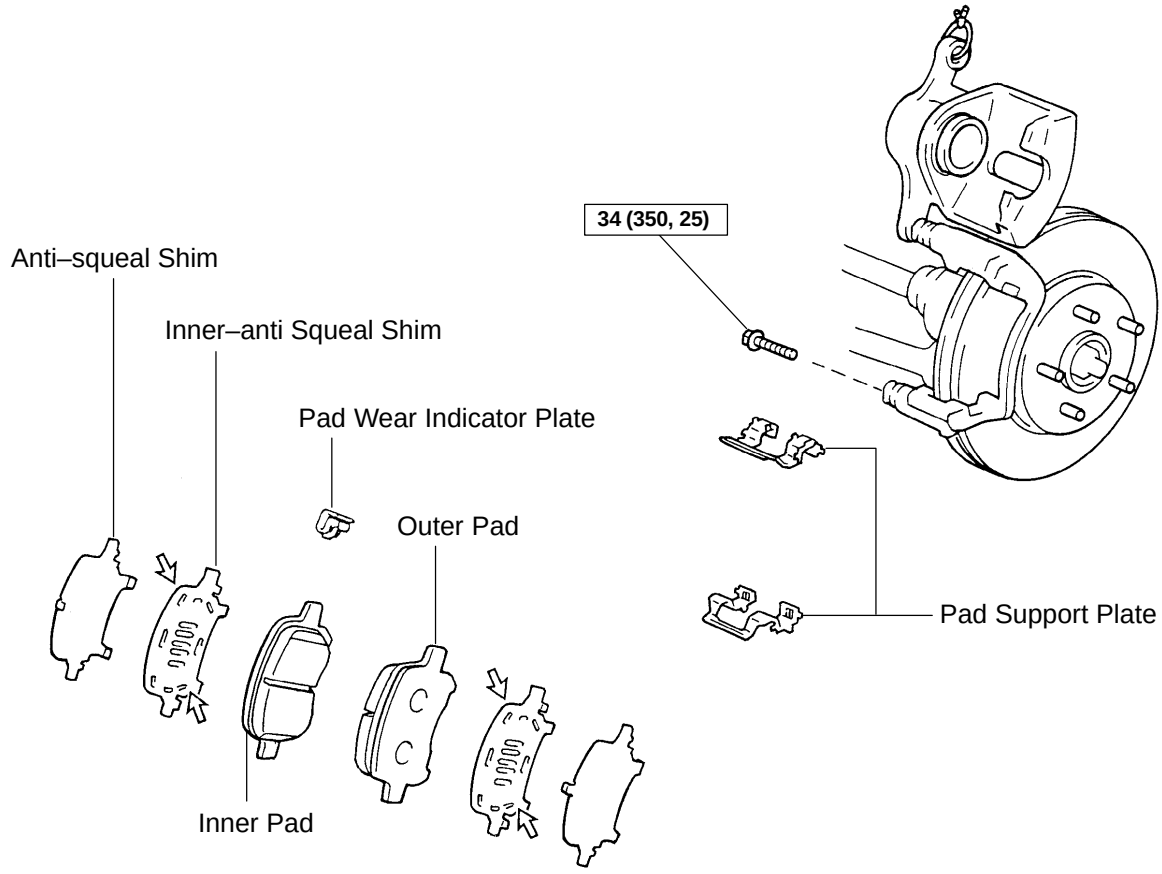
9. CHECK AND ADJUST BRAKE PEDAL (See page BR–6)

10. DO OPERATIONAL CHECK (See page BR–19)

FRONT BRAKE PAD

BR06J–03

COMPONENTS



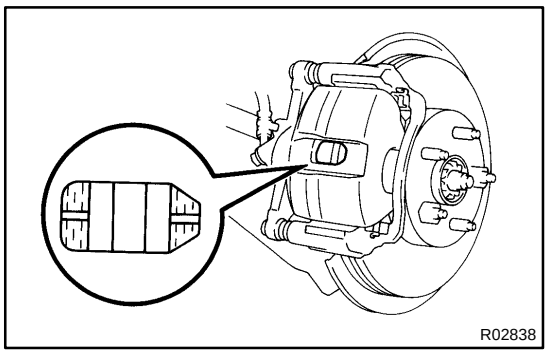
N·m (kgf·cm, ft·lbf) : Specified torque

⇦ Disc brake grease

F02609

BR06K–01

REPLACEMENT



1. REMOVE FRONT WHEEL

Remove the wheel and temporarily fasten the disc with hub nuts.

2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the caliper inspection hole and replace the pads if they are not within the specification.

Minimum thickness: 1.0 mm (0.039 in.)

3. LIFT UP CALIPER

(a) Remove the bolt and flexible hose from the shock absorber.
(b) Remove the bottom side installation bolt.
(c) Lift up the caliper and suspend it securely.

HINT:

Do not disconnect the flexible hose from the caliper.

4. REMOVE THESE PARTS:

(a) 2 brake pads
(b) 4 anti–squeal shims
(c) Pad wear indicator plate
(d) 2 pad support plates

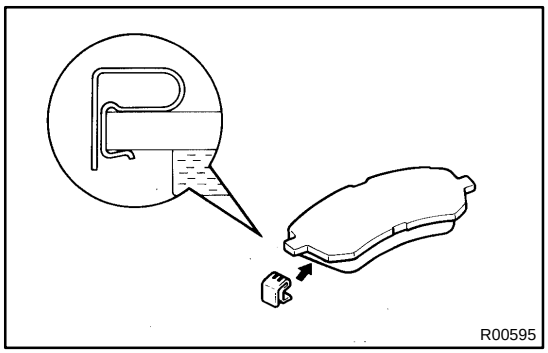
NOTICE:

The support plates can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.

5. CHECK DISC THICKNESS AND RUNOUT

(See page BR–29)

6. INSTALL 2 PAD SUPPORT PLATES



7. INSTALL NEW PADS

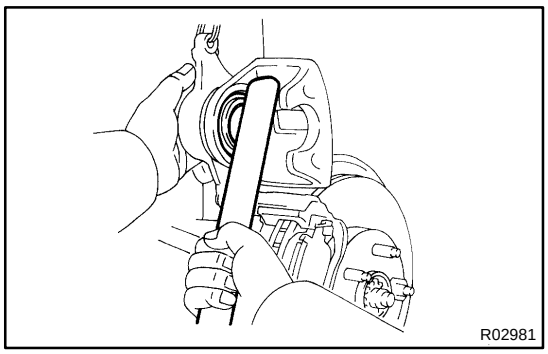
NOTICE:

When replacing worn pads, the anti–squeal shims and wear indicator plates must be replaced together with the pads.

(a) Install a pad wear indicator plate on the inner pad.
(b) Apply disc brake grease to both sides of the inner anti–squeal shim (See page BR–23).
(c) Install the 2 anti–squeal shims on each pad.
(d) Install inner pad with the pad wear indicator plate facing upward.
(e) Install outer pad.

NOTICE:

There should be no oil or grease adhering to the friction surfaces of the pads or the disc.



8. INSTALL CALIPER

(a) Draw out a small amount of brake fluid from the reservoir.

(b) Press in the piston with a hammer handle or similar implement.

HINT:

If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.

(c) Install the caliper.

(d) Install the installation bolt.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

(e) Install the flexible hose and bolt to the shock absorber.
Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)

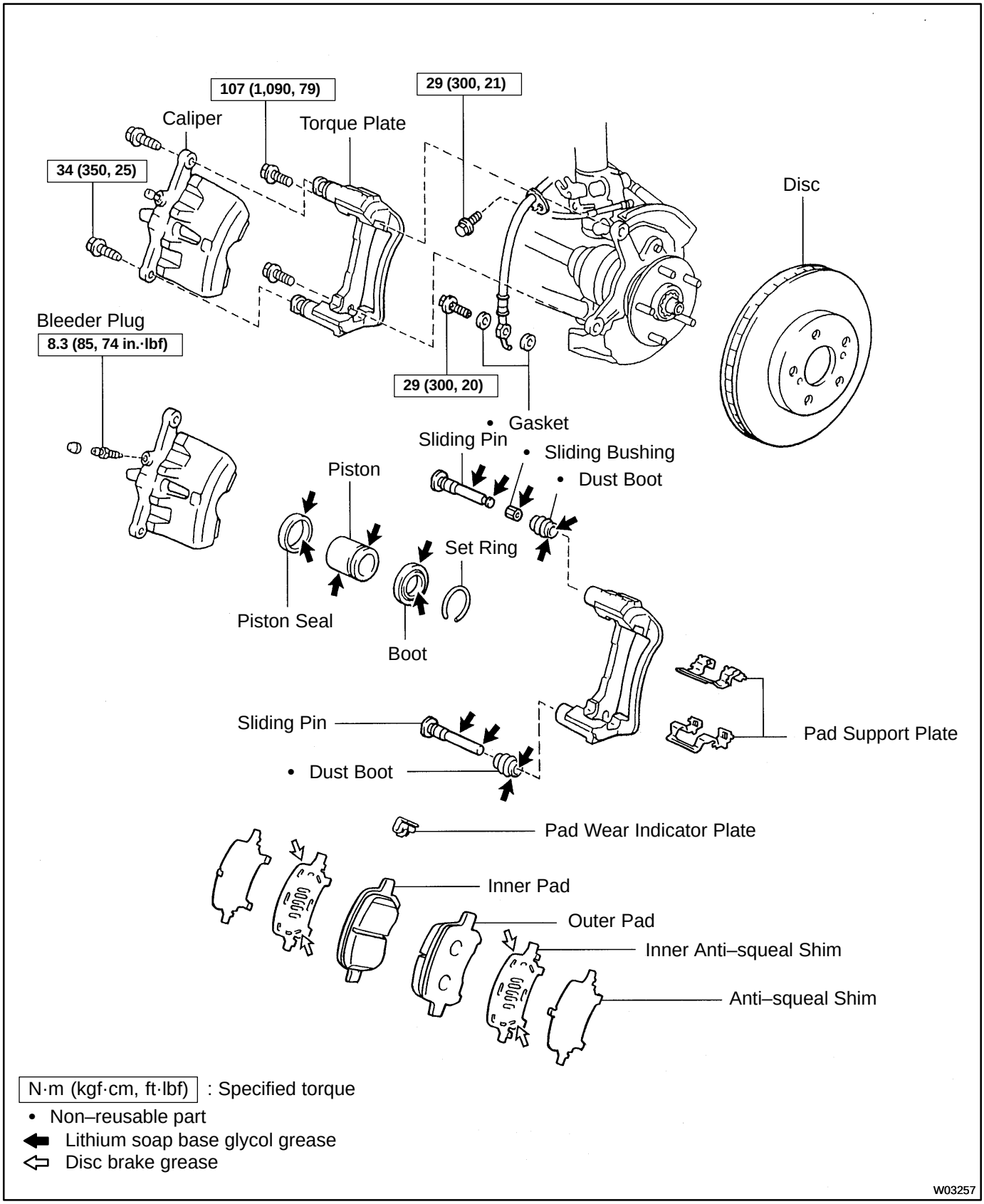
9. INSTALL FRONT WHEEL

10. CHECK THAT FLUID LEVEL IS AT MAX LINE

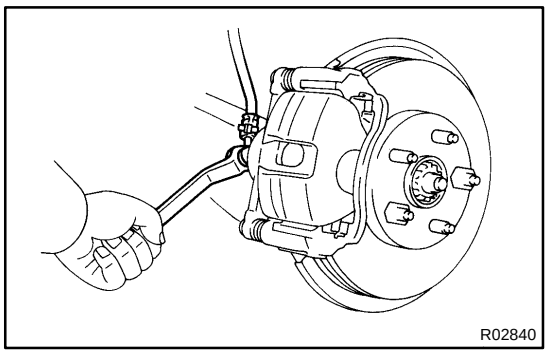
FRONT BRAKE CALIPER

BR06L–03

COMPONENTS



BR06M–01



REMOVAL

1. REMOVE FRONT WHEEL

2. DISCONNECT FLEXIBLE HOSE

(a) Remove the union bolt and 2 gaskets from the caliper, then disconnect the flexible hose from the caliper.
Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)

HINT:

At the time of installation, please refer to the following item. Install the flexible hose lock securely in the lock hole in the caliper.

(b) Use a container to catch the brake fluid as it drains out.

3. REMOVE CALIPER

(a) Remove the 2 installation bolts.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

(b) Remove the caliper from the torque plate.

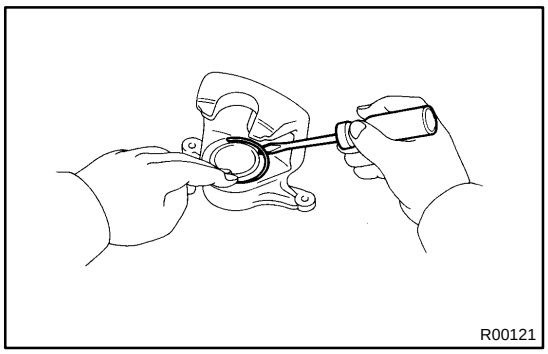
4. REMOVE THESE PARTS:

(a) 2 brake pads with anti–squeal shims

(b) 2 pad support plates

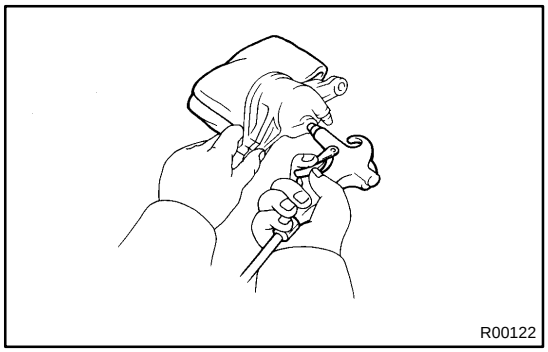
BR06N–01

DISASSEMBLY



1. REMOVE SET RING AND CYLINDER BOOT

Using a screwdriver, remove the set ring and cylinder boot from the caliper.



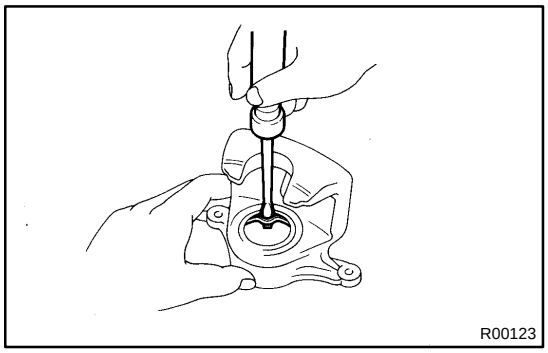
2. REMOVE PISTON

(a) Place a piece of cloth or similar, between the piston and the caliper.

(b) Use compressed air to remove the piston from the cylinder.

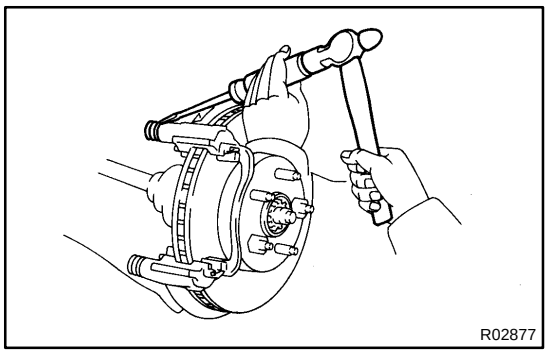
CAUTION:

Do not place your fingers in front of the piston when using compressed air.



3. REMOVE PISTON SEAL

Using a screwdriver, remove the piston seal from the cylinder.



4. REMOVE SLIDING PINS AND DUST BOOTS

(a) Remove the 2 sliding pins from the torque plate.

NOTICE:

At the time of reassembly, please refer to the following item. Insert the sliding pin with sliding bushing into the top side.

(b) Using a screwdriver and hammer, tap out the 2 dust boots.

HINT:

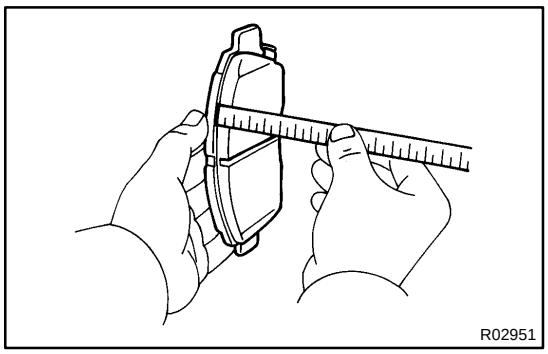
At the time of reassembly, please refer to the following item. Use a 24 mm socket wrench and tap in 2 new dust boots into the torque plate.

NOTICE:

At the time of reassembly, please refer to the following item. Check that the metal plate portion of the dust boot fits snugly in the torque plate.

BR06O–03

INSPECTION


R02951

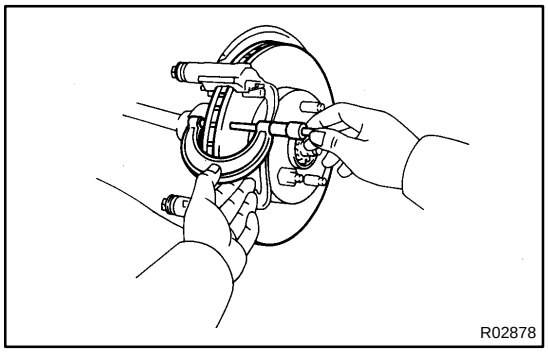
1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness: 11.0 mm (0.433 in.)

Minimum thickness: 1.0 mm (0.039 in.)

Replace the pad if the pad's thickness is at the minimum thickness or less, or if the pad has severe and uneven wear.


R02878

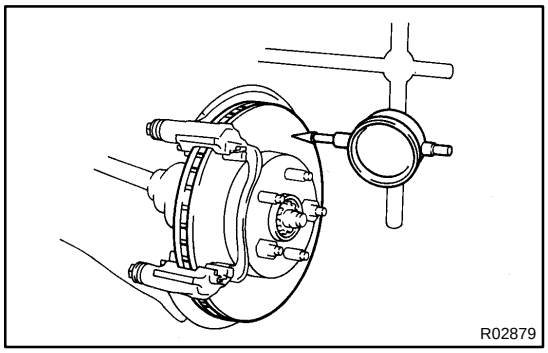
2. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 28.0 mm (1.102 in.)

Minimum thickness: 26.0 mm (1.024 in.)

Replace the disc if the disc's thickness is at the minimum thickness or less. Replace the disc or grind it on a lathe if it is badly scored or worn unevenly.

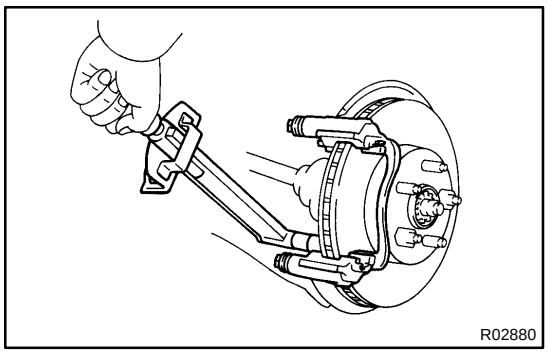

R02879

3. MEASURE DISC RUNOUT

Using a dial indicator, measure disc runout 10 mm (0.39 in.) away from the outer edge of the disc.

Maximum disc runout: 0.05 mm (0.0020 in.)

If the disc's runout is the maximum value or greater, check the bering play in the axial direction and check the axle hub runout (See page SA–9). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grind it on a "On–Car" brake lathe.


R02880

4. IF NECESSARY, ADJUST DISC RUNOUT

(a) Remove the torque plate from the knuckle.

(b) Remove the hub nuts and the disc. Reinstall the disc in the position turned 1/5 from its original position on the hub. Install and torque the hub nuts.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.

(c) Repeat (b) until the disc has been installed on the 3 remaining hub positions.

(d) If the minimum runout recorded in (b) and (c) is less than 0.05 mm (0.0020 in.), install the disc in that position.

(e) If the minimum runout recorded in (b) and (c) is greater than 0.05 mm (0.0020 in.), replace the disc and repeat step 3.

(f) Install the torque plate and torque the mounting bolts.

Torque: 107 N·m (1,090 kgf·cm, 79 ft·lbf)

BR06P–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR–28).

NOTICE:

Apply lithium soap base glycol grease to the parts indicated by arrows (See page BR–26).

BR06Q–01

INSTALLATION

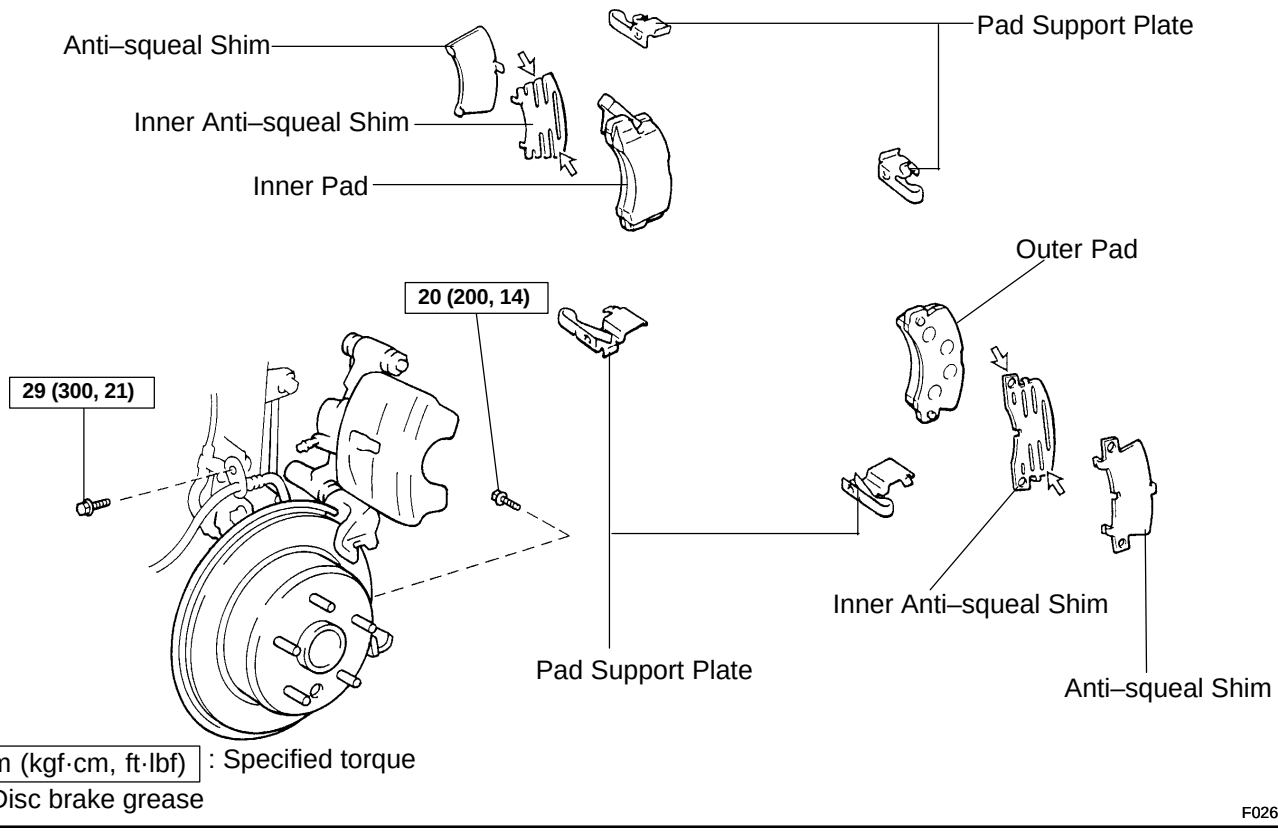
Installation is in the reverse order of removal (See page BR–27).

1. **AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR–4)**
2. **CHECK FOR LEAKS**

REAR BRAKE PAD

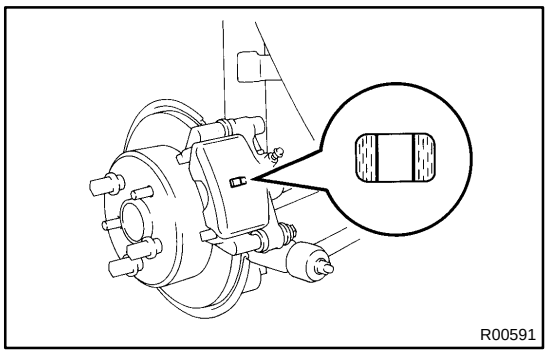
COMPONENTS

BR06R–04



BR06S–01

REPLACEMENT


R00591

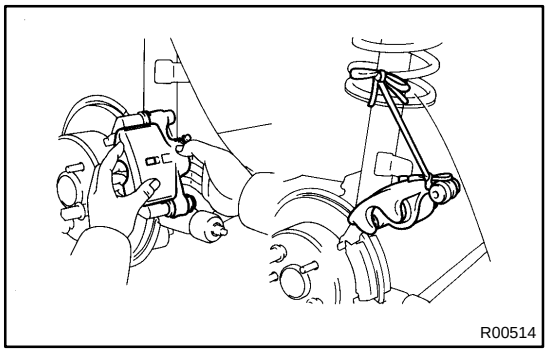
1. REMOVE REAR WHEEL

Remove the wheel and temporarily fasten the disc with the hub nuts.

2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the caliper inspection hole and replace pads if not within specification.

Minimum thickness: 1.0 mm (0.039 in.)


R00514

3. LIFT UP CALIPER

(a) Remove the bolt and flexible hose from the shock absorber.

(b) Remove the installation bolt from the torque plate.

(c) Lift up the caliper and suspend it securely.

HINT:

Do not disconnect the flexible hose.

4. REMOVE THESE PARTS:

(a) 2 brake pads

(b) 4 anti–squeal shims

(c) 4 pad support plates

NOTICE:

The support plates can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.

5. CHECK DISC THICKNESS AND RUNOUT

(See page BR–29)

6. INSTALL 4 PAD SUPPORT PLATES

7. INSTALL NEW PADS

NOTICE:

When replacing worn pads, the anti–squeal shims must be replaced together with the pads.

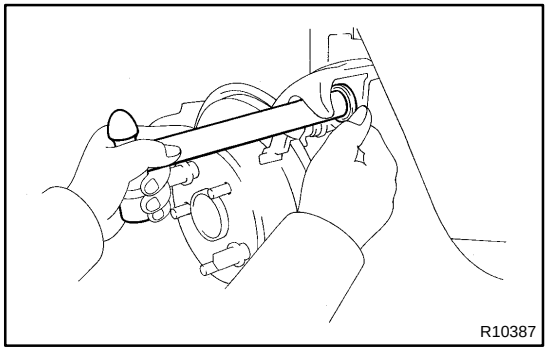
(a) Apply disc brake grease to both side of the inner anti–squeal shims (See page BR–32).

(b) Install the 2 anti–squeal shims on each pad.

(c) Install 2 pads with the pad wear indicator plate facing upward.

NOTICE:

There should be no oil or grease adhering to the friction surfaces of the pads or the disc.


R10387

8. INSTALL CALIPER

(a) Draw out a small amount of brake fluid from the reservoir.

(b) Press in the piston with a hammer handle or similar implement.

HINT:

If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.

(c) Install the caliper and torque the installation bolt.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

(d) Install the flexible hose and bolt to the shock absorber.
Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)

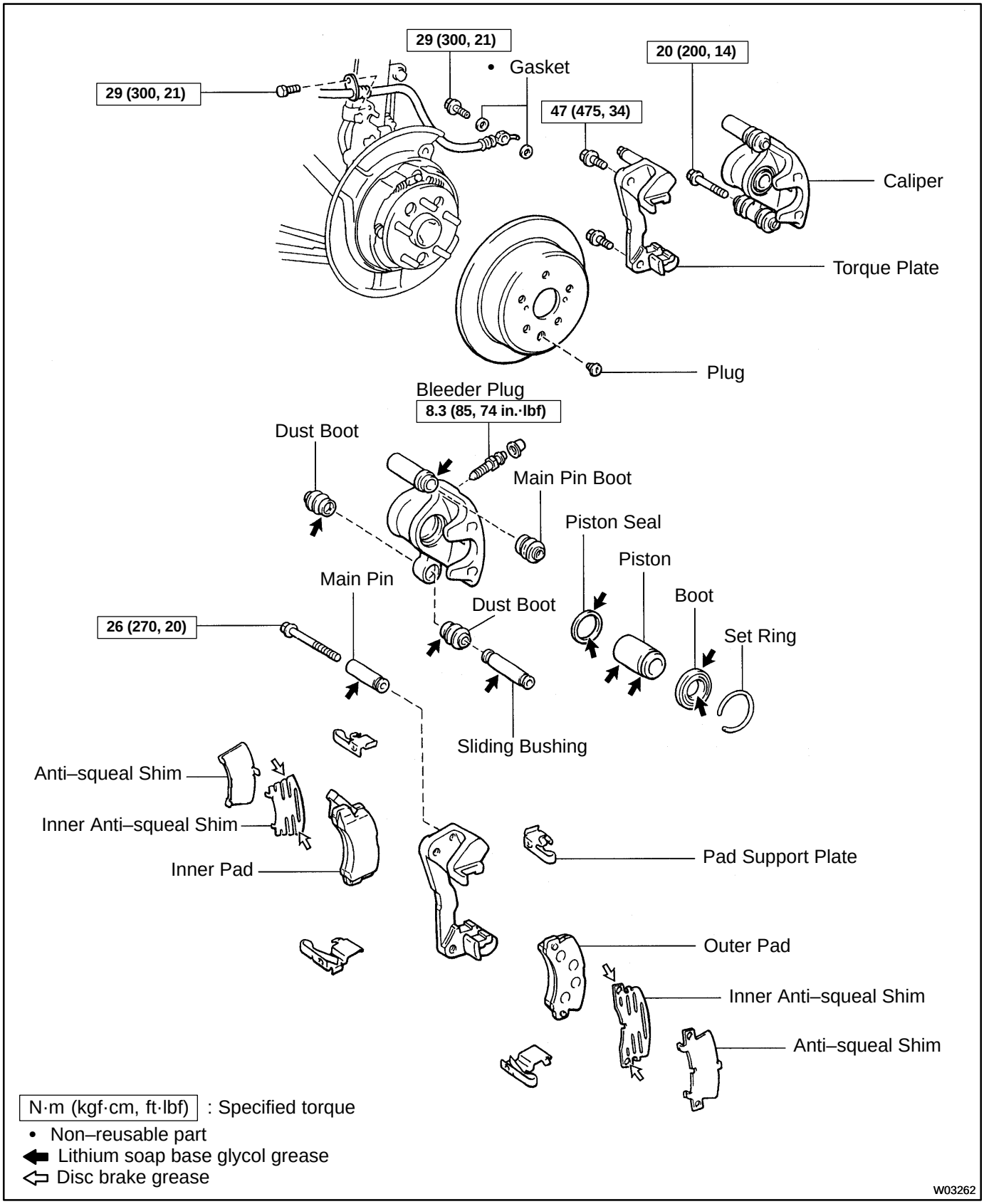
9. INSTALL REAR WHEEL

10. CHECK THAT FLUID LEVEL IS AT MAX LINE

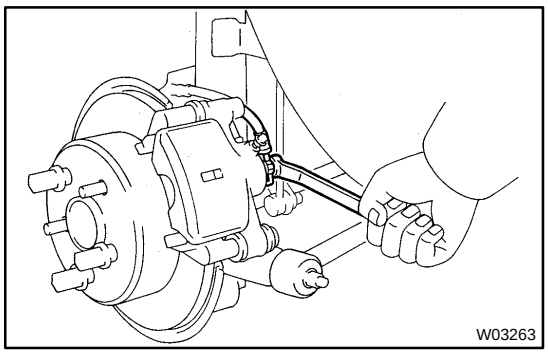
REAR BRAKE CALIPER

BR06T–04

COMPONENTS



BR06U–01



REMOVAL

1. REMOVE REAR WHEEL

2. DISCONNECT FLEXIBLE HOSE

(a) Remove the union bolt and 2 gaskets from the caliper, then disconnect the flexible hose from the caliper.

Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)

HINT:

At the time of installation, please refer to the following item. Insert the flexible hose lock securely in the lock hole in the caliper.

(b) Use a container to catch the brake fluid as it drains out.

3. REMOVE CALIPER

(a) Remove the installation bolt.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

(b) Remove the caliper from the torque plate.

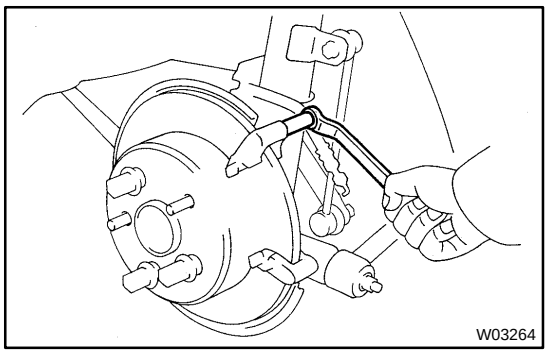
4. REMOVE THESE PARTS:

(a) 2 brake pads with anti–squeal shims

(b) 4 pad support plates

NOTICE:

At the time of installation, please refer to the following item. There should be no oil or grease adhering to the friction surfaces of the pads or disc.

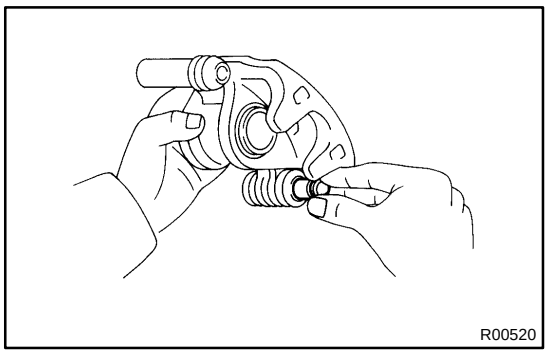


5. REMOVE MAIN PIN

Loosen the main pin installation bolt and remove the main pin.

Torque: 26 N·m (270 kgf·cm, 20 ft·lbf)

BR06V–01


R00520

DISASSEMBLY

1. REMOVE THESE PARTS:

(a) Sliding bushing

(b) 2 dust boots

(c) Main pin boot

NOTICE:

Ensure that the boots are secured firmly to the bushing and caliper grooves.

2. REMOVE CYLINDER BOOT SET RING AND BOOT (See step 1 on page BR–28)

3. REMOVE PISTON (See step 2 on page BR–28)

4. REMOVE PISTON SEAL (See step 3 on page BR–28)

BR06W–01

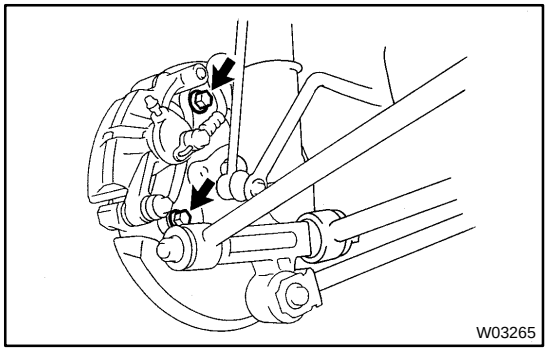
INSPECTION

1. MEASURE PAD LINING THICKNESS
(See step 1 on page BR–29)
Standard thickness: 10.0 mm (0.394 in.)
Minimum thickness: 1.0 mm (0.039 in.)

2. MEASURE DISC THICKNESS
(See step 2 on page BR–29)
Standard thickness: 10.0 mm (0.394 in.)
Minimum thickness: 9.0 mm (0.354 in.)

3. MEASURE DISC RUNOUT
(See step 3 on page BR–29)
Maximum disc runout: 0.15 mm (0.0059 in.)

If the disc's runout is maximum value or greater, check the bearing play in the axial direction and check the axle hub runout (See page SA–46). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grind it on a "On–Car" brake lathe.



4. IF NECESSARY, ADJUST DISC RUNOUT

(a) Remove the 2 bolts and torque plate.

(b) Remove the hub nuts and the disc. Reinstall the disc in the position turned 1/5 from its original position on the hub. Install and torque the hub nuts.
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.

(c) Repeat (b) until the disc has been installed on the 3 remaining hub positions.

(d) If the minimum runout recorded in (b) and (c) is less than 0.15 mm (0.0059 in.), install the disc in that position.

(e) If the minimum runout recorded in (b) and (c) is greater than 0.15 mm (0.0059 in.), replace the disc and repeat step 3.

(f) Install the torque plate and torque the mounting bolts.
Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)

BR06X–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR–37).

NOTICE:

Apply lithium soap base glycol grease to the parts indicated by the arrows (See page BR–35).

BR06Y–01

INSTALLATION

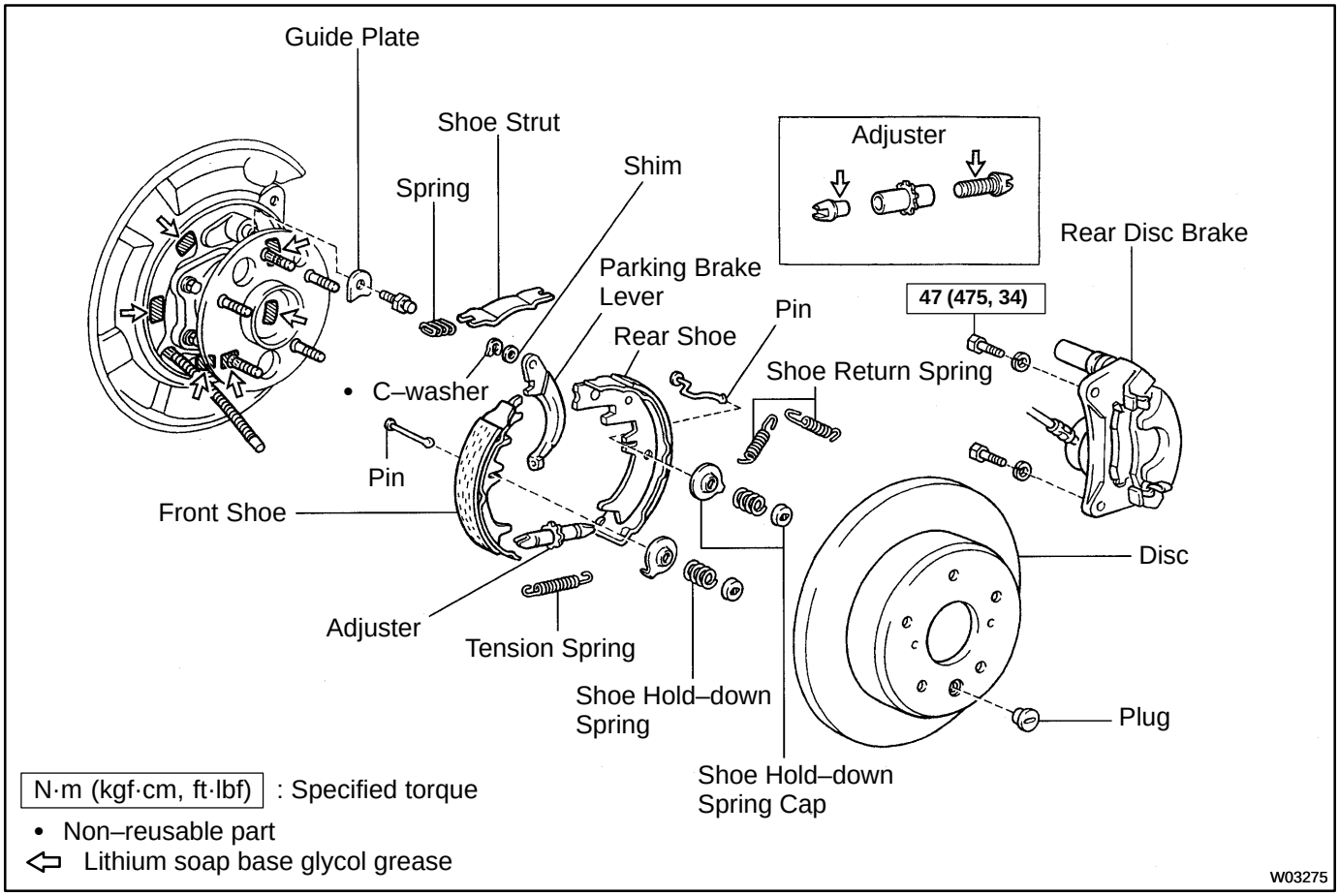
Installation is in the reverse order of removal (See page BR–36).

1. **AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR–4)**
2. **CHECK FOR LEAKS**

PARKING BRAKE

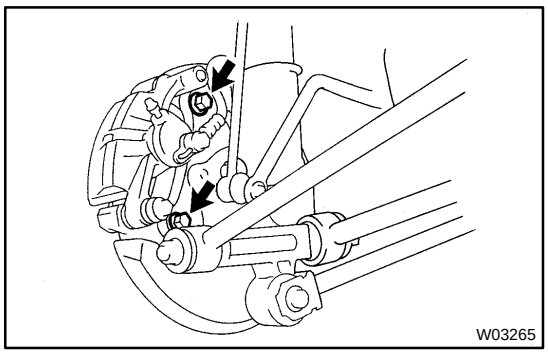
COMPONENTS

BR06Z–04



BR070–01

DISASSEMBLY



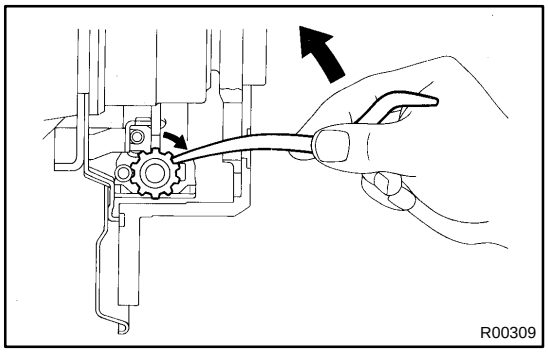
1. REMOVE REAR WHEEL

2. REMOVE REAR DISC BRAKE ASSEMBLY

(a) Remove the 2 mounting bolts and remove the disc brake assembly.

Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)

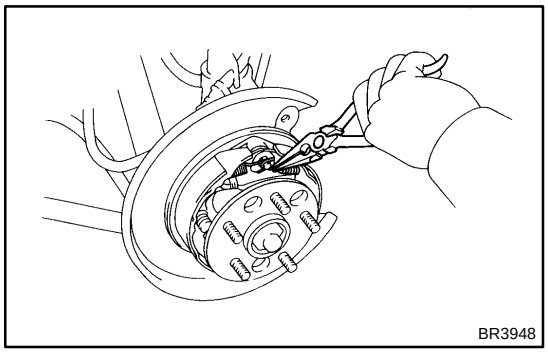
(b) Suspend the disc brake securely. Ensure that the hose is not stretched.



3. REMOVE DISC

HINT:

If the disc cannot be removed easily, turn the shoe adjuster until the wheel turns freely.



4. REMOVE SHOE RETURN SPRINGS

Using needle–nose pliers, remove the shoe return springs.

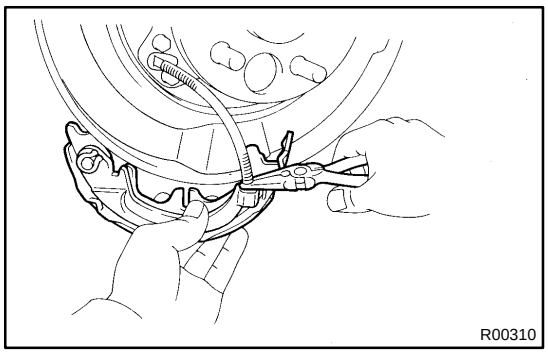
5. REMOVE FRONT SHOE ADJUSTER AND TENSION SPRING

(a) Slide out the front shoe and remove the shoe adjuster.

(b) Remove the shoe strut with the spring.

(c) Remove the shoe hold–down spring cups, spring and pin.

(d) Disconnect the tension spring and remove the front shoe.



6. REMOVE REAR SHOE

(a) Slide out the rear shoe.

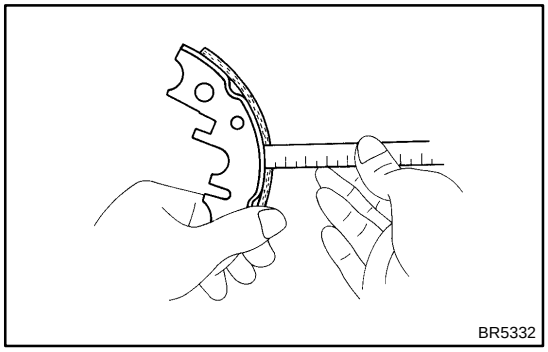
(b) Remove the tension spring from the rear shoe.

(c) Remove the shoe hold–down spring cups, spring and pin.

(d) Using needle–nose pliers, disconnect the parking brake cable from the parking brake shoe lever.

BR071–04

INSPECTION



1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.

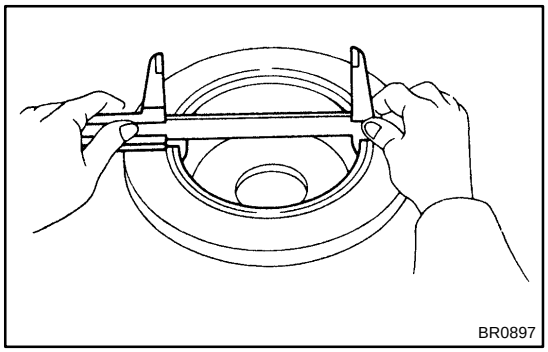
2. MEASURE BRAKE SHOE LINING THICKNESS

Using a ruler, measure the thickness of the shoe lining.

Standard thickness: 2.0 mm (0.079 in.)

Minimum thickness: 1.0 mm (0.039 in.)

If the lining thickness is at the minimum thickness or less, or if there is severe, uneven wear, replace the brake shoe.



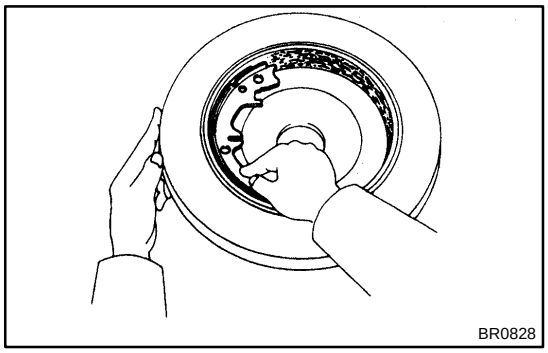
3. MEASURE DISC INSIDE DIAMETER

Using a vernier calipers, measure the inside diameter of the disc.

Standard inside diameter: 170 mm (6.69 in.)

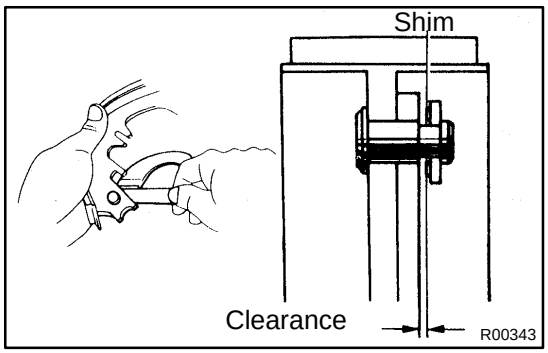
Maximum inside diameter: 171 mm (6.73 in.)

Replace the disc if the inside diameter is at the maximum value or more. Replace the disc or grind it with a lathe if the disc is scored or is worn unevenly.



4. INSPECT PARKING BRAKE LINING AND DISC FOR PROPER CONTACT

Apply chalk to the inside surface of the disc, then grind down the brake shoe lining to fit. If the contact between the disc and the brake shoe lining is improper, repair it using a brake shoe grinder or replace the brake shoe assembly.



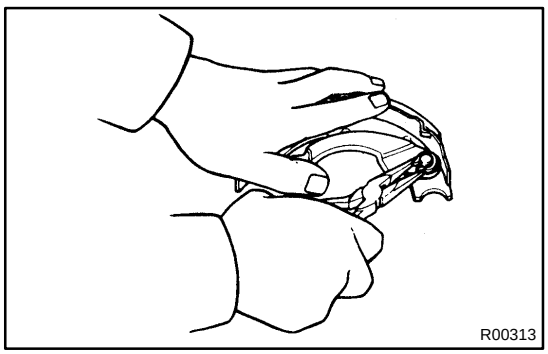
5. MEASURE CLEARANCE BETWEEN PARKING BRAKE SHOE AND LEVER

Using a feeler gauge, measure the clearance.

Standard clearance: Less than 0.35 mm (0.0138 in.)

If the clearance is not within the specification, replace the shim with one of the correct size.

Shim Thickness	Shim Thickness
0.3 mm (0.012 in.)	0.9 mm (0.035 in.)
0.6 mm (0.024 in.)	



6. IF NECESSARY, REPLACE SHIM

(a) Using a screwdriver, remove the C–washer and shim.

(b) Remove the parking brake lever, and install the correct size shim.

(c) Install the parking brake lever with a new C–washer.

(d) Remeasure the clearance.

BR072–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR–42).

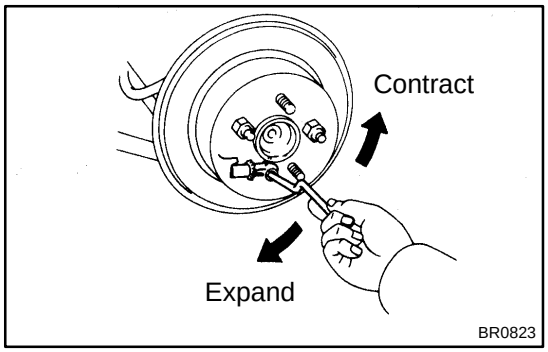
NOTICE:

Apply high temperature grease to the parts indicated by the arrows (See page BR–41).

1. ADJUST PARKING BRAKE SHOE CLEARANCE

(a) Temporarily install the hub nuts.

(b) Remove the hole plug.



(c) Turn the adjuster and expand the shoes until the disc locks.

(d) Return the adjuster 8 notches.

(e) Install the hole plug.

2. SETTLING PARKING BRAKE SHOES AND DISC

(a) Depress the parking brake pedal with 147 N (15 kgf, 33 lbf)

(b) Drive the vehicle at about 50 km/h (31 mph) on a safe, level and dry road for about 400 meters (0.25 mile) in this condition.

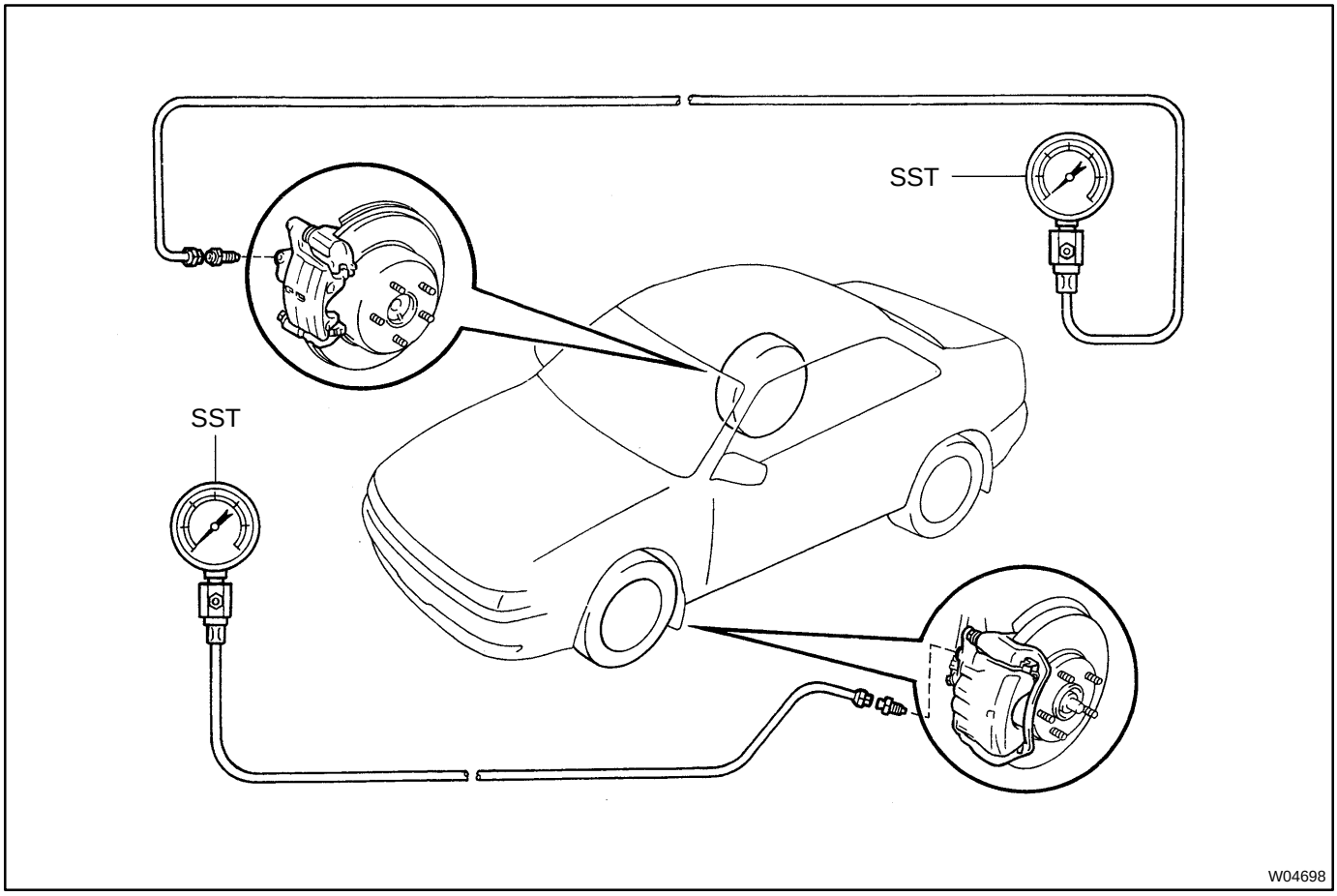
(c) Repeat this procedure 2 or 3 times.

3. RECHECK AND ADJUST PARKING BRAKE PEDAL TRAVEL (See page BR–8)

PROPORTIONING VALVE (P VALVE)

BR073–04

ON–VEHICLE INSPECTION



1. INSTALL LSPV GAUGE (SST) AND BLEED AIR
SST 09709–29018

2. BLEED AIR FROM FLUID PRESSURE GAUGE

3. RAISE MASTER CYLINDER PRESSURE AND CHECK REAR CALIPER PRESSURE

Master cylinder fluid pressure	Rear brake caliper fluid pressure
2,942 kPa (30 kgf/cm^2, 427 psi)	2,942 kPa (30 kgf/cm^2, 427 psi)
7,845 kPa (80 kgf/cm^2, 1,138 psi)	5,884 kPa (60 kgf/cm^2, 853 psi)

If the rear brake caliper pressure is incorrect, replace the P valve assembly.

4. BLEED BRAKE SYSTEM (See page BR–4)

5. CHECK FOR LEAKS

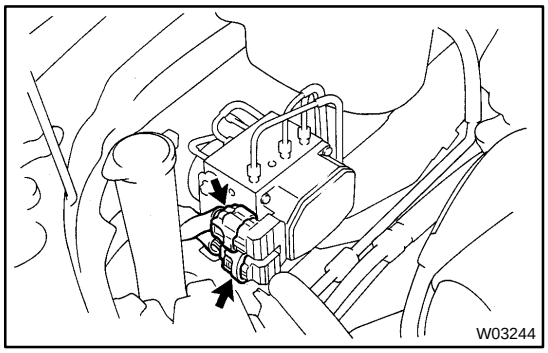
ABS ACTUATOR

BR07B–01

ON–VEHICLE INSPECTION

HINT:

Using the ABS actuator checker (SST), check the operation of the actuator. If the actuator does not operate, check the operation of sub–wire harness G according to the instructions on pages DI–240 and DI–243. If the solenoid and/or pump motor relay are abnormal, replace the relay and inspect the actuator operation again.



1. INSPECT BATTERY POSITIVE VOLTAGE

Battery positive voltage: 10 – 14 V

2. DISCONNECT CONNECTORS

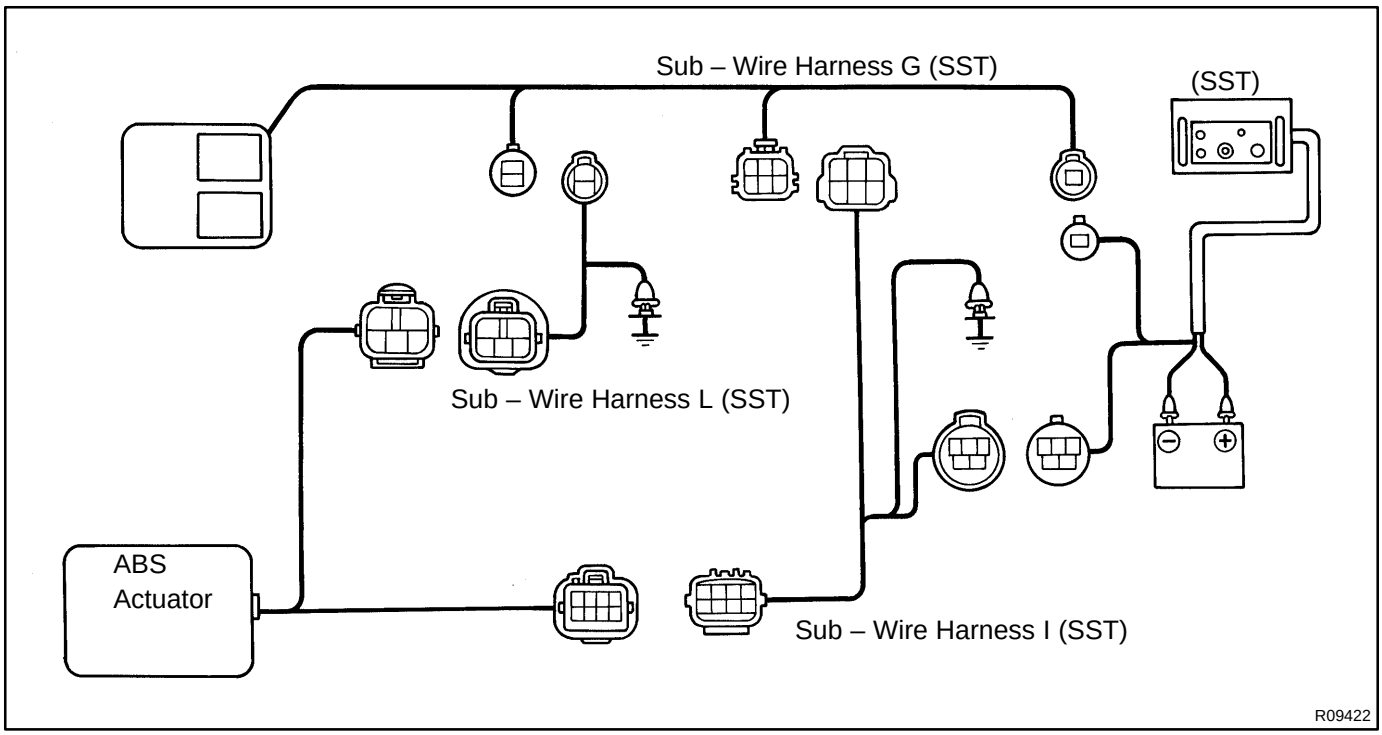
Disconnect the 2 connectors from the actuator.

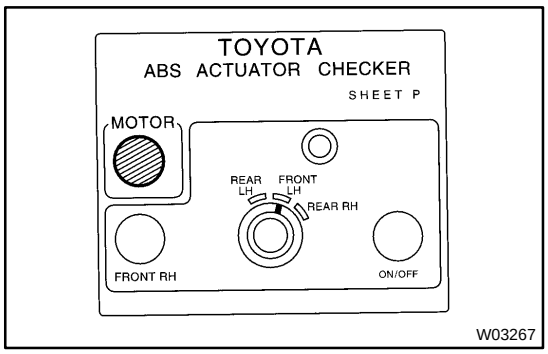
3. CONNECT ACTUATOR CHECKER (SST)

(a) Connect the actuator checker (SST) to the actuator side wire harness via the sub–wire harness (SST), as shown.

SST 09990–00150, 09990–00250, 09990–00300, 09990–00360

(b) Connect the red cable of the checker to the battery positive (+) terminal and black cable to the negative (–) terminal. Connect the black cable of the sub–wire harness to the battery negative (–) terminal or body ground.





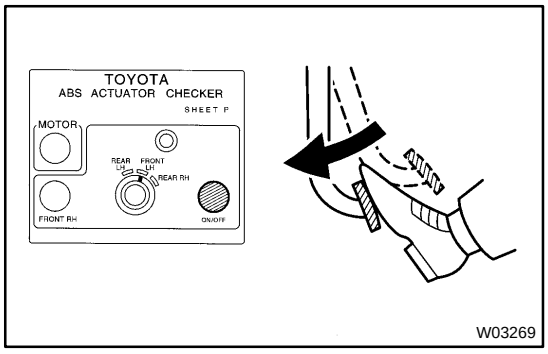
(c) Place the ”SHEET P” (SST) on the actuator checker.
SST 09990–00430

4. INSPECT BRAKE ACTUATOR OPERATION

(a) Start the engine, and run it at idle.

(b) Turn the selector switch of the actuator checker to ”FRONT LH” position.

(c) Push and hold in the MOTOR switch for a few seconds.



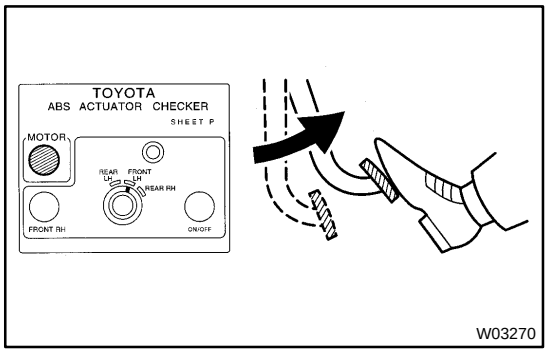
(d) Depress the brake pedal and hold it until step (g) is completed.

(e) Push the MAIN push switch, and check that the brake pedal does not go down.

NOTICE:

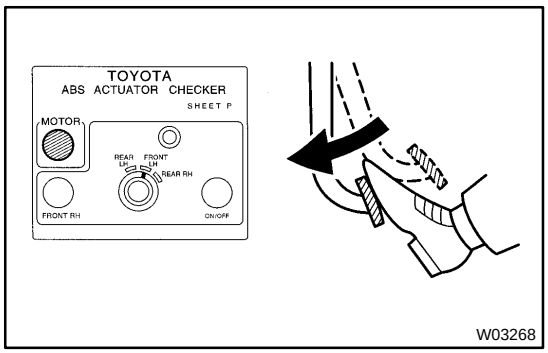
Do not keep the MAIN push switch pushed down for more than 10 seconds.

(f) Release the switch, and check that the pedal goes down.



(g) Push and hold in the MOTOR switch for a few seconds, and check that the pedal returns.

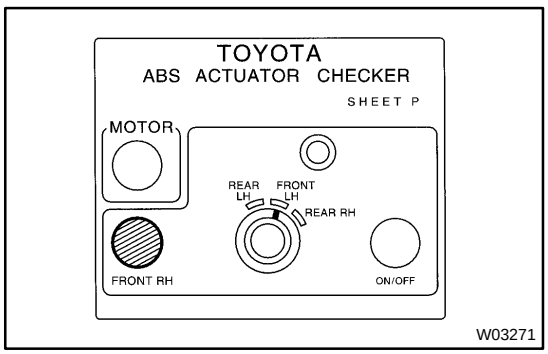
(h) Release the brake pedal.



(i) Push and hold in the MOTOR switch for a few seconds.

(j) Depress the brake pedal and hold it for about 15 seconds. As you hold the pedal down, push the MOTOR switch for a few seconds. Check that the brake pedal does not pulsate.

(k) Release the brake pedal.



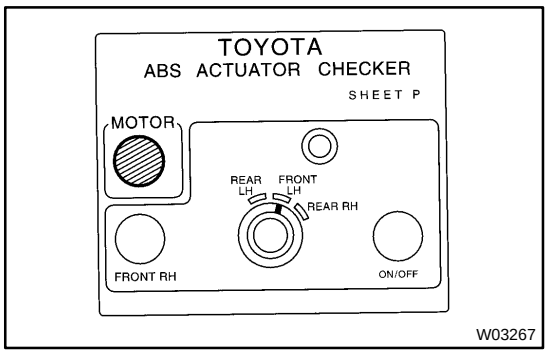
(l) Turn the selector switch to ”REAR RH” position.

(m) Repeat (c) to (j), checking the actuator operation similarly.

(n) Similarly, inspect ”REAR LH” and ”FRONT RH” position.

HINT:

When inspecting ”FRONT RH” position, push the FRONT RH switch instead of the MAIN push switch, and you can inspect in any selector switch position.



(o) Push and hold in the MOTOR switch for a few seconds.
(p) Stop the engine.

5. DISCONNECT ACTUATOR CHECKER (SST) FROM ACTUATOR

Remove the "SHEET P" (SST) and disconnect the actuator checker (SST) and sub–wire harness (SST) from the actuator.

SST 09990–00150, 09990–00250, 09990–00300, 09990–00360, 09990–00430

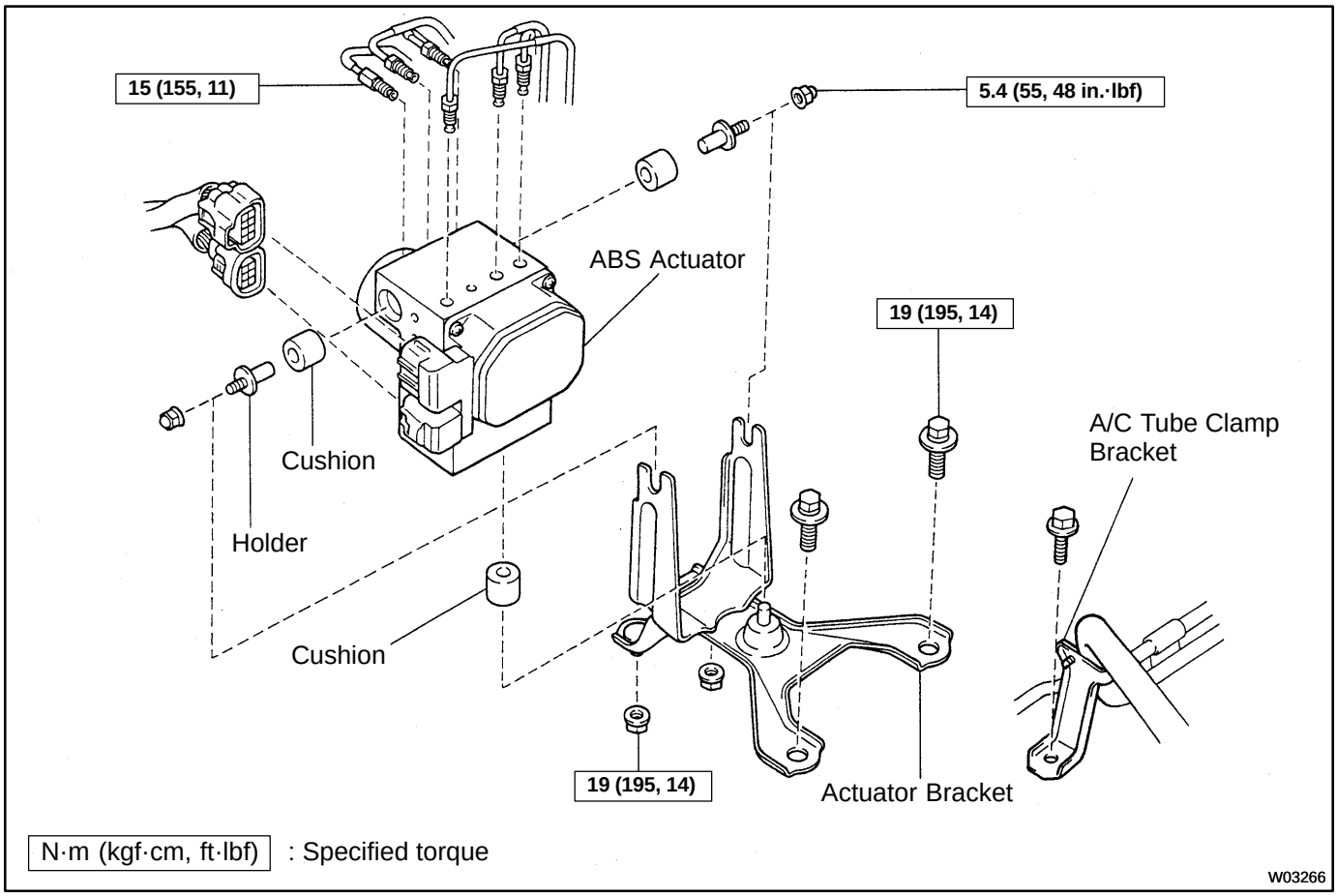
6. CONNECT CONNECTORS

Connect the 2 connectors to the actuator.

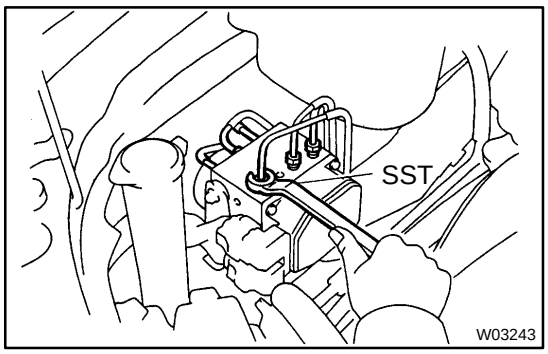
7. CLEAR DTC (See page DI–232)

BR074–03

COMPONENTS



BR075–02



REMOVAL

1. REMOVE RIGHT FRONT FENDER LINER

2. REMOVE A/C TUBE CLAMP BRACKET BOLT

3. DISCONNECT BRAKE LINES

Using SST, disconnect the 6 brake lines from the ABS actuator.

SST 09751–36011

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

4. REMOVE ABS ACTUATOR ASSEMBLY

(a) Disconnect the 2 connectors.

(b) Remove the 2 bolts, 2 nuts and ABS actuator assembly.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

5. REMOVE ABS ACTUATOR

(a) Remove the 2 nuts and ABS actuator from actuator bracket.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Remove the 2 holders and 3 cushions from the ABS actuator.

BR076–01

INSTALLATION

Installation is in the reverse order of removal (See page BR–50).

1. **AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR–4)**
2. **CHECK FOR LEAKS**

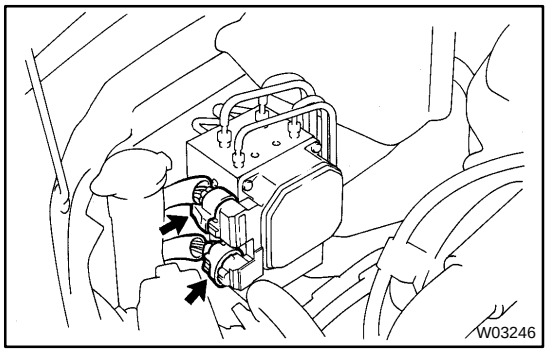
ABS & TRAC ACTUATOR

BR07A–02

ON–VEHICLE INSPECTION

HINT:

Using the ABS actuator checker (SST), check the operation of the actuator. If the actuator does not operate, check the operation of sub–wire harness G according to the instructions on pages DI–283 and DI–286. If the solenoid and/or pump motor relay are abnormal, replace the relay and inspect the actuator operation again.



1. INSPECT BATTERY POSITIVE VOLTAGE

Battery positive voltage: 10 – 14 V

2. DISCONNECT CONNECTORS

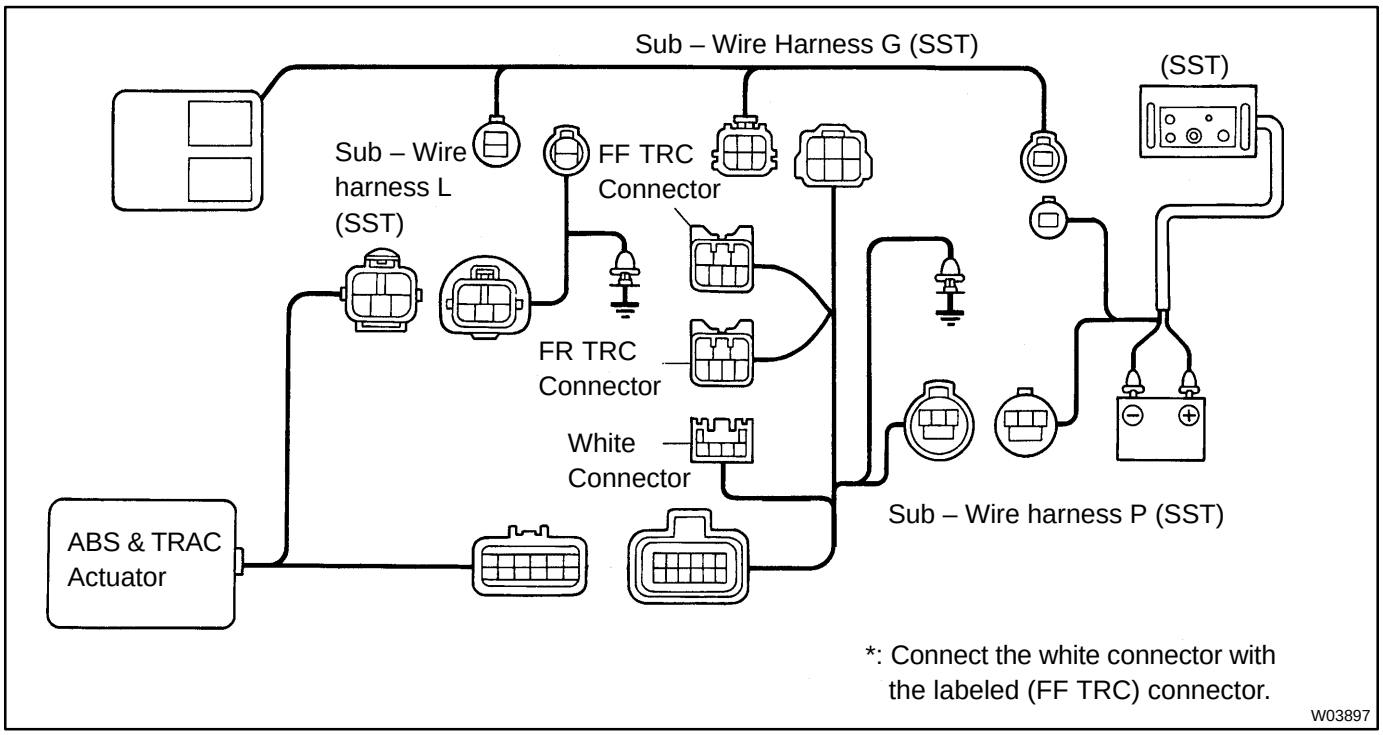
Disconnect the 2 connectors from the actuator.

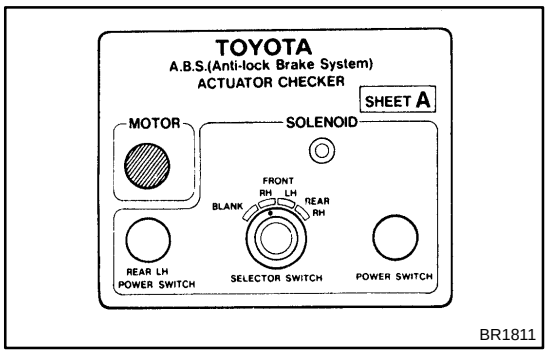
3. CONNECT ACTUATOR CHECKER (SST)

(a) Connect the actuator checker (SST) to the actuator side wire harness via the sub–wire harness (SST), as shown.

SST 09990–00150, 09990–00250, 09990–00360, 09990–00450

(b) Connect the red cable of the checker to the battery positive (+) terminal and black cable to the negative (–) terminal. Connect the black cable of the sub–wire harness to the battery negative (–) terminal or body ground.





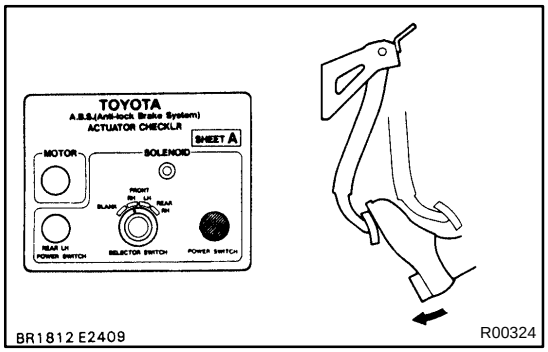
(c) Place the "SHEET A" (SST) on the actuator checker.
SST 09990–00163

4. INSPECT BRAKE ACTUATOR OPERATION

(a) Start the engine, and run it at idle.

(b) Turn the selector switch of the actuator checker to "FRONT RH" position.

(c) Push and hold in the MOTOR switch for a few seconds.



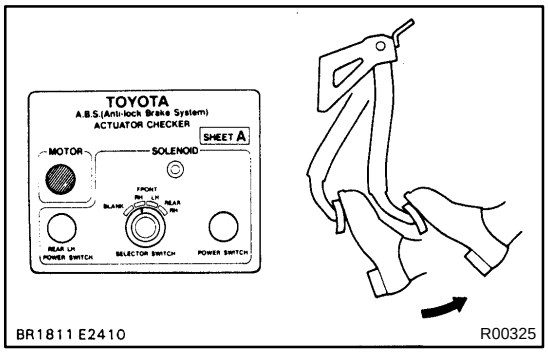
(d) Depress the brake pedal and hold it until step (g) is completed.

(e) Push the POWER SWITCH, and check that the brake pedal does not go down.

NOTICE:

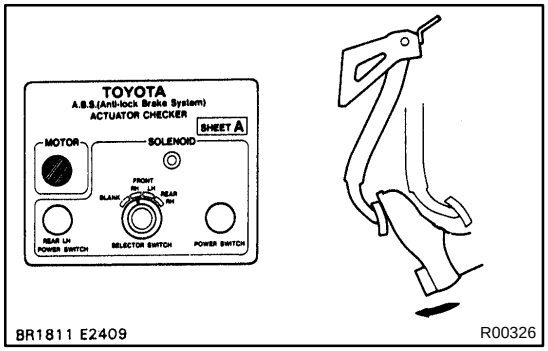
Do not keep the POWER SWITCH pushed down for more than 10 seconds.

(f) Release the switch, and check that the pedal goes down.



(g) Push and hold in the MOTOR switch for a few seconds, and check that the pedal returns.

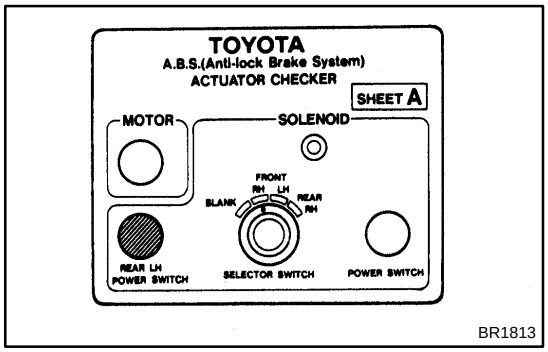
(h) Release the brake pedal.



(i) Push and hold in the MOTOR switch for a few seconds.

(j) Depress the brake pedal and hold it for about 15 seconds. As you hold the pedal down, push the MOTOR switch for a few seconds. Check that the brake pedal does not pulsate.

(k) Release the brake pedal.



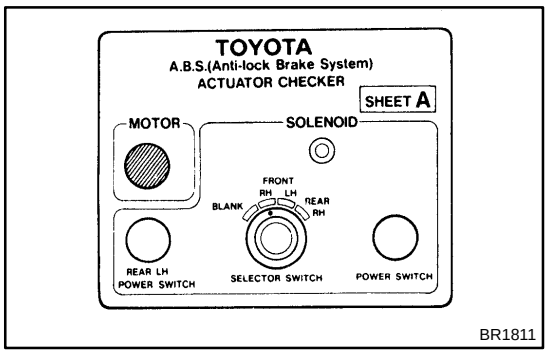
(l) Turn the selector switch to "FRONT LH" position.

(m) Repeat (c) to (j), checking the actuator operation similarly.

(n) Similarly, inspect "REAR RH" and "REAR LH" position.

HINT:

When inspecting "REAR LH" position, push the REAR LH switch instead of the POWER SWITCH, and you can inspect in any selector switch position.



(o) Push and hold in the MOTOR switch for a few seconds.

(p) Stop the engine.

5. DISCONNECT ACTUATOR CHECKER (SST) FROM ACTUATOR

Remove the ”SHEET A” (SST) and disconnect the actuator checker (SST) and sub–wire harness (SST) from the actuator.

SST 09990–00150, 09990–00163, 09990–00250, 09990–00360, 09990–00450

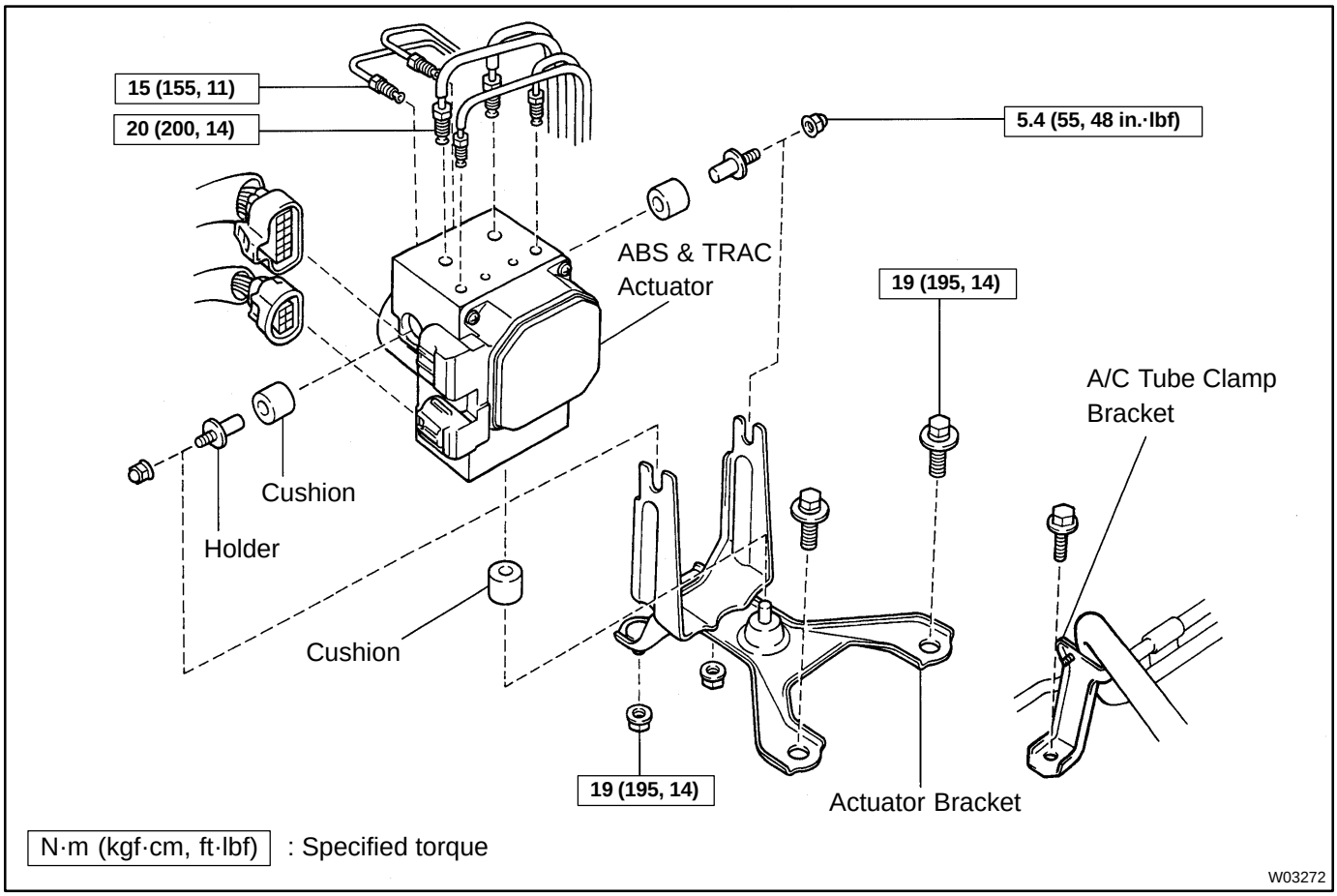
6. CONNECT CONNECTORS

Connect the 2 connectors to the actuator.

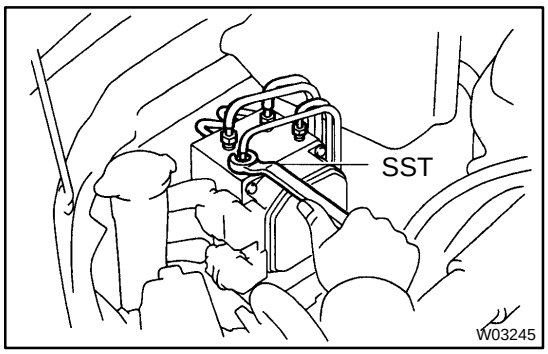
7. CLEAR DTC (See page DI–273)

BR077–01

COMPONENTS



BR078–06



REMOVAL

1. REMOVE RIGHT FRONT FENDER LINER

2. REMOVE A/C TUBE CLAMP BRACKET BOLT

3. DISCONNECT BRAKE LINES

Using SST, disconnect the 6 brake lines from the ABS & TRAC actuator.

SST 09751–36011

Torque:

10 mm nut 15 N·m (155 kgf·cm, 11 ft·lbf)

12 mm nut 20 N·m (200 kgf·cm, 14 ft·lbf)

4. REMOVE ABS & TRAC ACTUATOR ASSEMBLY

(a) Disconnect the 2 connectors.

(b) Remove the 2 bolts, 2 nuts and ABS & TRAC actuator assembly.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

5. REMOVE ABS & TRAC ACTUATOR

(a) Remove the 2 nuts and ABS & TRAC actuator from actuator bracket.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Remove the 2 holders and 3 cushions from the ABS & TRAC actuator.

BR079–01

INSTALLATION

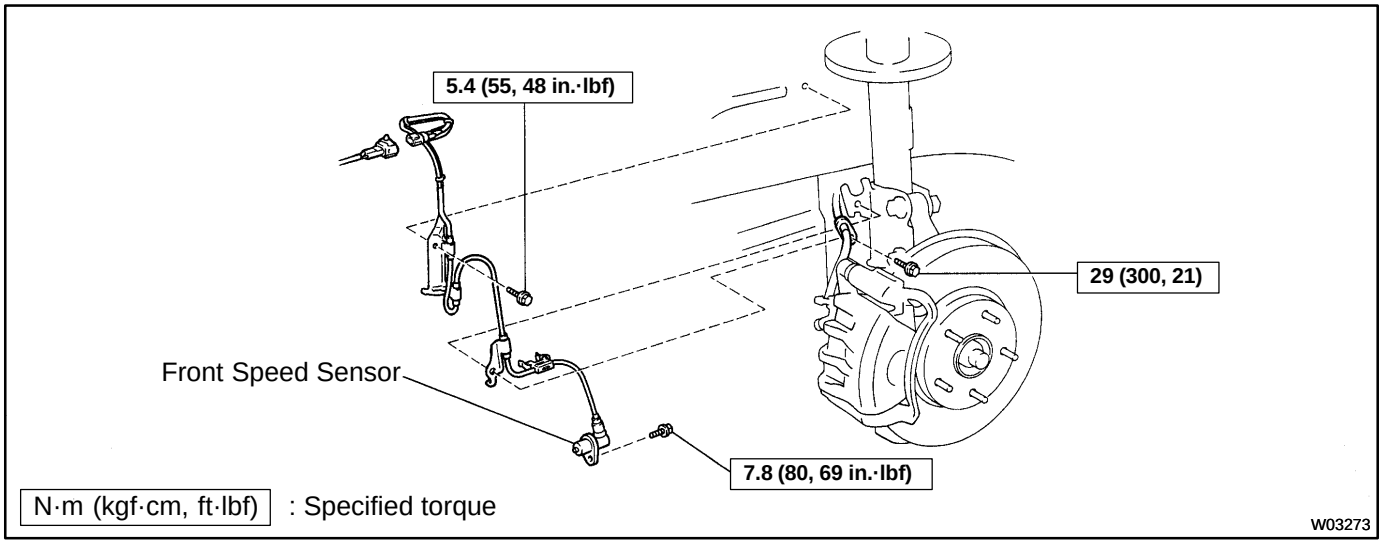
Installation is in the reverse order of removal (See page BR–56).

1. **AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR–4)**
2. **CHECK FOR LEAKS**

FRONT SPEED SENSOR

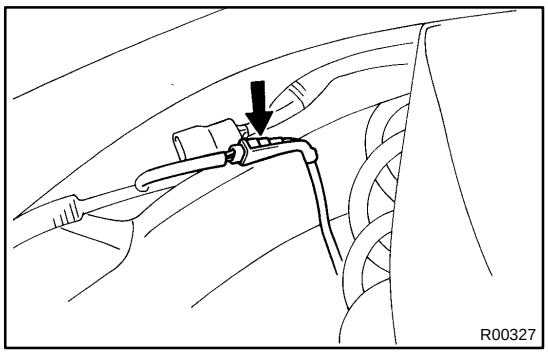
COMPONENTS

BR07C–04



BR07D–01

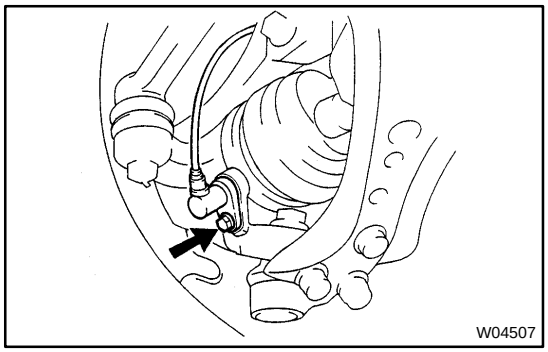
REMOVAL



1. DISCONNECT SPEED SENSOR CONNECTOR

(a) Remove the fender liner.

(b) Disconnect the speed sensor connector.



2. REMOVE SPEED SENSOR

(a) Remove the bolt, flexible hose and speed sensor harness clamp from the shock absorber.
Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)

(b) Remove the resin clip and clamp bolt holding the sensor harness to the body.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(c) Remove the speed sensor from the steering knuckle.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

BR07E–04

INSTALLATION

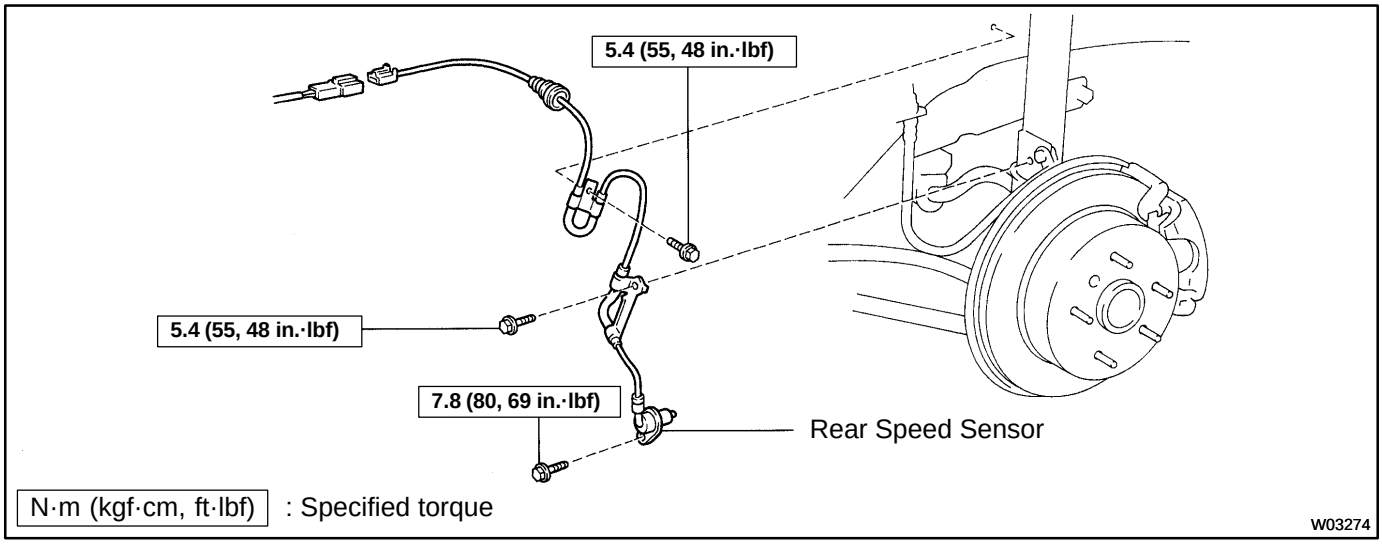
Installation is in the reverse order of removal (See page BR–59).

AFTER INSTALLATION, CHECK SPEED SENSOR SIGNAL (See page DI–232 or DI–273)

REAR SPEED SENSOR

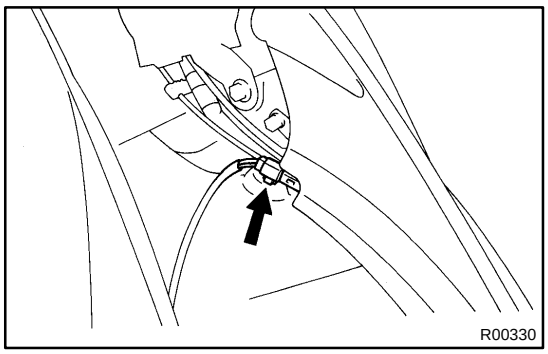
COMPONENTS

BR07F–04



BR07G–01

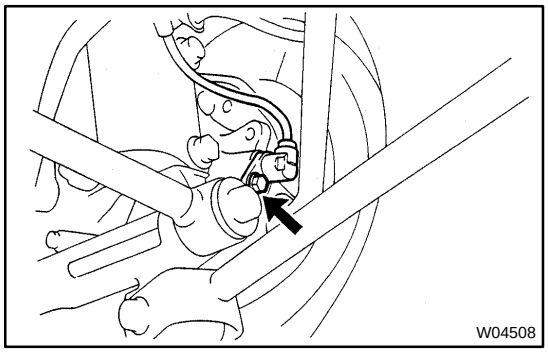
REMOVAL



1. DISCONNECT SPEED SENSOR CONNECTOR

(a) Remove the seat cushion and seatback.

(b) Disconnect the speed sensor connector, and pull out the sensor wire harness with the grommet.



2. REMOVE SPEED SENSOR

(a) Remove the 2 clamp bolts holding the sensor wire harness to the body and shock absorber.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Remove the speed sensor from the axle carrier.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

BR07H–04

INSTALLATION

Installation is in the reverse order of removal (See page BR–62).

AFTER INSTALLATION, CHECK SPEED SENSOR SIGNAL (See page DI–232 or DI–273)

CHARGING SYSTEM

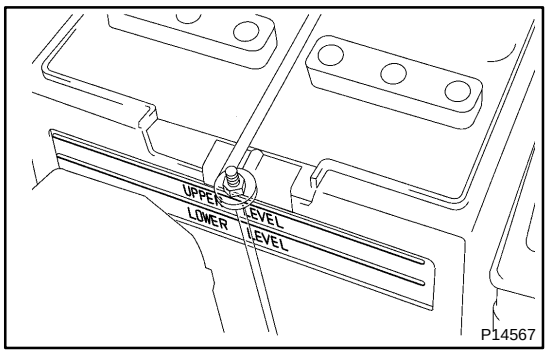
CH013–01

PRECAUTION

- **Check that the battery cables are connected to the correct terminals.**
- **Disconnect the battery cables when the battery is given a quick charge.**
- **Do not perform tests with a high voltage insulation resistance tester.**
- **Never disconnect the battery while the engine is running.**

CH014–02

ON–VEHICLE INSPECTION



1. CHECK BATTERY ELECTROLYTE LEVEL

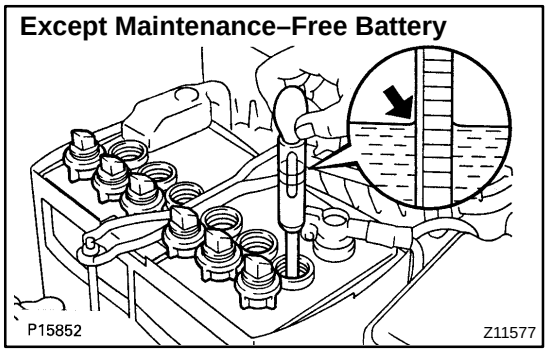
Check the electrolyte quantity of each cell.

Maintenance–Free Battery:

If under the lower level, replace the battery (or add distilled water if possible). Check the charging system.

Except Maintenance–Free Battery:

If under the lower level, add distilled water.

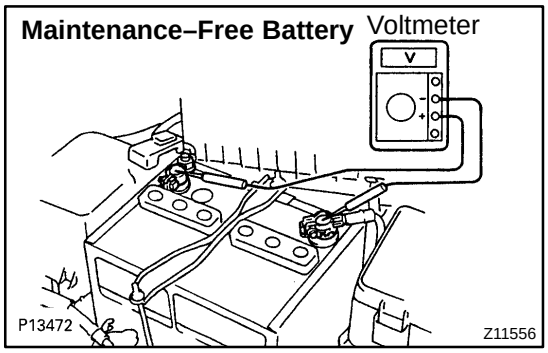


2. Except Maintenance–Free Battery: CHECK BATTERY SPECIFIC GRAVITY

Check the specific gravity of each cell.

Standard specific gravity: 1.25 – 1.29 at 20˚C (68˚F)

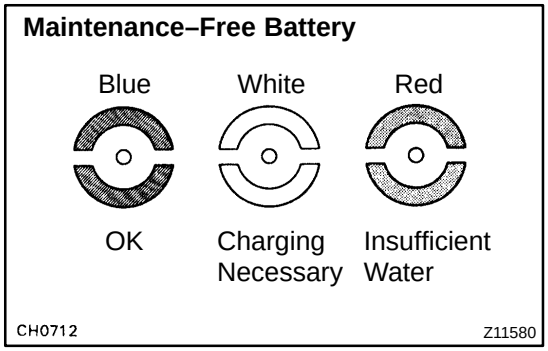
If the specific gravity is less than specification, charge the battery.



3. Maintenance–Free Battery: CHECK BATTERY VOLTAGE

(a) After having driven the vehicle and in the case that 20 minutes have not passed after having stopped the engine, turn the ignition switch ON and turn on the electrical system (headlight, blower motor, rear defogger etc.) for 60 seconds to remove the surface charge.

(b) Turn the ignition switch OFF and turn off the electrical systems.



(c) Measure the battery voltage between the negative (–) and positive (+) terminals of the battery.

Standard voltage:

12.5 – 12.9 V at 20˚C (68˚F)

If the voltage is less than specification, charge the battery.

HINT:

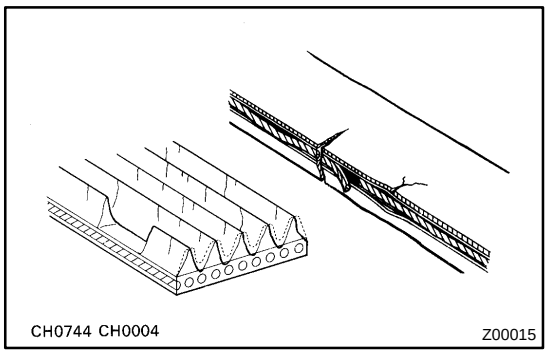
Check the indicator as shown in the illustration.

4. CHECK BATTERY TERMINALS, FUSIBLE LINK AND FUSES

(a) Check that the battery terminals are not loose or corroded.

If the terminals are corroded, clean the terminals.

(b) Check the fusible link, H–fuses, M–fuse and fuses for continuity.



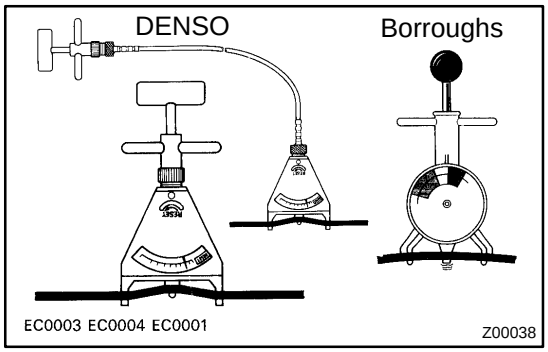
5. INSPECT DRIVE BELTS

(a) Visually check the drive belt for excessive wear, frayed cords etc.

If any defect has been found, replace the drive belt.

HINT:

Cracks on the rib side of a drive belt are considered acceptable. If the drive belt has chunks missing from the ribs, it should be replaced.

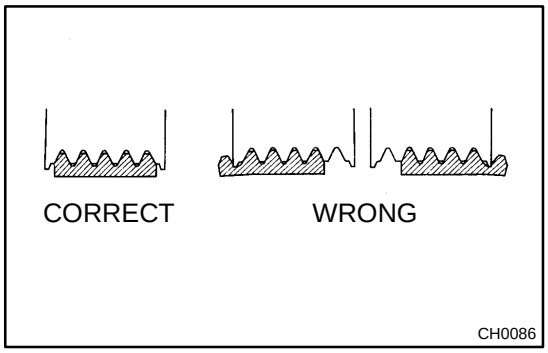


(b) Using a belt tension gauge, measure the belt tension.
Belt tension gauge:
DENSO BTG–20 (95506–00020)
Borroughs No. BT–33–73F
Drive belt tension:
New belt: 175 ± 5 lbf
Used belt: 115 ± 20 lbf

If the belt tension is not as specified, adjust it.

HINT:

- ”New belt” refers to a belt which has been used less than 5 minutes on a running engine.
- ”Used belt” refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing a belt, check that it fits properly in the ribbed grooves.
- Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.
- After installing a new belt, run the engine for about 5 minutes and recheck the belt tension.



6. VISUALLY CHECK GENERATOR WIRING AND LISTEN FOR ABNORMAL NOISES

(a) Check that the wiring is in good condition.

(b) Check that there is no abnormal noise from the generator while the engine is running.

7. CHECK DISCHARGE WARNING LIGHT CIRCUIT

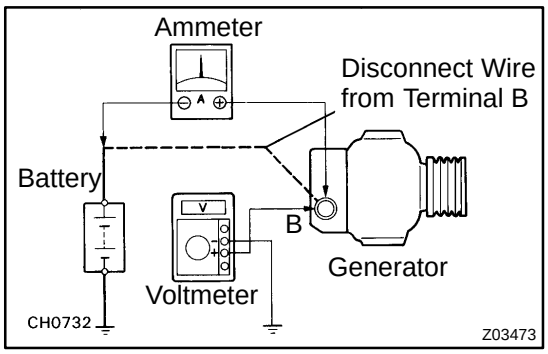
(a) Warm up the engine and then turn it off.

(b) Turn off all accessories.

(c) Turn the ignition switch ”ON”. Check that the discharge warning light is lit.

(d) Start the engine. Check that the light goes off.

If the light does not go off as specified, troubleshoot the discharge light circuit.



8. INSPECT CHARGING CIRCUIT WITHOUT LOAD

HINT:

If a battery/generator tester is available, connect the tester to the charging circuit as per manufacturer's instructions.

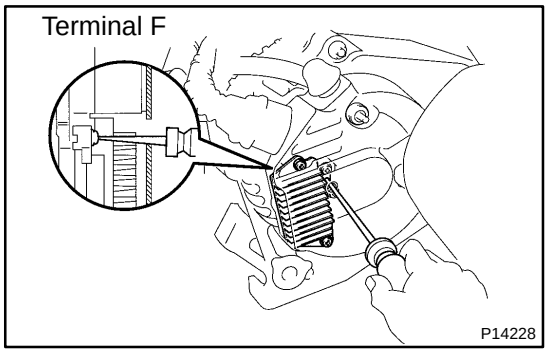
(a) If a tester is not available, connect a voltmeter and ammeter to the charging circuit as follows:
- Disconnect the wire from terminal B of the generator, and connect it to the negative (–) tester probe of the ammeter.
- Connect the positive (+) tester probe of the ammeter to terminal B of the generator.
- Connect the positive (+) tester probe of the voltmeter to terminal B of the generator.
- Ground the negative (–) tester probe of the voltmeter.

(b) Check the charging circuit as follows:

With the engine running from idling to 2,000 rpm, check the reading on the ammeter and voltmeter.

Standard amperage: 10 A or less

Standard voltage: 13.2 – 14.8 V



If the voltmeter reading is more than standard voltage, replace the voltage regulator.

If the voltmeter reading is less than standard voltage, check the voltage regulator and generator as follows:
- With terminal F grounded, start the engine and check the voltmeter reading of terminal B.
- If the voltmeter reading is more than standard voltage, replace the voltage regulator.
- If the voltmeter reading is less than standard voltage, check the generator.

9. INSPECT CHARGING CIRCUIT WITH LOAD

(a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater blower switch at "HI".

(b) Check the reading on the ammeter.

Standard amperage: 30 A or more

If the ammeter reading is less than the standard amperage, repair the generator.

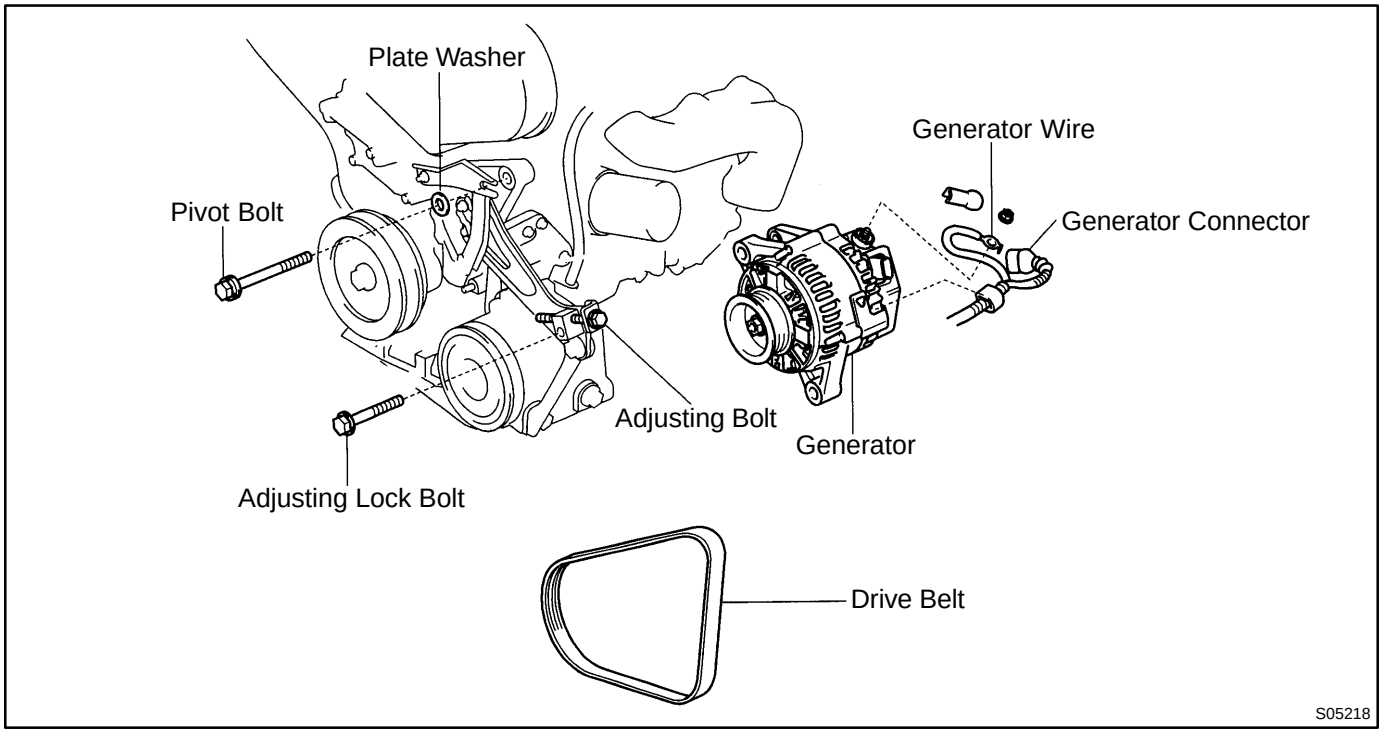
HINT:

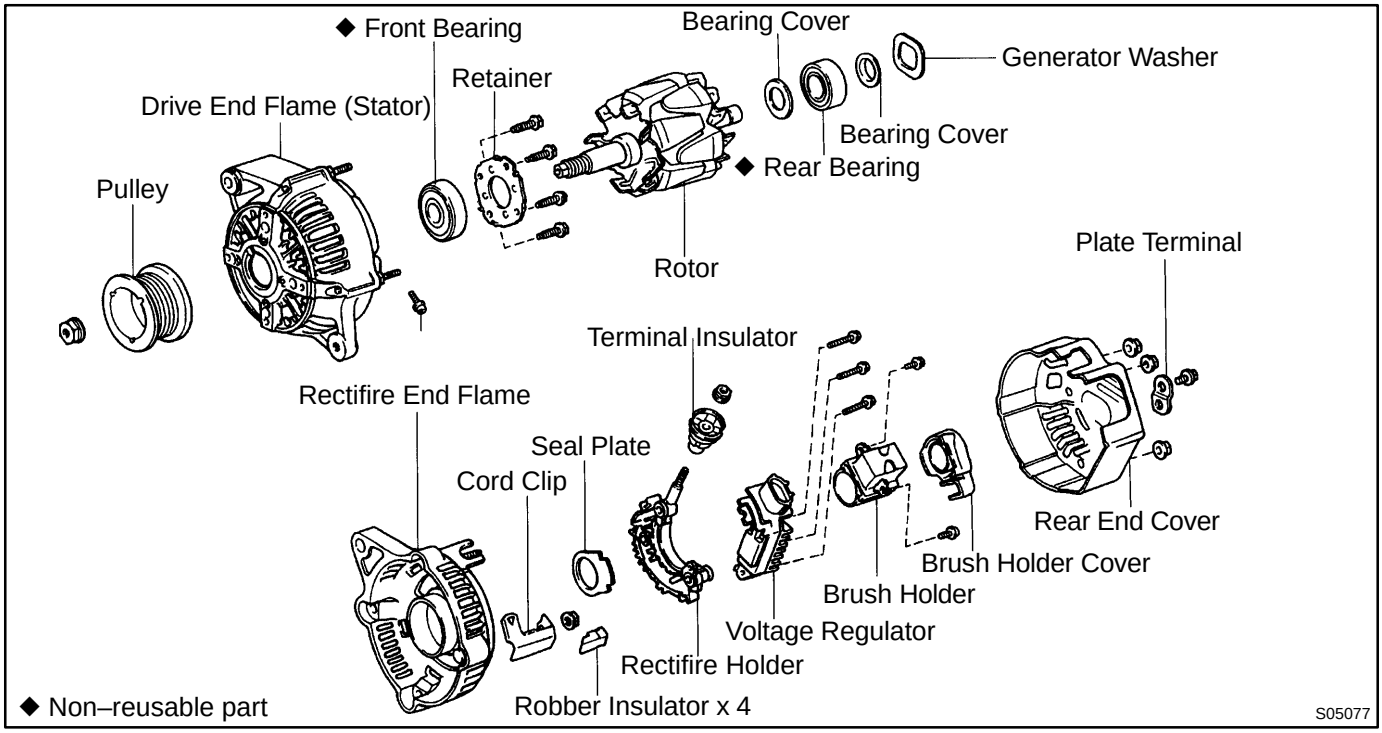
If the battery is fully charged, the indication will sometimes be less than standard amperage.

GENERATOR

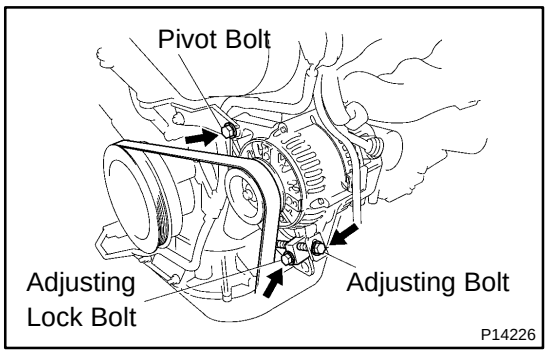
COMPONENTS

CH015–01





CH016–01

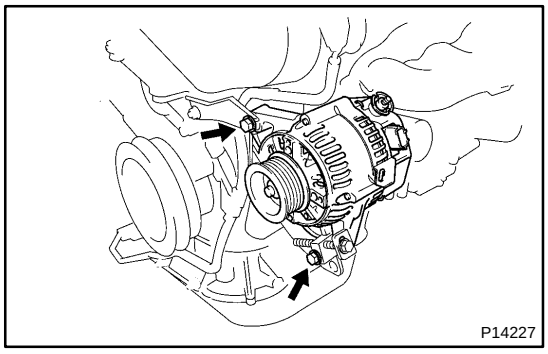


REMOVAL

1. REMOVE DRIVE BELT

Loosen the pivot bolt, adjusting lock bolt and adjusting bolt, and remove the drive belt.

Torque:
Pivot bolt: 56 N·m (570 kgf·cm, 41 ft·lbf)
Lock bolt: 18 N·m (180 kgf·cm, 13 ft·lbf)

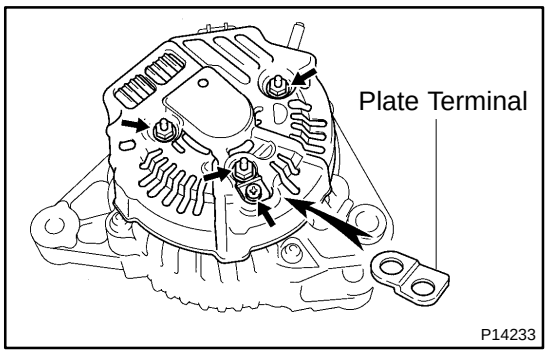


2. REMOVE GENERATOR

(a) Disconnect the generator connector.
(b) Remove the nut, and disconnect the generator wire.
(c) Disconnect the wire harness from the clip.
(d) Remove the pivot bolt, plate washer, adjusting lock bolt and generator.

CH017–01

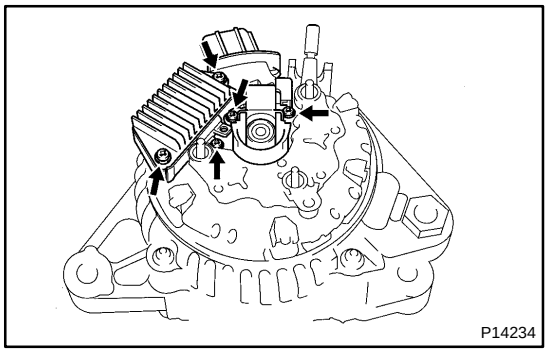
DISASSEMBLY



1. REMOVE REAR END COVER

(a) Remove the nut and terminal insulator.

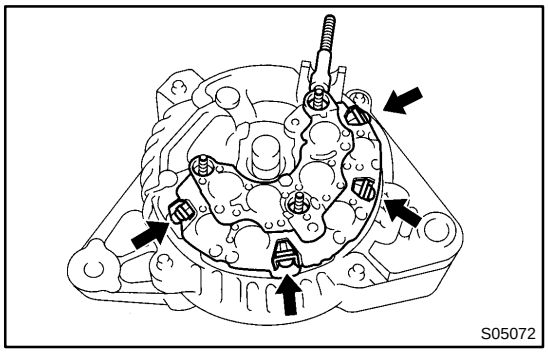
(b) Remove the screw, 3 nuts, plate terminal and end cover.



2. REMOVE BRUSH HOLDER AND VOLTAGE REGULATOR

(a) Remove the brush holder cover from the brush holder.

(b) Remove the 5 screws, brush holder and voltage regulator.

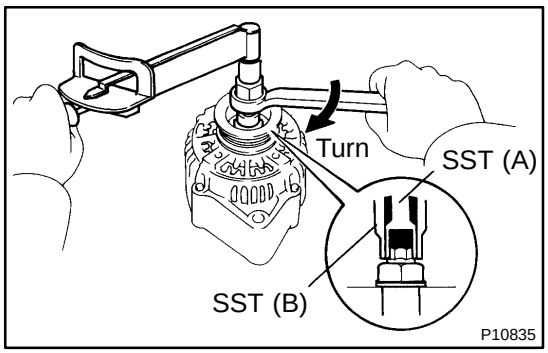


3. REMOVE RECTIFIER HOLDER

(a) Remove the 4 screws and rectifier holder.

(b) Remove the 4 rubber insulators.

(c) Remove the seal plate.



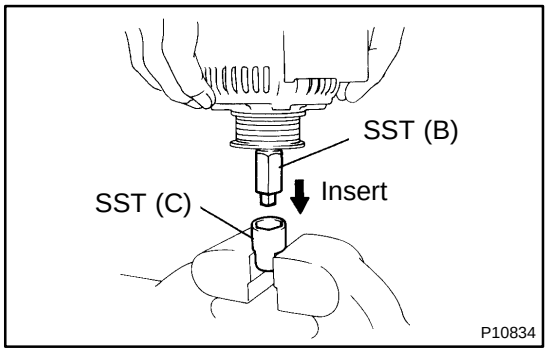
4. REMOVE PULLEY

(a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.

SST 09820–63010

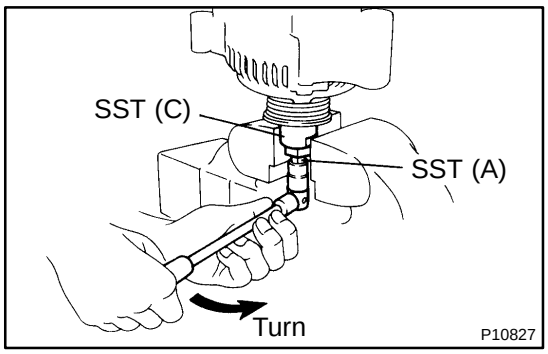
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Check that SST (A) is secured to the rotor shaft.



(c) Mount SST (C) in a vise.

(d) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).

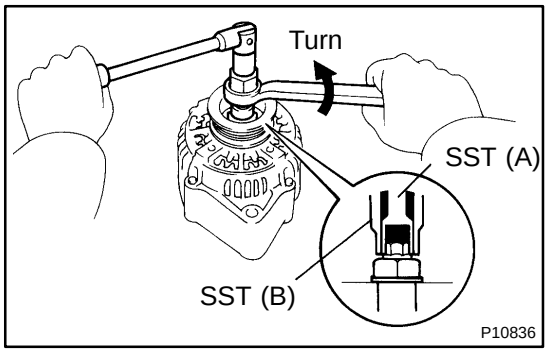


(e) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

NOTICE:

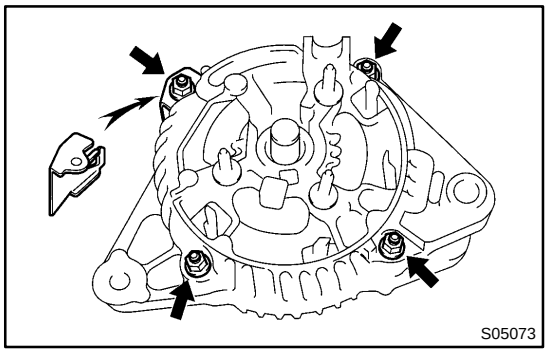
To prevent damage to the rotor shaft, do not loosen the pulley nut more than one–half of a turn.

(f) Remove the generator from SST (C).



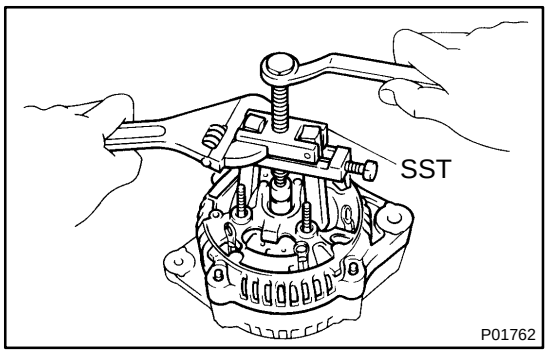
(g) Turn SST (B), and remove SST (A and B).

(h) Remove the pulley nut and pulley.



5. REMOVE RECTIFIER END FRAME

(a) Remove the 4 nuts and cord clip.



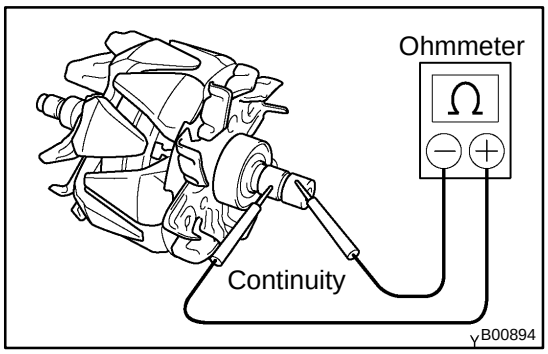
(b) Using SST, remove the rectifier end frame.
SST 09286–46011

(c) Remove the generator washer.

6. REMOVE ROTOR FROM DRIVE END FRAME

CH018–01

INSPECTION

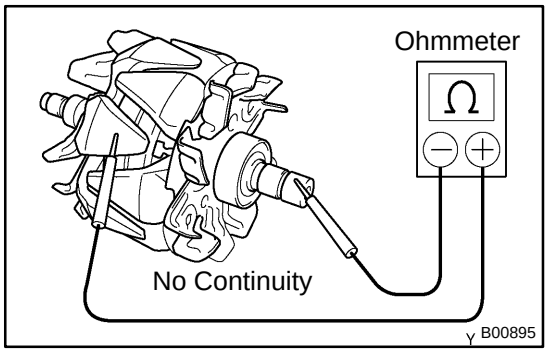


1. INSPECT ROTOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance: 2.1 – 2.5 Ω at 20˚C (68˚F)

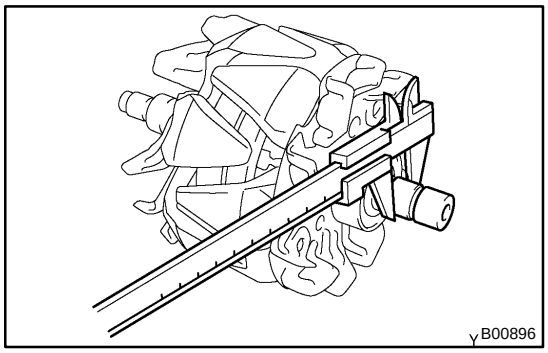
If there is no continuity, replace the rotor.



2. INSPECT ROTOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the slip ring and rotor.

If there is continuity, replace the rotor.



3. INSPECT SLIP RINGS

(a) Check that the slip rings are not rough or scored.

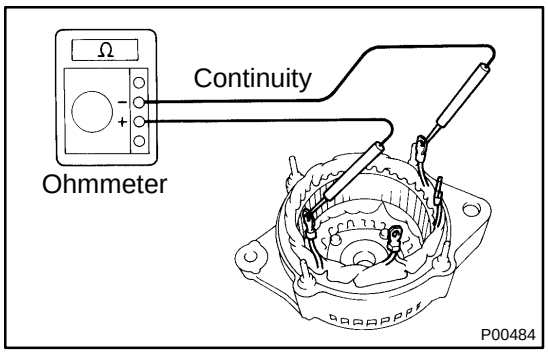
If rough or scored, replace the rotor.

(b) Using a vernier caliper, measure the slip ring diameter.

Standard diameter: 14.2 – 14.4 mm (0.559–0.567 in.)

Minimum diameter: 12.8 mm (0.504 in.)

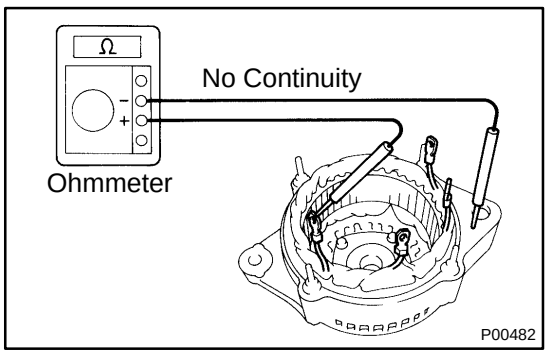
If the diameter is less than minimum, replace the rotor.



4. INSPECT STATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the coil leads.

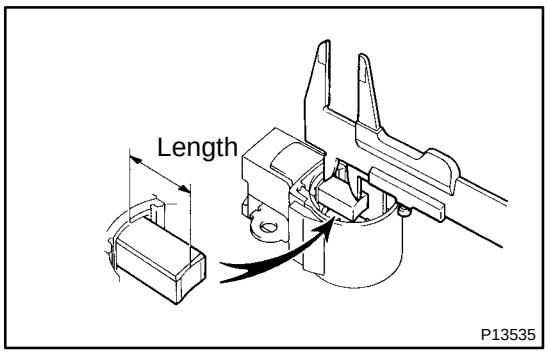
If there is no continuity, replace the drive end frame assembly.



5. INSPECT STATOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the coil lead and drive end frame.

If there is continuity, replace the drive end frame assembly.



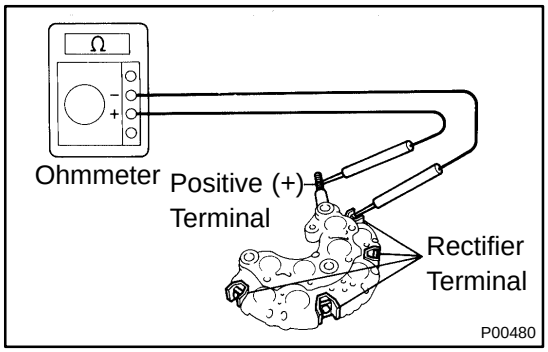
6. INSPECT EXPOSED BRUSH LENGTH

Using a vernier caliper, measure the exposed brush length.

Standard exposed length: 10.5 mm (0.413 in.)

Minimum exposed length: 1.5 mm (0.059 in.)

If the exposed length is less than minimum, replace the brushes and brush holder assembly.



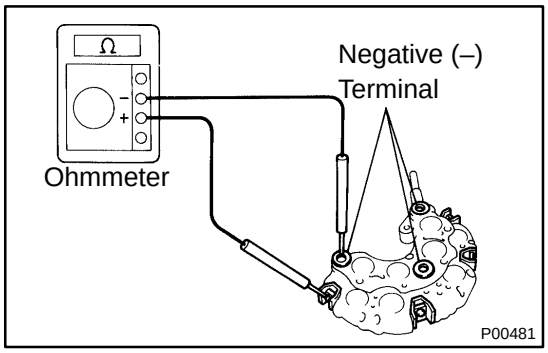
7. INSPECT POSITIVE RECTIFIER

(a) Using an ohmmeter, connect one tester probe to the positive (+) terminal and the other to each rectifier terminal.

(b) Reverse the polarity of the tester probes and repeat step (a).

(c) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.



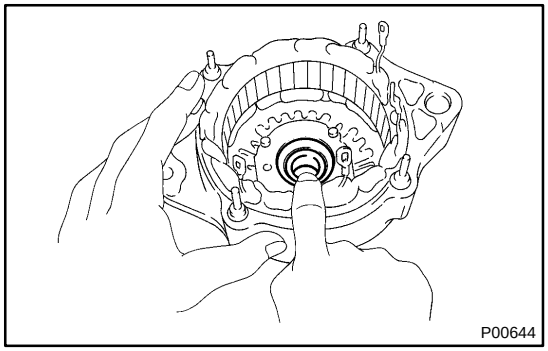
8. INSPECT NEGATIVE RECTIFIER

(a) Using an ohmmeter, connect one tester probe to each negative (–) terminal and the other to each rectifier terminal.

(b) Reverse the polarity of the tester probes and repeat step (a).

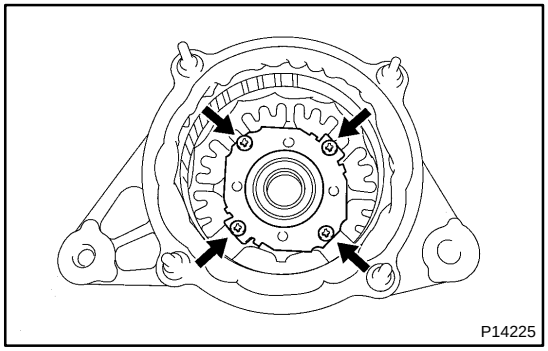
(c) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.



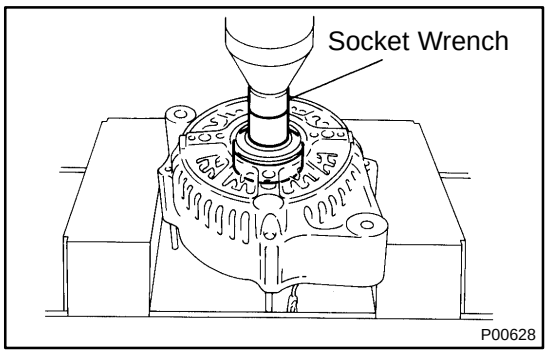
9. INSPECT FRONT BEARING

Check that the bearing is not rough or worn.

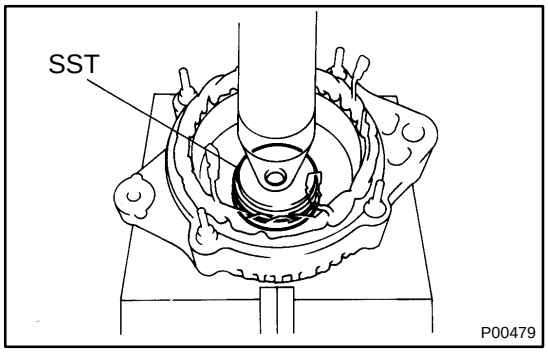


10. IF NECESSARY, REPLACE FRONT BEARING

(a) Remove the 4 screws, bearing retainer and bearing.

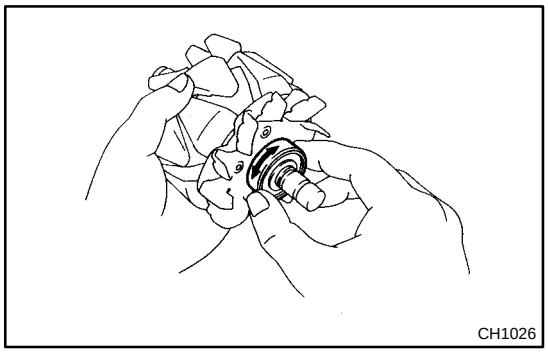


(b) Using a socket wrench and press, press out the bearing.



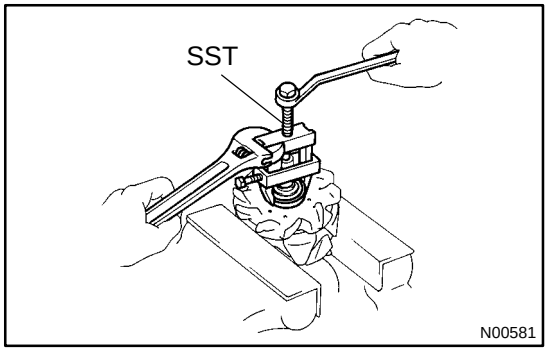
(c) Using SST and a press, press in a new bearing.
SST 09950–60010 (09951–00500)

(d) Install the bearing retainer with the 4 screws.
Torque: 3.0 N·m (31 kgf·cm, 27 in.·lbf)



11. INSPECT REAR BEARING

Check that the bearing is not rough or worn.

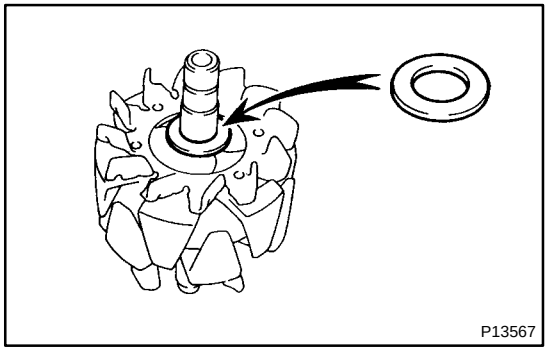


12. IF NECESSARY, REPLACE REAR BEARING

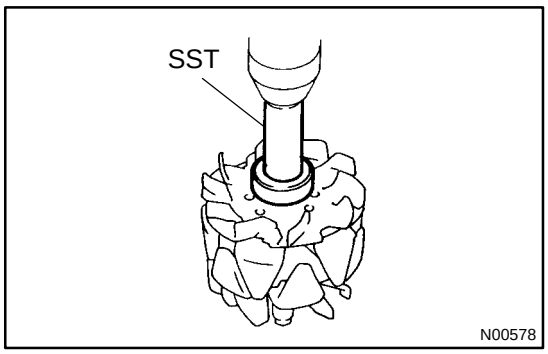
(a) Using SST, remove the bearing cover (outside) and bearing.
SST 09820–00021

NOTICE:
Be careful not to damage the fan.

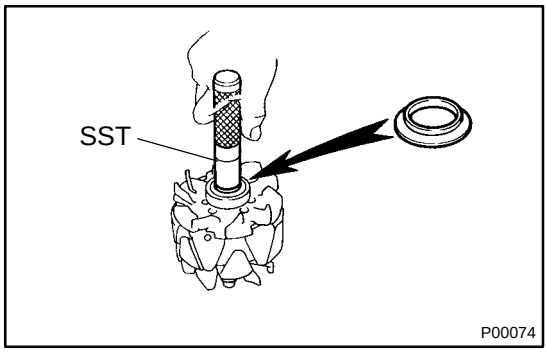
(b) Remove the bearing cover (inside).



(c) Place the bearing cover (inside) on the rotor.



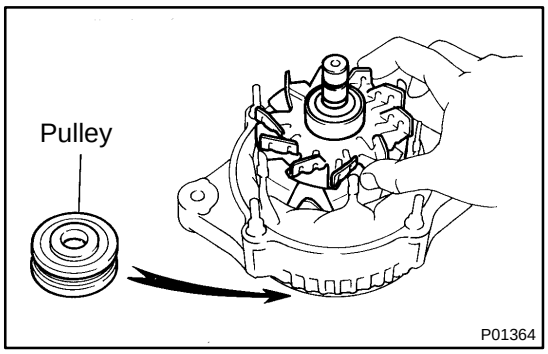
(d) Using SST and a press, press in a new bearing.
SST 09820–00030



(e) Using SST, push in the bearing cover (outside).
SST 09285–76010

CH019–01

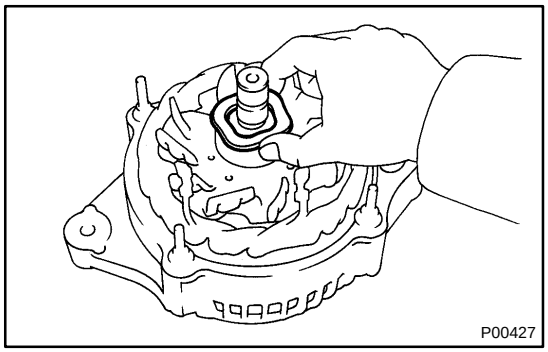
REASSEMBLY



1. INSTALL ROTOR TO DRIVE END FRAME

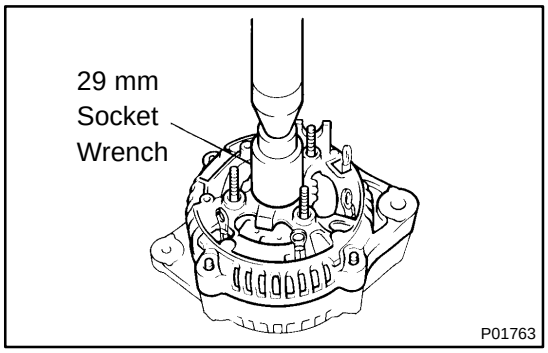
(a) Place the rectifier end frame on the pulley.

(b) Install the rotor to the rectifier end frame.

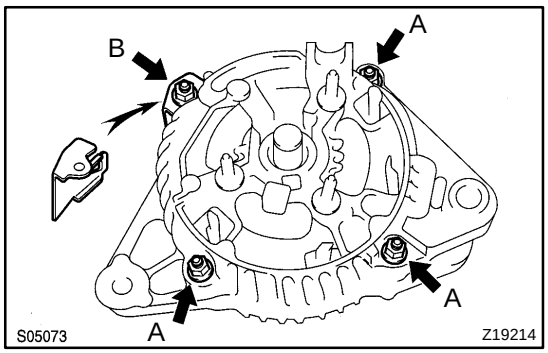


2. INSTALL RECTIFIER END FRAME

(a) Place the generator washer on the rotor.

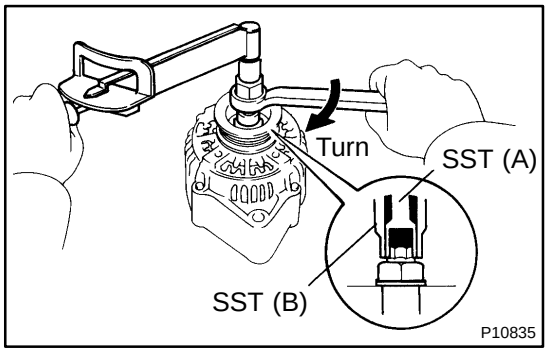


(b) Using a 29 mm socket wrench and press, slowly press in the rectifier end frame.



(c) Install the cord clip with the 4 nuts.

Torque:
Nut A: 4.5 N·m (46 kgf·cm, 40 in.·lbf)
Nut B: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

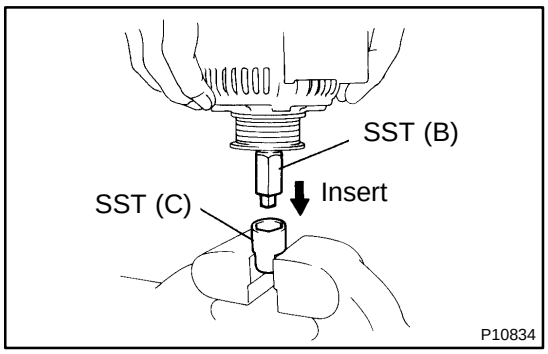


3. INSTALL PULLEY

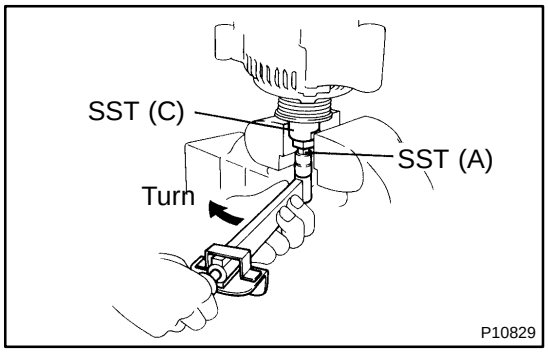
(a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.

(b) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.
SST 09820–63010
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

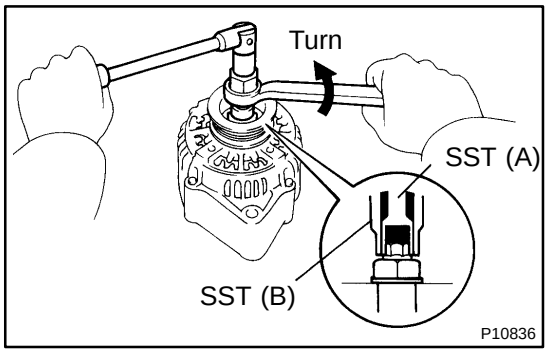
(c) Check that SST (A) is secured to the pulley shaft.



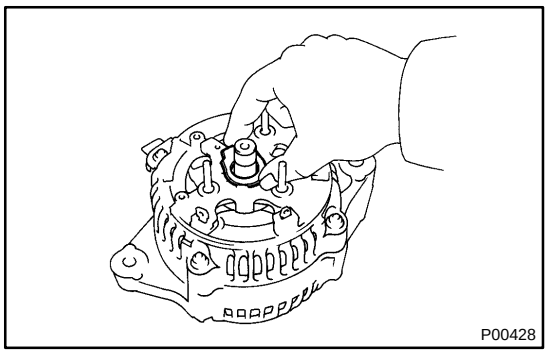
(d) Mount SST (C) in a vise.
(e) Insert SST (B) into SST (C), and attach the pulley nut to SST (C).



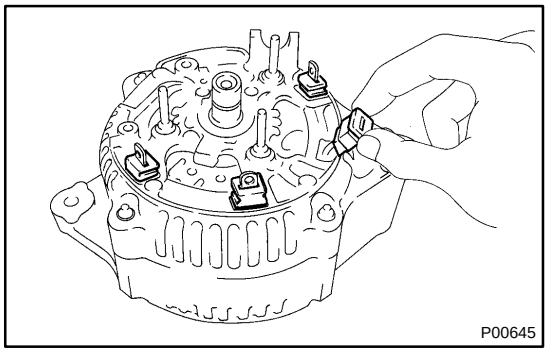
(f) To torque the pulley nut, turn SST (A) in the direction shown in the illustration.
Torque: 110.5 N·m (1,125 kgf·cm, 81 ft·lbf)
(g) Remove the generator from SST (C).



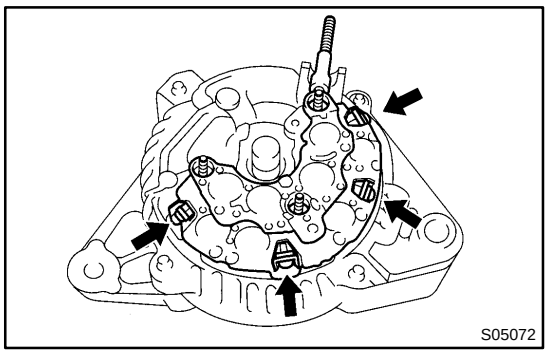
(h) Turn SST (B), and remove SST (A and B).



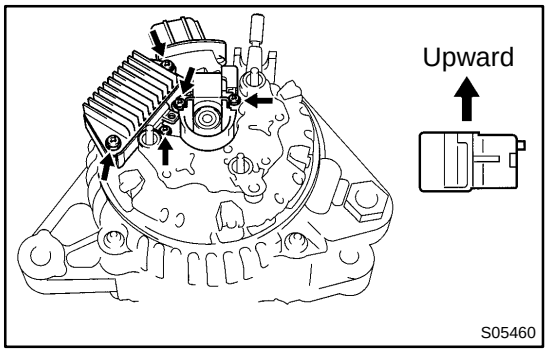
4. INSTALL RECTIFIER HOLDER
(a) Place the seal plate on the rectifier end frame.



(b) Install the 4 rubber insulators on the lead wires.



(c) Install the rectifier holder with the 4 screws.
Torque: 2.9 N·m (30 kgf·cm, 26 in.·lbf)

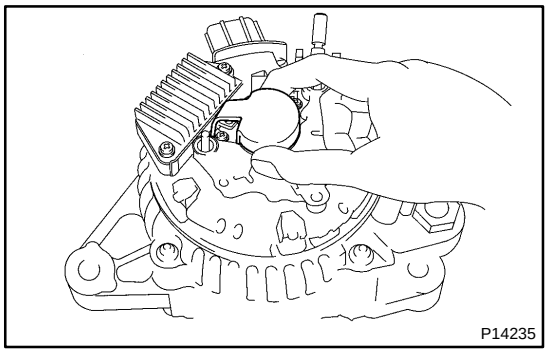


5. INSTALL VOLTAGE REGULATOR AND BRUSH HOLDER

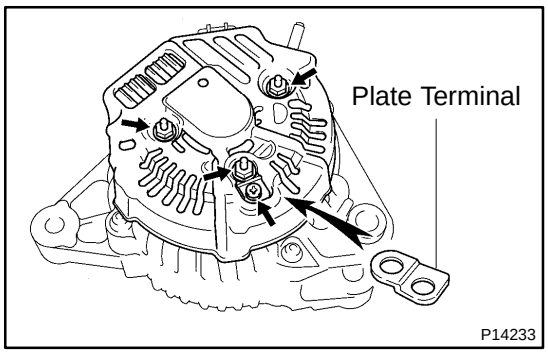
(a) Place the voltage regulator and brush holder on the rectifier end frame.

NOTICE:
Be careful of the holder installation direction.

(b) Install the 5 screws.
Torque: 2.0 N·m (20 kgf·cm, 18 in.·lbf)

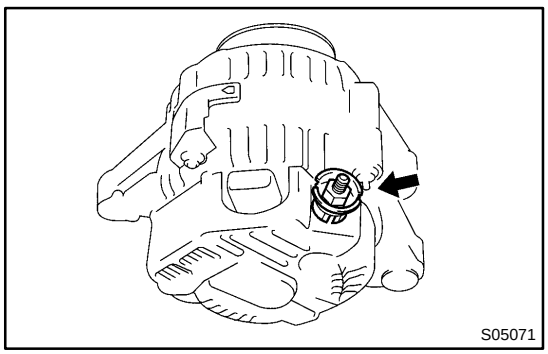


(c) Place the brush holder cover on the brush holder.



6. INSTALL REAR END COVER

(a) Install the end cover and plate terminal with the 3 nuts and screw.
Torque:
Screw: 3.9 N·m (39 kgf·cm, 35 in.·lbf)
Nut: 4.4 N·m (45 kgf·cm, 39 in.·lbf)



(b) Install the terminal insulator with the nut.
Torque: 4.1 N·m (42 kgf·cm, 36 in.·lbf)

7. CHECK THAT ROTOR ROTATES SMOOTHLY

CH01A–01

INSTALLATION

Installation is in the reverse order of removal (See page CH–6).

COOLANT

CO02K–01

INSPECTION

1. CHECK ENGINE COOLANT LEVEL AT RADIATOR RESERVOIR

The engine coolant level should be between the ”LOW” and ”FULL” lines, when the engine is cold.

If low, check for leaks and add engine coolant up to the ”FULL” line.

2. CHECK ENGINE COOLANT QUALITY

(a) Remove the radiator cap from the water outlet.

CAUTION:

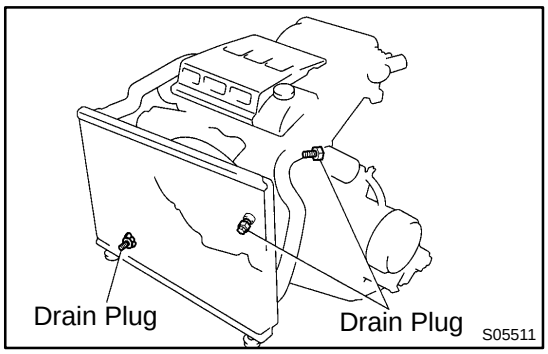
To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.

(b) There should not be any excessive deposits of rust or scale around the radiator cap or water outlet filler hole, and the coolant should be free from oil.

If excessively dirty, clean the coolant passages and replace the coolant.

(c) Reinstall the radiator cap.

CO02L–01



REPLACEMENT

1. DRAIN ENGINE COOLANT

(a) Remove the radiator cap from the water outlet.

CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.

(b) Loosen the radiator drain plug and engine drain plugs, and drain the coolant.

(c) Close the drain plugs.

Torque:

RH engine drain plug on EGR cooler:

7 N·m (70 kgf·cm, 61 in.·lbf)

LH engine drain plug on union:

13 N·m (130 kgf·cm, 9 ft·lbf)

2. FILL ENGINE COOLANT

(a) Slowly fill the system with coolant.

- Use a good brand of ethylene–glycol base engine coolant and mix it according to the manufacturer's directions.
- Using coolant which includes more than 50 % ethylene–glycol (but not more than 70 %) is recommended.

NOTICE:

- **Do not use an alcohol type coolant.**
- **The coolant should be mixed with demineralized water or distilled water.**

Capacity: 9.2 liters (9.7 US qts, 8.1 lmp. qts)

(b) Install the radiator cap.

(c) Start the engine, and bleed the cooling system.

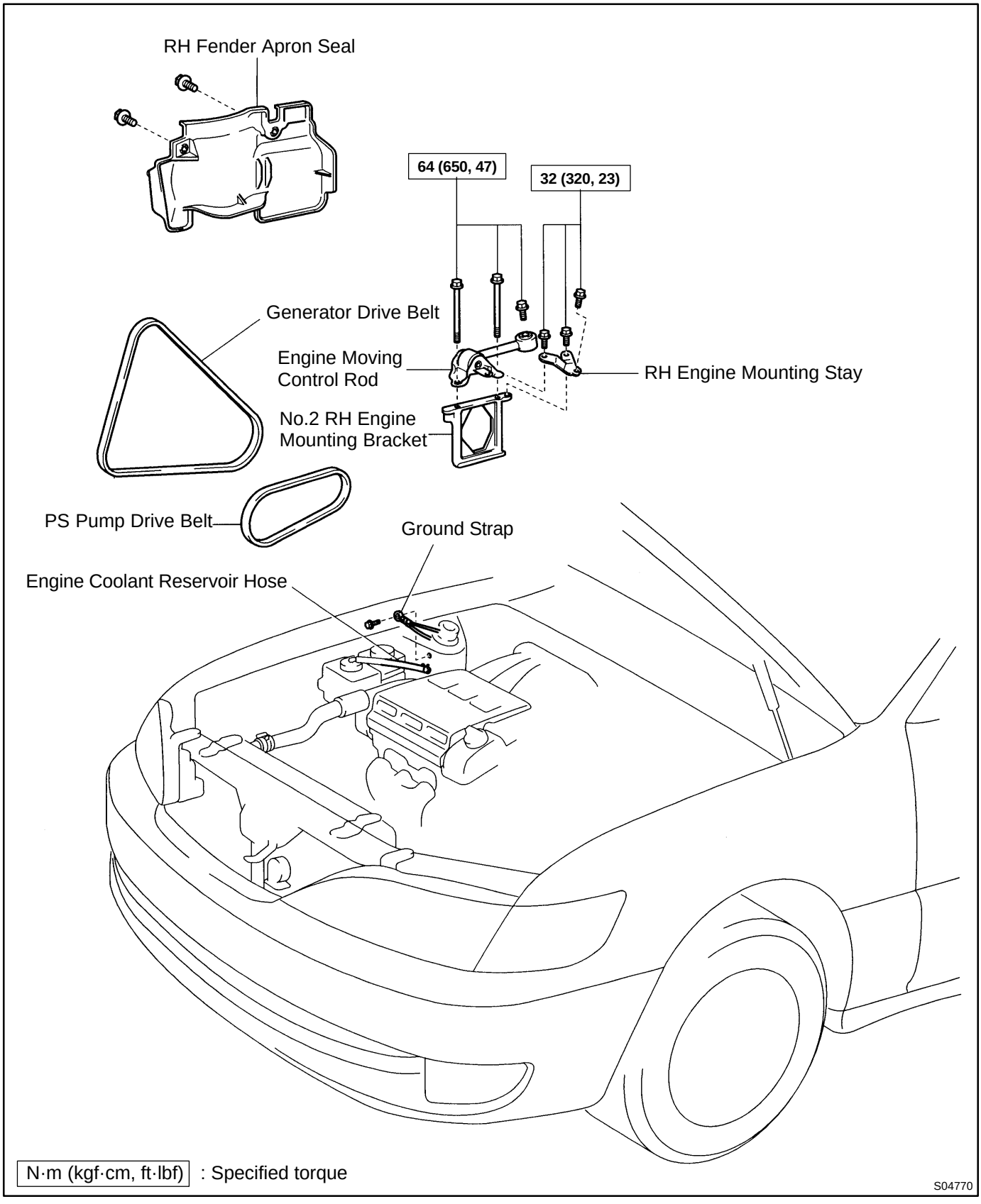
(d) If necessary, refill coolant into the reservoir up to the "FULL" line.

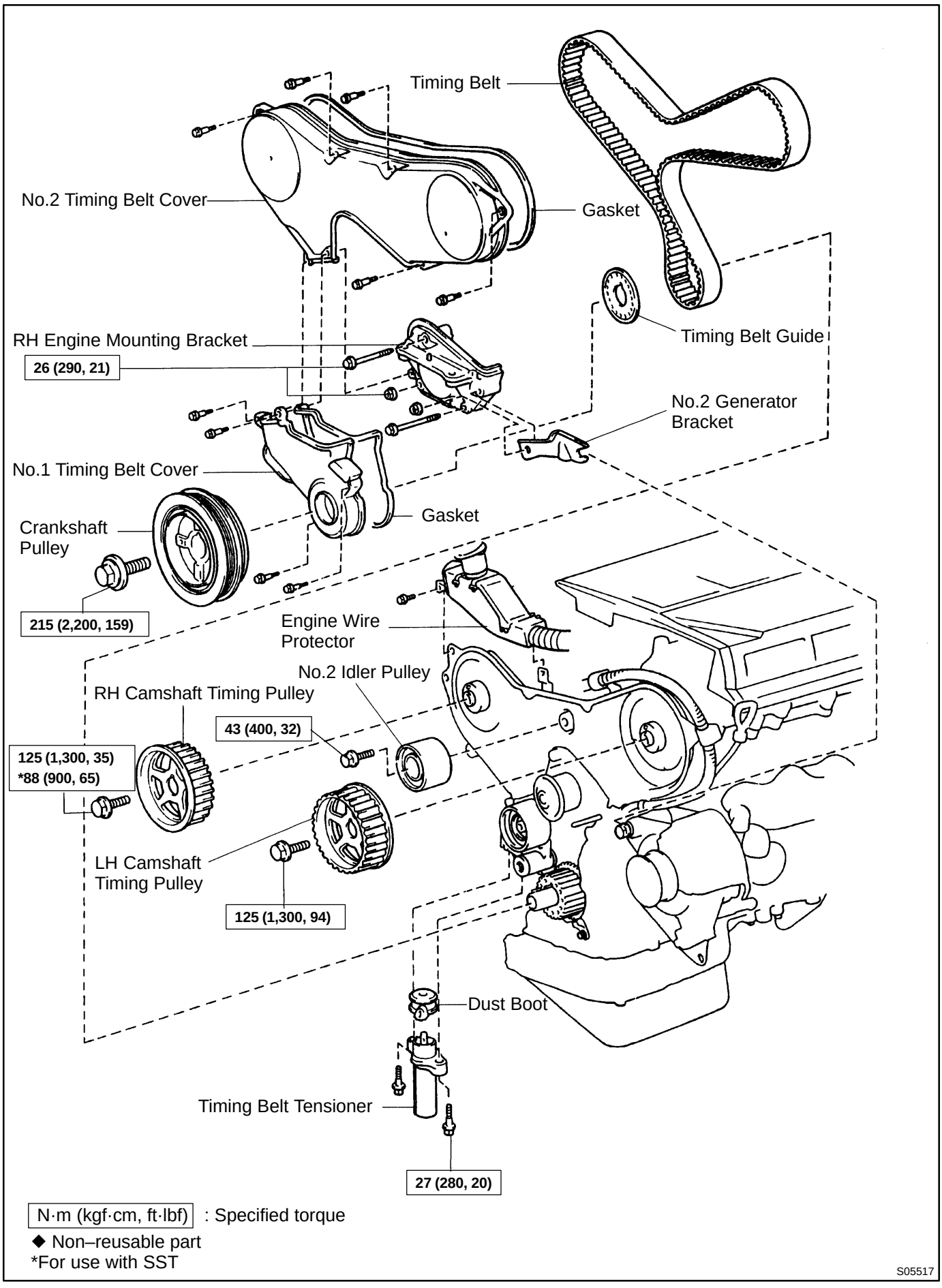
3. CHECK ENGINE COOLANT FOR LEAKS

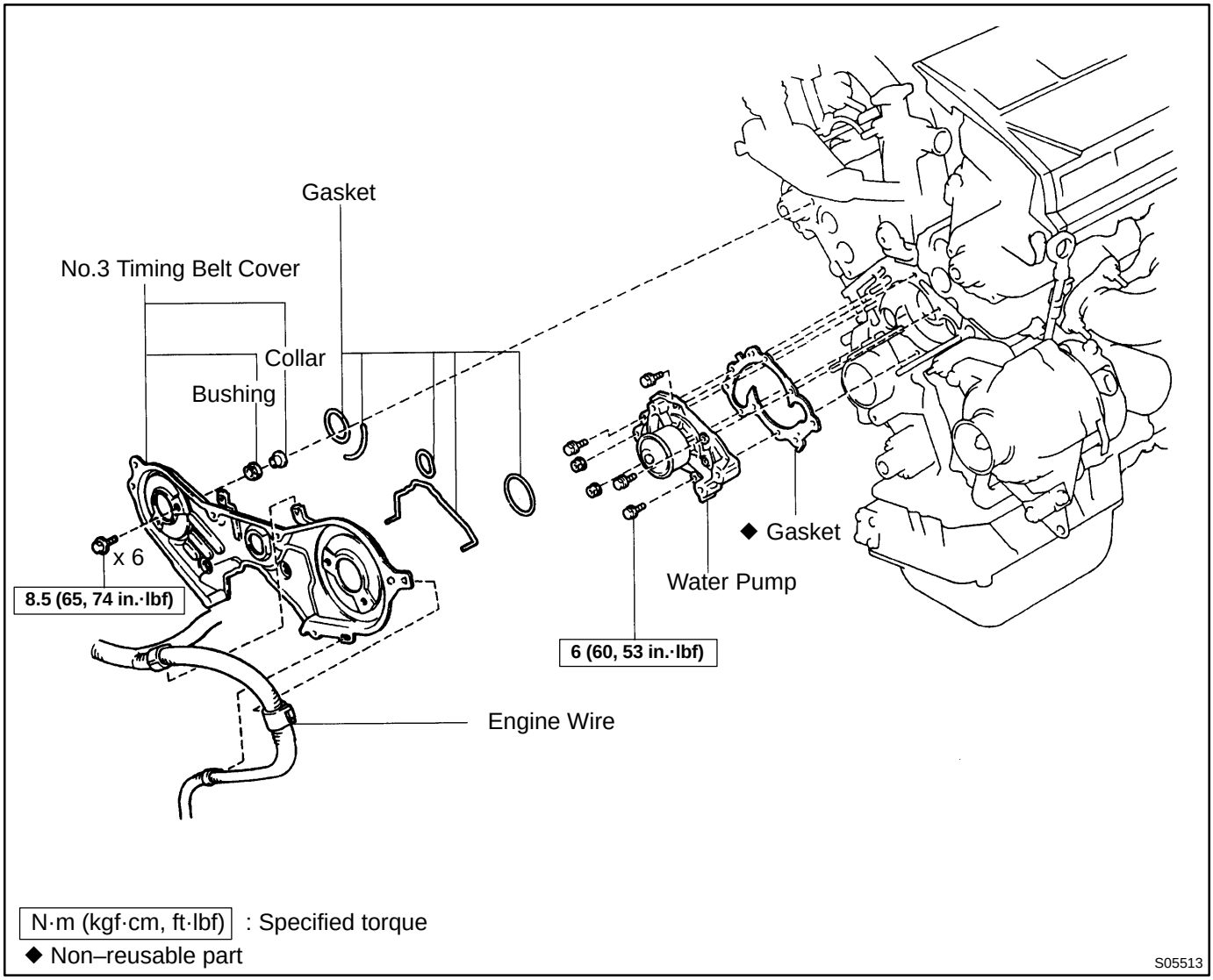
WATER PUMP

COMPONENTS

CO02M–04




Timing Belt
No.2 Timing Belt Cover
Gasket
Timing Belt Guide
RH Engine Mounting Bracket
26 (290, 21)
No.2 Generator Bracket
No.1 Timing Belt Cover
Gasket
Crankshaft Pulley
215 (2,200, 159)
Engine Wire Protector
No.2 Idler Pulley
RH Camshaft Timing Pulley
43 (400, 32)
125 (1,300, 35)
*88 (900, 65)
LH Camshaft Timing Pulley
125 (1,300, 94)
Dust Boot
Timing Belt Tensioner
27 (280, 20)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
*For use with SST
S05517

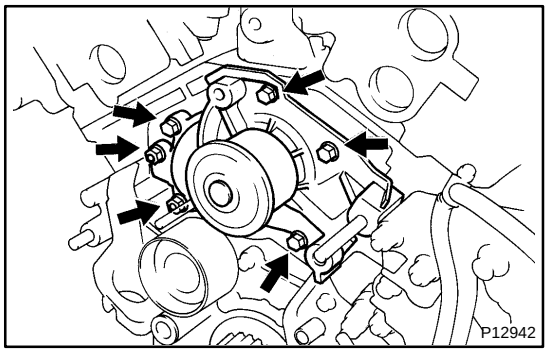

Gasket
No.3 Timing Belt Cover
Collar
Bushing
x 6
8.5 (65, 74 in.·lbf)
◆ Gasket
Water Pump
6 (60, 53 in.·lbf)
Engine Wire
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
S05513

CO02N–01

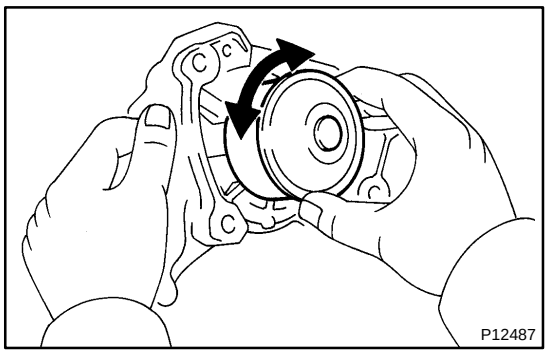
REMOVAL

1. DRAIN ENGINE COOLANT
2. REMOVE TIMING BELT
   (See page EM–14)
3. REMOVE CAMSHAFT TIMING PULLEYS
   (See page EM–14)
4. REMOVE NO.2 IDLER PULLEY
   (See page EM–14)
5. REMOVE NO.3 TIMING BELT COVER
   (See page EM–30)
6. REMOVE WATER PUMP

Remove the 4 bolts, 2 nuts, water pump and gasket.



CO02O–01



INSPECTION

1. INSPECT WATER PUMP

(a) Visually check the drain hole for coolant leakage.

If leakage is found, replace the water pump.

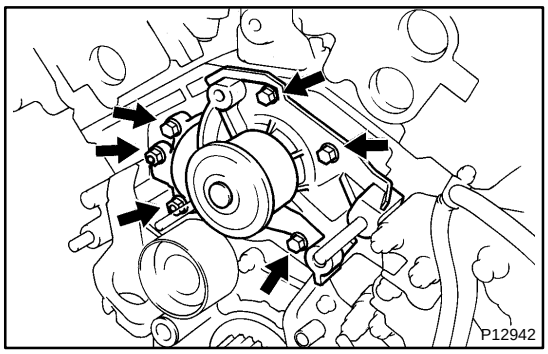
(b) Turn the pulley, and check that the water pump bearing moves smoothly and quietly.

If necessary, replace the water pump.

2. INSPECT TIMING BELT COMPONENTS

(See page EM–18)

CO02P–01



INSTALLATION

1. INSTALL WATER PUMP

Install a new gasket and the water pump with the 4 bolts and 2 nuts.

Torque: 6 N·m (60 kgf·cm, 53 in.·lbf)

NOTICE:

Do not get oil on the gasket.

2. INSTALL NO.3 TIMING BELT COVER
(See page EM–52)

3. INSTALL NO.2 IDLER PULLEY
(See page EM–20)

4. INSTALL CAMSHAFT TIMING PULLEYS
(See page EM–20)

5. INSTALL TIMING BELT
(See page EM–20)

6. FILL WITH ENGINE COOLANT

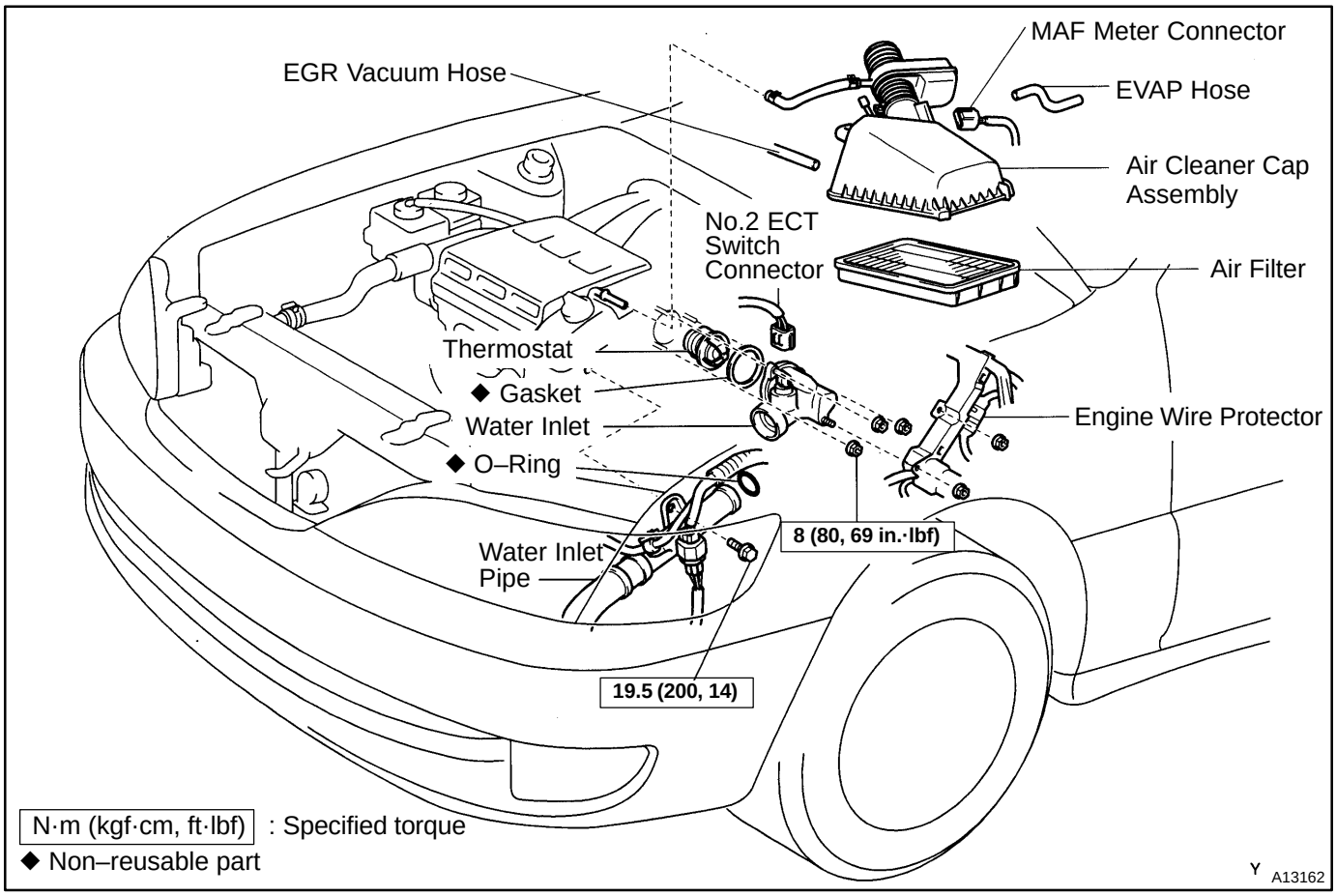
7. START ENGINE AND CHECK FOR LEAKS

8. RECHECK ENGINE COOLANT LEVEL

THERMOSTAT

COMPONENTS

CO02Q–04



CO02R–01

REMOVAL

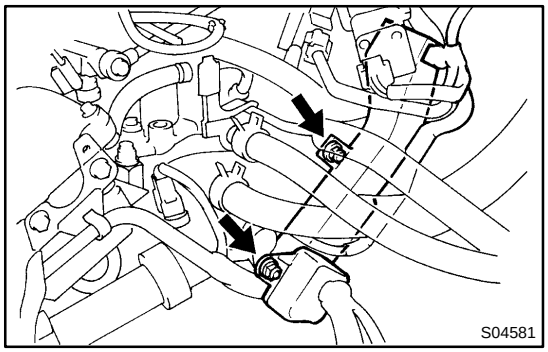
HINT:

Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

1. DRAIN ENGINE COOLANT

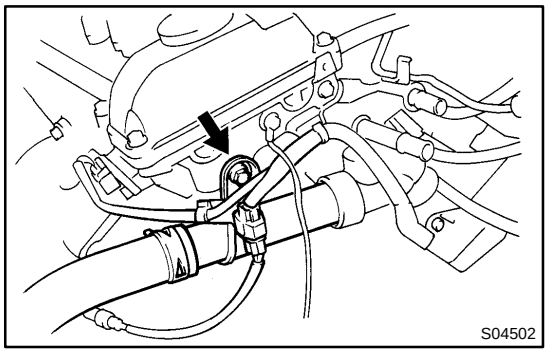
2. REMOVE AIR CLEANER CAP ASSEMBLY AND AIR FILTER

3. DISCONNECT ECT SWITCH CONNECTOR



4. DISCONNECT ENGINE WIRE PROTECTOR FROM WATER INLET AND RH CYLINDER HEAD

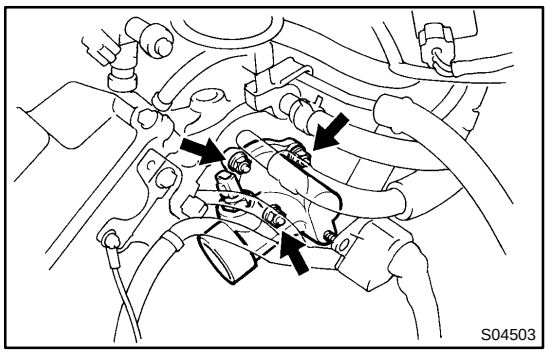
Remove the 2 nuts, and disconnect the engine wire protector from the water inlet and cylinder head.



5. DISCONNECT WATER INLET PIPE FROM WATER INLET AND LH CYLINDER HEAD

(a) Remove the bolt, and disconnect the inlet pipe from the water inlet.

(b) Remove the O–ring from the inlet pipe.



6. REMOVE WATER INLET AND THERMOSTAT

(a) Remove the 3 nuts, water inlet and thermostat.

(b) Remove the gasket from the thermostat.

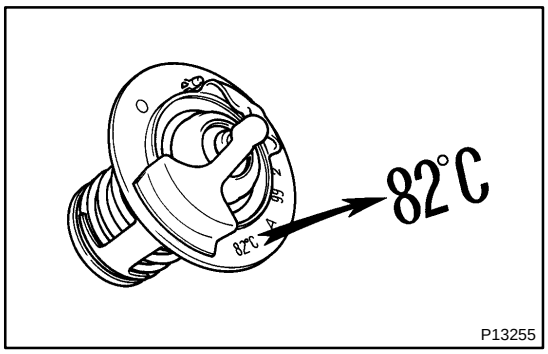
CO02S–01

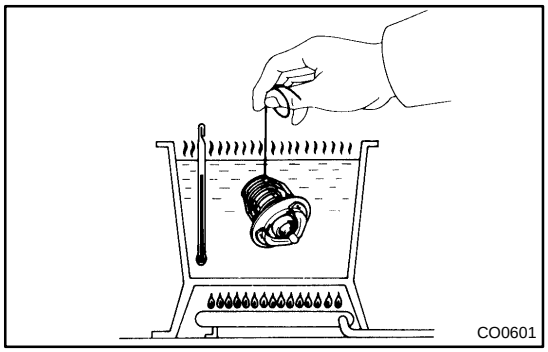
INSPECTION

INSPECT THERMOSTAT

HINT:

The thermostat is numbered with the valve opening temperature.



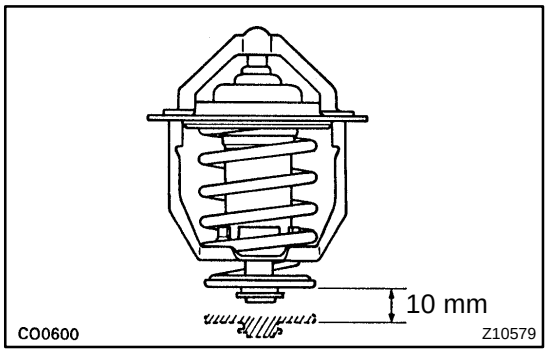


(a) Immerse the thermostat in water and gradually heat the water.

(b) Check the valve opening temperature.

Valve opening temperature:
80 – 84˚C (176 – 183˚F)

If the valve opening temperature is not as specified, replace the thermostat.



(c) Check the valve lift.

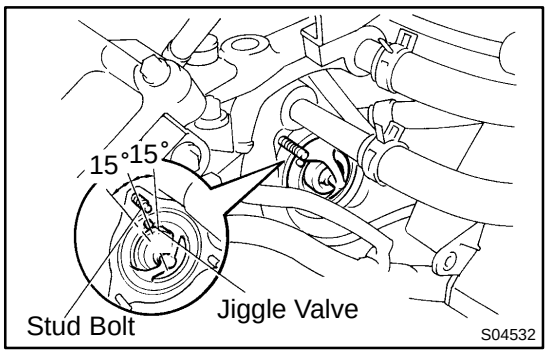
Valve lift: 10.0 mm (0.394 in.) or more at 95˚C (203˚F)

If the valve lift is not as specified, replace the thermostat.

(d) Check that the valve is fully closed when the thermostat is at low temperatures (below 40˚C (104˚F)).

If not closed, replace the thermostat.

CO02T–01



INSTALLATION

1. PLACE THERMOSTAT IN WATER PUMP

(a) Install a new gasket on to the thermostat.

(b) Align the thermostat jiggle valve with the upper stud bolt, and insert the thermostat in the water inlet housing.

HINT:

The jiggle valve may be set within 15° of either side of the prescribed position.

2. INSTALL WATER INLET

Install the water inlet with the 3 nuts.

Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

3. INSTALL WATER INLET PIPE

(a) Install a new O–ring to the water inlet pipe.

(b) Apply soapy water to the O–ring.

(c) Connect the water inlet pipe to the water inlet.

(d) Install the bolt holding the water inlet pipe to the cylinder head.

Torque: 19.5 N·m (200 kgf·cm, 14 ft·lbf)

4. INSTALL ENGINE WIRE PROTECTOR

5. CONNECT ECT SWITCH CONNECTOR

6. REINSTALL AIR FILTER AND AIR CLEANER CAP ASSEMBLY

7. FILL WITH ENGINE COOLANT

8. START ENGINE AND CHECK FOR LEAKS

9. RECHECK ENGINE COOLANT LEVEL

RADIATOR
ON–VEHICLE CLEANING

CO02U–01

Using water or a steam cleaner, remove any mud or dirt from the radiator core.

NOTICE:

If using a high pressure type cleaner, be careful not to deform the fins of the radiator core. (i.e. Maintain a distance between the cleaner nozzle radiator core)

CO02V–01

ON–VEHICLE INSPECTION

1. REMOVE RADIATOR CAP

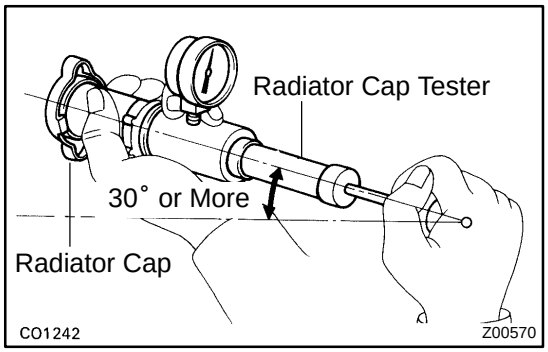
CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blow out under pressure.

2. INSPECT RADIATOR CAP

NOTICE:

- **If the radiator cap has contaminations, always rinse it with water.**
- **When performing steps (a) and (b) below, keep the radiator pump tester at an angle of over 30˚ above the horizontal.**
- **Before using a radiator cap tester, wet the relief valve and pressure valve with engine coolant or water.**



(a) Using a radiator cap tester, slowly pump the tester and check that air is coming from the vacuum valve.

Pump speed: 1 push/(3 seconds or more)

NOTICE:

Push the pump at a constant speed.

If air is not coming from the vacuum valve, replace the radiator cap.

(b) Pump the tester and measure the relief valve opening pressure.

Pump speed: 1 push within 1 second

NOTICE:

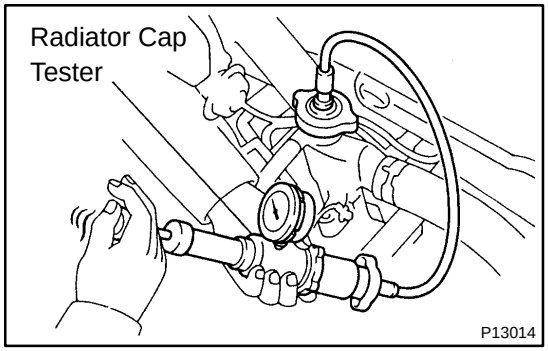
This pump speed is for the first pump only (in order to close the vacuum valve). After this, the pump speed can be reduced.

Standard opening pressure:
83 – 113 kPa (0.85 – 1.15 kgf/cm^2, 12.1 – 16.4 psi)
Minimum opening pressure:
69 kPa (0.7 kgf/cm^2, 10.0 psi)

HINT:

Use the tester's maximum reading as the opening pressure.

If the opening pressure is less than minimum, replace the radiator cap.



3. INSPECT COOLING SYSTEM FOR LEAKS

(a) Fill the radiator with coolant and attach a radiator cap tester.

(b) Warm up the engine.

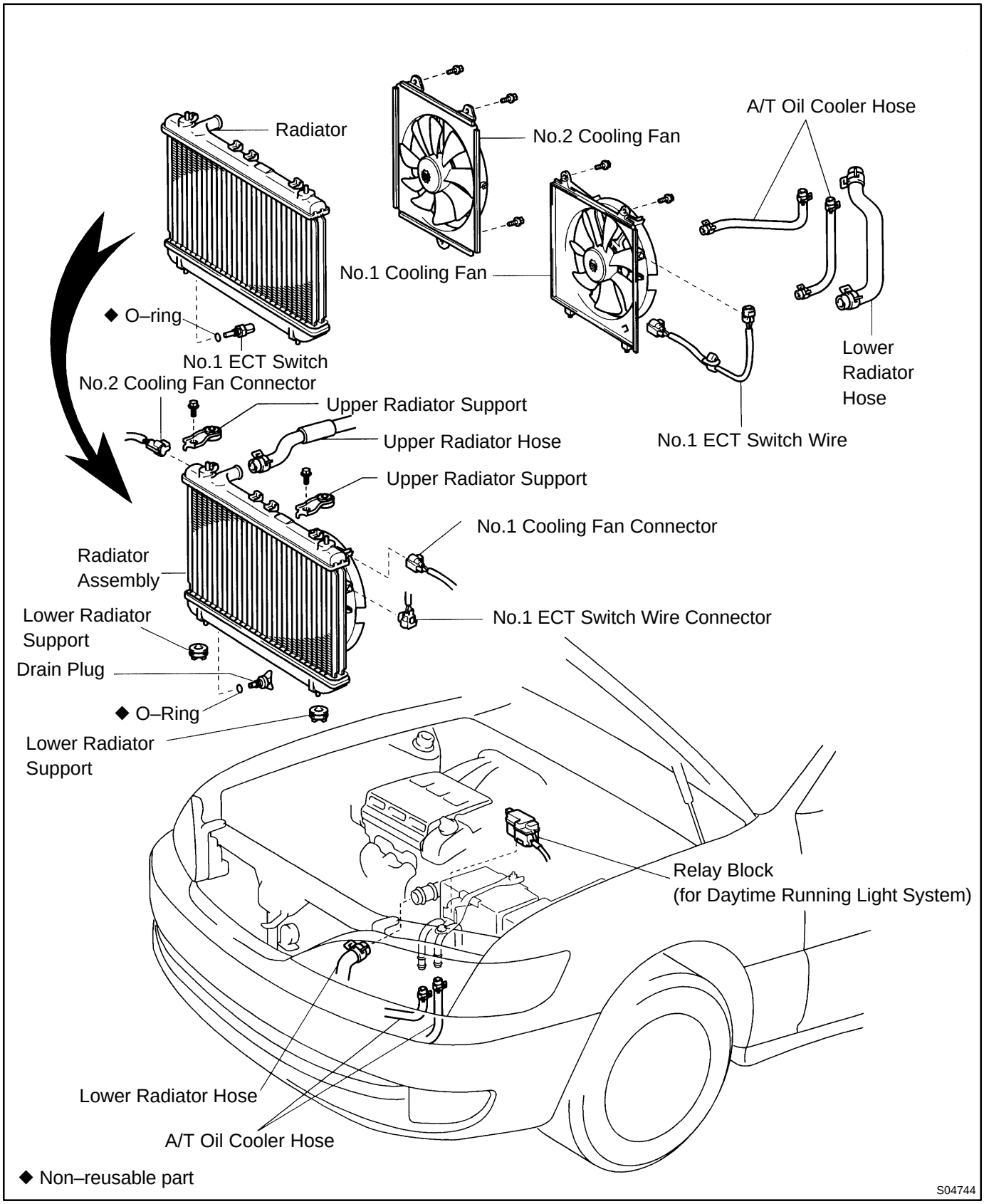
(c) Pump it to 127 kPa (1.3 kgf/cm^2, 18.5 psi), and check that the pressure does not drop.

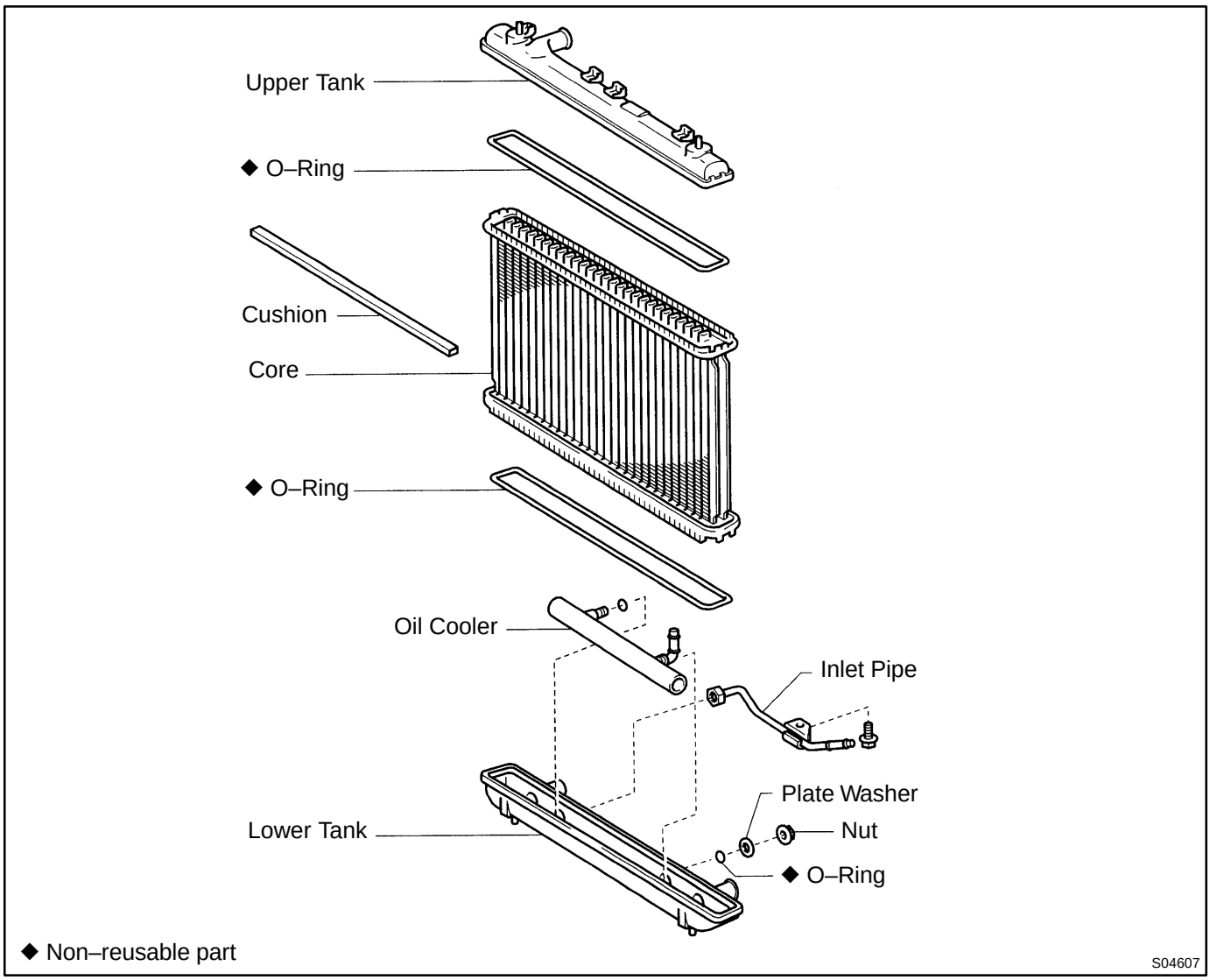
If the pressure drops, check the hoses, radiator or water pump for leaks. If no external leaks are found, check the heater core, cylinder block and cylinder head.

4. REINSTALL RADIATOR CAP

CO02W–01

COMPONENTS




Upper Tank
◆ O–Ring
Cushion
Core
◆ O–Ring
Oil Cooler
Inlet Pipe
Plate Washer
Nut
◆ O–Ring
Lower Tank
◆ Non–reusable part
S04607

CO02X–03

REMOVAL

HINT:

- At the time of installation, please refer to the following items.
- Start the engine, and check for coolant and A/T fluid leaks.
- Check the A/T fluid level.
  (See page DI–150)

1. DRAIN ENGINE COOLANT

2. CANADA:
DISCONNECT RELAY BLOCK (FOR DAYTIME RUNNING LIGHT SYSTEM) FROM BATTERY HOLD–DOWN CLAMP

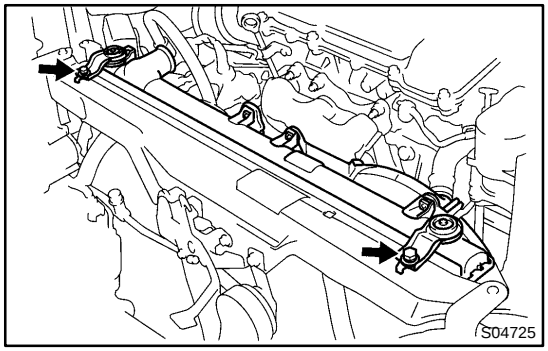
3. DISCONNECT UPPER RADIATOR HOSE FROM RADIATOR

4. DISCONNECT LOWER RADIATOR HOSE FROM WATER INLET PIPE

5. DISCONNECT A/T OIL COOLER HOSES FROM OIL COOLER PIPES

6. DISCONNECT NO.1 AND NO.2 COOLING FAN CONNECTORS

7. DISCONNECT NO.1 ECT SWITCH WIRE CONNECTOR

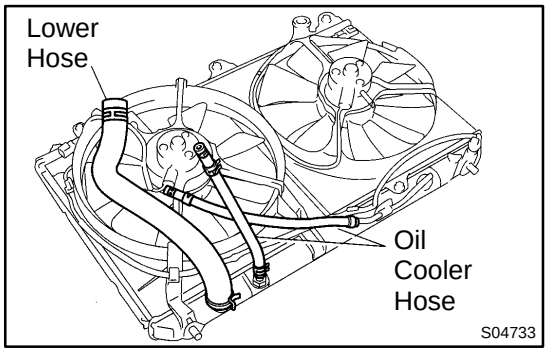


8. REMOVE RADIATOR AND COOLING FANS ASSEMBLY

(a) Remove the 2 bolts and 2 upper supports.
Torque: 12.8 N·m (130 kgf·cm, 9 ft·lbf)

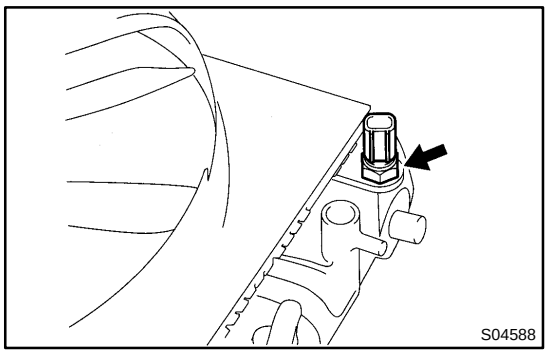
(b) Lift out the radiator, and remove the radiator and cooling fans assembly.

(c) Remove the 2 lower supports.

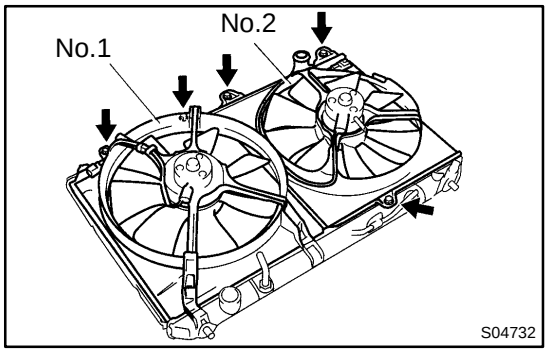


9. REMOVE A/T OIL COOLER HOSES FROM RADIATOR

10. REMOVE LOWER RADIATOR HOSE FROM RADIATOR



11. REMOVE NO.1 ECT SWITCH



12. REMOVE NO.1 COOLING FAN FROM RADIATOR

Remove the 2 bolts and cooling fan.

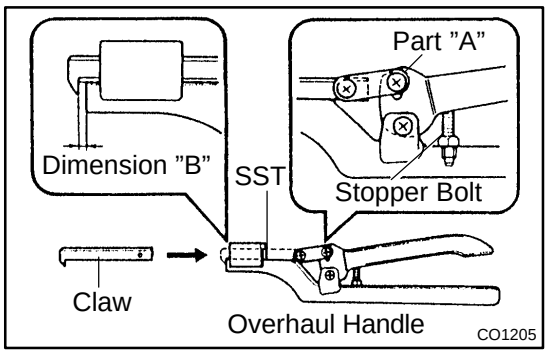
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

13. REMOVE NO.2 COOLING FAN FROM RADIATOR

Remove the 3 bolts and cooling fan.

Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

CO02Y–01



DISASSEMBLY

1. REMOVE CUSHION FROM RADIATOR

2. ASSEMBLE SST

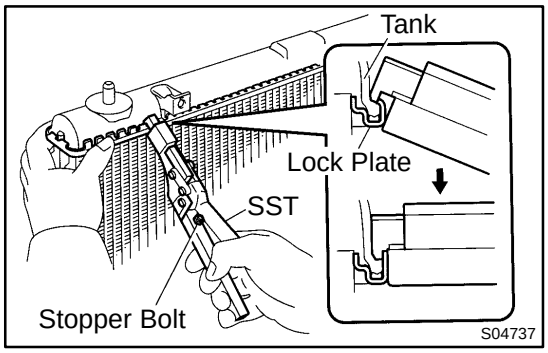
SST 09230–01010

(a) Install the claw to the overhaul handle, inserting it in the hole in part ”A” as shown in the diagram.

(b) While gripping the handle, adjust the stopper bolt so that dimension ”B” shown in the diagram is 0.2 – 0.5 mm (0.008 – 0.020 in.).

NOTICE:

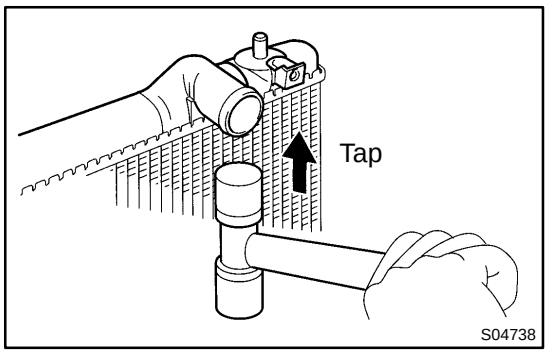
If this adjustment is not done, the claw may be damaged.



3. UNCAULK LOCK PLATES

Using SST to release the caulking, squeeze the handle until stopped by the stopper bolt.

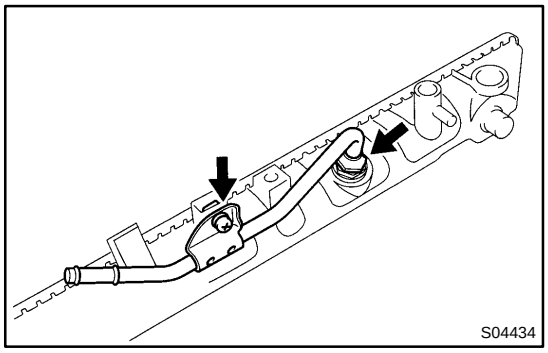
SST 09230–01010



4. REMOVE TANKS AND O–RINGS

(a) Lightly tap the bracket of the radiator (or radiator hose inlet or outlet) with a soft–faced hammer and remove the tank.

(b) Remove the O–ring.



5. REMOVE OIL COOLER FROM LOWER TANK

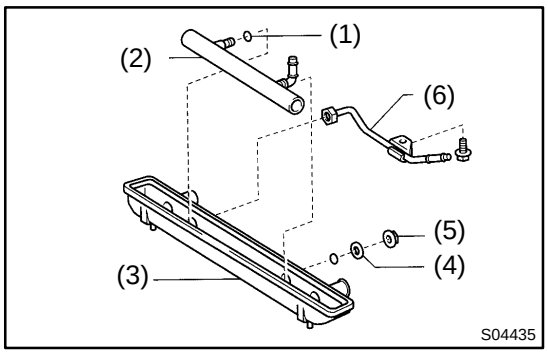
(a) Remove the pipe.

(b) Remove the nuts and plate washers.

(c) Remove the oil cooler and O–rings.

CO02Z–01

REASSEMBLY



1. INSTALL OIL COOLER TO LOWER TANK

(a) Clean the O–ring contact surface of the lower tank and oil cooler.

(b) Install a new O–rings (1) to the oil cooler (2).

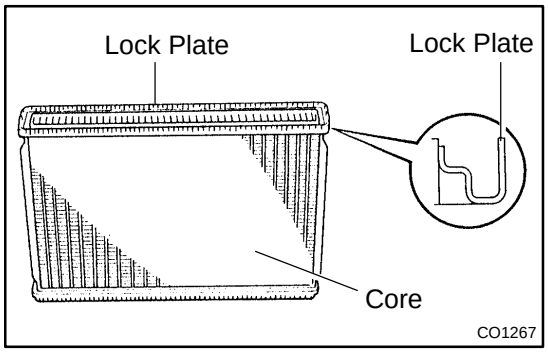
(c) Install the oil cooler with the O–rings to the lower tank (3).

(d) Install the plate washers (4), and nuts (5). Torque the nuts.

Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)

(e) Install the pipe (6).

Torque: 14.7 N·m (150 kgf·cm, 11 ft·lbf)

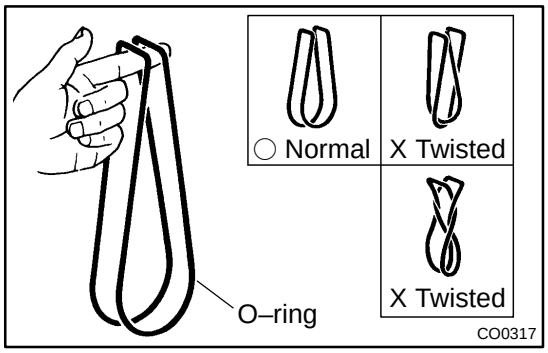


2. INSPECT LOCK PLATE

Inspect the lock plate for damage.

HINT:

- If the sides of the lock plate groove are deformed, reassembly of the tank will be impossible.
- Therefore, first correct any deformation with pliers or similar object. Water leakage will result if the bottom of the lock plate groove is damaged or dented, Therefore, repair or replace if necessary.



NOTICE:

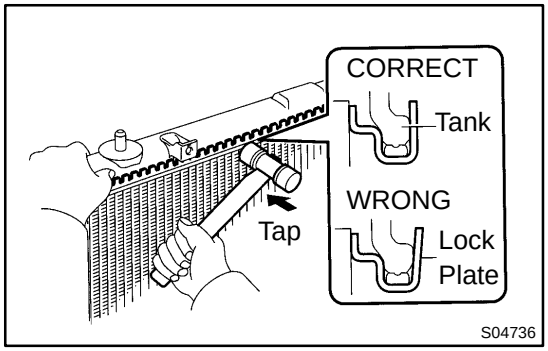
The radiator can only be recaulked 2 times. After the 2nd time, the radiator core must be replaced.

3. INSTALL NEW O–RINGS AND TANKS

(a) After checking that there are no foreign objects in the lock plate groove, install the new O–ring without twisting it.

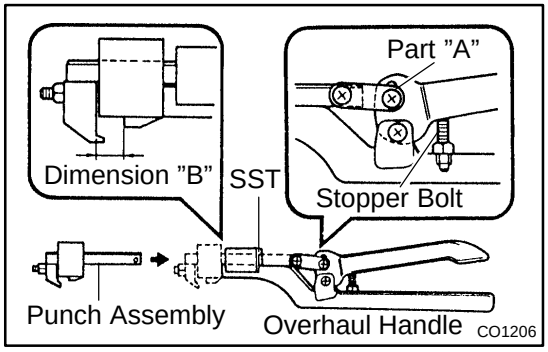
HINT:

When cleaning the lock plate groove, lightly rub it with sand paper without scratching it.



(b) Install the tank without damaging the O–ring.

(c) Tap the lock plate with a soft–faced hammer so that there is no gap between it and the tank.



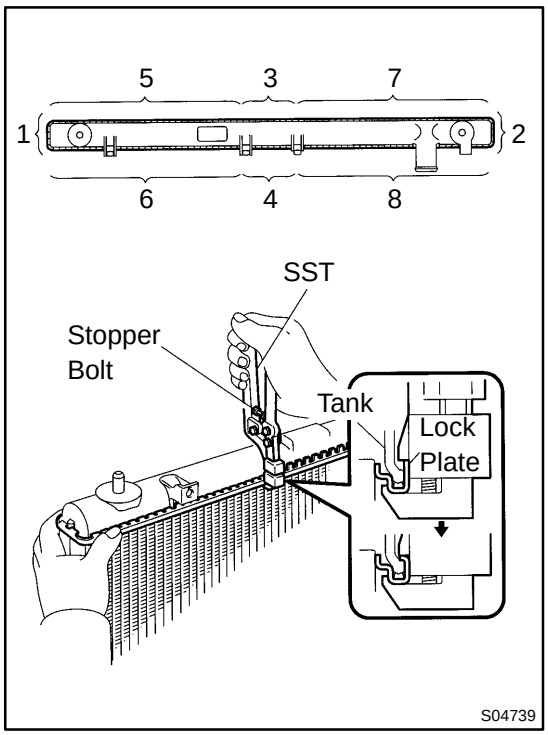
4. ASSEMBLE SST

SST 09230–01010, 09231–14010

(a) Install the punch assembly to the overhaul handle, inserting it in the hole in part ”A” as shown in the illustration.

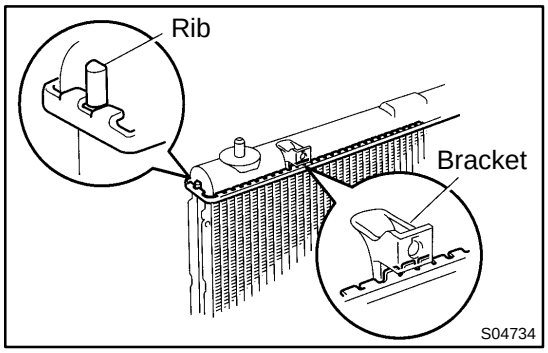
(b) While gripping the handle, adjust the stopper bolt so that dimension ”B” shown in the diagram.

Dimension ”B”: 8.4 mm (0.34 in.)



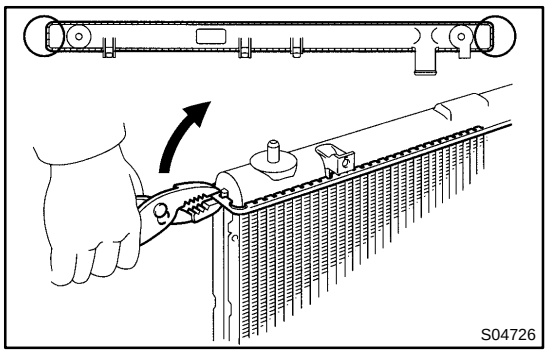
5. CAULK LOCK PLATE

(a) Lightly press SST against the lock plate in the order shown in the illustration. After repeating this a few times, fully caulk the lock plate by squeezing the handle until stopped by the stopper plate.
SST 09230–01010

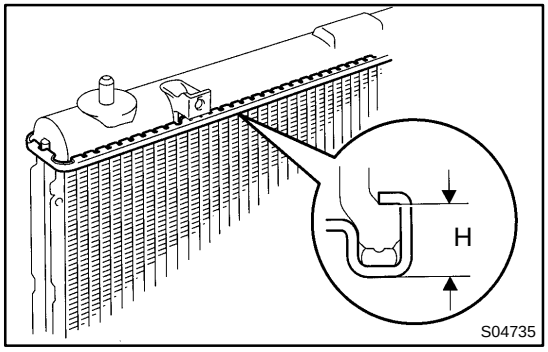


HINT:

- Do not stake the areas protruding around the pipes, brackets or tank ribs.



- The points shown in the rib sides and oil cooler near here cannot be staked with SST. Use pliers or similar object and be careful not to damage the core plates.



(b) Check the lock plate height (H) after completing the caulking.
Plate height (H): 7.4 – 7.8 mm (0.2959 – 0.3119 in.)

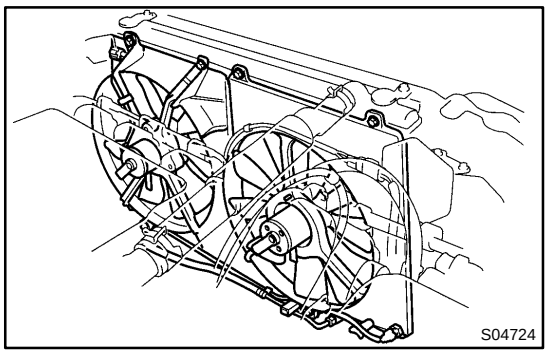
If not within the specified height, adjust the stopper bolt of the handle again and caulk again.

6. INSTALL CUSHION

CO030–01

INSTALLATION

Installation is in the reverse order of removal (See page CO–17).



ELECTRIC COOLING FAN

CO031–01

ON–VEHICLE INSPECTION

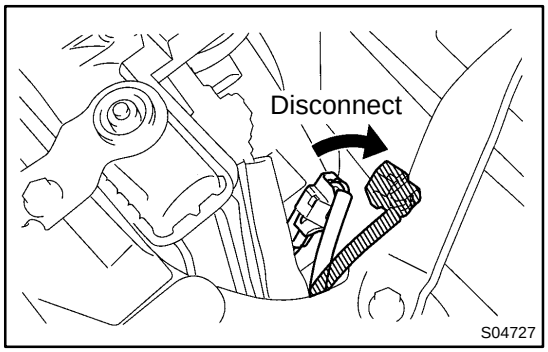
1. CHECK COOLING FAN OPERATION WITH LOW TEMPERATURE (Below 88˚C (190˚F))

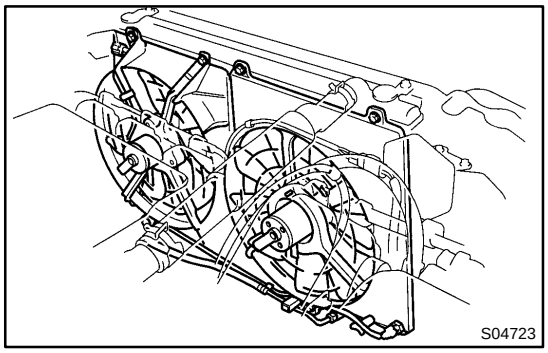
(a) Turn the ignition switch ON.

(b) Check that the cooling fan stops.

If not, check the cooling fan relay and ECT switch, and check for a separated connector or severed wire between the cooling fan relay and ECT switch.

(c) Disconnect the No.1 ECT switch connector.

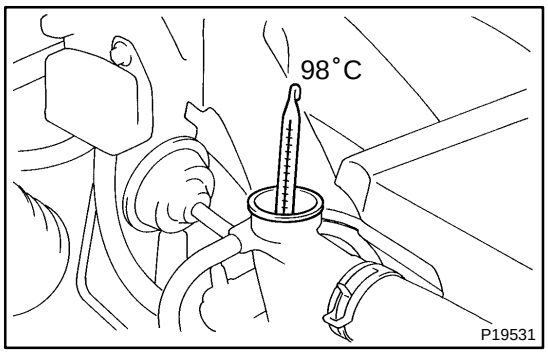




(d) Check that the cooling fan rotates.

If not, check the fuses, engine main relay, cooling fan relay, cooling fan, and check for a short circuit between the cooling fan relay and ECT switch.

(e) Reconnect the No.1 ECT switch connector.

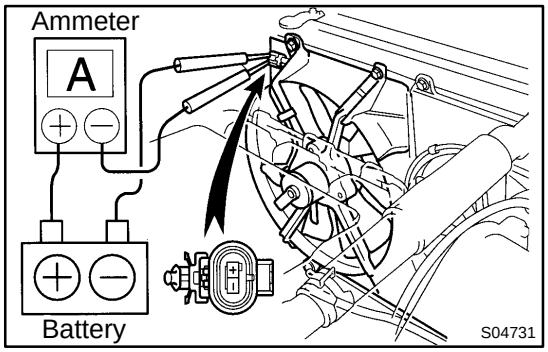


2. CHECK COOLING FAN OPERATION WITH HIGH TEMPERATURE (Above 98˚C (208˚F))

(a) Start the engine, and raise coolant temperature to above 98˚C (208˚F).

(b) Check that the cooling fan rotates.

If not, replace the No.1 ECT switch.



3. INSPECT NO.1 COOLING FAN

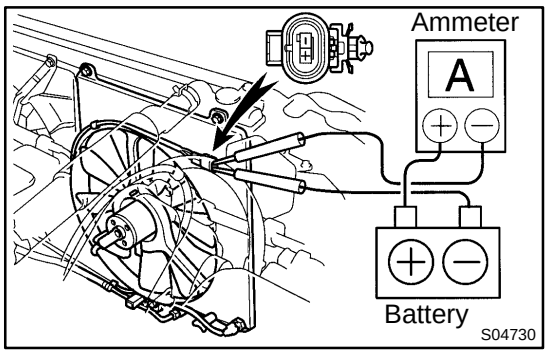
(a) Disconnect the cooling fan connector.

(b) Connect battery and ammeter to the cooling fan connector.

(c) Check that the cooling fan rotates smoothly, and check the reading on the ammeter.

Standard amperage: 8.3 – 11.3 A at 20˚C (68˚F)

(d) Reconnect the cooling fan connector.



4. INSPECT NO.2 COOLING FAN

(a) Disconnect the cooling fan connector.

(b) Connect battery and ammeter to the cooling fan connector.

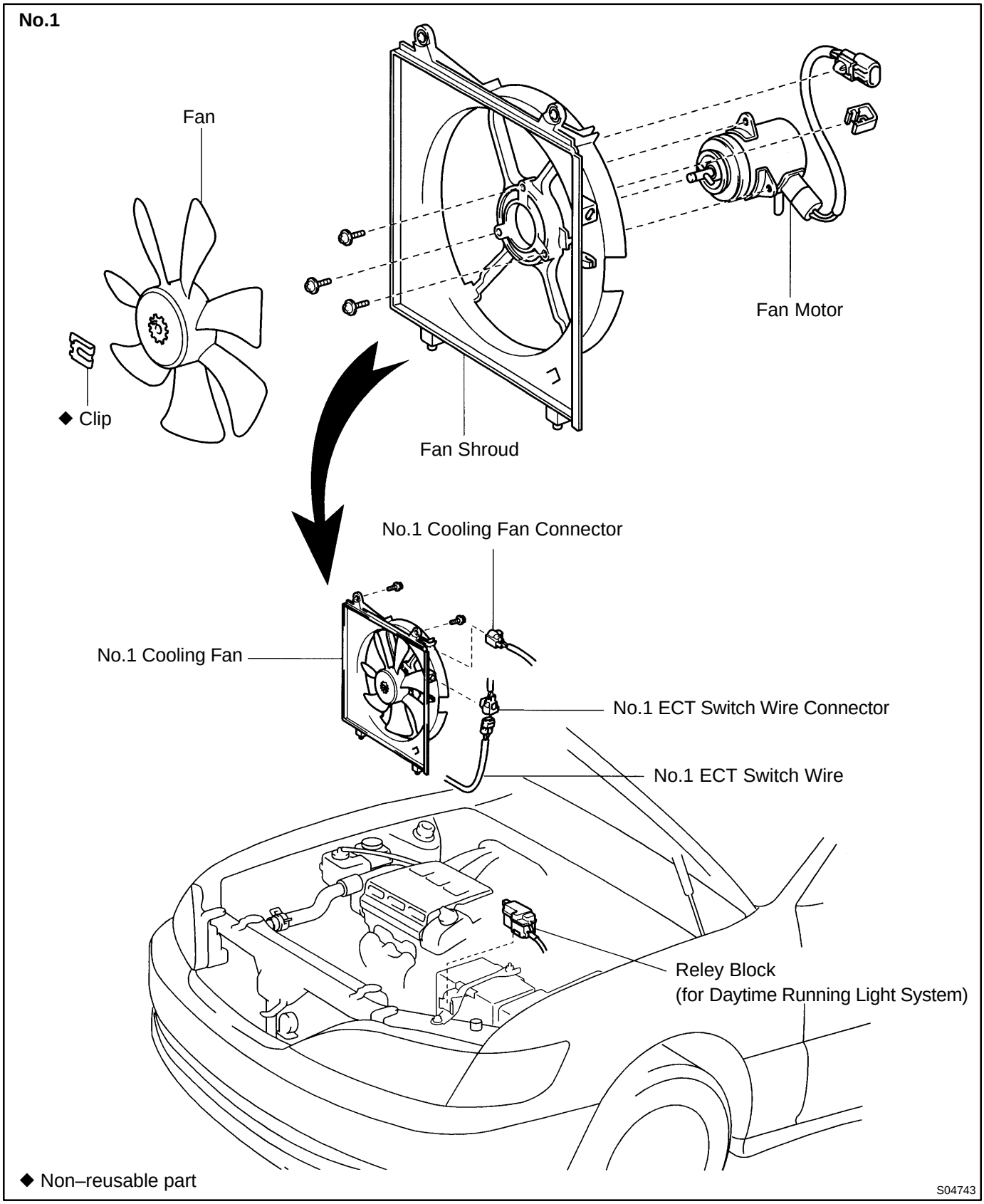
(c) Check that the cooling fan rotates smoothly, and check the reading on the ammeter.

Standard amperage: 8.3 – 11.3 A at 20˚C (68˚F)

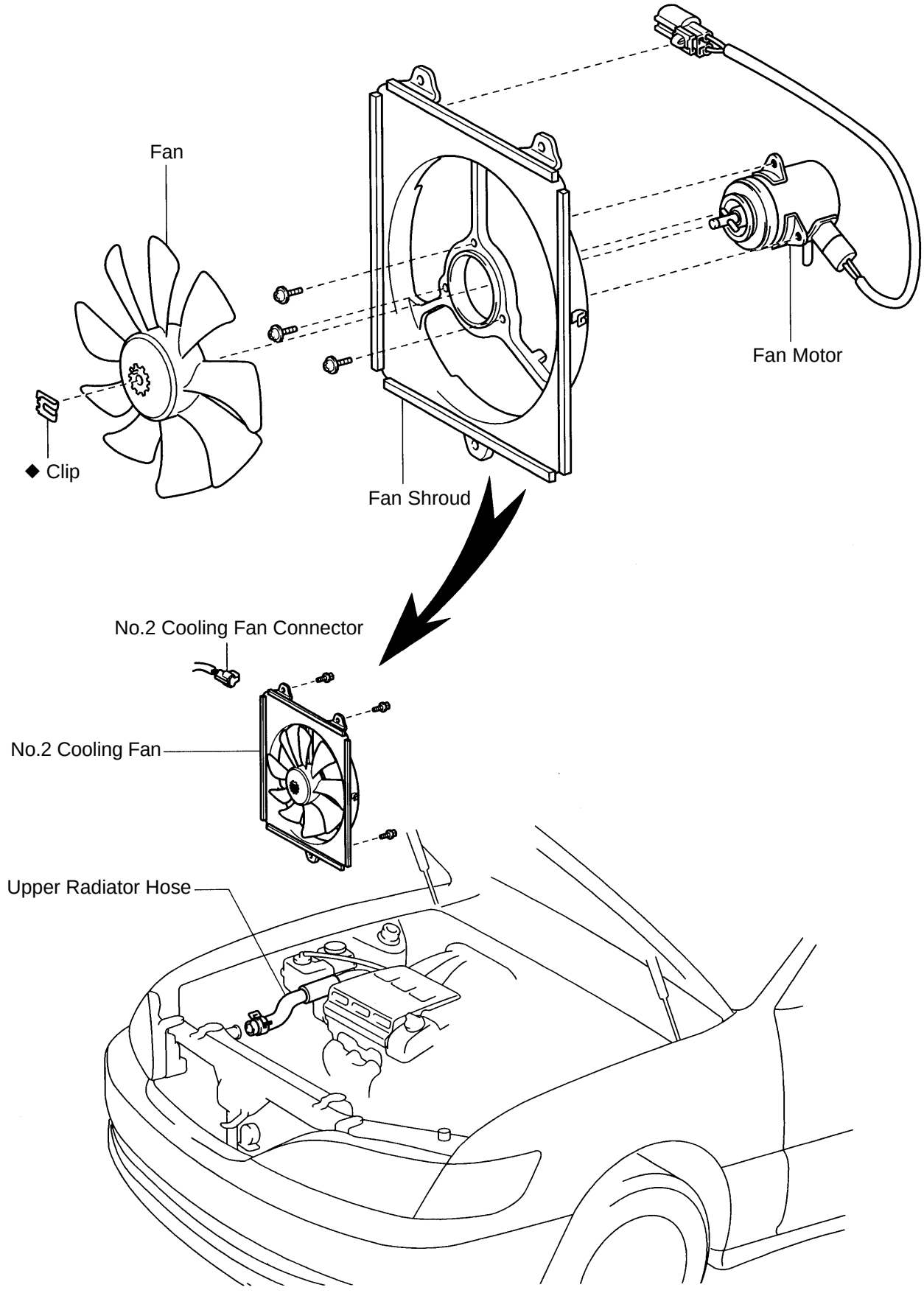
(d) Reconnect the cooling fan connector.

CO032–01

COMPONENTS



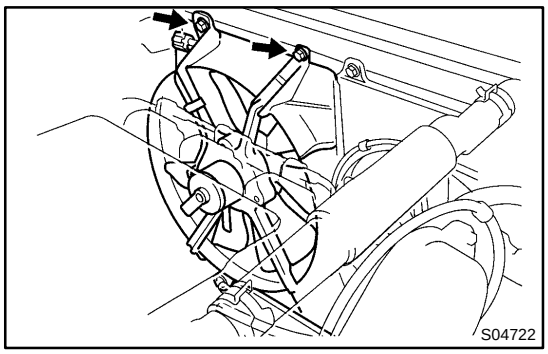
No.2



◆ Non–reusable part

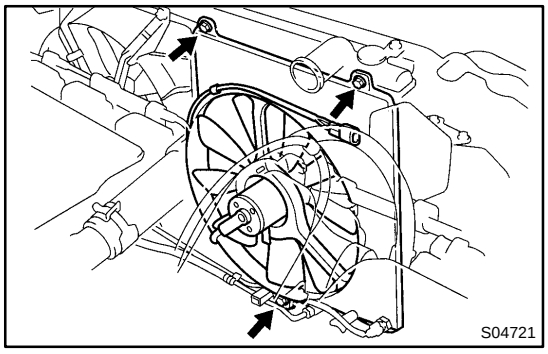
S04608

CO033–04



REMOVAL

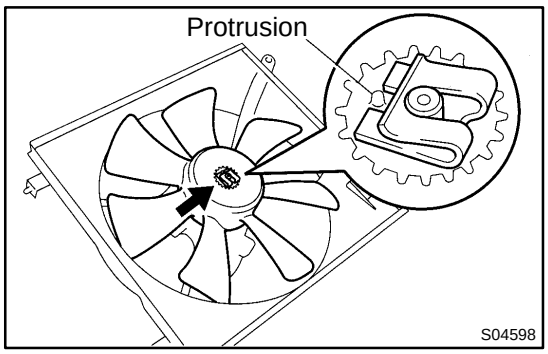
1. No. 1 cooling fan (CANADA):
DISCONNECT RELAY BLOCK (FOR DAYTIME RUNNING LIGHT SYSTEM) FROM BATTERY HOLD–DOWN CLAMP



2. REMOVE NO.2 COOLING FAN

(a) Drain engine coolant.
(b) Disconnect the upper radiator hose from the radiator.
(c) Disconnect the cooling fan connector.
(d) Remove the 3 bolts and cooling fan.
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

CO034–03



DISASSEMBLY

1. No. 1 cooling fan:
REMOVE FAN

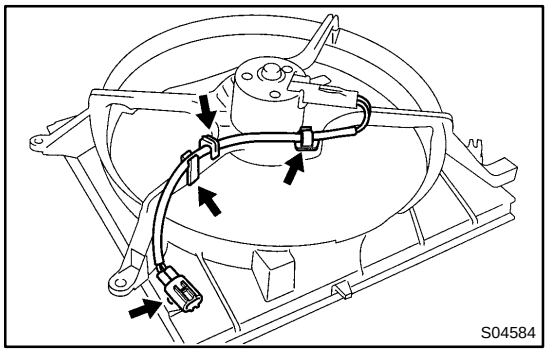
Remove the clip and fan.

NOTICE:

When removing the clip and fan, do not apply too much force to the motor shaft. And do not scratch the motor shaft.

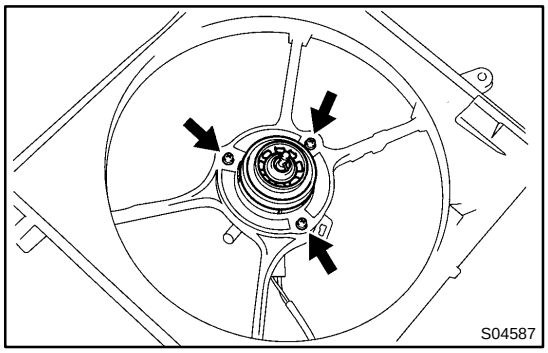
HINT:

Install a new clip from the side opposite the protrusion on the fan.

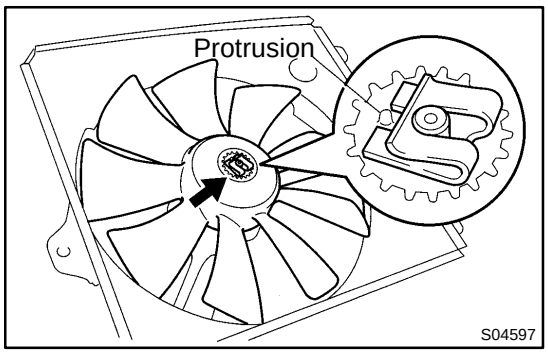


2. No. 1 cooling fan:
REMOVE FAN MOTOR

(a) Disconnect the lead wire from the fan shroud.



(b) Remove the 3 screws and fan motor.



3. No. 2 cooling fan:
REMOVE FAN

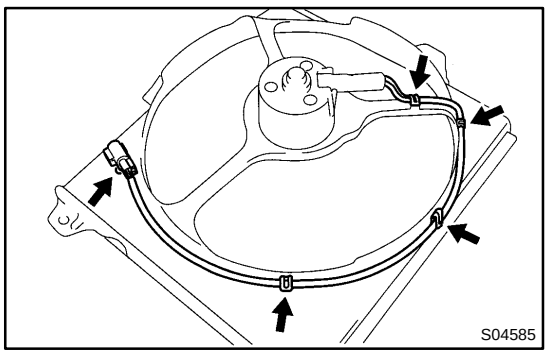
Remove the clip and fan.

NOTICE:

When removing the clip and fan, do not apply too much force to the motor shaft. And do not scratch the motor shaft.

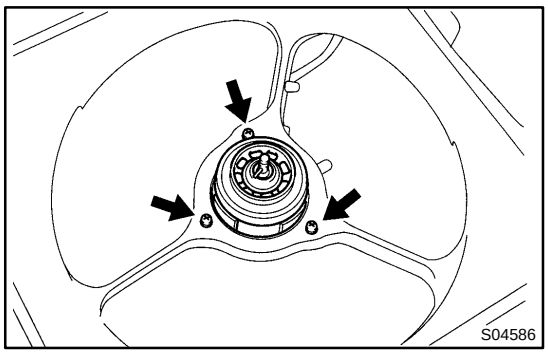
HINT:

Install a new clip from the side opposite the protrusion on the fan.



4. No. 2 cooling fan:
REMOVE FAN MOTOR

(a) Disconnect the lead wire from the fan shroud.



(b) Remove the 3 screws and fan motor.

CO035–01

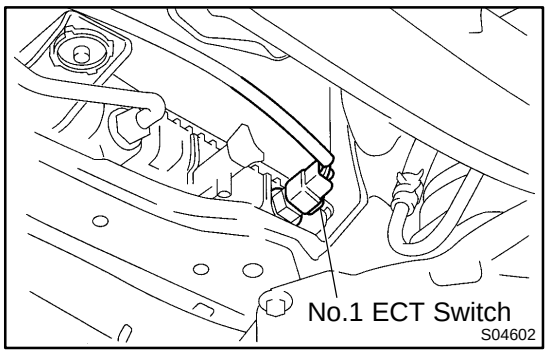
REASSEMBLY

Reassembly is in the reverse order of disassembly (See page CO–28).

CO036–01

INSTALLATION

Installation is in the reverse order of removal (See page CO–27).



ENGINE COOLANT TEMPERATURE (ECT) SWITCH

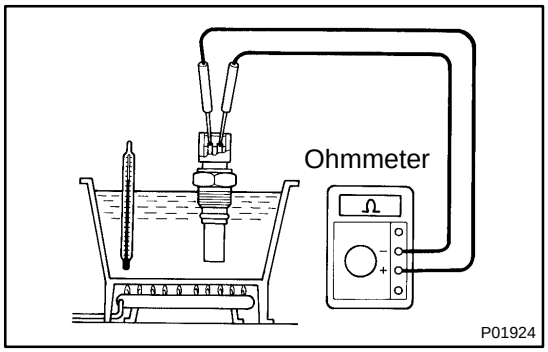
CO037–05

INSPECTION

1. INSPECT NO.1 ECT SWITCH

(a) Drain engine coolant.

(b) Remove the ECT switch.



(c) Using an ohmmeter, check that there is no continuity between the switch terminals when the coolant temperature is above 98˚C (208˚F).

If there is continuity, replace the switch.

(d) Using an ohmmeter, check that there is continuity between the switch terminals when the coolant temperature is below 88˚C (190˚F).

If there is no continuity, replace the switch.

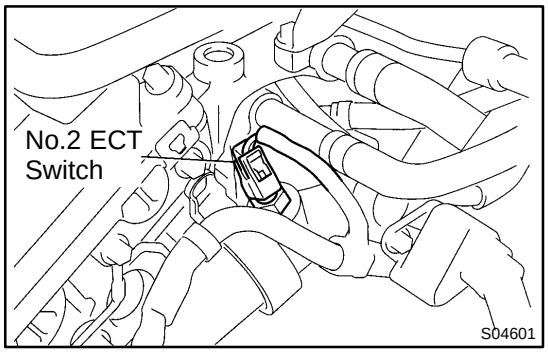
(e) Install the ECT switch.

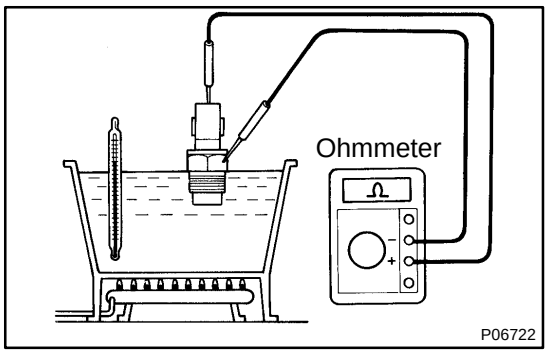
(f) Fill with engine coolant.

2. INSPECT NO.2 ECT SWITCH

(a) Drain engine coolant.

(b) Remove the ECT switch.





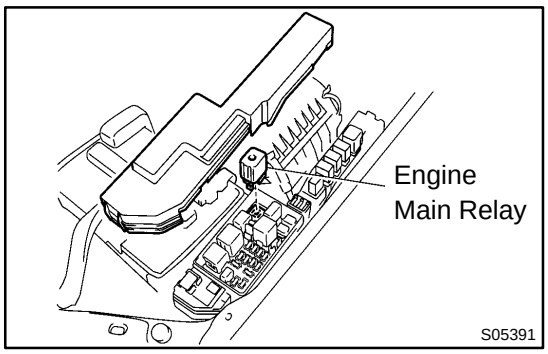
(c) Using an ohmmeter, check that there is continuity between the switch terminals when the coolant temperature is above 94˚C (201˚F).

(d) Using an ohmmeter, check that there is no continuity between the switch terminals when the coolant temperature is below 83˚C (181˚F).

If continuity is not as specified, replace the switch.

(e) Install the ECT switch.

(f) Fill with engine coolant.

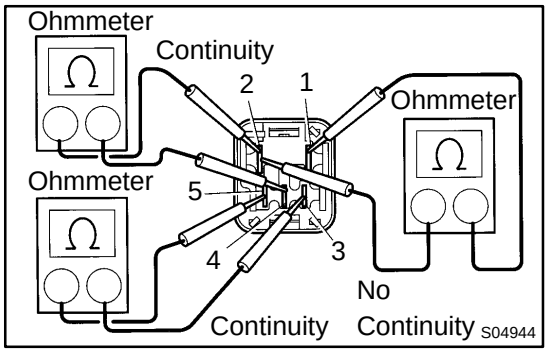


ENGINE MAIN RELAY

CO038–01

INSPECTION

1. REMOVE ENGINE MAIN RELAY (Marking: ENGINE MAIN)



2. INSPECT RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

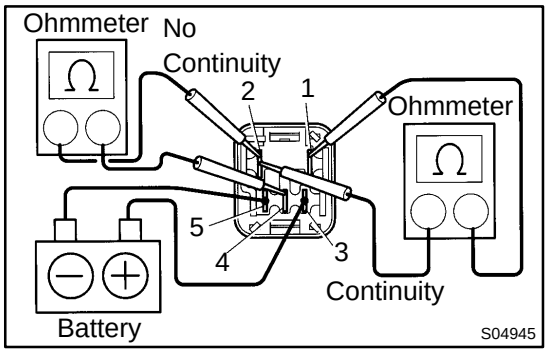
If there is no continuity, replace the relay.

(b) Check that there is continuity between terminals 2 and 4.

If there is no continuity, replace the relay.

(c) Check that there is no continuity between terminals 1 and 2.

If there is continuity, replace the relay.



3. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 3 and 5.

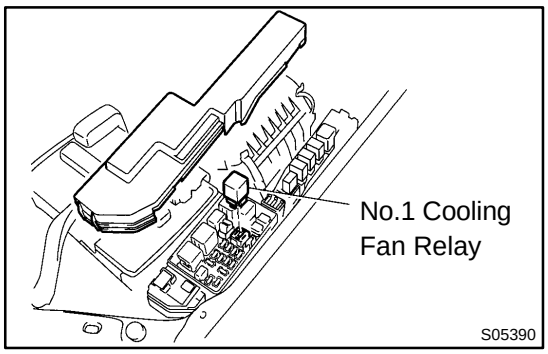
(b) Using an ohmmeter, check that there is no continuity between terminals 2 and 4.

If there is continuity, replace the relay.

(c) Check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

4. REINSTALL ENGINE MAIN RELAY



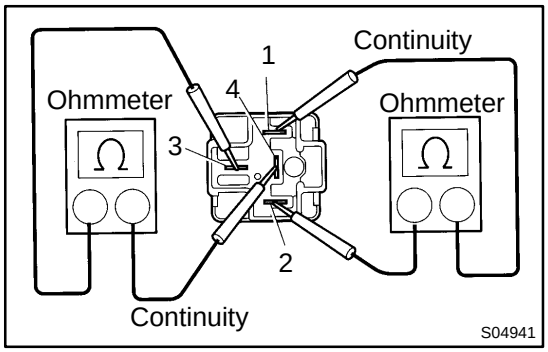
COOLING FAN RELAY

CO039–01

INSPECTION

1. INSPECT NO.1 COOLING FAN RELAY

(a) Remove the No.1 cooling fan relay. (Marking: FAN NO.1)



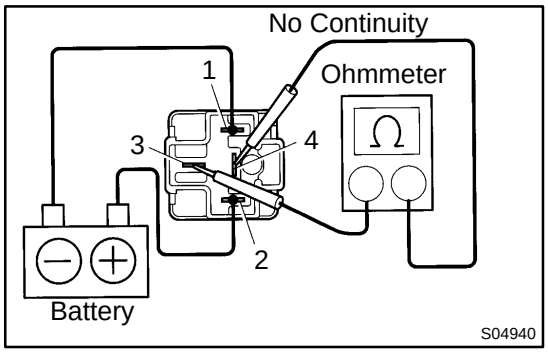
(b) Inspect the No.1 cooling fan relay continuity. (DENSO)

(1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(2) Check that there is continuity between terminals 3 and 4.

If there is no continuity, replace the relay.

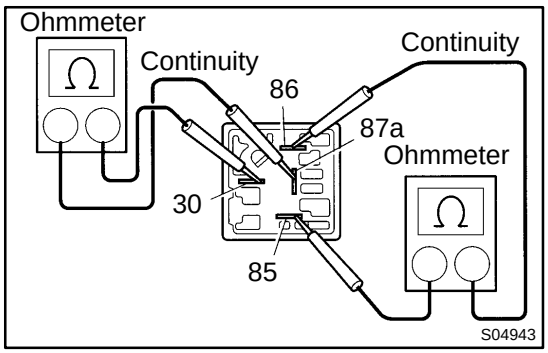


(c) Inspect the No.1 cooling fan relay operation. (DENSO)

(1) Apply battery voltage across terminals 1 and 2.

(2) Using an ohmmeter, check that there is no continuity between terminals 3 and 4.

If there is continuity, replace the relay.



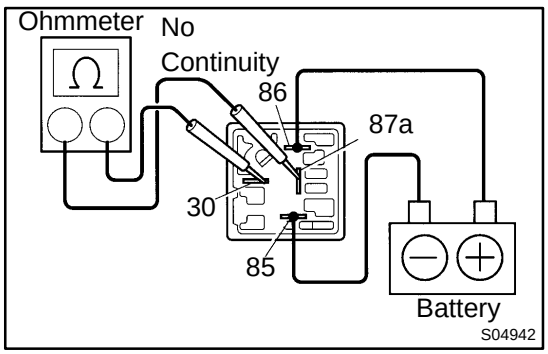
(d) Inspect the No.1 cooling fan relay continuity. (BOSCH)

(1) Using an ohmmeter, check that there is continuity between terminals 85 and 86.

(2) If there is no continuity, replace the relay.

(3) Check that there is continuity between terminals 30 and 87a.

If there is no continuity, replace the relay.



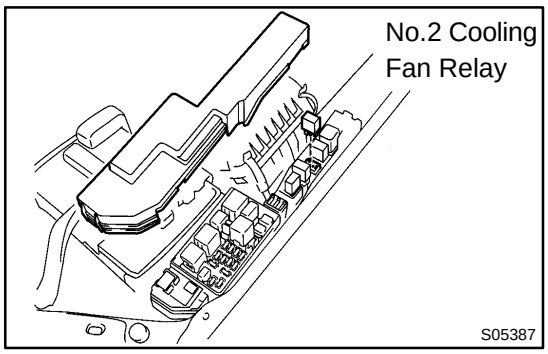
(e) Inspect the No.1 cooling fan relay operation. (BOSCH)

(1) Apply battery voltage across terminals 85 and 86.

(2) Using an ohmmeter, check that there is no continuity between terminals 30 and 87a.

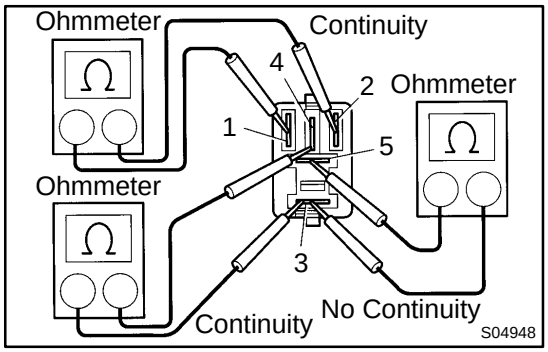
If there is continuity, replace the relay.

(f) Install the No.1 cooling fan relay.



2. INSPECT NO.2 COOLING FAN RELAY

(a) Remove the No.2 cooling fan relay. (Marking: FAN NO.2)



(b) Inspect the No.2 cooling fan relay continuity.

(1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

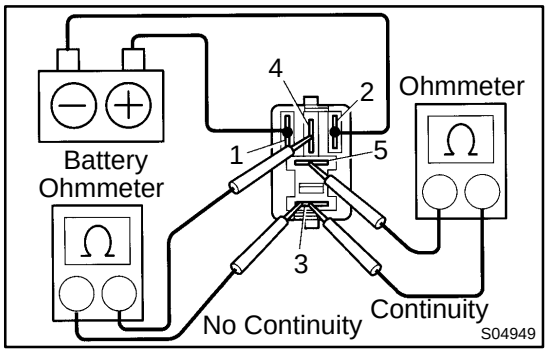
If there is no continuity, replace the relay.

(2) Check that there is continuity between terminals 3 and 4.

If there is no continuity, replace the relay.

(3) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



(c) Inspect the No.2 cooling fan relay operation.

(1) Apply battery voltage across terminals 1 and 2.

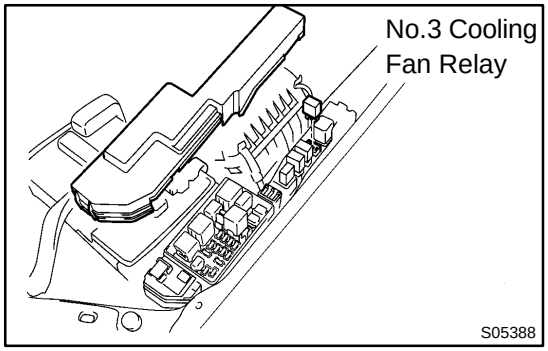
(2) Using an ohmmeter, check that there is no continuity between terminals 3 and 4.

If there is continuity, replace the relay.

(3) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

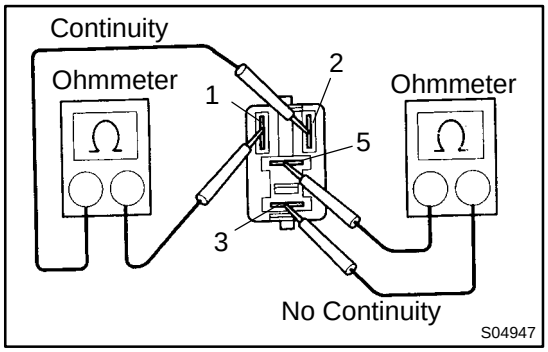
If there is no continuity, replace the relay.

(d) Install the No.2 cooling fan relay.



3. INSPECT NO.3 COOLING FAN RELAY

(a) Remove the No.3 cooling fan relay. (Marking: FAN NO.3)



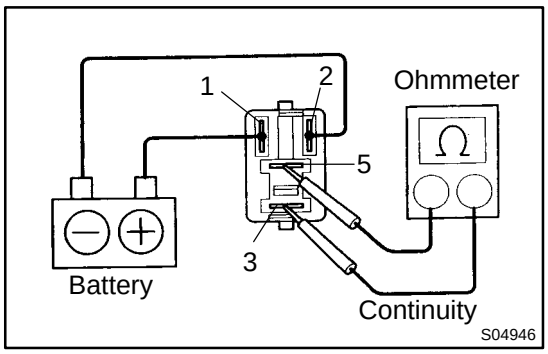
(b) Inspect the No.3 cooling fan relay continuity.

(1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(2) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



(c) Inspect the No.3 cooling fan relay operation.
  (1) Apply battery voltage across terminals 1 and 2.
  (2) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

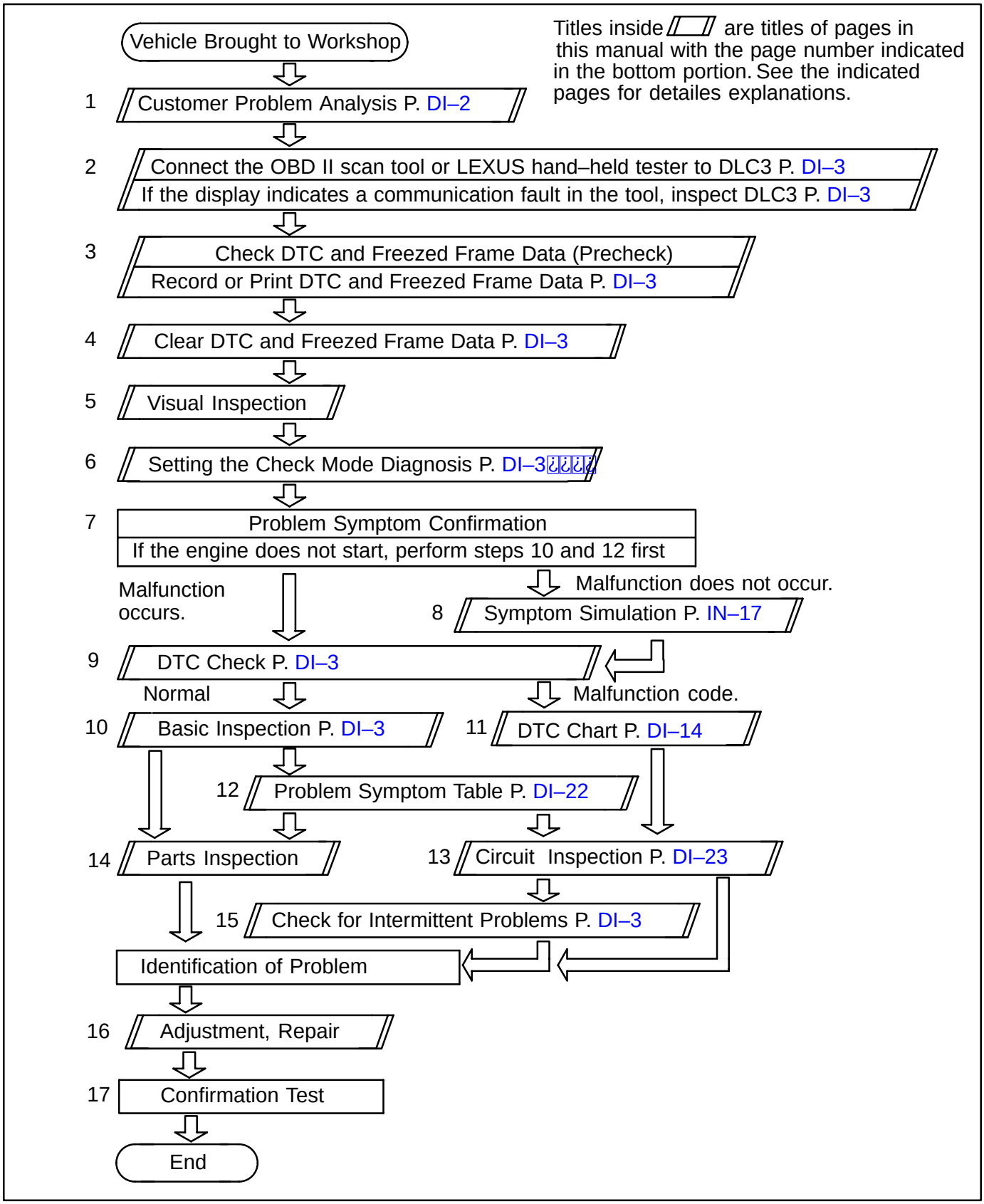
(d) Install the No.3 cooling fan relay.

ENGINE

DI094–01

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot in accordance with the procedure on the following page.



DI095–01

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's Name

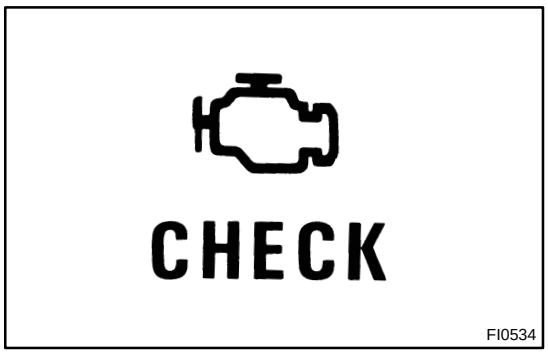
Customer's Name		Model and Model Year	
Driver's Name		Frame No.	
Date Vehicle Brought in		Engine Model	
License No.		Odometer Reading	km miles

Problem Symptoms	☐ Engine does not Start	☐ Engine does not crank ☐ No initial combustion ☐ No complete combustion
	☐ Difficult to Start	☐ Engine cranks slowly ☐ Other _____
	☐ Poor Idling	☐ Incorrect first idle ☐ Idling rpm is abnormal ☐ High (rpm) ☐ Low (rpm) ☐ Rough idling ☐ Other _____
	☐ Poor Driveability	☐ Hesitation ☐ Back fire ☐ Muffler explosion (after–fire) ☐ Surging ☐ Knocking ☐ Other _____
	☐ Engine Stall	☐ Soon after starting ☐ After accelerator pedal depressed ☐ After accelerator pedal released ☐ During A/C operation ☐ Shifting from N to D ☐ Other _____
	☐ Others	

Dates Problem Occurred		
Problem Frequency		☐ Constant ☐ Sometimes (times per day/month) ☐ Once only ☐ Other _____
Condition When Problem Occurs	Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Other _____
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (approx. ____˚F/____˚C)
	Place	☐ Highway ☐ Suburbs ☐ Inner City ☐ Uphill ☐ Downhill ☐ Rough road ☐ Other _____
	Engine Temp.	☐ Cold ☐ Warming up ☐ After Warming up ☐ Any temp. ☐ Other _____
	Engine Operation	☐ Starting ☐ Just after starting (min.) ☐ Idling ☐ Racing ☐ Driving ☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ A/C switch ON/OFF ☐ Other _____

Condition of MIL		☐ Remains on	☐ Sometimes light up ☐ Does not light up
DTC Inspection	Normal mode (Precheck)	☐ Normal	☐ Malfunction code(s) (code) ☐ Freezed frame data ( )
	Check Mode	☐ Normal	☐ Malfunction code(s) (code) ☐ Freezed frame data ( )

DI096–01



PRE–CHECK

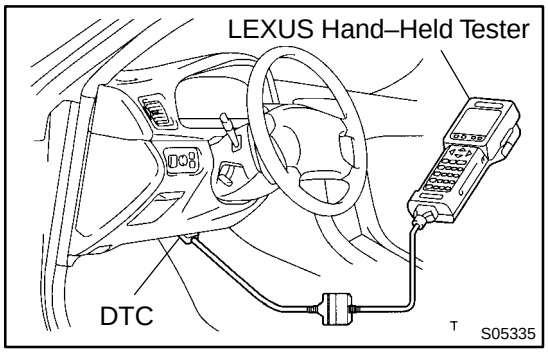
1. DIAGNOSIS SYSTEM

(a) Description

When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle the OBD II scan tool complying with SAE J1978 or LEXUS hand–held tester, and read off various data output from the vehicle's ECM.

OBD II regulations require that the vehicle's on–board computer lights up the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components which affect vehicle emissions. In addition to the MIL lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTC) prescribed by SAE J2012 are recorded in the ECM memory (See page DI–14).

If the malfunction does not reoccur in 3 trips, the MIL goes off but the DTC remain recorded in the ECM memory.



To check the DTC, connect the OBD II scan tool or LEXUS hand–held tester to Data Link Connector 3 (DLC3) on the vehicle. The OBD II scan tool or LEXUS hand–held tester also enables you to erase the DTC and check freezed frame data and various forms of engine data (For operating instructions, see the OBD II scan tool's instruction book.).

DTC include SAE controlled codes and manufacturer controlled codes. SAE controlled codes must be set as prescribed by the SAE, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits (See DTC chart on page DI–14).

The diagnosis system operates in normal mode during normal vehicle use. It also has a check mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTC use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the ECM to check mode when troubleshooting, the technician can cause the MIL to light up for a malfunction that is only detected once or momentarily (LEXUS hand–held tester only).

(See page DI–14)

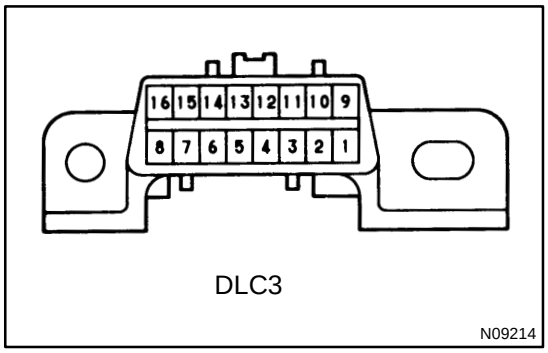
*2 trip detection logic: When a logic malfunction is first detected, the malfunction is temporarily stored in the ECM memory. If the same malfunction is detected again during the second drive test, this second detection causes the MIL to light up.

The 2 trip repeats the same mode a 2nd time (However, the IG switch must be turned OFF between the 1st trip and 2nd trip.).

Freeze frame data:
Freeze frame data records the engine condition when a misfire (DTC P0300 ~ P0306) or fuel trim malfunction (DTC P0171, P0172) or other malfunction (first malfunction only), is detected.
Because freeze frame data records the engine conditions (fuel system, calculator load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air–fuel ratio lean or rich, etc. at the time of the malfunction.
Priorities for troubleshooting:
If troubleshooting priorities for multiple DTC are given in the applicable DTC chart, these should be followed.
If no instructions are given troubleshoot DTC according to the following priorities.

(1) DTC other than fuel trim malfunction (DTC P0171, P0172), EGR (DTC P0401, P0402) and misfire (DTC P0300 ~ P0306).
(2) Fuel trim malfunction (DTC P0171, P0172) and EGR (DTC P0401, P0402).
(3) Misfire (DTC P0300 ~ P0306).

(b) Check the DLC3.
The vehicle's ECM uses ISO 9141–2 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141–2 format.

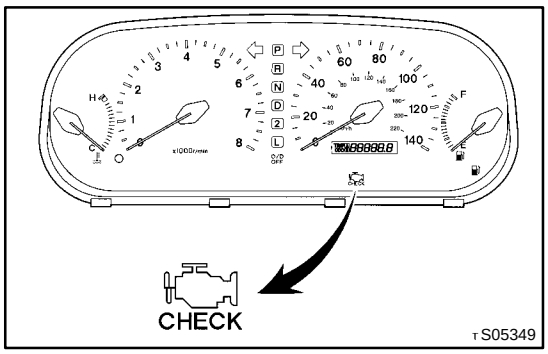


DLC3

Terminal No.	Connection / Voltage or Resistance	Condition
7	Bus ⊖ Line / Pulse generation	During transmission
4	Chassis Ground / ↔ Body Ground 1 Ω or less	Always
5	Signal Ground / ↔ Body Ground 1 Ω or less	Always
16	Battery Positive / ↔ Body Ground 9 ~ 14 V	Always

HINT:If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of the OBD II scan tool or LEXUS hand–held tester to DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

(1) If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
(2) If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.



2. INSPECT DIAGNOSIS (Normal Mode)

(a) Check the MIL.

(1) The MIL comes on when the ignition switch is turned ON and the engine is not running.

HINT:If the MIL does not light up, troubleshoot the combination meter (See page BE–87).

(2) When the engine started, the MIL should go off. If the lamp remains on, the diagnosis system has detected a malfunction or abnormality in the system.

(b) Check the DTC.

NOTICE:NOTICE (LEXUS hand–held tester only): When the diagnosis system is switched from normal mode to check mode, it erases all DTC and freezed frame data recorded in normal mode. So before switching modes, always check the DTC and freezed frame data, and note them down.

(1) Prepare the OBD II scan tool (complying with SAE J 1978) or LEXUS hand–held tester.

(2) Connect the OBD II scan tool or LEXUS hand–held tester to DLC3 at the lower center of the instrument panel.

(3) Turn the ignition switch ON and push the OBD II scan tool or LEXUS hand–held tester switch ON.

(4) Use the OBD II scan tool or LEXUS hand–held tester to check the DTC and freezed frame data, note them down (For operating instructions, see the OBD II scan tool's instruction book.).

(5) See page DI–14 to confirm the details of the DTC.

NOTICE:When simulating symptoms with an OBD II scan tool (excluding LEXUS hand–held tester) to check the DTC, use normal mode. For code on the DTC chart subject to "2 trip detection logic", turn the ignition switch OFF after the symptom is simulated the first time. Then repeat the simulation process again. When the problem has been simulated twice, the MIL lights up and the DTC are recorded in the ECM.

3. INSPECT DIAGNOSIS (Check Mode)

LEXUS hand–held tester only:

Compared to the normal mode, the check mode has an increased sensitivity to detect malfunctions.

Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check mode.

(a) Check the DTC.

(1) Initial conditions.

- Battery positive voltage 11V or more
- Throttle valve fully closed
- Transmission in ”P” or ”N” position
- Air conditioning switched OFF

(2) Turn ignition switch OFF.

(3) Prepare the LEXUS hand–held tester.

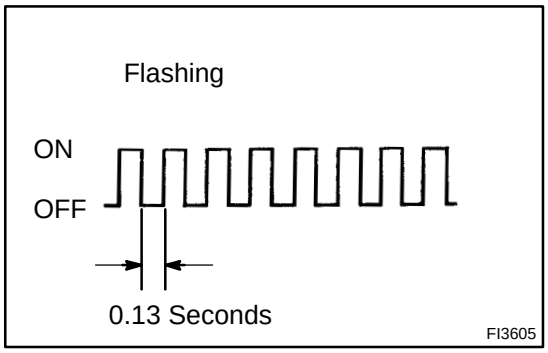
(4) Connect the LEXUS hand–held tester to DLC3 at the lower center of the instrument panel.

(5) Turn the ignition switch ON and push the LEXUS hand–held tester switch ON.

(6) Switch the LEXUS hand–held tester normal mode to check mode (Check that the MIL flashes.).

(7) Start the engine (The MIL goes out after the engine start.).

(8) Simulate the conditions of the malfunction described by the customer.



NOTICE:Leave the ignition switch ON until you have checked the DTC, etc.

(9) After simulating the malfunction conditions, use the LEXUS hand–held tester diagnosis selector to check the DTC and freezed frame data, etc.

HINT:Take care not to turn the ignition switch OFF. Turning the ignition switch OFF switches the diagnosis system from check mode to normal mode, so all DTC, etc. are erased.

(10) After checking the DTC, inspect the applicable circuit.

(b) Clear the DTC.

The following actions will erase the DTC and freezed frame data.

(1) Operating the OBD II scan tool (complying with SAE J1978) or LEXUS hand–held tester to erase the codes (See the OBD II scan tool’s instruction book for operating instructions.).

(2) Disconnecting the battery terminals or EFI fuse.

NOTICE:If the LEXUS hand–held tester switches the ECM from normal mode to check mode or vice–versa, or if the ignition switch is turned from ON to ACC or OFF during check mode, the DTC and freezed frame data will be erased.

4. FAIL–SAFE CHART

If any of the following codes is recorded, the ECM enters fail–safe mode.

DTC No.	Fail–Safe Operation	Fail–Safe Deactivation Conditions
P0100	Ignition timing fixed at 10˚ BTDC	Returned to normal condition
P0110	Intake air temp. is fixed at 20˚C (68˚F)	Returned to normal condition
P0115	Engine coolant temp. is fixed at 80˚C (176˚F)	Returned to normal condition
P0120	VTA is fixed at 0˚	The following condition must be repeated at least 2 times consecutively 0.1 V ∼ VTA ∼ 0.95 V
P0135 P0141 P0155	The heater circuit in witch an abnormality is detected is turned off	Ignition switch OFF
P0325 P0330	Max. timing retardation	Ignition switch OFF
P1300	Fuel cut	Returned to normal condition

5. CHECK FOR INTERMITTENT PROBLEMS

LEXUS HAND–HELD TESTER only:

By putting the vehicle's ECM in check mode, 1 trip detection logic is possible instead of 2 trip detection logic and sensitivity to detect open circuits is increased. This makes it easier to detect intermittent problems.

(a) Clear the DTC (See page DI–3).
(b) Set the check mode (See page DI–3).
(c) Perform a simulation test (See page IN–17).
(d) Check the connector and terminal (See page IN–27).
(e) Handle the connector (See page IN–27).

6. BASIC INSPECTION

When the malfunction code is not confirmed in the DTC check, troubleshooting should be performed in the order for all possible circuits to be considered as the causes of the problems. In many cases, by carrying out the basic engine check shown in the following flow chart, the location causing the problem can be found quickly and efficiently. Therefore, use of this check is essential in engine troubleshooting.

1	**Is battery positive voltage 11 V or more when engine is stopped ?**

NO → **Charge or replace battery.**

YES

2	**Is engine cranked ?**

NO → **Proceed to page ST–18 and continue to troubleshoot.**

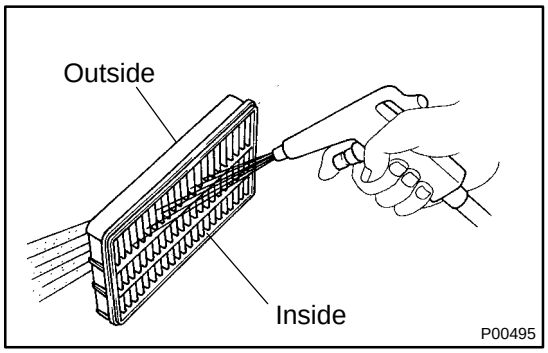
YES

3	**Does engine start ?**

NO → **Go to step 7.**

YES

4	**Check air filter.**



PREPARATION:
Remove the air filter.
CHECK:
Visual check that the air filter is not dirty or excessive oily.
HINT:If necessary, clean the filter with compressed air. First blow from inside thoroughly, then blow from outside of filter.

NG → **Repair or replace.**

OK

5	**Check engine idle speed.**

PREPARATION:
(a) Warm up engine to normal operating temperature.
(b) Switch off all accessories.
(c) Switch off air conditioning.
(d) Shift transmission into ”N” position.
(e) Connect the OBD II scan tool or LEXUS hand–held tester to DLC3 on the vehicle.

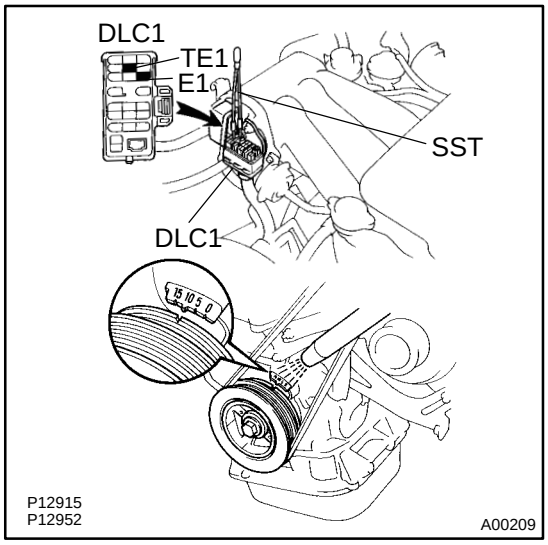
CHECK:
Use CURRENT DATA to check the idle speed.

OK:
Idle speed: 650 ~ 750 rpm

NG → **Proceed to problem symptoms table on page DI–22.**

OK

6	Check ignition timing.



PREPARATION:

(a) Warm up engine to normal operating temperature.
(b) Switch off all accessories.
(c) Switch off air conditioning.
(d) Shift transmission into ”N” position.
(e) Keep the engine speed at idle.
(f) Using SST, connect terminals TE1 and E1 of the DLC1.
SST 09843 – 18020
(g) Using a timing light, connect the tester to check wire.

CHECK:

Check ignition timing.

OK:

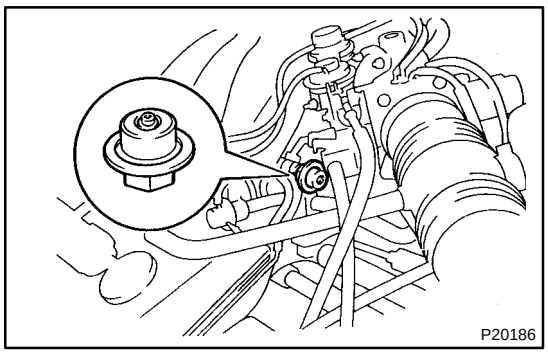
Ignition timing: 10° BTDC at idle

NG → **Proceed to page IG–1 and continue to troubleshoot.**

OK

Proceed to problem symptoms table on page DI–22.

7	Check fuel pressure.



PREPARATION:

(a) Be sure that enough fuel is in the tank.
(b) Connect the LEXUS hand–held tester to the DLC3.
(c) Turn ignition switch ON and push LEXUS hand–held tester main switch ON.
(d) Use ACTIVE TEST mode to operate the fuel pump.
(e) If you have no LEXUS hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector (See page SF–6).

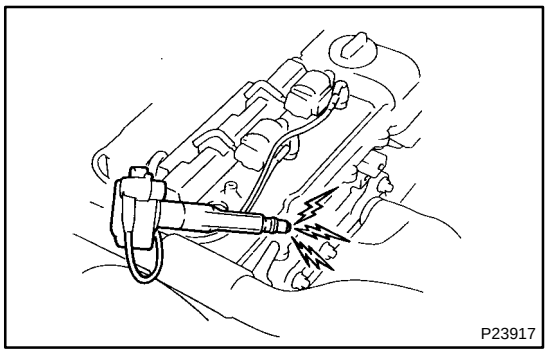
CHECK:

Check that the pulsation damper screw rises up when the fuel pump operates.

NG → **Proceed to page SF–6 and continue to troubleshoot.**

OK

8	Check for spark.



PREPARATION:

(a) Remove the ignition coil or disconnect the high–tension cord from spark plug.
(b) Remove the spark plug.
(c) Install the spark plug to the ignition coil or high–tension cord.
(d) Disconnect the injector connector.
(e) Hold the end about 12.5 mm (0.5 in.) from the ground.

CHECK:

Check if spark occurs while engine is being cranked.

NOTICE:To prevent excess fuel being injected from the injectors during this test, don't crank the engine for more than 5 ~ 10 seconds at a time.

OK:

Spark jumps across electrode gap.

NG → **Proceed to page IG–1 and continue to troubleshoot.**

OK

Proceed to problem symptoms table on page DI–22.

7. ENGINE OPERATING CONDITION

NOTICE:The values given below for ”Normal Condition” are representative values, so a vehicle may still be normal even if its value from those listed here. So do not decide whether a part is faulty or not solely according to the ”Normal Condition” here.

(a) CARB mandated signals.

LEXUS hand–held tester display	Measurement Item	Normal Condition*
FUEL SYS #1	Fuel System Bank 1 OPEN: Air–fuel ratio feedback stopped CLOSED: Air–fuel ratio feedback operating	Idling after warming up: CLOSED
FUEL SYS #2	Fuel System Bank 2 OPEN: Air–fuel ratio feedback stopped CLOSED: Air–fuel ratio feedback operating	Idling after warming up: CLOSED
CALC LOAD	Calculator Load: Current intake air volume as a proportion of max. intake air volume	Idling: 13.1 ~ 18.7% Racing without load (2,500rpm): 11.7 ~ 17.3%
COOLANT TEMP.	Engine Coolant Temp. Sensor Value	After warming up: 80 ~ 95°C (176 ~ 203°F)
SHORT FT #1	Short–term Fuel Trim Bank 1	0 ± 20%
LONG FT #1	Long–term Fuel Trim Bank 1	0 ± 20%
SHORT FT #2	Short–term Fuel Trim Bank 2	0 ± 20%
LONG FT #2	Long–term Fuel Trim Bank 2	0 ± 20%
ENGINE SPD	Engine Speed	Idling: 650 ~ 750 rpm
VEHICLE SPD	Vehicle Speed	Vehicle stopped: 0 km/h (0 mph)
IGN ADVANCE	Ignition Advance: Ignition Timing of Cylinder No. 1	Idling: BTDC 10 ~ 25.0°
INTAKE AIR	Intake Air Temp. Sensor Value	Equivalent to Ambient Temp.
MAF	Air Flow Rate Through Mass Air Flow Meter	Idling: 3.3 ~ 4.7 gm/sec. Racing without load (2,500 rpm): 10.4 ~ 15.4 gm/sec.
THROTTLE POS	Voltage Output of Throttle Position Sensor Calculated as a percentage: 0 V → 0%, 5 V → 100%	Throttle valve fully closed: 7 ~ 11% Throttle valve fully open: 65 ~ 75%
O2S B1, S1	Voltage Output of Oxygen Sensor Bank 1, Sensor 1	Idling: 0.1 ~ 0.9 V
O2FT B1, S1	Oxygen Sensor Fuel Trim Bank 1, Sensor 1 (Same as SHORT FT #1)	0 ± 20%
O2S B1, S2	Voltage Output of Oxygen Sensor Bank 1, Sensor 2	Driving 50 km/h (31 mph): 0.1 ~ 0.9 V
O2S B2, S1	Voltage Output of Oxygen Sensor Bank 2, Sensor 1	Idling: 0.1 ~ 0.9 V
O2FT B2, S1	Oxygen Sensor Fuel Trim Bank 2, Sensor 1 (Same as SHORT FT #2)	0 ± 20%

*: If no conditions are specifically stated for ”Idling”, it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.

(b) LEXUS Enhanced Signals.

LEXUS hand–held tester display	Measurement Item	Normal Condition*
MISFIRE RPM	Engine RPM for first misfire range	Misfire 0: 0 rpm
MISFIRE LOAD	Engine load for first misfire range	Misfire 0: 0 g/r
INJECTOR	Fuel injection time for cylinder No.1	Idling: 1.6 ~ 2.9 ms
IAC DUTY RATIO	Intake Air Control Valve Duty Ratio Opening ratio rotary solenoid type IAC valve	Idling: 27 ~ 47 %
STARTER SIG	Starter Signal	Cranking: ON
CTP SIG	Closed Throttle Position Signal	Throttle Fully Closed: ON
A/C SIG	A/C Switch Signal	A/C ON: ON
PNP SW	Park/Neutral Position Switch Signal	P or N position: ON
ELCTRCL LOAD SIG	Electrical Load Signal	Defogger switch ON: ON
STOP LIGHT SW	Stop Light Switch Signal	Stop light switch ON: ON
PS OIL PRESS SW	Power Steering Oil Pressure Switch Signal	Turn steering wheel: ON
FC IDL	Fuel Cut Idle: Fuel cut when throttle valve fully closed, during deceleration	Fuel cut operating: ON
FC TAU	Fuel Cut TAU: Fuel cut during very light load	Fuel cut operating: ON
CYL#1 ~ CYL#6	Abnormal revolution variation for each cylinder	0%
IGNITION	Total number of ignition for every 1,000 revolutions	0 ~ 3,000 rpm
EGRT GAS	EGR Gas Temperature Sensor Value	EGR not operating: Temperature between intake air temp. and engine coolant temp.
INTAKE CTRL VSV	Intake Air Control Valve VSV Signal	VSV operating: ON
EGR SYSTEM	EGR system operating condition	Idling: OFF
A/C CUT SIG	A/C Cut Signal	A/C S/W OFF: ON
FUEL PUMP	Fuel Pump Signal	Idling: ON
EVAP (PURGE) VSV	EVAP VSV Signal	VSV operating: ON
VAPOR PRESS VSV	Vapor Pressure VSV Signal	VSV operating: ON

*: If no conditions are specifically stated for ”Idling”, it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.

LEXUS hand–held tester display	Measurement Item	Normal Condition*
TOTAL FT B1	Total Fuel Trim Bank 1: Average value for fuel trim system of bank 1	Idling: 0.8 ~ 1.2
TOTAL FT B2	Total Fuel Trim Bank 1: Average value for fuel trim system of bank 2	Idling: 0.8 ~ 1.2
O2 LR B1, S1	Oxygen Sensor Lean Rich Bank 1, Sensor 1 Response time for oxygen sensor output to switch from lean to rich	Idling after warmed up: 0 ~ 1,000 msec.
O2 LR B2, S1	Oxygen Sensor Lean Rich Bank 2, Sensor 1 Response time for oxygen sensor output to switch from lean to rich	Idling after warmed up: 0 ~ 1,000 msec.
O2 RL B1, S1	Oxygen Sensor Rich Lean Bank 1, Sensor 1 Response time for oxygen sensor output to switch from rich to lean	Idling after warmed up: 0 ~ 1,000 msec.
O2 RL B2, S1	Oxygen Sensor Rich Lean Bank 2, Sensor 1 Response time for oxygen sensor output to switch from rich to lean	Idling after warmed up: 0 ~ 1,000 msec.

*: If no conditions are specifically stated for ”ldling”, it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.

DI097–01

DIAGNOSTIC TROUBLE CODE CHART

HINT:Parameters listed in the chart may not be exactly the same as your reading due to the type of instrument or other factors.

If a malfunction code is displayed during the DTC check in check mode, check the circuit for that code listed in the table below. For details of each code, turn to the page referred to under the ”See page ” for the respective ”DTC No.” in the DTC chart.

DTC No. (See Page)	Detection Item	Trouble Area	MIL*	Memory
P0100 (DI–23)	Mass Air Flow Circuit Malfunction	□Open or short in mass air flow meter circuit □Mass air flow meter □ECM	○	○
P0101 (DI–27)	Mass Air Flow Circuit Range/Performance Problem	□Mass air flow meter	○	○
P0110 (DI–28)	Intake Air Temp. Circuit Malfunction	□Open or short in intake air temp. sensor circuit □Intake air temp. sensor □ECM	○	○
P0115 (DI–33)	Engine Coolant Temp. Circuit Malfunction	□Open or short in engine coolant temp. sensor circuit □Engine coolant temp. sensor □ECM	○	○
P0116 (DI–37)	Engine Coolant Temp. Circuit Range/Performance Problem	□Engine coolant temp. sensor □Cooling system	○	○
P0120 (DI–38)	Throttle/Pedal Position Sensor/Switch ”A” Circuit Malfunction	□Open or short in throttle position sensor circuit □Throttle position sensor □ECM	○	○
P0121 (DI–42)	Throttle/Pedal Position Sensor/Switch ”A” Circuit Range/Performance Problem	□Throttle position sensor	○	○
P0125 (DI–43)	Insufficient Coolant Temp. for Closed Loop Fuel Control	□Open or short in heated oxygen sensor circuit □Heated oxygen sensor	○	○
P0130 (DI–46)	Heated Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)	□Heated oxygen sensor □Fuel trim malfunction	○	○
P0133 (DI–49)	Heated Oxygen Sensor Circuit Slow Response (Bank 1 Sensor 1)	□Heated oxygen sensor	○	○
P0135 (DI–50)	Heated Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)	□Open or short in heater circuit of heated oxygen sensor □Heated oxygen sensor □ECM	○	○
P0136 (DI–52)	Heated Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	□Heated oxygen sensor	○	○
P0141 (DI–50)	Heated Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)	□Same as DTC No. P0135	○	○
P0150 (DI–46)	Heated Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 1)	□Same as DTC No. P0130	○	○

*: ○ ~~~MIL lights up

DTC No. (See Page)	Detection Item	Trouble Area	MIL*	Memory
P0153 (DI–49)	Heated Oxygen Sensor Circuit Slow Response (Bank 2 Sensor 1)	□Same as DTC No. P0133	○	○
P0155 (DI–50)	Heated Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)	□Same as DTC No. P0135	○	○
P0171 (DI–54)	System too Lean (Fuel Trim)	□Air intake (hose loose) □Fuel line pressure □Injector blockage □Heated oxygen sensor malfunction □Mass air flow meter □Engine coolant temp. sensor	○	○
P0172 (DI–54)	System too Rich (Fuel Trim)	□Fuel line pressure □Injector leak, blockage □Heated oxygen sensor malfunction □Mass air flow meter □Engine coolant temp. sensor	○	○
P0300 (DI–57)	Random/Multiple Cylinder Misfire Detected	□Ignition system □Injector □Fuel line pressure □Compression pressure □Valve clearance not to specification □Valve timing □Mass air flow meter □Engine coolant temp. sensor	○*2	○
P0301 P0302 P0303 P0304 P0305 P0306 (DI–57)	Misfire Detected – Cylinder 1 – Cylinder 2 – Cylinder 3 – Cylinder 4 – Cylinder 5 – Cylinder 6			
P0325 (DI–62)	Knock Sensor 1 Circuit Malfunction	□Open or short in knock sensor 1 circuit □Knock sensor 1 (looseness) □ECM	○	○
P0330 (DI–62)	Knock Sensor 2 Circuit Malfunction	□Open or short in knock sensor 2 circuit □Knock sensor 2 (looseness) □ECM	○	○
P0335 (DI–66)	Crankshaft Position Sensor ”A” Circuit Malfunction	□Open or short in crankshaft position sensor circuit □Crankshaft position sensor □Starter □ECM	○	○
P0340 (DI–69)	Camshaft Position Sensor Circuit Malfunction	□Open or short in camshaft position sensor circuit □Camshaft position sensor □Starter □ECM	○	○
P0401 (DI–71)	Exhaust Gas Recirculation Flow Insufficient Detected	□EGR valve (stuck closed) □Open or short in EGR gas temp. sensor circuit □EGR gas temp. sensor □Open in VSV circuit for EGR □VSV for EGR □Vacuum control valve □Vacuum hose disconnected or blocked □ECM	○	○

*1: ○ ~~~MIL lights up *2: MIL lights up or blinking

DTC No. (See Page)	Detection Item	Trouble Area	MIL*	Memory
P0402 (DI–81)	Exhaust Gas Recirculation Flow Excessive Detected	□EGR valve stuck open □VSV for EGR open malfunction □Short in VSV circuit for EGR □Open or short in EGR valve position sensor circuit □EGR valve position sensor □ECM	○	○
P0420 (DI–84)	Catalyst System Efficiency Below Threshold	□Three–way catalytic converter □Open or short in heated oxygen sensor circuit □Heated oxygen sensor	○*2	○
P0440 (DI–87)	Evaporative Emission Control System Malfunction	□Vapor pressure sensor □Fuel tank cap incorrectly installed □Fuel tank cap cracked or damaged □Vacuum hose cracked, holed, blocked, damaged or disconnected □Hose or tube cracked, holed, damaged or insufficient seal □Fuel tank cracked, holed or damaged □Charcoal canister cracked, holed or damaged	○	○
P0441 (DI–93)	Evaporative Emission Control System Incorrect Purge Flow	□Open or short in VSV circuit for EVAP □VSV for EVAP □Open or short in vapor pressure sensor circuit □Vapor pressure sensor □Open or short in VSV circuit for vapor pressure sensor □VSV for vapor pressure sensor □Vacuum hose cracked, holed, blocked, damaged or disconnected □Charcoal canister cracked, holed or damaged	○	○
P0446 (DI–93)	Evaporative Emission Control System Vent Control Malfunction	□Open or short in VSV circuit for EVAP □VSV for EVAP □Open or short in vapor pressure sensor circuit □Vapor pressure sensor □Open or short in VSV circuit for vapor pressure sensor □VSV for vapor pressure sensor □Vacuum hose cracked, holed, blocked, damaged or disconnected □Charcoal canister cracked, holed or damaged	○	○
P0450 (DI–104)	Evaporative Emission Control System Pressure Sensor Malfunction	□Open or short in vapor pressure sensor circuit □Vapor pressure sensor □ECM	○	○
P0500 (DI–106)	Vehicle Speed Sensor Malfunction	□Open or short in speed signal circuit □Open or short in speed sensor circuit for ABS □Combination meter □ECM □ABS ECU	○	○
P0505 (DI–109)	Idle Control System Malfunction	□IAC valve is stuck or closed □Open or short in IAC valve circuit □Open or short in A/C signal circuit □Air intake (hose loose)	○	○

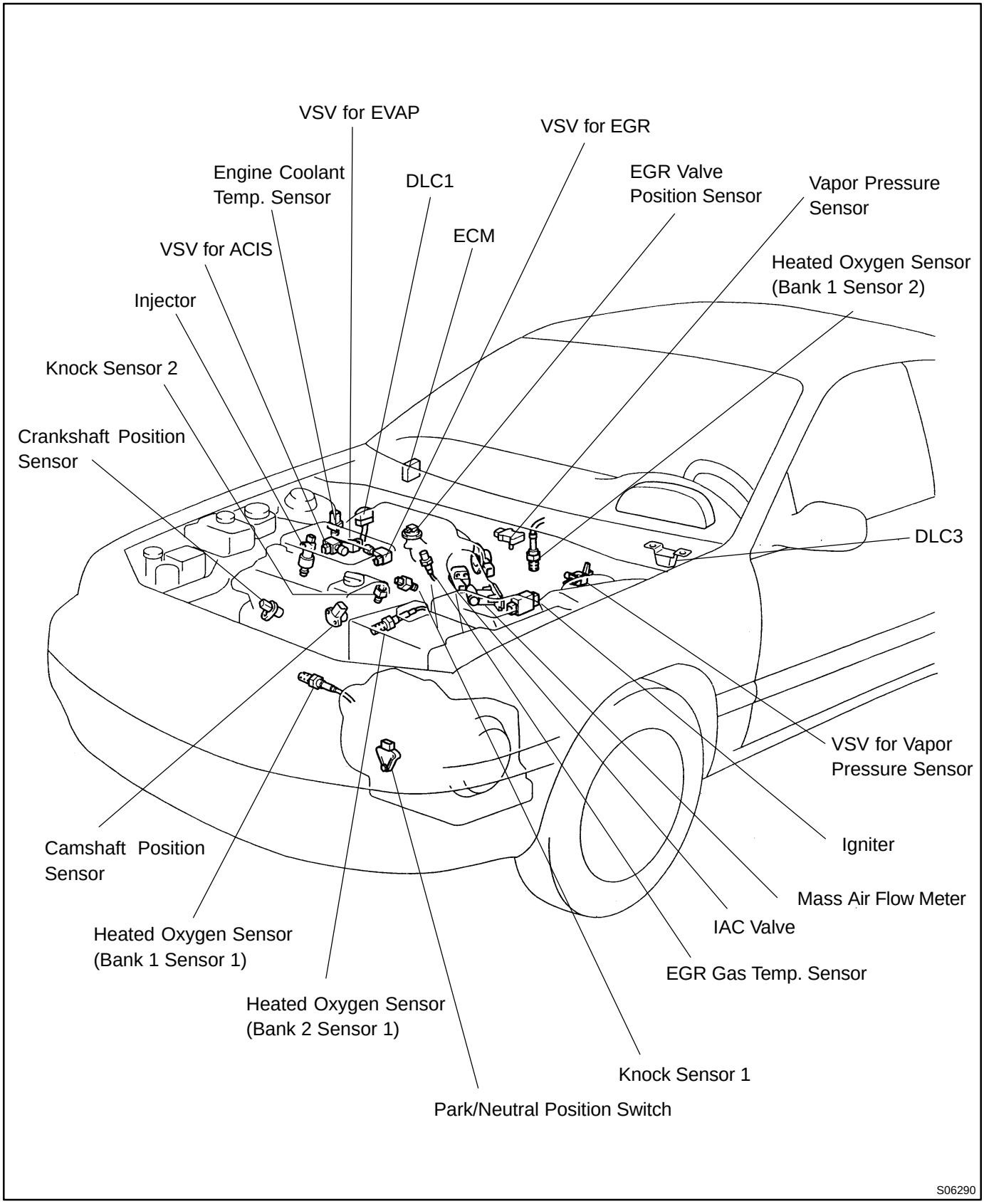
*1: ○ ~~~MIL lights up *2: MIL lights up on U.S.A. and Canadian specification vehicles

DTC No. (See Page)	Detection Item	Trouble Area	MIL*	Memory
P1300 (DI–112)	Igniter Circuit Malfunction	□ Open or short in IGF or IGT circuit from igniter to ECM □ Igniter □ ECM	○	○
P1335 (DI–117)	Crankshaft Position Sensor Circuit Malfunction (during engine running)	□ Open or short in crankshaft position sensor circuit □ Crankshaft position sensor □ ECM	–	○
P1410 (DI–118)	EGR Valve Position Sensor Circuit Malfunction	□ Open or short in EGR valve position sensor circuit □ EGR valve position sensor □ ECM	○	○
P1411 (DI–122)	EGR Valve Position Sensor Circuit Range/Performance Problem	□ EGR valve position sensor	○	○
P1520 (DI–123)	Stop Light Switch Signal Malfunction	□ Short in stop light switch signal circuit □ Stop light switch □ ECM	○	○
P1600 (DI–126)	ECM BATT Malfunction	□ Open in back up power source circuit □ ECM	○	○
P1780 (DI–128)	Park/Neutral Position Switch Malfunction	□ Short in park/neutral position switch circuit □ Park/neutral position switch □ ECM	○	○

*: – ~~~MIL does not light up ○ ~~~MIL lights up

DI098–01

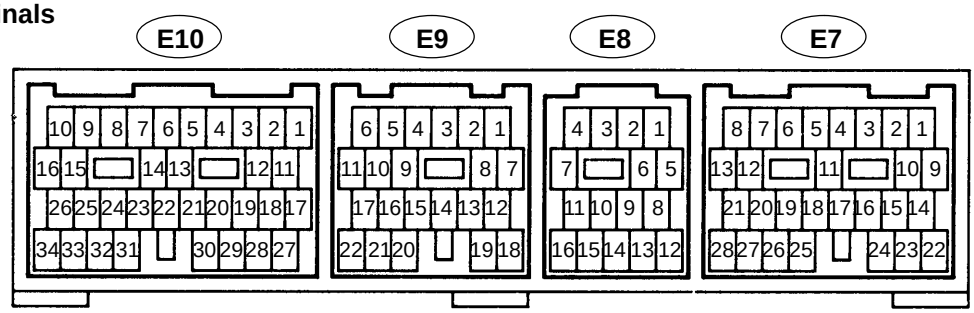
PARTS LOCATION



DI099–01

TERMINALS OF ECM

ECM Terminals



FI6810

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
BATT (E7 – 14) – E1 (E8 – 16)	B–Y ↔ BR	Always	9 ~ 14
+B (E7 – 23) – E1 (E8 – 16)	B–Y ↔ BR	IG switch ON	9 ~ 14
VC (E9 – 1) – E2 (E9 – 22)	Y ↔ BR	IG switch ON	4.5 ~ 5.5
VTA1 (E9 – 7) – E2 (E9 – 22)	L ↔ BR	IG switch ON Throttle valve fully closed	0.3 ~ 1.0
		IG switch ON Throttle valve fully open	3.2 ~ 4.9
VG (E9 – 8) – E2G (E8 – 7)	P ↔ R–B	Idling , A/C switch OFF	1.1 ~ 1.5
THA (E9 – 21) – E2 (E9 – 22)	L–Y ↔ BR	Idling, Intake air temp. 20˚C (68˚F)	0.5 ~ 3.4
THW (E9 –20) – E2 (E9 – 22)	G–B ↔ BR	Idling, Engine coolant temp. 80˚C (176˚F)	0.2 ~ 1.0
STA (E10 – 13) – E1 (E8 – 16)	GR ↔ BR	Cranking	6.0 or more
#10 (E10 – 10) – E01 (E10 – 34)	L ↔ BR	IG switch ON	9 ~ 14
		Idling	Pulse generation (See page DI–57)
#20 (E10 – 9) – E01 (E10 – 34)	R ↔ BR	IG switch ON	9 ~ 14
		Idling	Pulse generation (See page DI–57)
#30 (E10 – 8) – E01 (E10 – 34)	Y ↔ BR	IG switch ON	9 ~ 14
		Idling	Pulse generation (See page DI–57)
#40 (E10 – 7) – E01 (E10 – 34)	W ↔ BR	IG switch ON	9 ~ 14
		Idling	Pulse generation (See page DI–57)
#50 (E10 – 6) – E01 (E10 – 34)	R–L ↔ BR	IG switch ON	9 ~ 14
		Idling	Pulse generation (See page DI–57)
#60 (E10 – 5) – E01 (E10 – 34)	G ↔ BR	IG switch ON	9 ~ 14
		Idling	Pulse generation (See page DI–57)
IGT1 (E10 – 24) – E1 (E8 – 16)	GR ↔ BR	Idling	Pulse generation (See page DI–112)
IGT2 (E10 – 16) – E1 (E8 – 16)	BR–Y ↔ BR	Idling	Pulse generation (See page DI–112)
IGT3 (E10 – 15) – E1 (E8 – 16)	LG–B ↔ BR	Idling	Pulse generation (See page DI–112)

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
IGF (E10 – 12) – E1 (E8 – 16)	W–R ↔ BR	IG switch ON	4.5 ~ 5.5
		Idling	Pulse generation (See page DI–112)
THG (E8 – 14) – E2 (E9 – 22)	G–Y ↔ BR	IG switch ON	4.5 ~ 5.5
G22+ (E9 – 17) – NE– (E9 – 6)	B–W ↔ L	Idling	Pulse generation (See page DI–66)
NE+ (E9 – 5) – NE– (E9 – 6)	B–R ↔ L	Idling	Pulse generation (See page DI–66)
ELS (E7 – 3) – E1 (E8 – 16)	G–O ↔ BR	Taillight switch ON	7.5 ~ 14
		Taillight switch OFF	0 ~ 1.5
ELS2 (E7 – 2) – E1 (E8 – 16)	B–Y ↔ BR	Defogger switch ON	7.5 ~ 14
		Defogger switch OFF	0 ~ 1.5
EGR (E8 – 12) – E01 (E10 –34)	Y–G ↔ BR	IG switch ON	9 ~ 14
ACIS (E8 – 6) – E01 (E10 – 34)	R–G ↔ BR	IG switch ON	9 ~ 14
FC (E9 – 18) – E1 (E8 – 16)	G–R ↔ BR	IG switch ON	9 ~ 14
		Idling	0 ~ 3.0
EVP1 (E8 – 2) – E01 (E10 – 34)	LG ↔ BR	IG switch ON	9 ~ 14
RSC (E10 – 22) – E01 (E10 – 34)	Y–B ↔ BR	IG switch ON Disconnect E10 of ECM connector	9 ~ 14
RSO (E10 – 23) – E01 (E10 – 34)	R–W ↔ BR	IG switch ON Disconnect E10 of ECM connector	9 ~ 14
OXR1 (E9 – 13) – E1 (E8 – 16)	W ↔ BR	Maintain engine speed at 2,500 rpm for 2 min. after warming up	Pulse generation (See page DI–84)
OXL1 (E9 – 19) – E1 (E8 – 16)	B ↔ BR	Maintain engine speed at 2,500 rpm for 2 min. after warming up	Pulse generation (See page DI–84)
OXS (E7 – 18) – E1 (E8 – 16)	B ↔ BR	Maintain engine speed at 2,500 rpm for 2 min. after warming up	Pulse generation (See page DI–84)
HTL (E8– 10) – E03 (E10 – 28)	Y–R ↔ BR	Idling	Below 3.0
		IG switch ON	9 ~ 14
HTR (E8 – 11) – E03 (E10 – 28)	L–B ↔ BR	Idling	Below 3.0
		IG switch ON	9 ~ 14
HTS (E7 – 17) – E03 (E10 –28)	P–B ↔ BR	Idling	Below 3.0
		IG switch ON	9 ~ 14
KNKR (E9 – 15) – E1 (E8 – 16)	W ↔ BR	Idling	Pulse generation (See page DI–62)
KNKL (E9 – 14) – E1 (E8 – 16)	W ↔ BR	Idling	Pulse generation (See page DI–62)
NSW (E10 – 14) – E1 (E8 – 16)	B–W ↔ BR	IG switch ON Other shift position in ”P” ,”N” position	9 ~ 14
		IG switch ON Shift position in ”P” ,”N” position	0 ~ 3.0
SPD (E7 – 12) – E1 (E8 – 16)	V–W ↔ BR	IG switch ON Rotate driving wheel slowly	Pulse generation
TC (E8 – 5) – E1 (E8 – 16)	L–W ↔ BR	IG switch ON	9 ~ 14

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
W (E8 – 3) – E1 (E8 – 16)	G–R ↔ BR	IG switch ON	Below 3.0
PS (E10 – 31) – E1 (E8 – 16)	B ↔ L	IG switch ON	9 ~ 14
ACT (E7 – 5) – E1 (E8 – 16)	B–Y ↔ BR	A/C switch OFF	Below 2.0
		A/C switch ON at idling	9 ~ 14
A/C (E7 – 16) – E1 (E8 – 16)	LG–W ↔ BR	A/C switch ON at idling	Below 2.0
		A/C switch OFF	9 ~ 14
CF (E8 – 9) – E1 (E8 – 16)	G–W ↔ BR	Electric cooling fan is operating on high speed	9 ~ 14
		Electric cooling fan is operating on low speed or OFF	0 ~ 2
TACH (E7 – 13) – E1 (E8–16)	B–O ↔ BR	Idling	Pulse generation
TPC (E8 – 8) – E1 (E8 – 16)	W–R ↔ BR	IG switch ON Disconnect the vacuum hose from the vapor pressure sensor	9 ~ 14
PTNK (E8 – 13) – E1 (E8 – 16)	L–R ↔ BR	IG switch ON	3.0 ~ 3.6
		IG switch ON Apply vacuum 2.0 kPa (15 mmHg, 0.6 in.Hg)	1.3 ~ 2.1
SIL (E7 – 8) – E1 (E8 – 16)	W ↔ BR	During transmission	Pulse generation
STP (E7 – 24) – E1 (E8 – 16)	G–W ↔ BR	IG switch ON Brake pedal depressed	7.5 ~ 14
		IG switch ON Brake pedal released	Below 1.5
EGLS (E8 – 15) – E1 (E8 – 16)	W–G ↔ BR	IG switch ON Apply vacuum (0 kPa, 0 mmHg, 0 in.Hg) to EGR valve	0.4 ~ 1.6
		IG switch ON Apply vacuum (17.3 kPa, 130 mmHg, 5.12 in.Hg) to EGR valve	3.2 ~ 5.1

DI09A–01

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	1. Starter and starter relay	ST–18 ST–20
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. Engine control module (ECM)	DI–132 DI–138 IN–27
No complete combustion (Does not start)	1. Fuel pump control circuit	DI–138
Engine cranks normally (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	DI–132 DI–138 EM–3
Cold engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI–132 DI–138
Hot engine	1. Starter signal circuit 2. Fuel pump control circuit	DI–132 DI–138
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	DI–569 DI–135
Low engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. Fuel pump control circuit	DI–569 DI–138
Rough idling (Poor idling)	1. Compression 2. Fuel pump control circuit	EM–3 DI–138
Hunting (Poor idling)	1. ECM power source circuit 2. Fuel pump control circuit	DI–135 DI–138
Hesitation/Poor acceleration (Poor driveability)	1. Fuel pump control circuit 2. A/T faulty	DI–138 DI–148
Surging	1. Fuel pump control circuit	DI–138
Soon after starting (Engine stall)	1. Fuel pump control circuit	DI–138
During A/C operation (Engine stall)	1. A/C signal circuit (Compressor circuit) 2. Engine control module (ECM)	DI–569 IN–27

DI09B–01

CIRCUIT INSPECTION

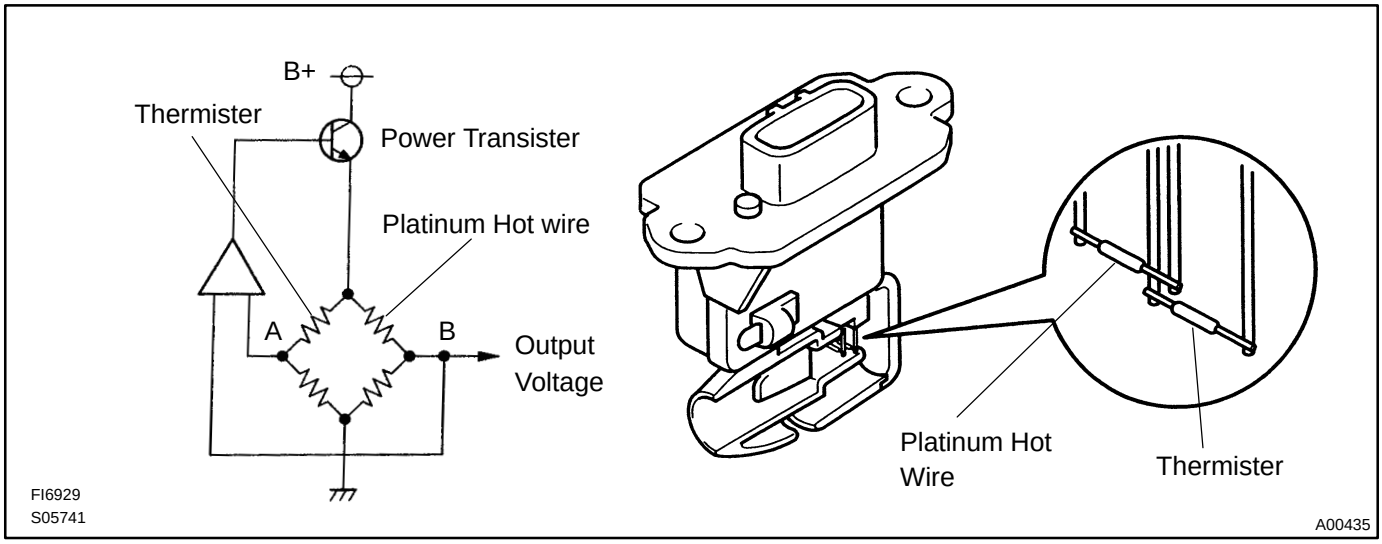
DTC	P0100	Mass Air Flow Circuit Malfunction

CIRCUIT DESCRIPTION

The mass air flow meter uses a platinum hot wire. The hot wire air flow meter consists of a platinum hot wire, thermistor and a control circuit installed in a plastic housing. The hot wire air flow meter works on the principle that the hot wire and thermistor located in the intake air bypass of the housing detect any changes in the intake air temp.

The hot wire is maintained at the set temp. by controlling the current flow through the hot wire. This current flow is then measured as the output voltage of the air flow meter.

The circuit is constructed so that the platinum hot wire and thermistor provide a bridge circuit,with the power transistor controlled so that the potential of A and B remains equal to maintain the set temp.



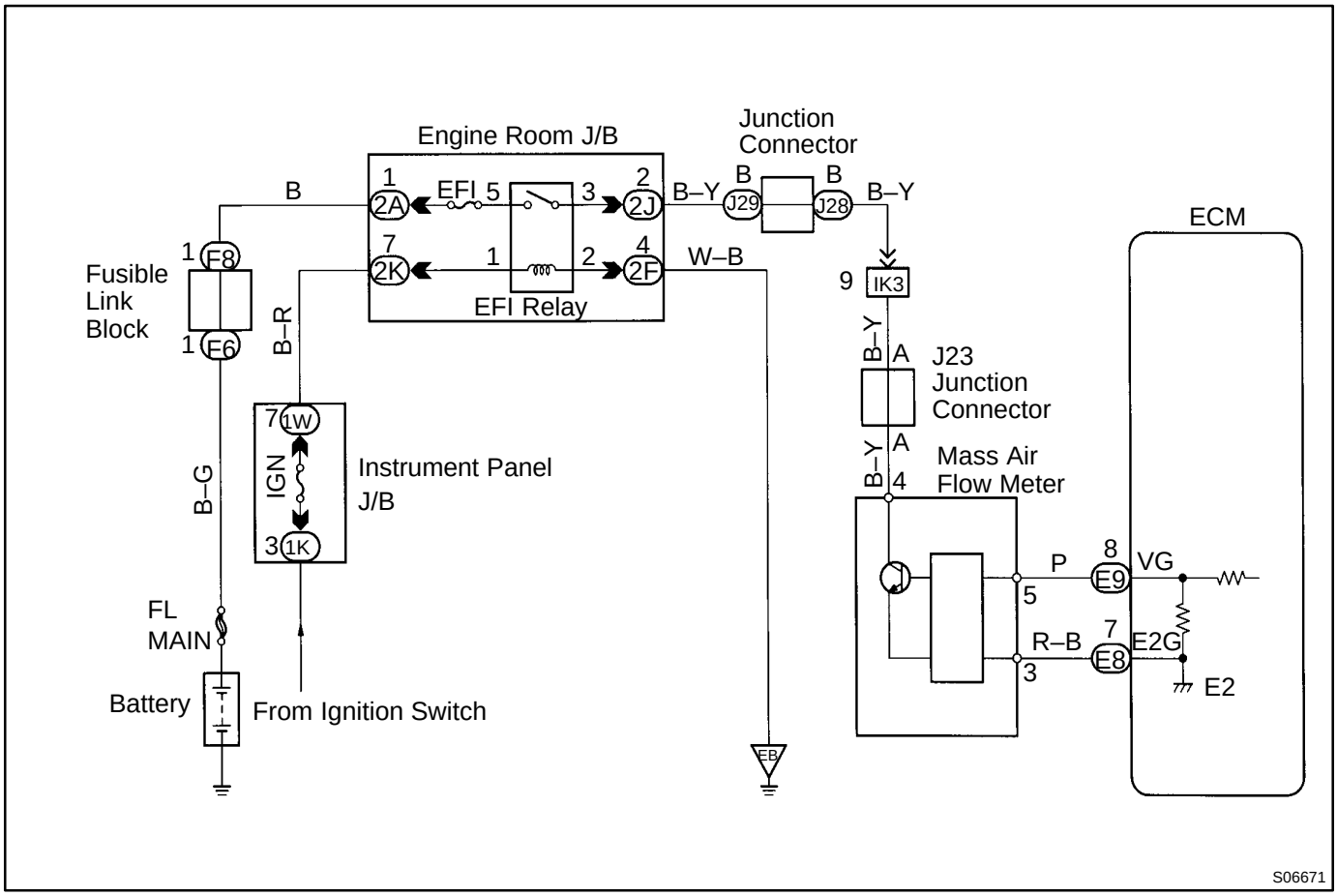
DTC No.	DTC Detecting Condition	Trouble Area
P0100	Open or short in mass air flow meter circuit with more than 3 sec. engine speed 4,000 rpm or less	●Open or short in mass air flow meter circuit ●Mass air flow meter ●ECM

If the ECM detects DTC ”P0100” it operates the fail–safe function, keeping the ignition timing and injection volume constant and making it possible to drive the vehicle.

HINT:After confirming DTC P0100 use the OBD II scan tool or LEXUS hand–held tester to confirm the mass air flow ratio from ”CURRENT DATA”.

Mass Air Flow Value (gm/sec.)	Malfunction
0.0	●Mass air flow meter power source circuit open ●VG circuit open or short
271.0 or more	●E2G circuit open

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Connect OBD II scan tool or LEXUS hand–held tester, and read value of mass air flow rate.**

PREPARATION:

(a) Connect the OBD II scan tool or LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and push the OBD II scan tool or LEXUS hand–held tester main switch ON.
(c) Start the engine.

CHECK:

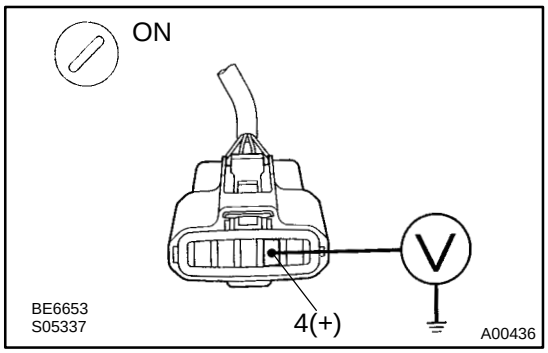
Read mass air flow rate on the OBD II scan tool or LEXUS hand–held tester.

RESULT:

	Type I	Type II
Mass air flow rate (gm/sec.)	0.0	271.0 or more

Type I	**Go to step 2.**
Type II	**Go to step 5.**

2	Check voltage of mass air flow meter power source.



PREPARATION:

(a) Disconnect the mass air flow meter connector.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal 4 of mass air flow meter connector and body ground.

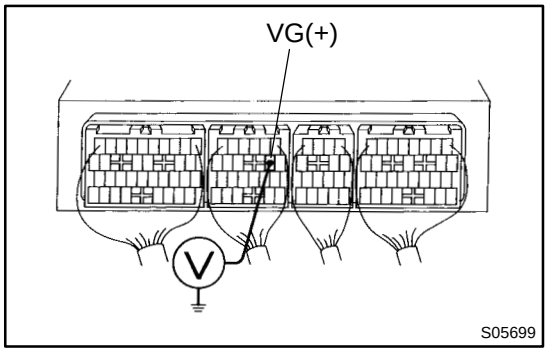
OK:

Voltage: 9 ~ 14 V

NG → **Check for open in harness and connector between EFI main relay (Marking: EFI) and mass air flow meter (See page IN–27).**

OK

3	Check voltage between terminal VG of ECM connector and body ground.



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Start the engine.

CHECK:

Measure voltage between terminal VG of ECM and body ground while engine is idling.

OK:

Voltage:
1.1 ~ 1.5 V (P or N position and A/C switch OFF)

OK → **Check and replace ECM (See page IN–27).**

NG

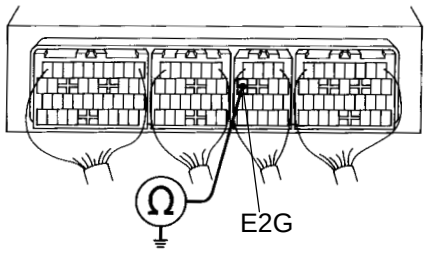
4	**Check for open and short in harness and connector between mass air flow meter and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Replace mass air flow meter.

5	**Check continuity between terminal E2G of ECM and body ground.**



PREPARATION:
Remove the glove compartment (See page SF–64).
CHECK:
Check continuity between terminal E2G of ECM connector and body ground.
OK:
Continuity (1 Ω or less)

NG → **Check and replace ECM (See page IN–27).**

OK

6	**Check for open in harness and connector between mass air flow meter and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Replace mass air flow meter.

DI09C–01

DTC	P0101	Mass Air Flow Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0100 (Mass Air Flow Circuit Malfunction) on page DI–23.

DTC No.	DTC Detecting Condition	Trouble Area
P0101	Conditions (a), (b) and (c) continue 10 sec. or more with engine speed 900 rpm or less: (2 trip detection logic) (a) Throttle valve fully closed (b) Mass air flow meter output ⊖ 2.2 V (c) THW > 70°C	●Mass air flow meter
	Conditions (a) and (b) continue 10 sec. or more with engine speed 1,500 rpm or more: (2 trip detection logic) (a) VTA ≧ 0.63 V (b) Mass air flow meter output ～ 1.06 V	

WIRING DIAGRAM

Refer to DTC P0100 on page DI–23 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

1	**Are there any other codes (besides DTC P0101) being output?**

NO → **Replace mass air flow meter.**

YES

Go to relevant DTC chart.

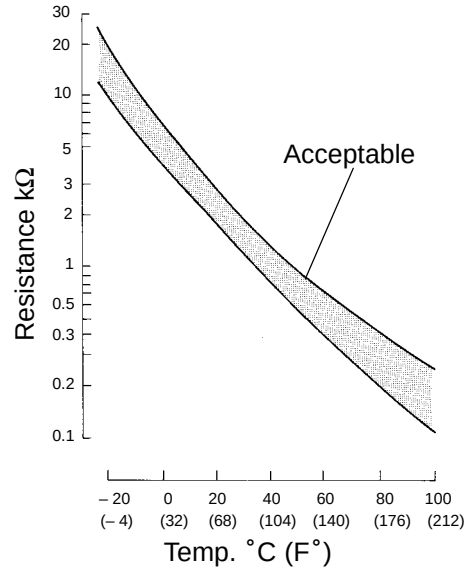
DI09D–01

DTC	P0110	Intake Air Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

The intake air temp. sensor is built into the air flow meter and senses the intake air temperature.
A thermistor built in the sensor changes the resistance value according to the intake air temperature.
The lower the intake air temperature, the greater the thermistor resistance value, and the higher the intake air temperature, the lower the thermistor resistance value (See Fig. 1).
The intake air temperature sensor is connected to the ECM. The 5 V power source voltage in the ECM is applied to the intake air temperature sensor from the terminal THA via resistor R.
That is, the resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes in accordance with changes in the intake air temperature, the potential at terminal THA also changes. Based on this signal, the ECM increases the fuel injection volume to improve driveability during cold engine operation.
If the ECM detects the DTC ”P0110”, it operates the fail–safe function in which the intake air temperature is assumed to be 20˚C (68˚F).

(fig. 1)



<Reference>

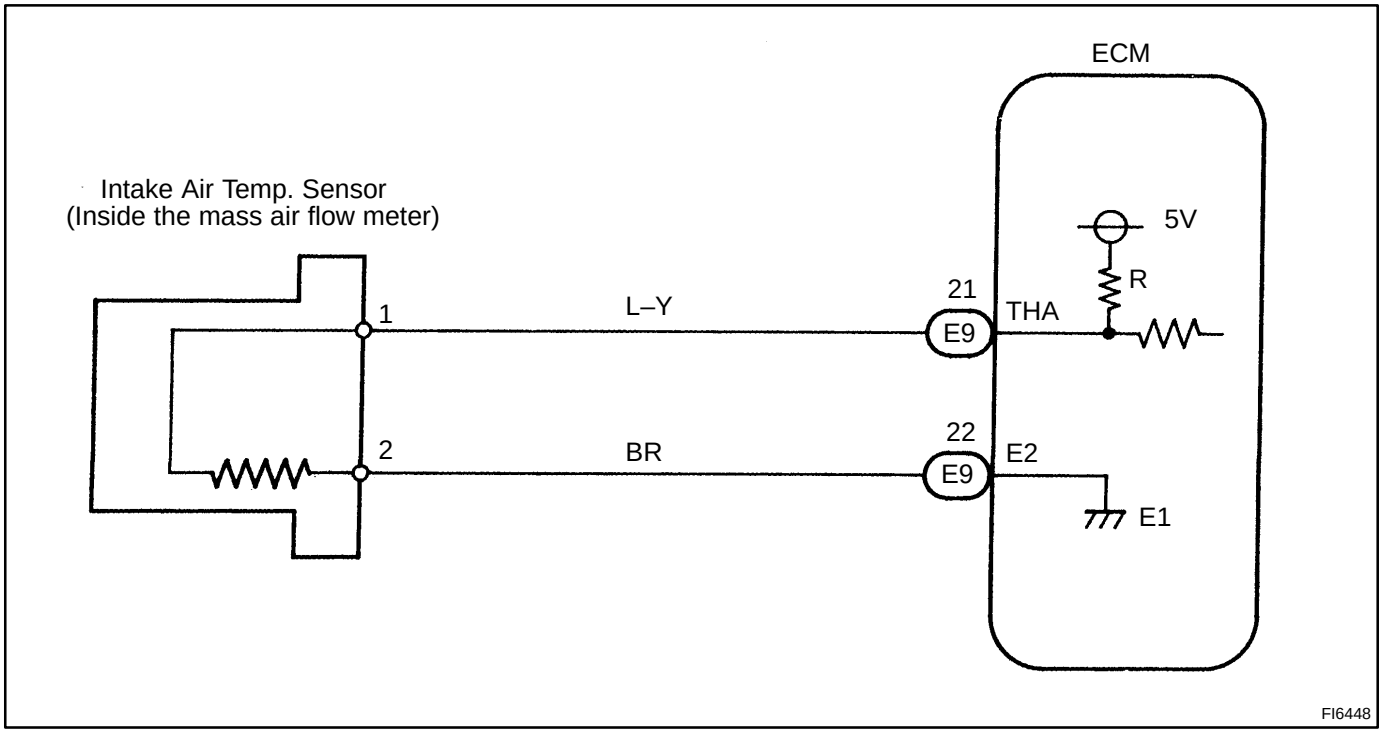
Intake air temp. ˚C (˚F)	Resistance (kΩ)	Voltage (V)
–20 (–4)	16.0	4.3
0 (32)	5.9	3.4
20 (68)	2.5	2.4
40 (104)	1.1	1.4
60 (140)	0.6	0.9
80 (176)	0.3	0.5
100 (212)	0.1	0.2

DTC No.	DTC Detecting Condition	Trouble Area
P0110	Open or short in intake air temp. sensor circuit	●Open or short in intake air temp. sensor circuit ●Intake air temp. sensor ●ECM

HINT:After confirming DTC P0110 use the OBD II scan tool or LEXUS hand–held tester to confirm the intake air temp. form ”CURRENT DATA”.

Temp. Displayed	Malfunction
–40˚C (–40˚F)	Open circuit
140˚C (284˚F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:If DTC P0110 (Intake Air Temp. Circuit Malfunction), P0115 (Engine Coolant Temp. Circuit Malfunction), P0120 (Throttle/Pedal Position Sensor/Switch ”A” Circuit Malfunction) and P1410 (EGR Valve Position Sensor Circuit Malfunction) are output simultaneously, E2 (Sensor Ground) may be open.

1	**Connect OBD II scan tool or LEXUS hand–held tester, and read value of intake air temp.**

PREPARATION:

(a) Connect the OBD II scan tool or LEXUS hand–held tester to the DLC3.

(b) Turn ignition switch ON and push the OBD II scan tool or LEXUS hand–held tester main switch ON.

CHECK:

Read temp. value on the OBD II scan tool or LEXUS hand–held tester.

OK:

Same as actual intake air temp.

HINT:

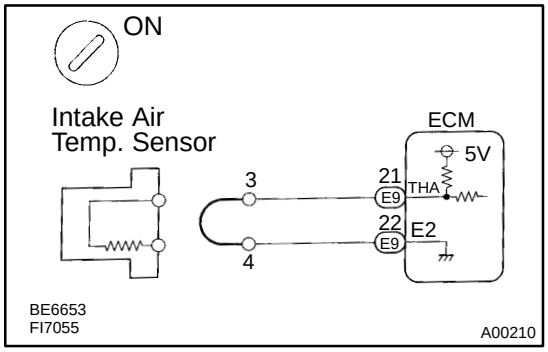
- If there is open circuit, OBD II scan tool or LEXUS hand–held tester indicates –40˚C (–40˚F).
- If there is short circuit, OBD II scan tool or LEXUS hand–held tester indicates 140˚C (284˚F) or more.

NG → **–40˚C (–40˚F)...Go to step 2.**
140˚C (284˚F) or more... Go to step 4.

OK

Check for intermittent problems (See page DI–3).

2	**Check for open in harness or ECM.**



PREPARATION:

(a) Disconnect the mass air flow meter connector.

(b) Connect sensor wire harness terminals together.

(c) Turn ignition switch ON.

CHECK:

Read temp. value on the OBD II scan tool or LEXUS hand–held tester.

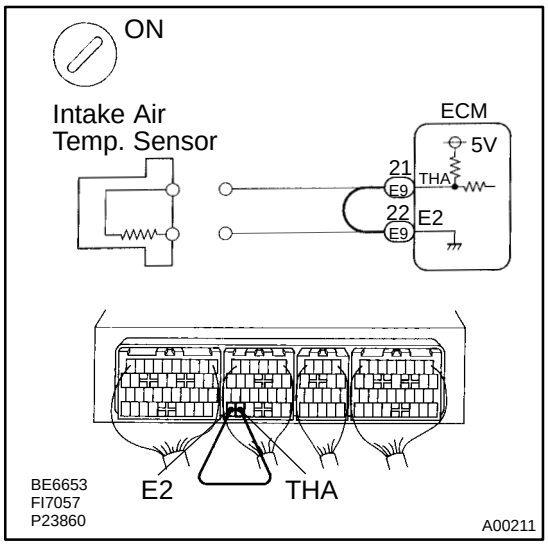
OK:

Temp. value: 140°C (284°F) or more

OK → **Confirm good connection at sensor.**
If OK, replace mass air flow meter.

NG

3	Check for open in harness or ECM.



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Connect between terminals THA and E2 of ECM connector.

HINT:Mass air flow meter connector is disconnected.

Before checking, do a visual and contact pressure check for the ECM connector (See page IN–27).

CHECK:

Read temp. value on the OBD II scan tool or LEXUS hand–held tester.

OK:

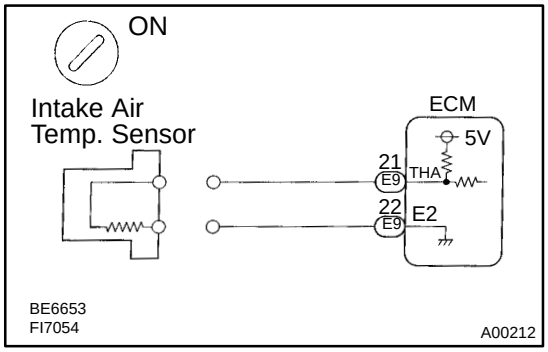
Temp. value: 140°C (284°F) or more

OK	Open in harness between terminal E2 or THA, repair or replace harness.

NG

Confirm good connection at ECM.
If OK, check and replace ECM.

4	Check for short in harness and ECM.



PREPARATION:

(a) Disconnect the mass air flow meter connector.

(b) Turn ignition switch ON.

CHECK:

Read temp. value on the OBD II scan tool or LEXUS hand–held tester.

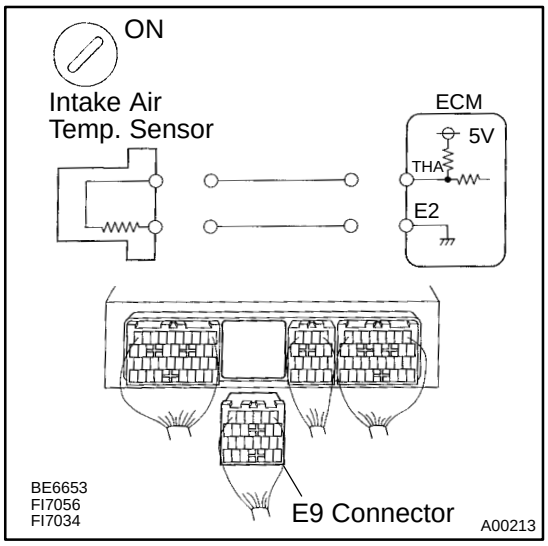
OK:

Temp. value: –40°C (–40°F)

OK	Replace mass air flow meter.

NG

5	Check for short in harness or ECM.



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Disconnect the E9 connector of ECM.

HINT: Mass air flow meter connector is disconnected.

(c) Turn ignition switch ON.

CHECK:

Read temp. value on the OBD II scan tool or LEXUS hand–held tester.

OK:

Temp. value: – 40°C (– 40°F)

OK → **Repair or replace harness or connector.**

NG

Check and replace ECM (See page IN–27).

DI09E–01

DTC	P0115	Engine Coolant Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

A thermistor built into the engine coolant temp. sensor changes the resistance value according to the engine coolant temp.

The structure of the sensor and connection to the ECM is the same as in the intake air temp. circuit malfunction shown on page DI–28.

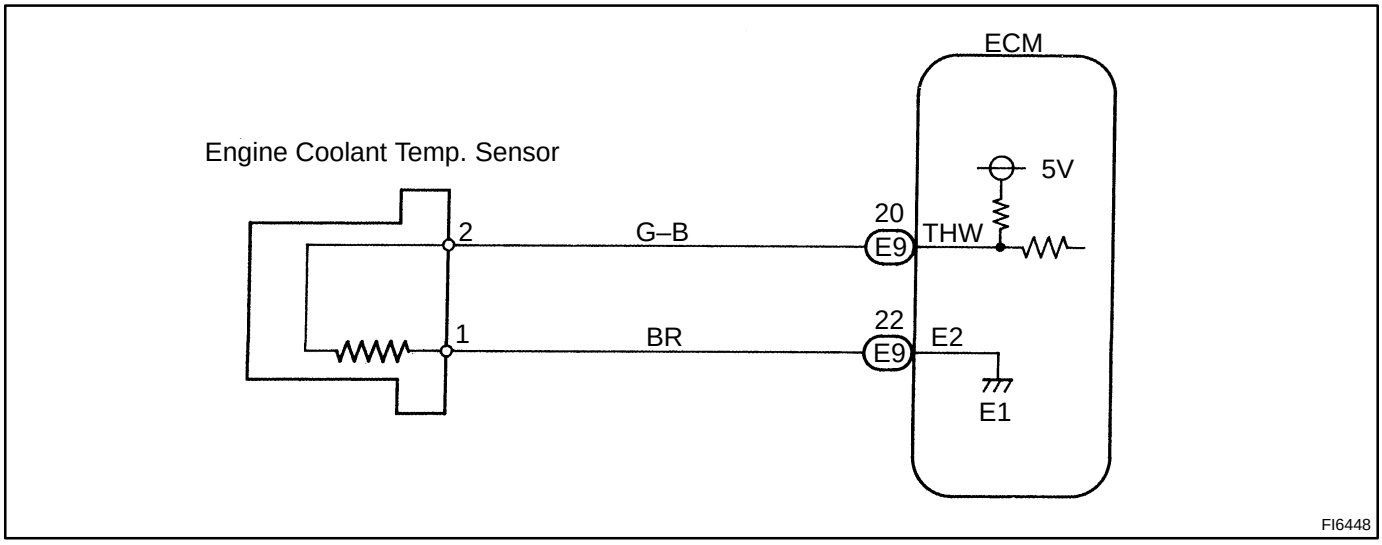
If the ECM detects the DTC P0115, it operates the fail–safe function in which the engine coolant temp. is assumed to be 80˚C (176˚F).

DTC No.	Detection Item	Trouble Area
P0115	Open or short in engine coolant temp. sensor circuit	●Open or short in engine coolant temp. sensor circuit ●Engine coolant temp. sensor ●ECM

HINT:After confirming DTC P0115 use the OBD II scan tool or LEXUS hand–held tester to confirm the engine coolant temp. from CURRENT DATA.

Temp. Displayed	Malfunction
–40˚C (–40˚F)	Open circuit
140˚C (284˚F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:If DTC P0110 (Intake Air Temp. Circuit Malfunction), P0115 (Engine Coolant Temp. Circuit Malfunction), P0120 (Throttle/Pedal/Position Sensor/Switch "A" Circuit Malfunction) and P1410 (EGR Valve Position Sensor Circuit Malfunction) are output simultaneously, E2 (Sensor Ground) may be open.

1	**Connect OBD II scan tool or LEXUS hand–held tester, and read value of engine coolant temp.**

PREPARATION:

(a) Connect the OBD II scan tool or LEXUS hand–held tester to the DLC3.

(b) Turn ignition switch ON and switch the OBD II scan tool or LEXUS hand–held tester main switch ON.

CHECK:

Read temp. value on the OBD II scan tool or LEXUS hand–held tester.

OK:

Same as actual engine coolant temp.

HINT:

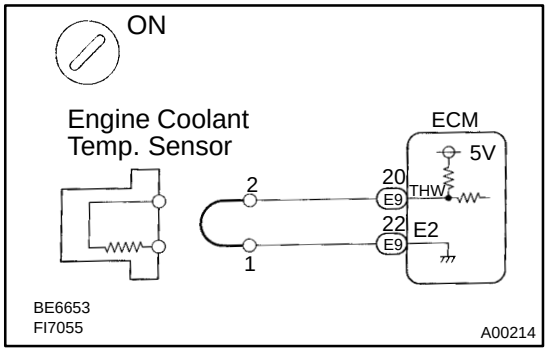
- If there is open circuit, OBD II scan tool or LEXUS hand–held tester indicates –40˚C (–40˚F).
- If there is open circuit, OBD II scan tool or LEXUS hand–held tester indicates 140˚C (284˚F) or more.

NG → **–40˚C (–40˚F) ... Go to step 2.**
140˚C (284˚F) or more ... Go to step 4.

OK

Check for intermittent problems (See page DI–3).

2	**Check for open in harness or ECM.**



PREPARATION:

(a) Disconnect the engine coolant temp. sensor connector.

(b) Connect sensor wire harness terminals together.

(c) Turn ignition switch ON.

CHECK:

Read temp. value on the OBD II scan tool or LEXUS hand–held tester.

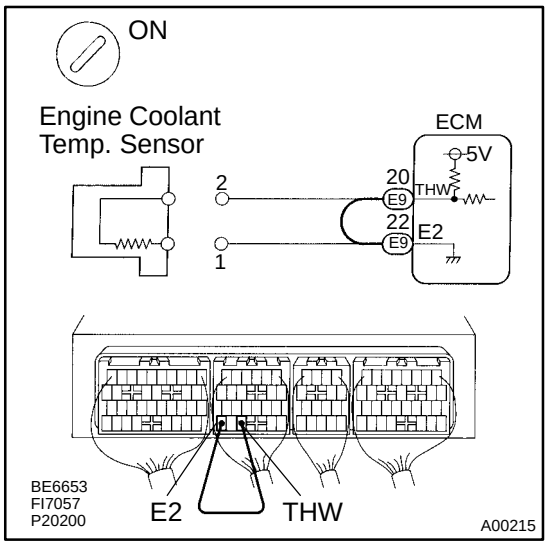
OK:

Temp. value: 140°C (284°F) or more

OK → **Confirm good connection at sensor.**
If OK, replace engine coolant temp. sensor.

NG

3	Check for open in harness or ECM.



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Connect between terminals THW and E2 of ECM connector.

HINT:Engine coolant temp. sensor connector is disconnected. Before checking, do a visual and contact pressure check for the ECM connector (See page IN–27).

(c) Turn ignition switch ON.

CHECK:

Read temp. value on the OBD II scan tool or LEXUS hand–held tester.

OK:

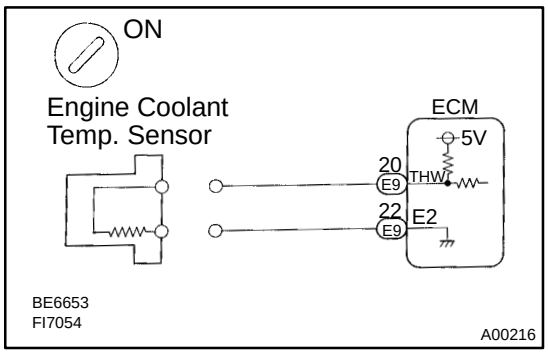
Temp. value: 140°C (284°F) or more

OK	Open in harness between terminal E2 or THW, repair or replace harness.

NG

Confirm good connection at ECM.
If OK, check and replace ECM.

4	Check for short in harness and ECM.



PREPARATION:

(a) Disconnect the engine coolant temp. sensor connector.

(b) Turn ignition switch ON.

CHECK:

Read temp. value on the OBD II scan tool or LEXUS hand–held tester.

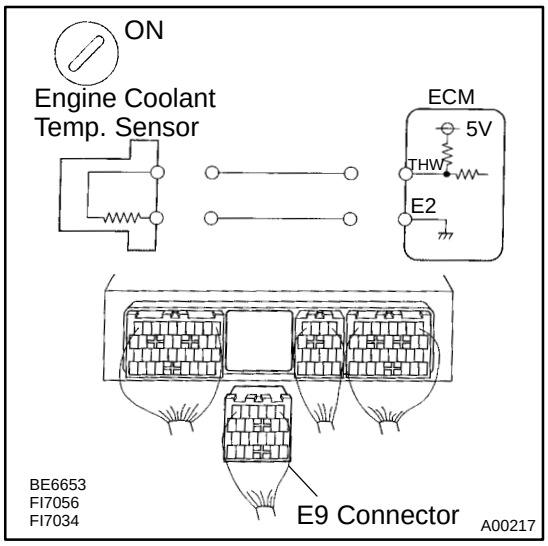
OK:

Temp. value: –40°C (–40°F)

OK	Replace engine coolant temp. sensor.

NG

5	Check for short in harness or ECM.



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Disconnect the E9 connector of ECM.

HINT: Engine coolant temp. sensor connector is disconnected.

(c) Turn ignition switch ON.

CHECK:

Read temp. value on the OBD II scan tool or LEXUS hand–held tester.

OK:

Temp. value: –40°C (–40°F)

OK → **Repair or replace harness or connector.**

NG → **Check and replace ECM (See page IN–27).**

DI09F–01

DTC	P0116	Engine Coolant Temp. Circuit Range/ Performance problem

CIRCUIT DESCRIPTION

Refer to DTC P0115 (Engine Coolant Temp. Circuit Malfunction) on page DI–33.

DTC No.	DTC Detecting Condition	Trouble Area
P0116	If THW ⍰ –7˚C (19.4˚F), 20 min. or more after starting engine, engine coolant temp. sensor value is 35˚C (95˚F) or less (2 trip detection logic)	●Engine coolant temp. sensor ●Cooling system
	If THW ⍰ –7˚C (19.4˚F), 5 min. or more after starting engine, engine coolant temp. sensor value is 35˚C (95˚F) or less (2 trip detection logic)	

INSPECTION PROCEDURE

HINT:If DTC P0115 (Engine Coolant Temp. Circuit Malfunction) and P0116 (Engine Coolant Temp. Circuit Range/Performance) are output simultaneously, engine coolant temp. sensor circuit may be open. Perform troubleshooting of DTC P0115 first.

1	Are there any other codes (besides DTC P0116) being output?

YES → Go to relevant DTC chart.

NO

2	Check thermostat (See page CO–11).

NG → Replace thermostat.

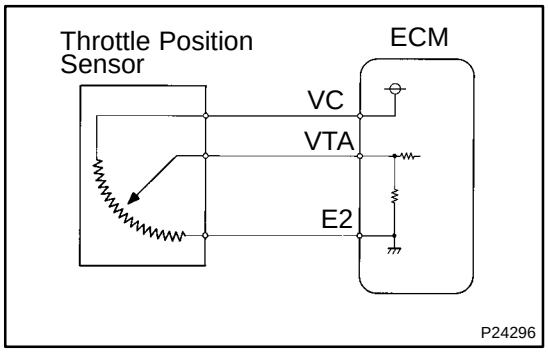
OK

Replace engine coolant temp. sensor.

DI09G–01

DTC	P0120	Throttle/Pedal position Sensor/Switch ”A” Circuit Malfunction

CIRCUIT DESCRIPTION



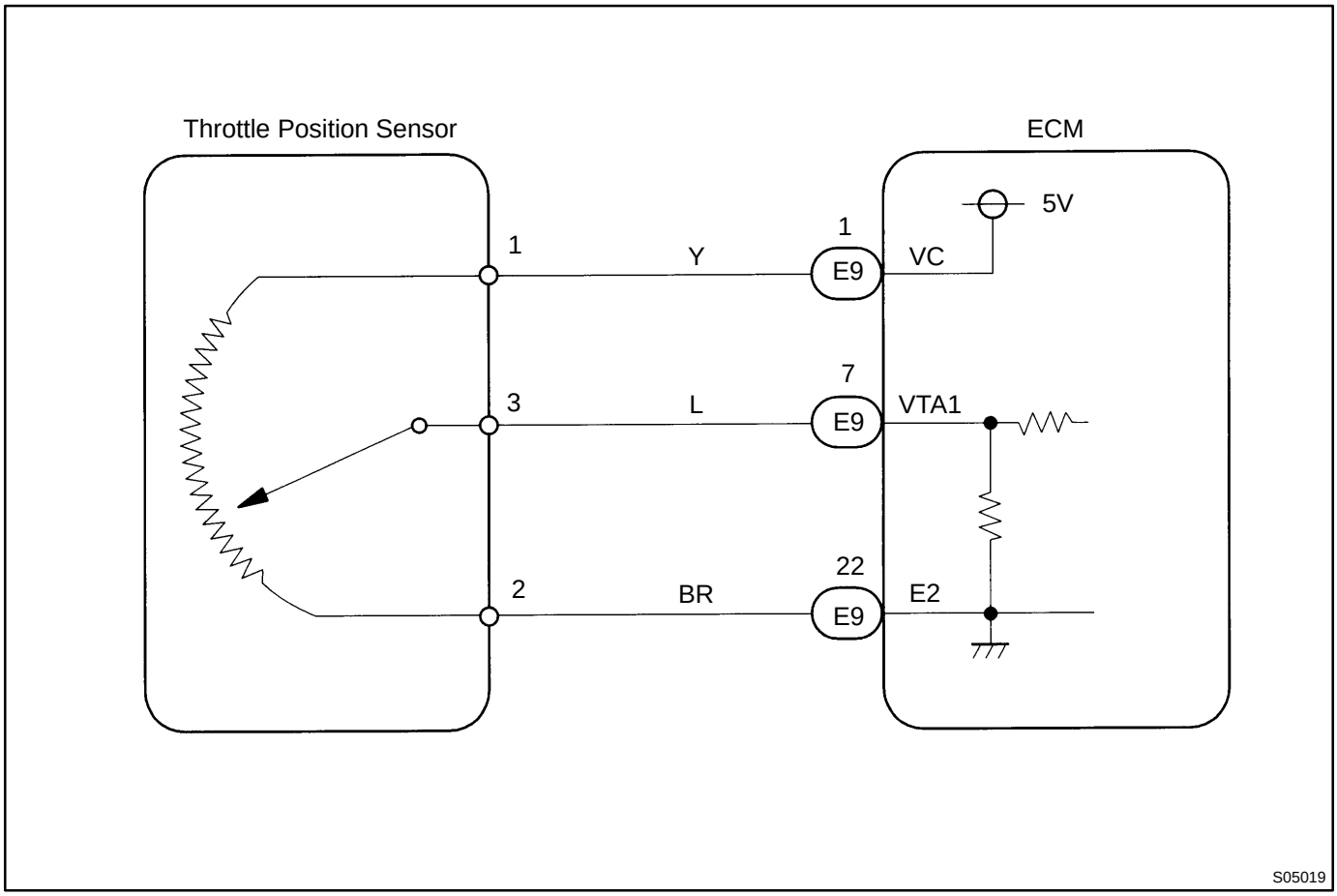
The throttle position sensor is mounted in the throttle body and detects the throttle valve opening angle. When the throttle valve is fully closed, a voltage of approximately 0.7 V is applied to terminal VTA of the ECM. The voltage applied to the terminals VTA of the ECM increases in proportion to the opening angle of the throttle valve and becomes approximately 2.7 ~ 5.2 V when the throttle valve is fully opened. The ECM judges the vehicle driving conditions from these signals input from terminals VTA and uses them as one of the conditions for deciding the air–fuel ratio correction, power increase correction and fuel–cut control etc.

DTC No.	DTC Detecting Condition	Trouble Area
P0120	Condition (a) or (b) continues: (a) VTA ⍁ 0.1 V (b) VTA ⍂ 4.9 V	●Open or short in throttle position sensor circuit ●Throttle position sensor ●ECM

HINT:After confirming DTC P0120 use the OBD II scan tool or LEXUS hand–held tester to confirm the throttle valve opening percentage and closed throttle position switch condition.

Throttle valve opening position expressed as percentage		Trouble Area
Throttle valve fully closed	Throttle valve fully open	
0 %	0 %	VC line open VTA line open or short
Approx. 100 %	Approx. 100 %	E2 line open

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:If DTC P0110, P0115, P0120 and P1410 are output simultaneously, E2 (Sensor Ground) may be open.

1	**Connect OBD II scan tool or LEXUS hand–held tester, read throttle valve opening percentage.**

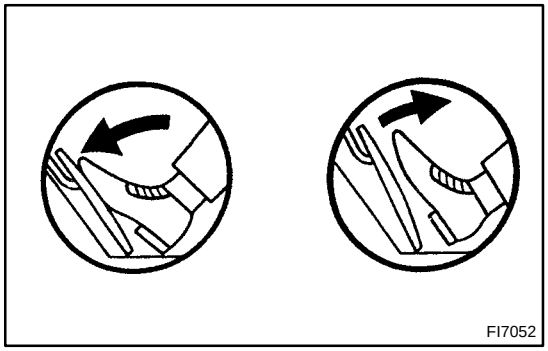
PREPARATION:

(a) Connect the OBD II scan tool or LEXUS hand–held tester to DLC3.

(b) Turn ignition switch ON and switch the OBD II scan tool or LEXUS hand–held tester main switch ON.

CHECK:

Read the throttle valve opening percentage.



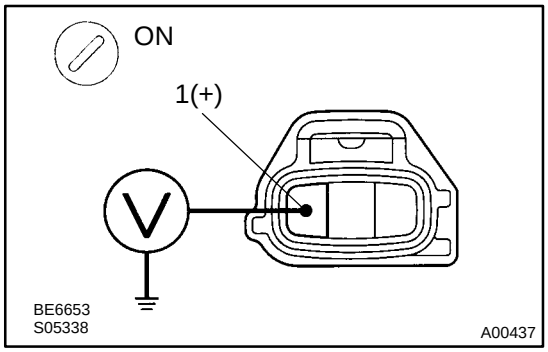
OK:

Throttle valve	Throttle valve opening position expressed as percentage
Fully open	Approx. 75 %
Fully closed	Approx. 10 %

OK → **Check for intermittent problems (See page DI–3).**

NG

2	Check voltage between terminal 1 of wire harness side connector and body ground.



PREPARATION:
(a) Disconnect the throttle position sensor connector.
(b) Turn ignition switch ON.

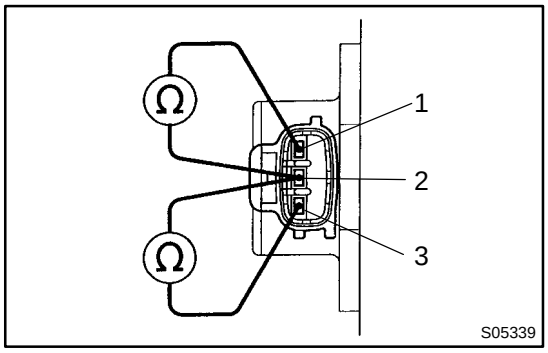
CHECK:
Measure voltage between terminal 1 (VC) of wire harness side connector and body ground.

OK:
Voltage: 4.5 ~ 5.5 V

NG → **Go to step 5.**

OK

3	Check throttle position sensor.



PREPARATION:
Disconnect the throttle position sensor connector.

CHECK:
Measure voltage between terminals 1, 3 and 2 of throttle position sensor.

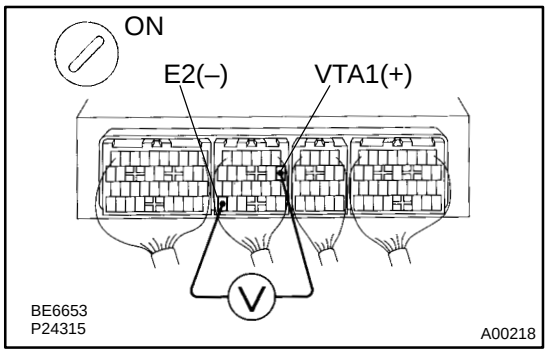
OK:

Terminals	Throttle valve	Resistance
1 ~ 2	—	2.5 ~ 5.9 kΩ
3 ~ 2	Fully closed	0.2 ~ 6.3 kΩ
	Fully open	2.0 ~ 10.2 kΩ

NG → **Replace throttle position sensor.**

OK

4	Check voltage between terminals VTA1 and E2 of ECM.



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals VTA1 and E2 of ECM connector.

OK:

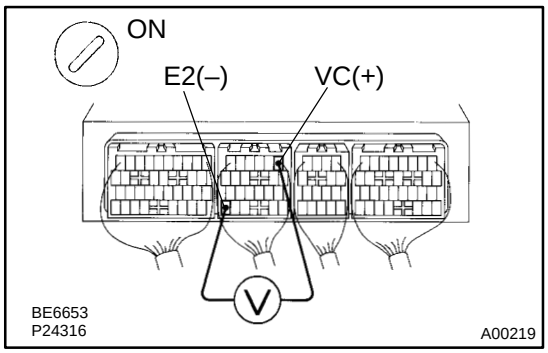
Throttle valve	Voltage
Fully closed	0.3 ~ 1.0 V
Fully open	2.7 ~ 5.2 V

NG → **Check for open and short in harness and connector between ECM and throttle position sensor (VTA line) (See page IN–27).**

OK

Check and replace ECM (See page IN–27).

5	Check voltage between terminals VC and E2 of ECM.



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals VC and E2 of ECM connector.

OK:

Voltage: 4.5 ~ 5.5 V

NG → **Check and replace ECM (See page IN–27).**

OK

Check for open in harness and connector between ECM and sensor (VC line) (See page IN–27).

DI09H–01

DTC	P0121	Throttle/Pedal Position Sensor/Switch ”A” Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0120 (Throttle/Pedal Position Sensor/Switch ”A” Circuit Malfunction) on page DI–38.

DTC No.	DTC Detecting Condition	Trouble Area
P0121	After the vehicle speed has been exceeded 30 km/h (19 mph) even once, the output value of the throttle position sensor is out of the applicable range while the vehicle speed between 30 km/h (19 mph) and 0 km/h (0 mph)	●Throttle position sensor

INSPECTION PROCEDURE

1	Are there any other codes (besides DTC P0121) being output?

YES → Go to relevant DTC chart.

NO

Replace throttle position sensor.

DTC	P0125	Insufficient Coolant Temp. for Closed Loop Fuel Control

CIRCUIT DESCRIPTION

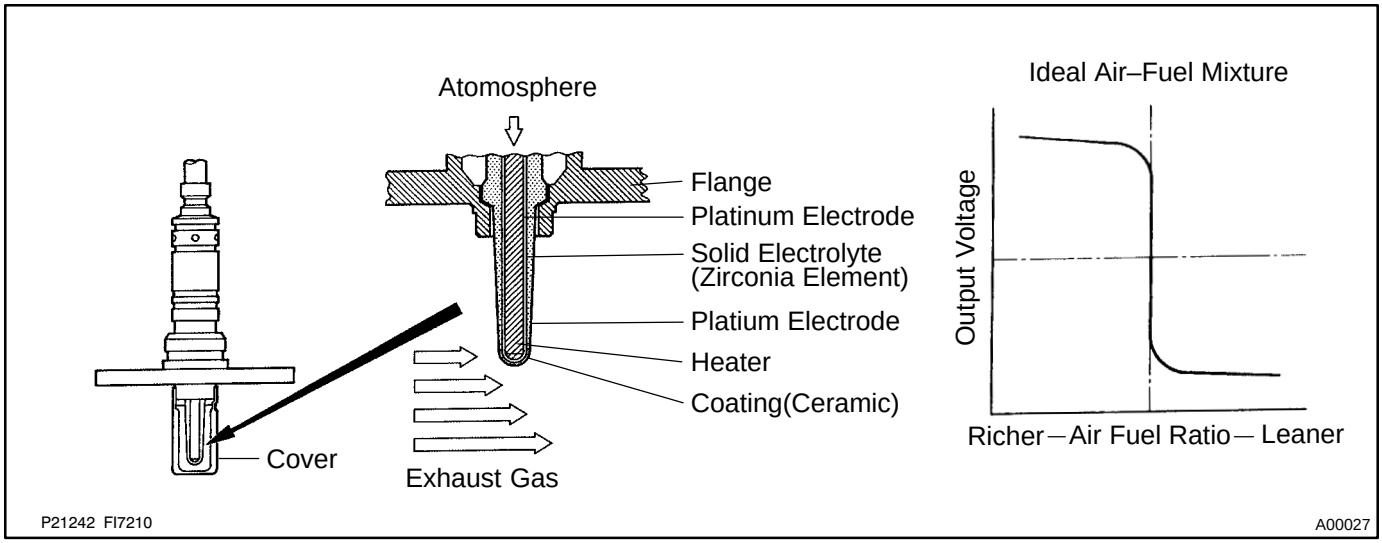
To obtain a high purification rate for the CO, HC and NOx components of the exhaust gas, a three–way catalytic converter is used, but for the most efficient use of the three–way catalytic converter, the air–fuel ratio must be precisely controlled so that it is always close to the stoichiometric air–fuel ratio.

The oxygen sensor has the characteristic whereby its output voltage changes suddenly in the vicinity of the stoichiometric air–fuel ratio. This characteristic is used to detect the oxygen concentration in the exhaust gas and provide feedback to the computer for control of the air–fuel ratio.

When the air–fuel ratio becomes LEAN, the oxygen concentration in the exhaust increases and the oxygen sensor informs the ECM of the LEAN condition (small electromotive force: 0 V).

When the air–fuel ratio is RICHER than the stoichiometric air–fuel ratio the oxygen concentration in the exhaust gas in reduced and the oxygen sensor informs the ECM of the RICH condition (large electromotive force: 1V). The ECM judges by the electromotive force from the oxygen sensor whether the air–fuel ratio is RICH or LEAN and controls the injection time accordingly. However, if malfunction of the oxygen sensor causes output of abnormal electromotive force, the ECM is unable to perform accurate air–fuel ratio control.

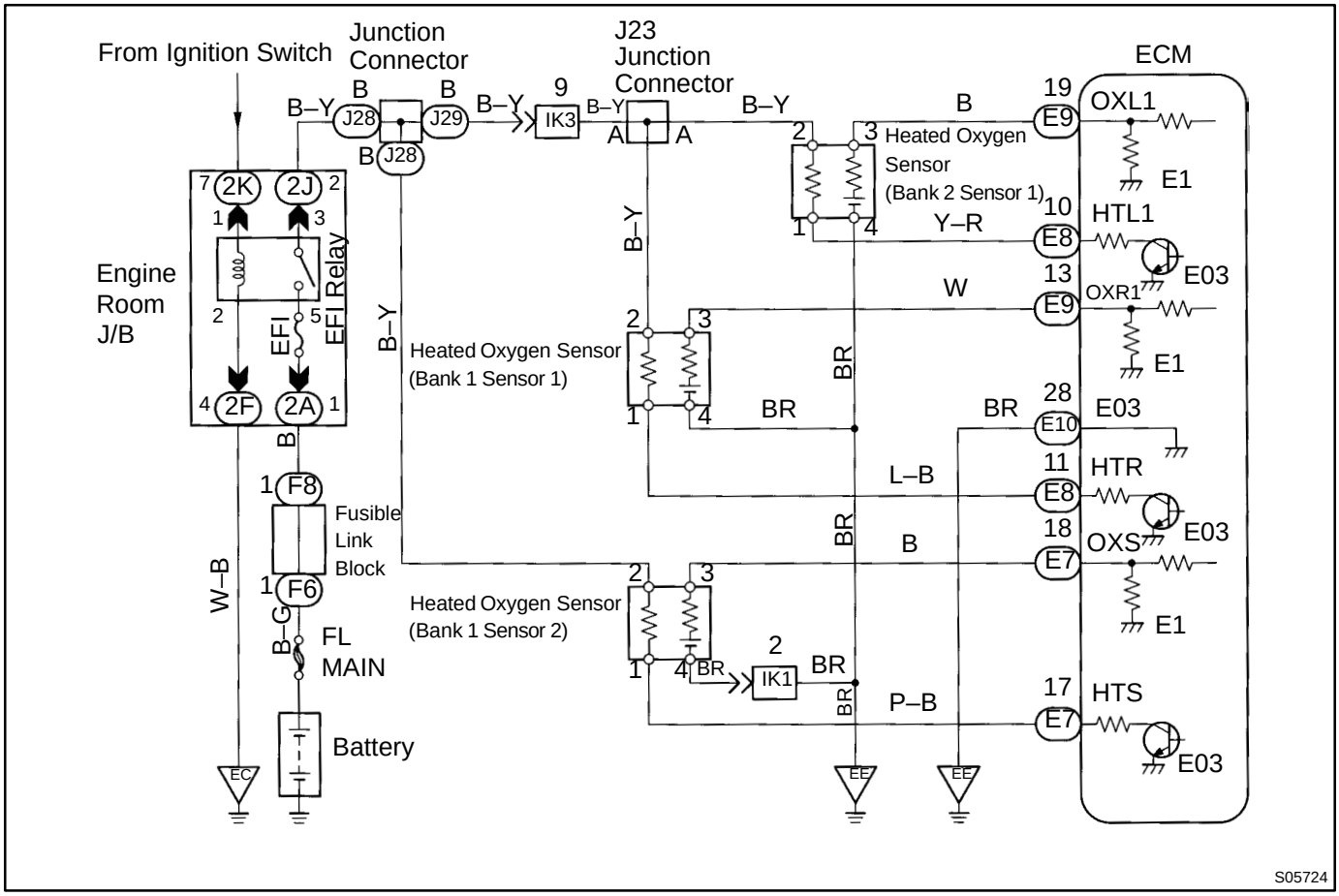
The heated oxygen sensors include a heater which heats the Zirconia element. The heater is controlled by the ECM. When the intake air volume is low (the temp. of the exhaust gas is low) current flows to the heater to heat the sensor for accurate oxygen concentration detection.



DTC No.	DTC Detecting Condition	Trouble Area
P0125	After the engine is warmed up, heated oxygen sensor (bank 1, 2 sensor 1) output does not indicate RICH even once when conditions (a), (b), (c) and (d) continue for at least 2 min.: (a) Engine speed: 1,500 rpm or more (b) Vehicle speed: 40 ~ 100 km/h (25 ~ 62 mph) (c) Throttle valve does not fully closed (d) 140 sec. or more after starting engine	●Open or short in heated oxygen sensor (bank 1, 2 sensor 1) circuit ●Heated oxygen sensor (bank 1, 2 sensor 1)

HINT:After confirming DTC P0125 use the OBD II scan tool or LEXUS hand–held tester to confirm voltage output of heated oxygen sensor (bank 1, 2 sensor 1) from CURRENT DATA.
If voltage output of heated oxygen sensor (bank 1, 2 sensor 1) is 0 V, heated oxygen sensor (bank 1, 2 sensor 1) circuit may be open or short.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Connect OBD II scan tool or LEXUS hand–held tester and read value for voltage output of heated oxygen sensor (bank 1, 2 sensor 1).**

PREPARATION:
(a) Connect the OBD II scan tool or LEXUS hand–held tester to the DLC3.
(b) Warm up engine to normal operating temp.

CHECK:
Read voltage output of heated oxygen sensor (bank 1 sensor 1) when engine is suddenly raced.
HINT:Perform quick racing to 4,000 rpm 3 times using accelerator pedal.

OK:

Both heated oxygen sensors [(bank 1 sensor 1) (bank 2 sensor 1)] output a RICH signal (0.45 V or more) at least once.

OK	**Check and replace ECM (See page IN–27).**

NG

2	**Check for open and short in harness and connector between ECM and heated oxygen sensor (bank 1, 2 sensor 1) (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Replace heated oxygen sensor (bank 1, 2 sensor 1).

DI09J–01

DTC	P0130	Heated Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)

DTC	P0150	Heated Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125 (Insufficient Coolant Temp. for Closed Loop Fuel Control) on page DI–43.

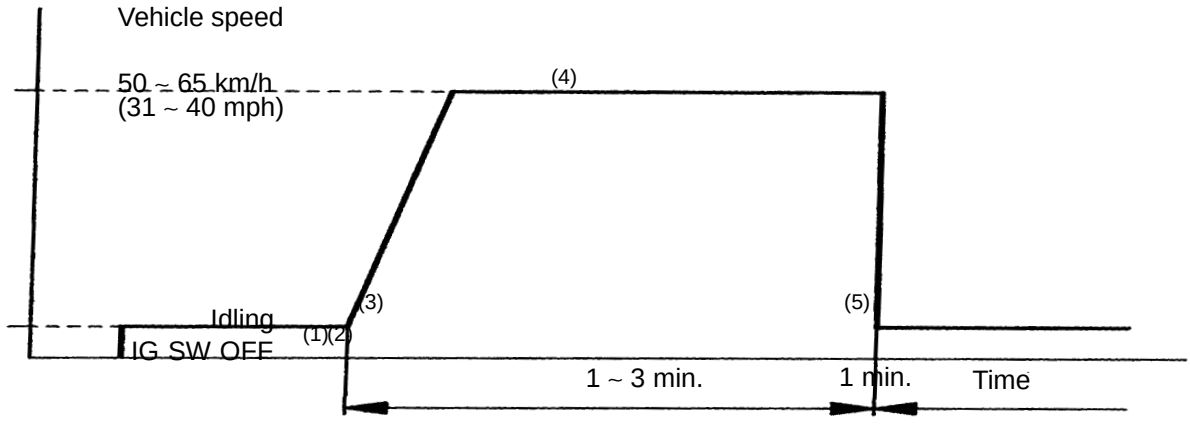
DTC No.	DTC Detecting Condition	Trouble Area
P0130 P0150	Voltage output of heated oxygen sensor remains at 0.4 V or more, or 0.55 V or less, during idling after the engine is warmed up (2 trip detection logic)	●Heated oxygen sensor ●Fuel trim malfunction

HINT:Bank 1 refers to the bank that includes cylinder No.1. Bank 2 refers to the bank that does not include cylinder No.1. Sensor 1 refers to the sensor closer to the engine body.
The heated oxygen sensor's output voltage and the short−term fuel trim value can be read using the OBD II scan tool or LEXUS hand−held tester.

WIRING DIAGRAM

Refer to DTC P0125 on page DI–43 for the WIRING DIAGRAM.

CONFIRMATION DRIVING PATTERN



FI7130

(1) Connect the LEXUS hand–held tester to the DLC3.
(2) Switch the LEXUS hand–held tester from normal mode to check mode (See page DI–3).
(3) Start the engine and warm it up with all accessory switches OFF.
(4) Drive the vehicle at 50 ~ 65 km/h (31 ~ 40 mph) for 1 ~ 3 min. to warm up the heated oxygen sensor.
(5) Let the engine idle for 1 min.

HINT:If a malfunction exists, the MIL will light up during step (5).

NOTICE:If the conditions in this test are not strictly followed, detection of the malfunction will not be possible .

If you do not have a LEXUS hand–held tester, turn the ignition switch OFF after performing steps (3) to (5), then perform steps (3) to (5) again.

INSPECTION PROCEDURE

1	**Check for open and short in harness and connector between ECM and heated oxygen sensor (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

2	**Check for heated oxygen sensor data.**

PREPARATION:

(a) Connect the OBD II scan tool or LEXUS hand–held tester to the DLC3.

(b) Warm up engine to normal operating temp.

CHECK:

Read the heated oxygen sensor output voltage and short–term fuel trim.

RESULT:

Pattern	Heated oxygen sensor output voltage	Short–term fuel trim
1	Lean condition (Changes at 0.55 V or less)	Changes at about +20%
2	RIch condition (Changes at 0.4 V or more)	Changes at about –20%
3	Except 1 and 2	

1, 2 → **Check fuel trim system (See page DI–54).**

3

3	**Check output voltage of heated oxygen sensor during idling.**

PREPARATION:

Warm up the heated oxygen sensor with the engine at 2,500 rpm for approx. 90 sec.

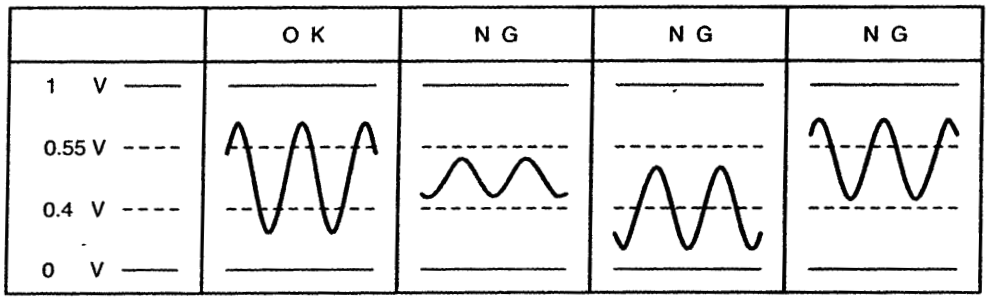
CHECK:

Use the OBD II scan tool or LEXUS hand–held tester read the output voltage of the heated oxygen sensor during idling.

OK:

Heated oxygen sensor output voltage:

Alternates repeatedly between less than 0.4 V and more than 0.55 V (See the following table).



P18349

OK → **Perform confirmation driving pattern (See page DI–46).**

NG → **Replace heated oxygen sensor.**

DI09L–01

DTC	P0135	Heated Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)

DTC	P0141	Heated Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)

DTC	P0155	Heated Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125 (Insufficient Coolant Temp. for Closed Loop Fuel Control) on page DI–43.

DTC No.	DTC Detecting Condition	Trouble Area
P0135 P0141 P0155	When the heater operates, heater current exceeds 2 A (2 trip detection logic)	●Open or short in heater circuit of heated oxygen sensor ●Heated oxygen sensor heater ●ECM
	Heater current of 0.2 A or less when the heater operates (2 trip detection logic)	

HINT:

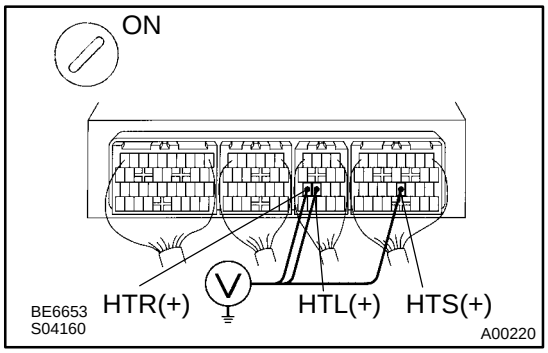
- Bank 1 refers to the bank that includes cylinder No.1.
- Bank 2 refers to the bank that does not include cylinder No.1.
- Sensor 1 refers to the sensor closer to the engine body.
- Sensor 2 refers to the sensor farther away from the engine body.

WIRING DIAGRAM

Refer to DTC P0125 on page DI–43 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

1	**Check voltage between terminals HTR, HTS, HTL of ECM connectors and body ground.**



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals HTR, HTS, HTL of ECM connectors and body ground.

HINT:

- Connect terminal HTR to bank 1 sensor 1.
- Connect terminal HTS to bank 1 sensor 2.
- Connect terminal HTL to bank 2 sensor 1.

OK:

Voltage: 9 ~ 14 V

OK	**Check and replace ECM (See page IN–27).**

NG

2	**Check resistance of heated oxygen sensor heater (See page SF–63).**

NG	**Replace heated oxygen sensor.**

OK

Check and repair harness or connector between EFI main relay (Marking: EFI), heated oxygen sensor and ECM (See page IN–27).

DI09M–01

DTC	P0136	Heated Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)

CIRCUIT DESCRIPTION

Refer to DTC P0125 (Insufficient Coolant Temp. for Closed Loop Fuel Control) on page DI–43.

DTC No.	DTC Detecting Condition	Trouble Area
P0136	Voltage output of the heated oxygen sensor (bank 1 sensor 2) remains at 0.4 V or more or 0.5 V or less when the vehicle is driven at 50 km/h (31 mph) or more after the engine is warmed up (2 trip detection logic)	●Heated oxygen sensor

HINT:Bank 1 refers to the bank that includes cylinder No.1. Sensor 2 refers to the sensor farther away from the engine body.

WIRING DIAGRAM

Refer to DTC P0125 on page DI–43 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

1	**Are there any other codes (besides DTC P0136) being output?**

YES → **Go to relevant DTC chart.**

NO

2	**Check for open and short in harness and connector between ECM and heated oxygen sensor (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

3	**Check output voltage of heated oxygen sensor (bank 1 sensor 2).**

PREPARATION:

(a) Connect the OBD II scan tool or LEXUS hand–held tester to the DLC3.

(b) Warm up engine to normal operating temp.

CHECK:

Read voltage output of heated oxygen sensor (bank 1 sensor 2) when engine suddenly raced.

HINT:Perform quick racing to 4,000 rpm 3 min. using accelerator pedal.

OK:

Heated oxygen sensor output voltage: Alternates from 0.4 V or less to 0.5 V or more.

OK → **Check that each connector is properly connected.**

NG

Replace heated oxygen sensor (bank 1 sensor 2).

DI09N–01

DTC	P0171	System too Lean (Fuel Trim)

DTC	P0172	System too Rich (Fuel Trim)

CIRCUIT DESCRIPTION

Fuel trim refers to the feedback compensation value compared against the basic injection time. Fuel trim includes short–term fuel trim and long–term fuel trim.

Short–term fuel trim is the short–term fuel compensation used to maintain the air–fuel ratio at its ideal theoretical value. The signal from the heated oxygen sensor indicates whether the air–fuel ratio is RICH or LEAN compared to the ideal theoretical value, triggering a reduction in fuel volume if the air–fuel ratio is rich, and an increase in fuel volume if it is lean.

Long–term fuel trim is overall fuel compensation carried out long–term to compensate for continual deviation of the short–term fuel trim form the central value due to individual engine differences, wear over time and changes in the usage environment.

If both the short–term fuel trim and long–term fuel trim are LEAN or RICH beyond a certain value, it is detected as a malfunction and the MIL lights up.

DTC No.	DTC Detecting Condition	Trouble Area
P0171	When the air fuel ratio feedback is stable after engine warming up, the fuel trim is considerably in error on the RICH side (2 trip detection logic)	●Air intake (hose loose) ●Fuel line pressure ●Injector blockage ●Heated oxygen sensor (bank 1, 2 sensor 1) malfunction ●Mass air flow meter ●Engine coolant temp. sensor
P0172	When the air fuel ratio feedback is stable after engine warming up, the fuel trim is considerably in error on the LEAN side (2 trip detection logic)	●Fuel line pressure ●Injector leak, blockage ●Heated oxygen sensor (bank 1, 2 sensor 1) malfunction ●Mass air flow meter ●Engine coolant temp. sensor

HINT:

- When DTC P0171 is recorded, the actual air–fuel ratio is on the LEAN side. When DTC P0172 is recorded, the actual air–fuel ratio is on the RICH side.
- If the vehicle runs out of fuel, the air–fuel ratio is LEAN and DTC P0171 is recorded. The MIL then comes on.
- If the total of the short–term fuel trim value and long–term fuel trim value is within ± 25 %, the system is functioning normally.

INSPECTION PROCEDURE

1	**Check air induction system (See page SF–1).**

NG → **Repair or replace.**

OK

2	**Check for heated oxygen sensors (bank 1, 2 sensor 1) data.**

PREPARATION:

(a) Connect the OBD II scan tool or LEXUS hand–held tester to the DLC3.

(b) Warm up engine to normal operating temp.

CHECK:

Read the heated oxygen sensor (bank 1, 2 sensor 1) output voltage and short–term fuel trim.

HINT:Read the values for the same bank.

RESULT:

Pattern	Heated oxygen sensor output voltage	Short–term fuel trim
1	Lean condition (Changes at 0.55 V or less)	Changes at about + 20 %
2	RIch condition (Changes at 0.4 V or more)	Changes at about – 20 %
3	Except 1 and 2	

3 → **Check for heated oxygen sensor (bank 1, 2 sensor 1) (See page DI–46).**

1, 2 ↓

3	**Check fuel pressure (See page SF–6).**

NG → **Check and repair fuel pump, fuel pipe line and filter (See page SF–1).**

OK ↓

4	**Check injector injection (See page SF–20).**

NG → **Replace injector.**

OK ↓

5	Check mass air flow meter and engine coolant temp. sensor (See page SF–29, SF–57).

NG → Repair or replace.

OK

6	Check for spark and ignition (See page IG–1).

NG → Repair or replace.

OK

Check and replace ECM (See page IN–27).

DI09O–01

DTC	P0300	Random/Multiple Cylinder Misfire Detected

DTC	P0301	Cylinder 1 Misfire Detected

DTC	P0302	Cylinder 2 Misfire Detected

DTC	P0303	Cylinder 3 Misfire Detected

DTC	P0304	Cylinder 4 Misfire Detected

DTC	P0305	Cylinder 5 Misfire Detected

DTC	P0306	Cylinder 6 Misfire Detected

CIRCUIT DESCRIPTION

Misfire: The ECM uses the crankshaft position sensor and camshaft position sensor to monitor changes in the crankshaft rotation for each cylinder.

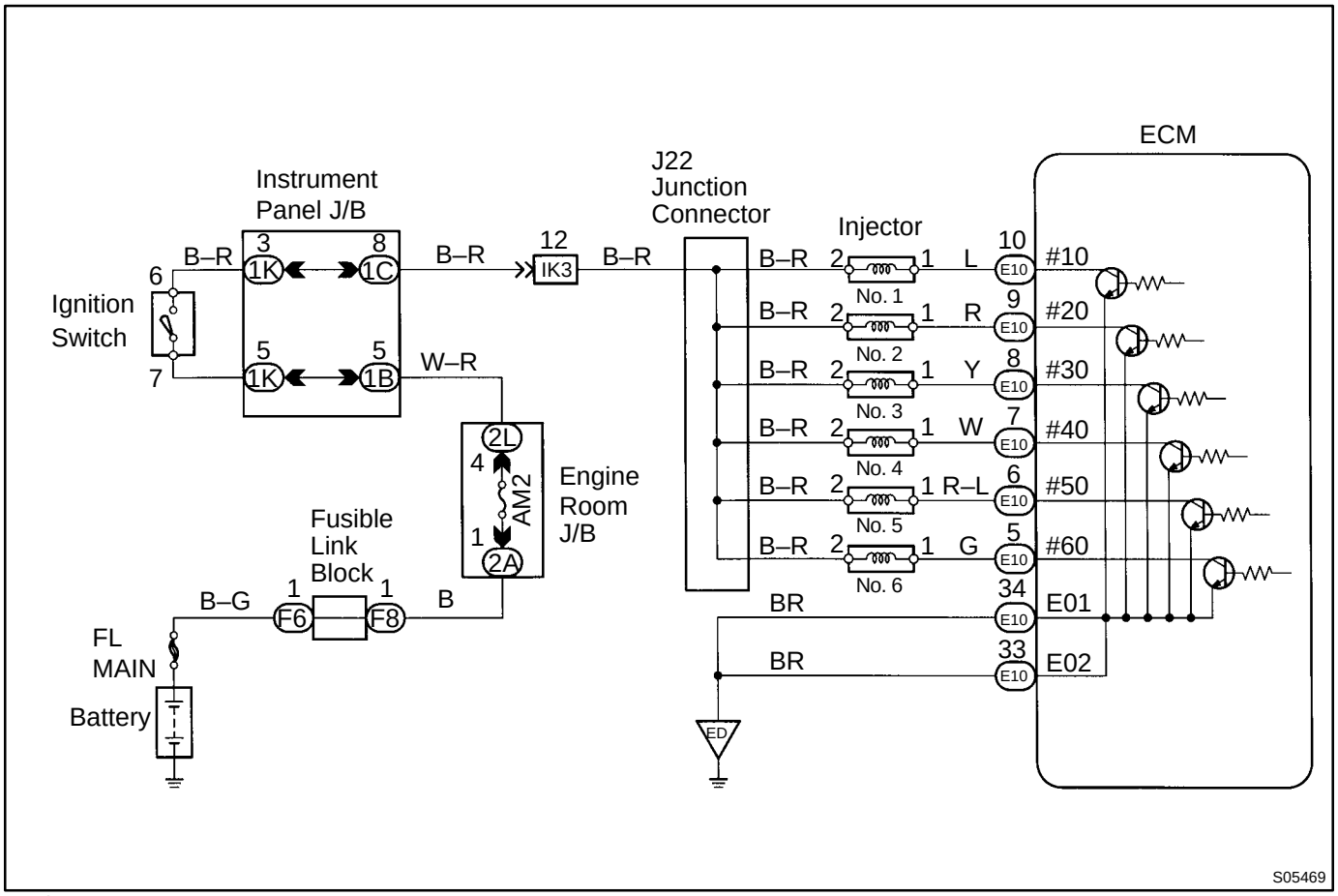
The ECM counts the number of times the engine speed change rate indicates that misfire has occurred. When the misfire rate equals or exceeds the count indicating that the engine condition has deteriorated, the MIL lights up.

If the misfire rate is high enough and the driving conditions will cause catalyst overheating, the MIL blinks when misfiring occurs.

DTC No.	DTC Detecting Condition	Trouble Area
P0300	Misfiring of random cylinders is detected during the any particular 200 or 1,000 revolutions	●Ignition system ●Injector ●Fuel line pressure ●EGR ●Compression pressure ●Valve clearance not to specification ●Valve timing ●Mass air flow meter ●Engine coolant temp. sensor
P0301 P0302 P0303 P0304 P0305 P0306	For any particular 200 revolutions for the engine, misfiring is detected which can cause catalyst overheating (This causes MIL to blink)	
	For any particular 1,000 revolutions of the engine, misfiring is detected which causes a deterioration in emission (2 trip detection logic)	

HINT:When the 2 or more codes for a misfiring cylinder are recorded repeatedly but no Random Misfire code is recorded, it indicates that the misfires were detected and recorded at different times.

WIRING DIAGRAM

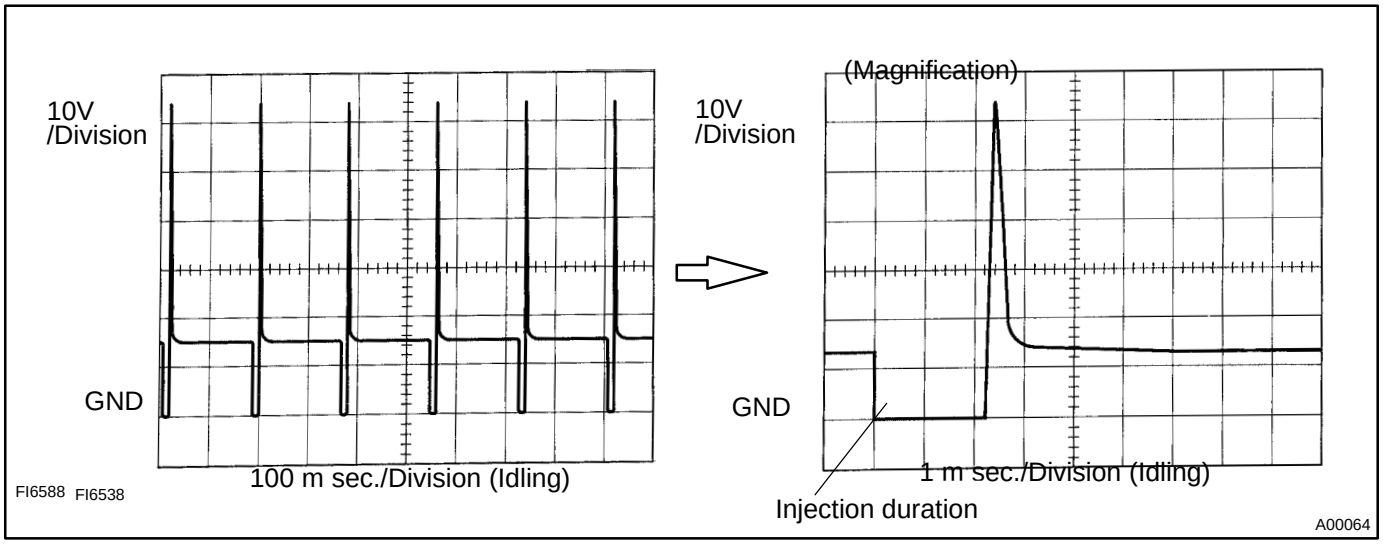


Reference INSPECTION USING OSCILLOSCOPE

INJECTOR SIGNAL WAVEFORM

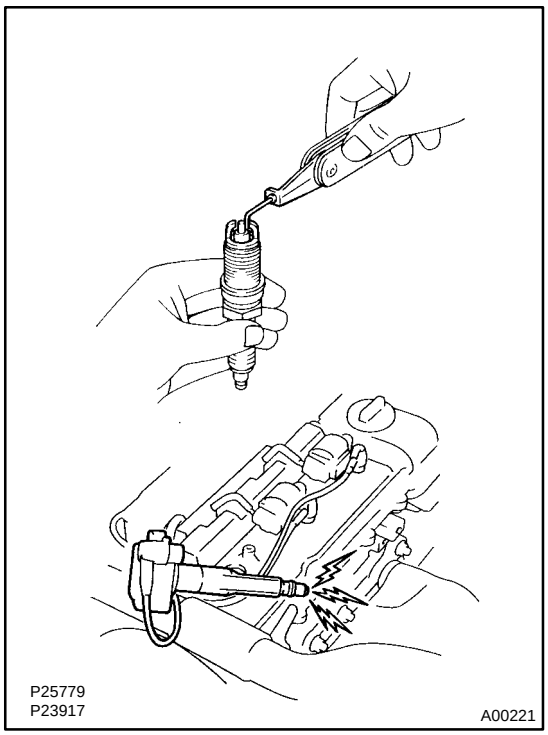
With the engine idling, measure between terminals #10 ~ #60 and E01 of ECM.

HINT:The correct waveform is as shown.



INSPECTION PROCEDURE

1	**Check spark plug and spark of misfiring cylinder.**



PREPARATION:

(a) Remove the ignition coil (See page IG–7).

(b) Remove the spark plug.

CHECK:

(1) Check spark plug type.

(2) Check for carbon deposits on electrode.

(3) Check electrode gap.

OK:

(1) Twin ground electrodes type.
Recommended spark plug:
ND PK20TR11
NGK BKR6EKPB–11
(2) No large carbon deposit present.
Not wet with gasoline or oil.
(3) Electrode gap: 1.1 ~ 1.3 mm (0.043 ~ 0.051 in.)

PREPARATION:

(a) Install the spark plug to the ignition coil, and connect the ignition coil connector.

(b) Disconnect injector connector.

(c) Hold the end about 12.5 mm (0.5 in.) from the ground.

CHECK:

Check if spark occurs while engine is being cranked.

NOTICE:To prevent excess fuel being injected from the injectors during this test, don't crank the engine for more than 5 ~ 10 sec. at a time.

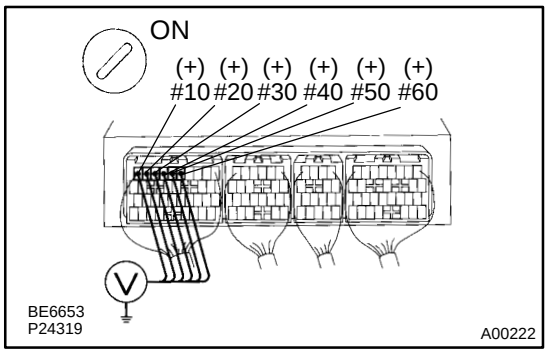
OK:

Spark jumps across electrode gap.

NG → **Replace or check ignition system (See page IG–1).**

OK

2	Check voltage of ECM terminal for injector of failed cylinder.



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between applicable terminal of ECM connector and body ground.

OK:

Voltage: 9 ~ 14 V

OK → **Go to step 4.**

NG

3	Check resistance of injector of misfiring cylinder (See page SF–16).

NG → **Replace injector.**

OK

Check for open and short in harness and connector between injector and ECM (See page IN–27).

4	Check fuel pressure (See page SF–6).

NG → **Check and repair fuel pump, fuel pipe line and filter (See page SF–1).**

OK

5	Check injector injection (See page SF–20).

NG → Replace injector.

OK

6	Check EGR system (See page EC–7).

NG → Replace EGR system.

OK

7	Check mass air flow meter and engine coolant temp. sensor (See page SF–29, SF–57).

NG → Repair or replace.

OK

Check compression pressure, valve clearance and valve timing.

DI09P–01

DTC	P0325	Knock Sensor 1 Circuit Malfunction

DTC	P0330	Knock Sensor 2 Circuit Malfunction

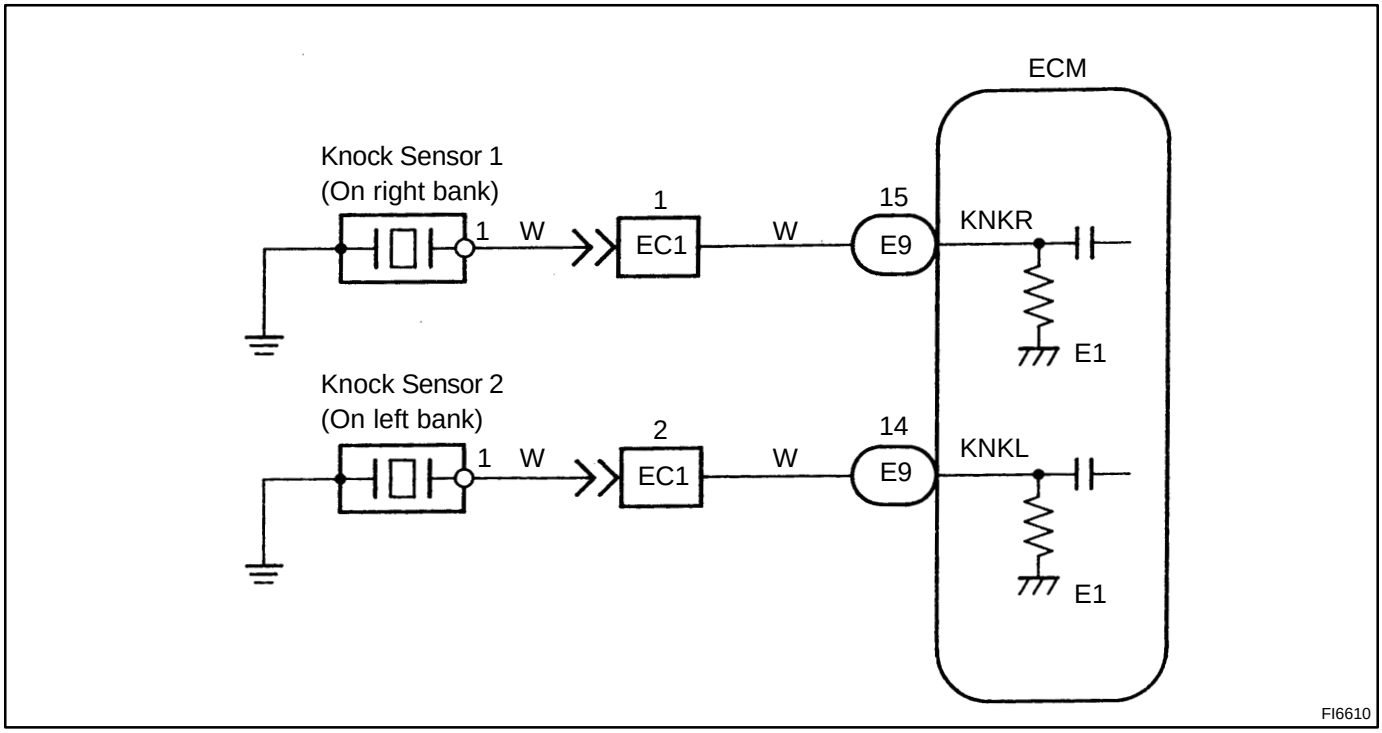
CIRCUIT DESCRIPTION

Knock sensors are fitted one to the right bank and left bank of the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

DTC No.	DTC Detecting Condition	Trouble Area
P0325	No knock sensor 1 signal to ECM with engine speed between 2,000 rpm and 5,600 rpm	●Open or short in knock sensor 1 circuit ●Knock sensor 1 (looseness) ●ECM
P0330	No knock sensor 2 signal to ECM with engine speed between 2,000 rpm and 5,600 rpm	●Open or short in knock sensor 2 circuit ●Knock sensor 2 (looseness) ●ECM

If the ECM detects the above diagnosis conditions, it operates the fail–safe function in which the corrective retard angle value is set to the maximum value.

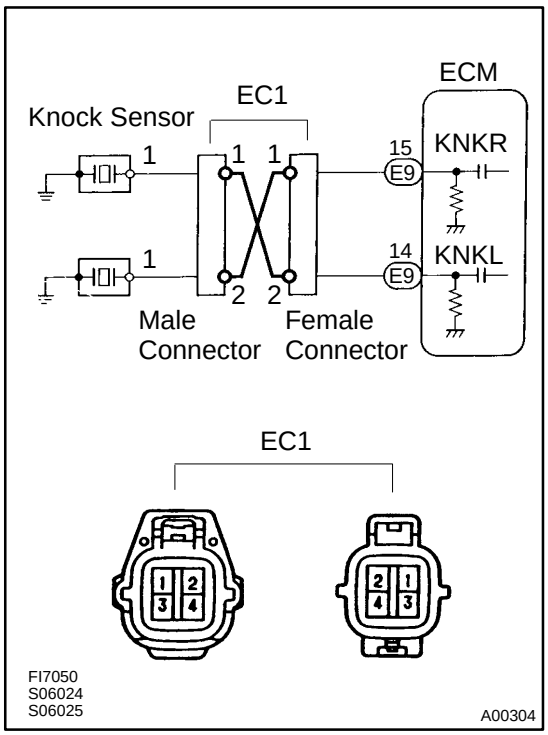
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:DTC P0325 is for the right bank knock sensor circuit. DTC P0330 is for the left bank knock sensor circuit.

1	**Connect OBD II scan tool or LEXUS hand–held tester and check knock sensor circuit.**



PREPARATION:

(a) Connect the OBD II scan tool or LEXUS hand–held tester to the DLC3.

(b) Disconnect the wire to wire connector EC1.

(c) Connect the terminals of the disconnected EC1 male connector and EC1 female as follows.

Male connector ↔ Female connector
Terminal 1 ↔ Terminal 2
Terminal 2 ↔ Terminal 1

(d) Turn ignition switch ON and switch the OBD II scan tool or LEXUS hand–held tester main switch ON.

(e) After the engine is warmed up, perform quick racing to 4,000 rpm three times.

CHECK:

Check the DTC.

RESULT:

Type I	DTC same as when vehicle brought in. P0325 → P0325 or P0330 → P0330
Type II	DTC different to when vehicle brought in. P0325 → P0330 or P0330 → P0325

Type II → **Go to step 3 .**

Type I

2	**Check for open and short in harness and connector between EC1 connector and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN–27).

3	**Check for open and short in harness and connector between EC1 connector and knock sensor (See page IN–27).**

HINT:

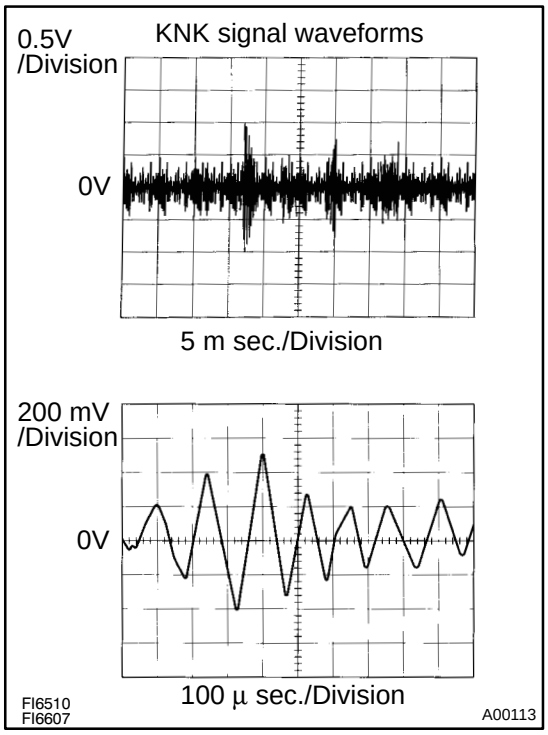
- If DTC P0325 has changed to P0330, check the knock sensor circuit on the right bank side.
- If DTC P0330 has changed to P0325, check the knock sensor circuit on the left bank side.

NG → **Repair or replace harness or connector.**

OK

Replace knock sensor.

Reference INSPECTION USING OSCILLOSCOPE



- With the engine racing (4,000 rpm) measure between terminals KNKR, KNKL of ECM and body ground.

HINT: The correct waveform is as shown.

- Spread the time on the horizontal axis, and confirm that period of the wave is 141 μ sec.
  (Normal mode vibration frequency of knock sensor: 7.1 kHz)

HINT: If normal mode vibration frequency is not 7.1 kHz, the sensor is malfunctioning.

DI09Q–01

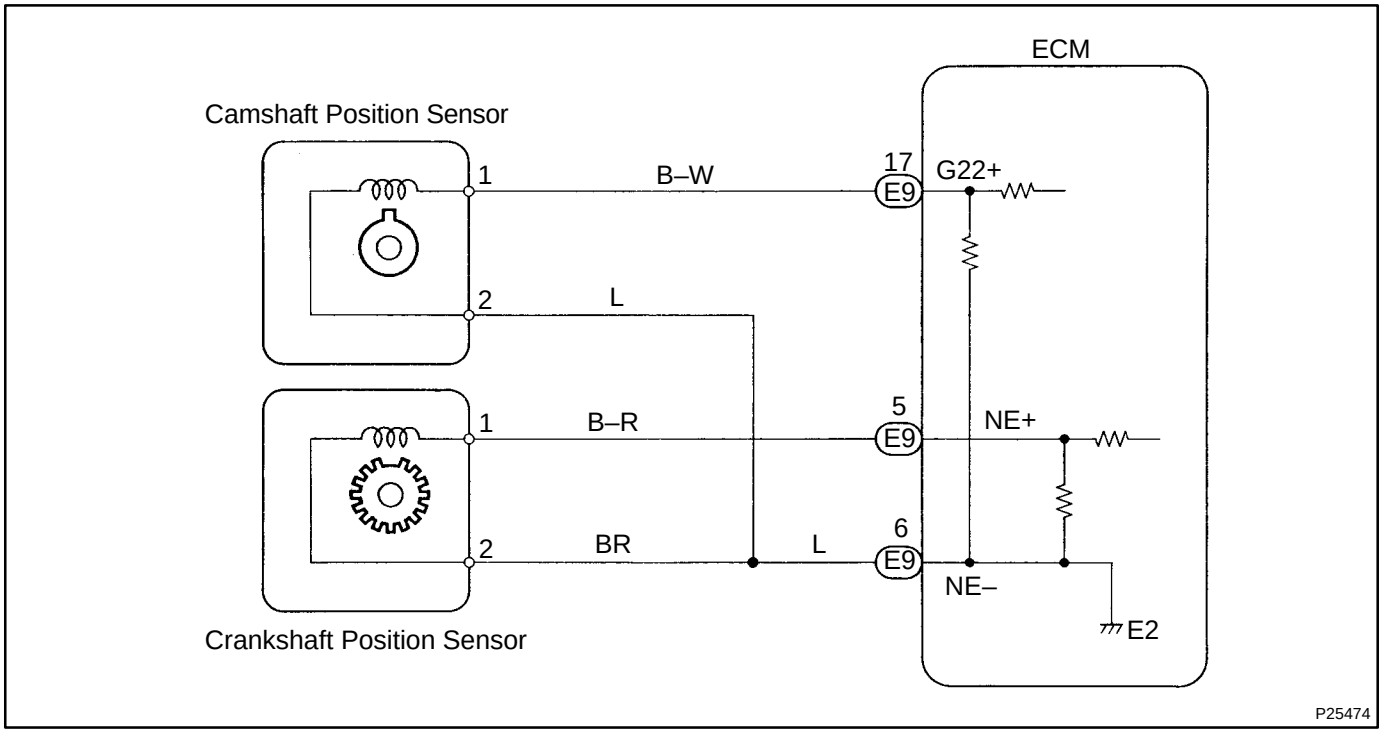
DTC	P0335	Crankshaft Position Sensor ”A” Circuit Malfunction

CIRCUIT DESCRIPTION

Crankshaft position sensor (NE signal) consists of a signal plate and pickup coil.
The NE signal plate has 34 teeth and is mounted on the crankshaft. The NE signal sensor generates 34 signals for every engine revolution. The ECM detects the standard crankshaft angle based on the G22 signals, and the actual crankshaft angle and the engine speed by the NE signals.

DTC No.	DTC Detecting Condition	Trouble Area
P0335	No crankshaft position sensor signal to ECM during cranking (2 trip detection logic)	●Open or short in crankshaft position sensor circuit ●Crankshaft position sensor ●Starter ●ECM
	No crankshaft position sensor signal to ECM with engine speed 600 rpm or more (2 trip detection logic)	

WIRING DIAGRAM

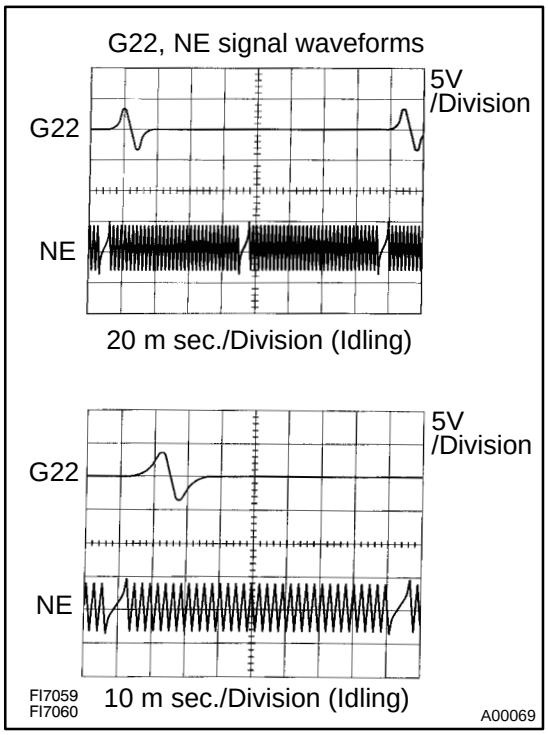


INSPECTION PROCEDURE

HINT:Perform troubleshooting of DTC P0335 first. If no trouble is found, troubleshoot the following mechanical systems.

1	**Check resistance of crankshaft position sensor (See page IG–12).**

Reference INSPECTION USING OSCILLOSCOPE



During cranking or idling, check between terminals G22+ and NE–, NE and NE– of ECM.
HINT:The correct waveforms are as shown.

NG → **Replace crankshaft position sensor.**

OK

2	**Check for open and short in harness and connector between ECM and crankshaft position sensor (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

3	**Inspect sensor installation and teeth of crankshaft timing pulley.**

NG → **Tighten the sensor.**
Replace crankshaft timing pulley.

OK

Check and replace ECM (See page IN–27).

DTC	P0340	Camshaft Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Camshaft position sensor (G22 signal) consist of a signal plate and pickup coil.
The G22 signal plate has one tooth, on its outer circumference and is mounted on the left bank camshafts. When the camshafts rotate, the protrusion on the signal plate and the air gap on the pickup coil change, causing fluctuations in the magnetic field and generating an electromotive force in the pickup coil.
The NE signal plate has 34 teeth and is mounted on the crankshaft. The NE signal sensor generates 34 signals for every engine revolution. The ECM detects the standard crankshaft angle based on the G22 signal and the actual crankshaft angle and the engine speed by the NE signals.

DTC No.	DTC Detecting Condition	Trouble Area
P0340	No camshaft position sensor signal to ECM during cranking (2 trip detection logic)	●Open or short in camshaft position sensor circuit ●Camshaft position sensor ●Starter ●ECM
	No camshaft position sensor signal to ECM with engine speed 600 rpm or more	

WIRING DIAGRAM

Refer to DTC P0335 on page DI–66 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

1	**Check resistance of camshaft position sensor (See page IG–1).**

Reference INSPECTION USING OSCILLOSCOPE
Refer to DTC P0335 on page DI–66 for the OSCILLOSCOPE.

NG → **Replace camshaft position sensor.**

OK

2	**Check for open and short in harness and connector between ECM and camshaft position sensor (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

3	**Inspect sensor installation and tooth of left bank camshaft timing pulley.**

NG → **Tighten the sensor.**
Replace left bank camshaft timing pulley.

OK

Check and replace ECM (See page IN–27).

DTC	P0401	Exhaust Gas Recirculation Flow Insufficient Detected

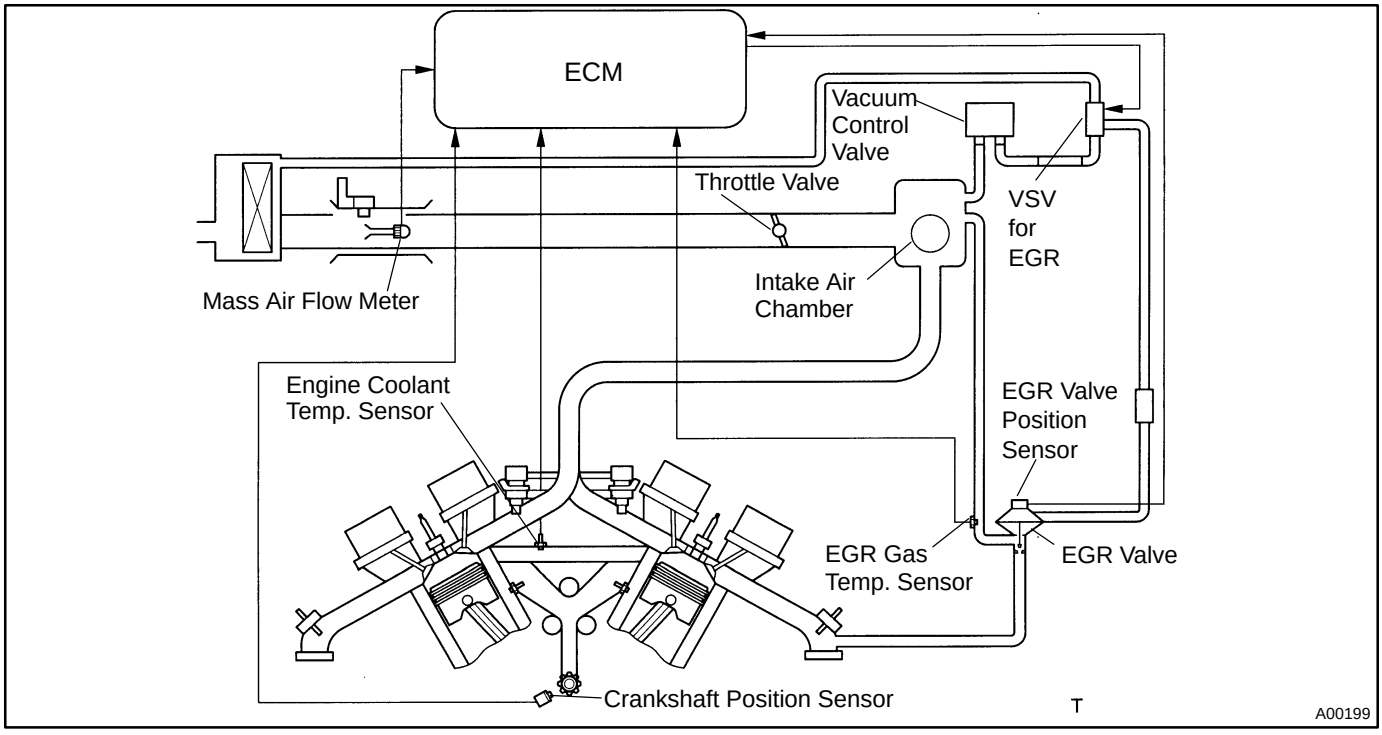
CIRCUIT DESCRIPTION

The EGR system recirculates exhaust gas, which is controlled to the proper quantity to suit the driving conditions, into the intake air mixture to slow down combustion, reduce the combustion temperature and reduce NOx emissions.

The lift amount of EGR valve is controlled by the vacuum which is regulated by the Duty–VSV operated by the ECM. The lift amount of EGR valve is detected by the EGR valve position sensor which is mounted on the EGR valve and it provides feedback to the ECM to control the lift amount of EGR valve in response to engine operating conditions.

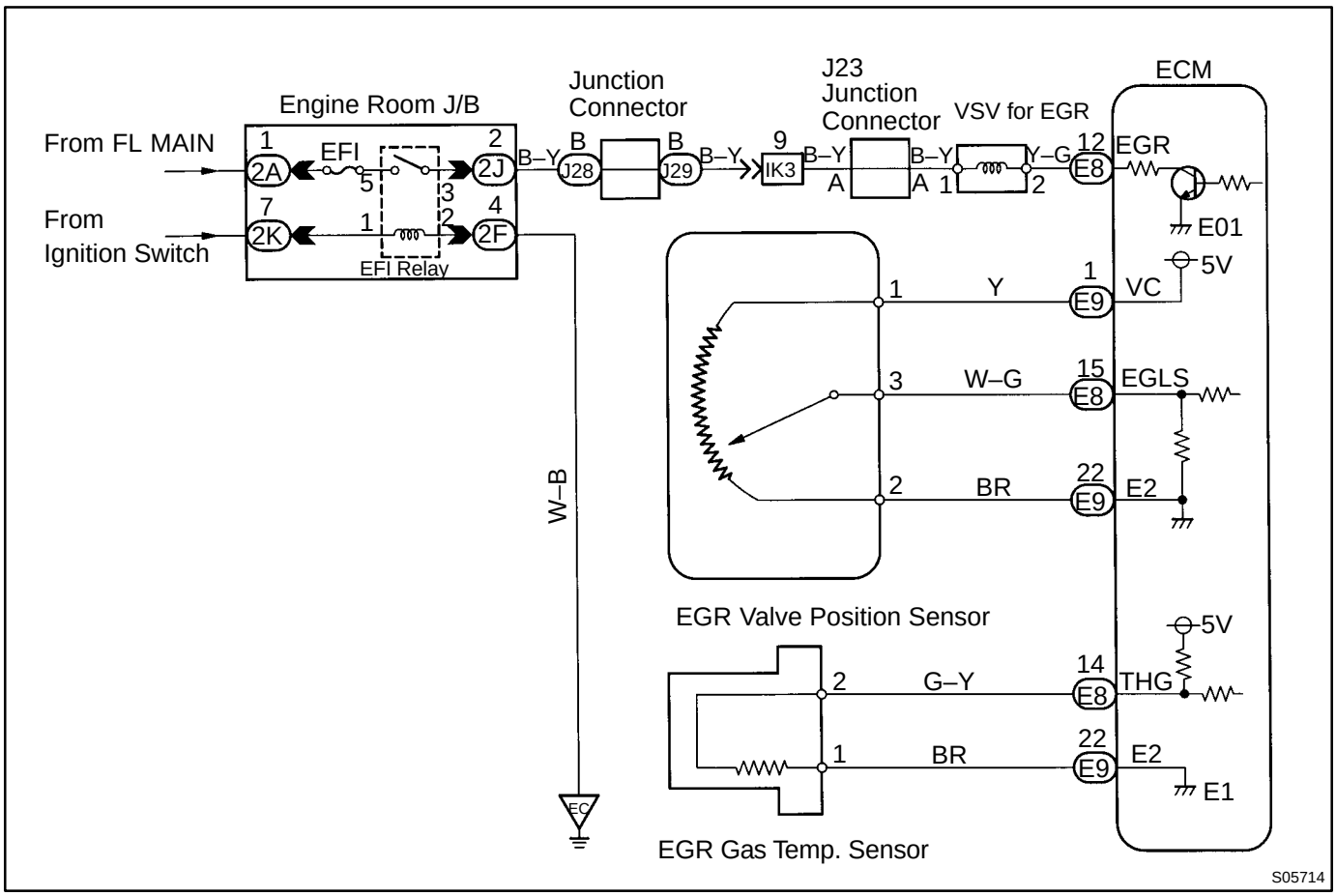
Under the following conditions, EGR is cut to maintain driveability.

- Before the engine is warmed up
- During deceleration (throttle valve closed)
- Light engine load (amount of intake air very small)
- Engine speed over 4,000 rpm
- Engine idling

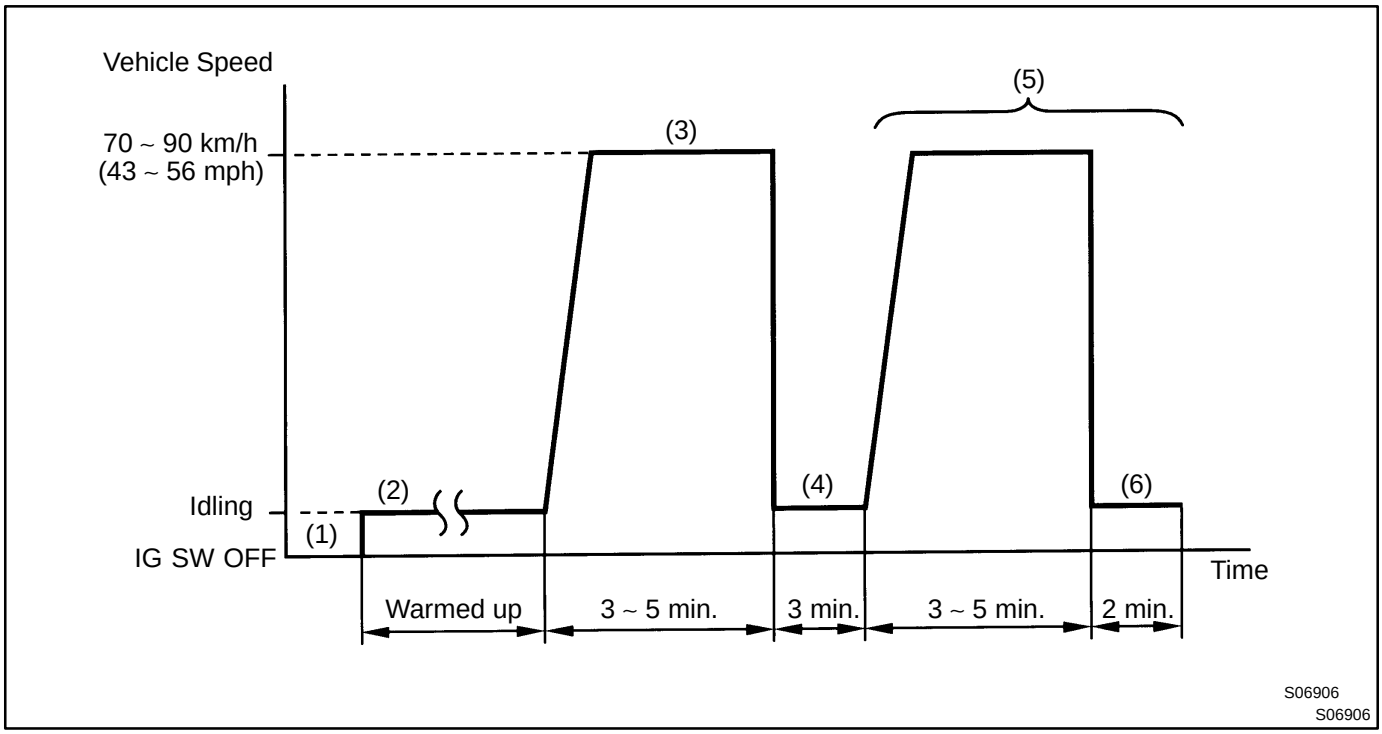


DTC No.	DTC Detecting Condition	Trouble Area
P0401	After the engine is warmed up and run at 80 km/h (50 mph) for 3 to 5 min. the EGR gas temperature sensor valve does not exceed 35˚C (95˚F) above the ambient air temperature (2 trip detection logic)	●EGR valve (stuck closed) ●Open or short in EGR gas temp. sensor circuit ●EGR gas temp. sensor ●Open in VSV circuit for EGR ●VSV for EGR ●Vacuum control valve ●Vacuum hose disconnected or blocked ●ECM

WIRING DIAGRAM



SYSTEM CHECK DRIVING PATTERN



(1) Connect the OBD II scan tool or LEXUS hand–held tester to the DLC3.
(2) Start and warm up the engine with all accessories switched OFF.
(3) Run the vehicle at 70 ~ 90 km/h (43 ~ 56 mph) for 3 min. or more.
(4) Idle the engine for about 2 min.
(5) Start the engine and do steps (3) and (4) again.
(6) Check the READINESS TESTS mode on the OBD II scan tool or LEXUS hand–held tester.

If COMPL is displayed and the MIL does not light up, the system is normal.

If INCMPL is displayed and the MIL does not light up, run the vehicle step (5) for some times and check it.

HINT:INCMPL is displayed when either condition (a) or (b) exists.

(a) The system check is incomplete.
(b) There is a malfunction in the system.
If there is a malfunction in the system, the MIL light up after steps (2) to (5) above are done again.

INSPECTION PROCEDURE

LEXUS hand–held tester

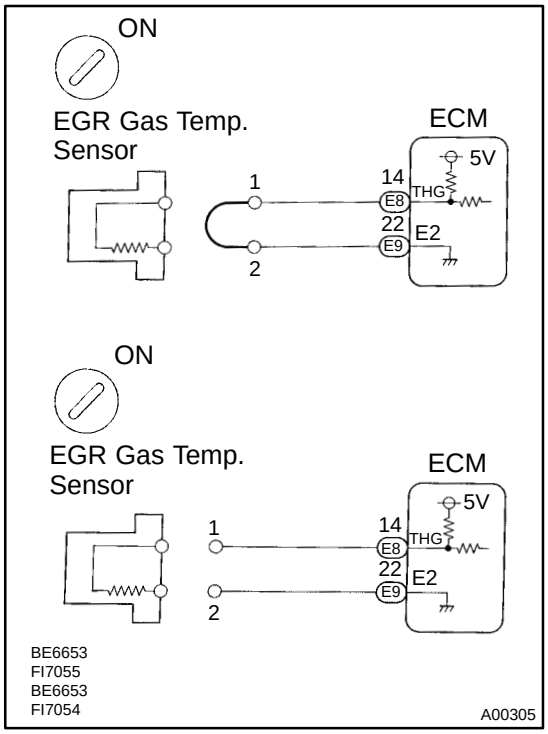
1	**Connect LEXUS hand–held tester and read value of EGR gas temperature.**

PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Warm up the engine.
CHECK:
Read EGR gas temperature on LEXUS hand–held tester during idling.
OK:
EGR gas temp. : 10°C (50°F) ~ 150°C (302°F) (Not immediately after driving)
HINT:If there is an open circuit, LEXUS hand–held tester indicates 3.1°C (37.6°F).
If there is an short circuit, LEXUS hand–held tester indicates 159.3°C (318.7°F).

OK → **Go to step 4.**

NG

2	**Check for open or short in harness or ECM.**



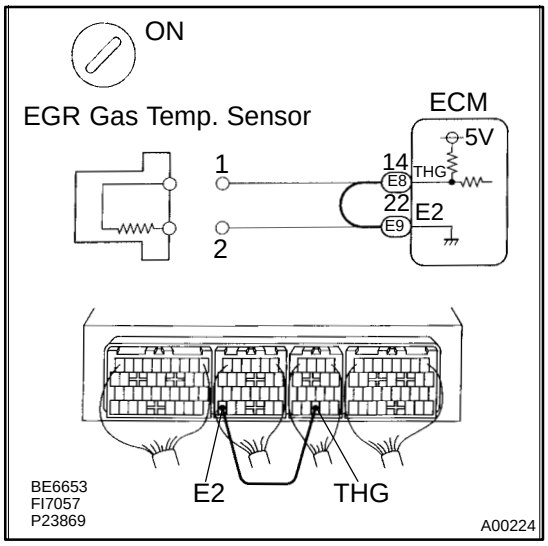
For open circuit
PREPARATION:
(a) Disconnect the EGR gas temp. sensor connector.
(b) Connect sensor wire harness terminals together.
(c) Turn ignition switch ON.
CHECK:
Read EGR gas temperature on the LEXUS hand–held tester.
OK:
EGR gas temp. : 159.3°C (318.7°F)

For short circuit
PREPARATION:
Disconnect the EGR gas temp. sensor connector.
CHECK:
Read EGR gas temperature on the LEXUS hand–held tester.
OK:
EGR gas temp. : 3.1°C (37.6°F)

OK → **Confirm good connection at sensor.**
If OK, check and replace EGR gas temp. sensor.

NG

3	Check for open or short in harness or ECM.



For open circuit

PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Connect between terminals THG and E2 of ECM connectors.

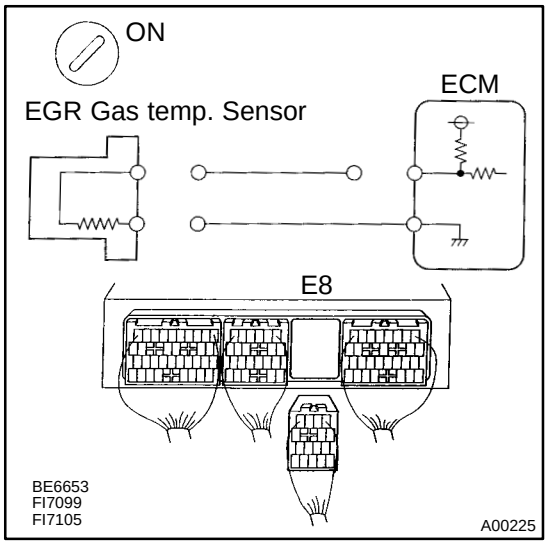
HINT:EGR gas temp. sensor connector is disconnected. Before checking, do a visual check and contact pressure check for the ECM connector (See page IN–27).

CHECK:

Read EGR gas temperature on the LEXUS hand–held tester.

OK:

EGR gas temp. : 159.3°C (318.7°F)



For short circuit

PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Disconnect the E8 connector of ECM.

CHECK:

Read EGR gas temperature on the LEXUS hand–held tester.

OK:

EGR gas temp. : 3.1°C (37.6°F)

OK → **Repair or replace harness.**

NG

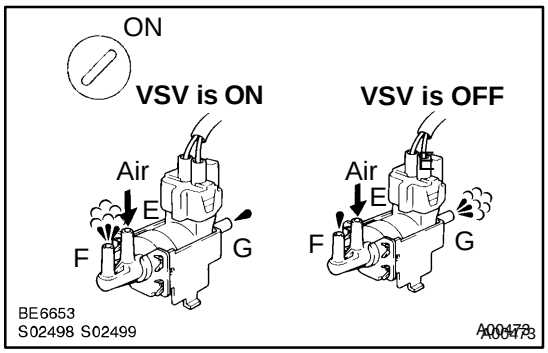
Confirm connection at ECM.
If OK, check and replace ECM.

4	Check connection and blockage of vacuum hose (See page EC–7).

NG → **Repair or replace vacuum hose.**

OK

5	Check VSV for EGR.



PREPARATION:
Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:
Check operation VSV when it is operated by the LEXUS hand–held tester.

OK:

VSV is ON:
Air from pipe E is flowing out through pipe F.
VSV is OFF:
Air from pipe E is flowing out through pipe G.

OK	Go to step 7.

NG

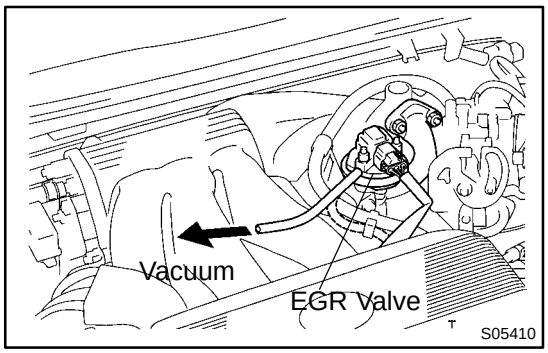
6	Check operation of VSV for EGR (See page SF–50).

NG	Replace VSV for EGR.

OK

Check for open in harness and connector between engine room J/B and ECM.

7	**Check EGR valve.**



PREPARATION:

(a) Disconnect the vacuum hose from EGR valve.

(b) Start the engine.

CHECK:

Check whether the engine stall when apply vacuum to EGR valve.

OK:

Engine runs rough or stall.

NG → **Repair or replace EGR valve.**

OK

8	**Check vacuum control valve (See page EC–7).**

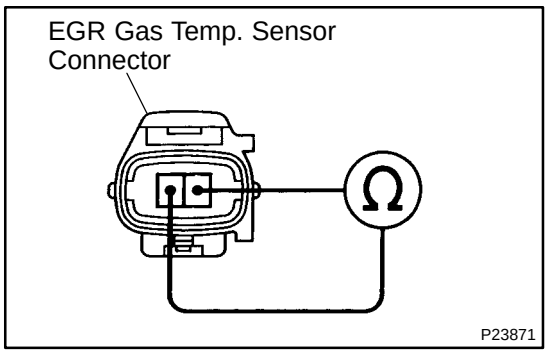
NG → **Replace vacuum control valve.**

OK

Check and replace ECM (See page IN–27).

OBDII scan tool (excluding LEXUS hand–held tester)

1	**Check resistance of EGR gas temp. sensor.**



PREPARATION:
Disconnect the EGR gas temp. sensor connector.
CHECK:
Measure resistance between terminals of EGR gas temp. sensor connector.
OK:

Resistance: 2.5 kΩ ~ 600 kΩ
(Not immediately after driving)

HINT:If there is open circuit, ohmmeter indicates 720 kΩ or more. If there is short circuit, ohmmeter indicates 200 Ω or less.

NG → **Replace EGR gas temp. sensor.**

OK

2	**Check for open and short in harness and connector between EGR gas temp. sensor and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

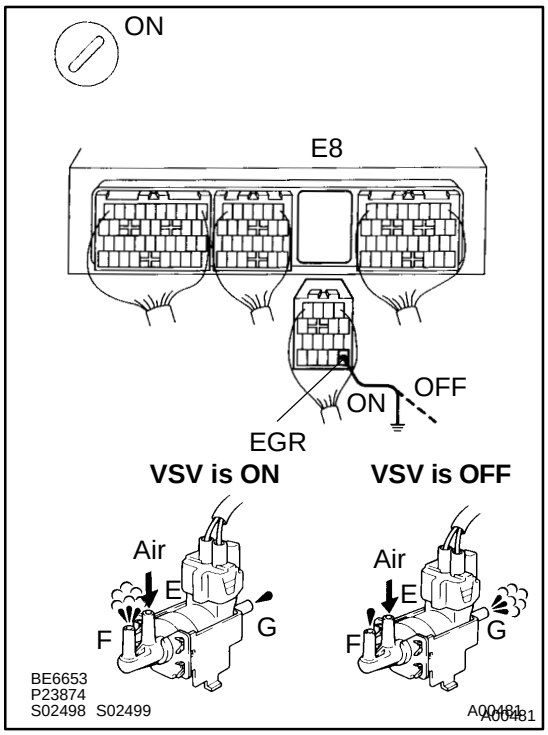
OK

3	**Check connection and blockage of vacuum hose (See page EC–7).**

NG → **Repair or replace vacuum hose.**

OK

4	Check VSV for EGR.



PREPARATION:

(a) Remove the glove compartment (See page SF–64).
(b) Disconnect the E8 connector of ECM..
(c) Turn ignition switch ON.

CHECK:

Check VSV function.

(1) Connect between terminal EGR of ECM and body ground (VSV is ON).
(2) Disconnect between terminal EGR of ECM and body ground (VSV is OFF).

OK:

(1) VSV is ON:
Air from pipe E flows out through pipe F.
(2) VSV is OFF:
Air from pipe E flows out through pipe G.

OK	Go to step 6.

NG

5	Check operation of VSV for EGR (See page SF–50).

NG	Replace VSV for EGR.

OK

Check for open in harness and connector between engine room J/B and ECM.

6	Check EGR valve (See page EC–7).

NG	Repair or replace EGR valve.

OK

7	Check vacuum control valve (See page EC–7).

NG → Replace vacuum control valve.

OK →

Check and replace ECM (See page IN–27).

DTC	P0402	Exhaust Gas Recirculation Flow Excessive Detected

CIRCUIT DESCRIPTION

Refer to DTC P0401 (Exhaust Gas Recirculation Flow Insufficient Detected) on page DI–71.

DTC No.	DTC Detecting Condition	Trouble Area
P0402	When the EGR cut–off, the lift amount of EGR valve is 2.6 mm (0.1 in.) or more (2 trip detection logic)	●EGR valve stuck open ●VSV for EGR open malfunction ●Short in VSV circuit for EGR ●Open or short in EGR valve position sensor circuit ●EGR valve position sensor ●ECM

See DTC P0401 for SYSTEM CHECK DRIVING PATTERN and WIRING DIAGRAM.

INSPECTION PROCEDURE

LEXUS hand–held tester

1	**Check connection and blockage of vacuum hose.**

NG → **Repair or replace vacuum hose.**

OK

2	**Check VSV for EGR (See page DI–164, DI–14).**

OK → **Go to step 4.**

NG

3	Check operation of VSV for EGR (See page SF–50).

NG → Replace VSV for EGR.

OK →

Check for short in harness between VSV for EGR and ECM.

4	Check EGR valve (See page EC–7).

NG → Repair or replace EGR valve.

OK →

5	Check EGR valve position sensor (See page DI–118).

NG → Repair or replace EGR valve position sensor or harness.

OK →

Check and replace ECM (See page IN–27).

OBDII scan tool (excluding LEXUS hand–held tester)

1	Check connection and blockage of vacuum hose.

NG → Repair or replace vacuum hose.

OK →

2	Check VSV for EGR (See page DI–164, DI–14).

OK → Go to step 4.

NG

3	Check operation of VSV for EGR (See page SF–50).

NG → Replace VSV for EGR.

OK

Check for short in harness between VSV for EGR and ECM.

4	Check EGR valve (See page EC–7).

NG → Repair or replace EGR valve.

OK

5	Check EGR valve position sensor (See page DI–118).

NG → Repair or replace EGR valve position sensor or harness.

OK

Check and replace ECM (See page IN–27).

DI09U–01

DTC	P0420	Catalyst System Efficiency Below Threshold

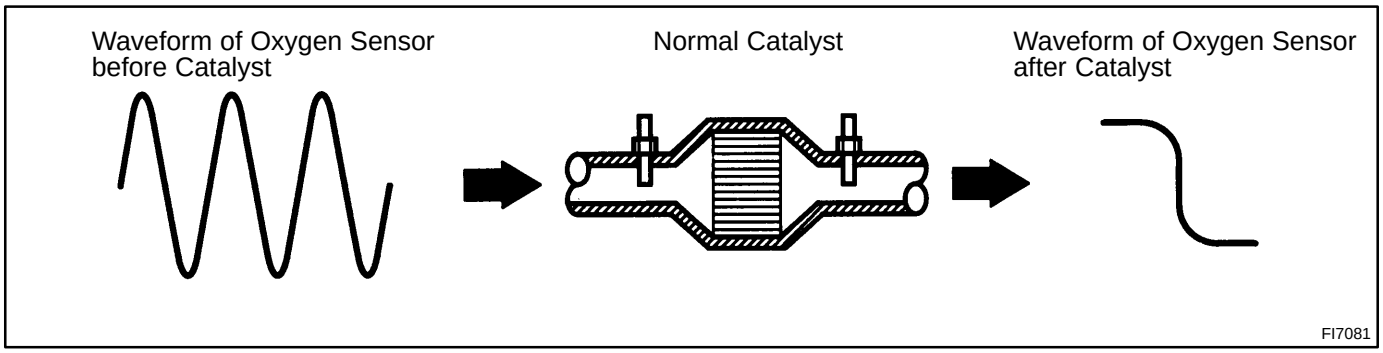
CIRCUIT DESCRIPTION

The ECM compares the waveform of the oxygen sensor located before the catalyst with the waveform of the oxygen sensor located after the catalyst to determine whether or not catalyst performance has deteriorated.

Air–fuel ratio feedback compensation keeps the waveform of the oxygen sensor before the catalyst repeatedly changing back and forth from rich to lean.

If the catalyst is functioning normally, the waveform of the oxygen sensor after the catalyst switches back and forth between rich and lean much more slowly than the waveform of the oxygen sensor before the catalyst.

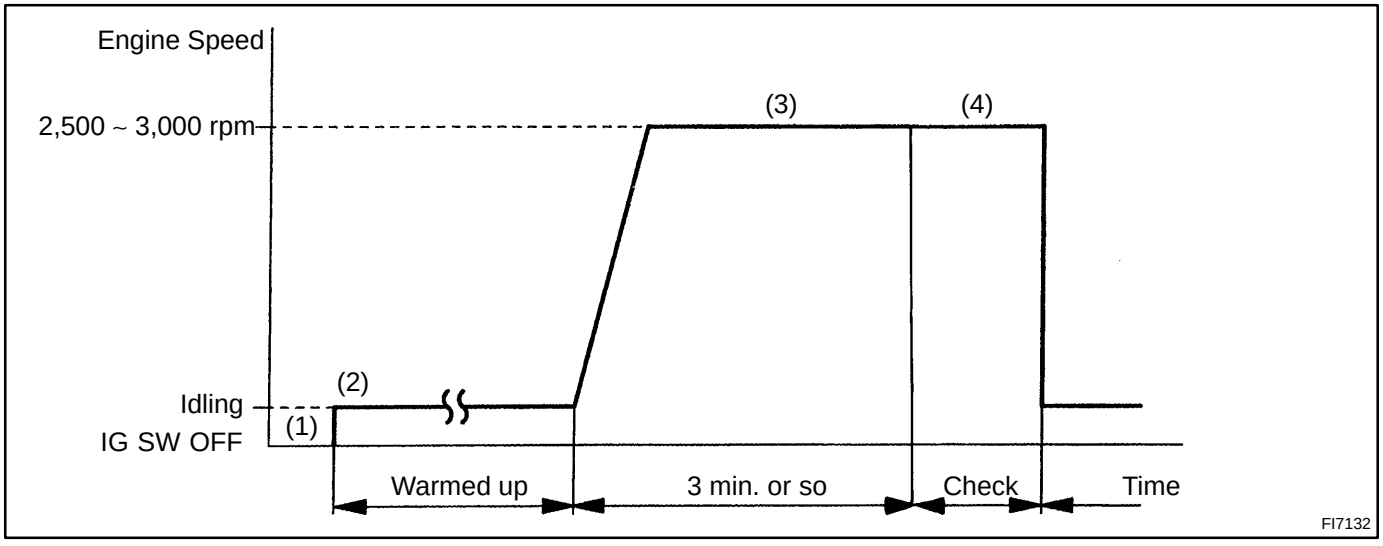
But when both waveforms change at a similar rate, it indicates that catalyst performance has deteriorated.



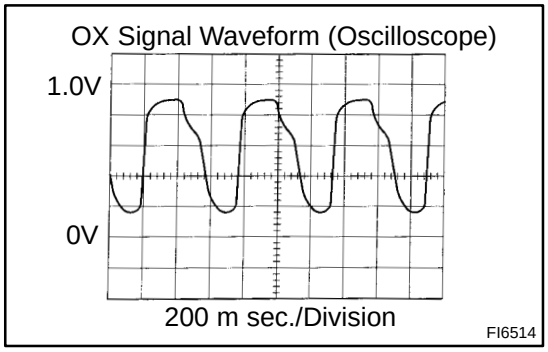
DTC No.	DTC Detecting Condition	Trouble Area
P0420	After the engine and the catalyst are warmed up, and while the vehicle is driven within the set vehicle and engine speed range, the waveforms of the heated oxygen sensors (bank 1, 2 sensor 1 and bank 1 sensor 2) have the same amplitude (2 trip detection logic)	●Three–way catalytic converter ●Open or short in heated oxygen sensor (bank 1, 2 sensor 1/ bank 1 sensor 2) circuit ●Heated oxygen sensor (bank 1, 2 sensor 1/ bank 1 sensor 2)

HINT:U.S.A. and Canadian vehicles does the MIL light up when a malfunction is detected.

CONFIRMATION ENGINE RACING PATTERN



(1) Connect the LEXUS hand–held tester to the DLC3, or connect the probe of the oscilloscope between terminals OXR, OXL, OXS and E1 of ECM.
(2) Start engine and warm it up with all accessories switched OFF until water temp. is stable.
(3) Race the engine at 2,500 ~ 3,000 rpm for about 3 min.
(4) After confirming that the waveform of the heated oxygen sensor, bank 1, 2 sensor 1 (OXR, OXL), oscillate around 0.5 V during feedback to the ECM, check the waveform of the heated oxygen sensor, bank 1 sensor 2 (OXS).



HINT:If there is a malfunction in the system, the waveform of the heated oxygen sensor, bank 1 sensor 2 (OXS), is almost the same as that of the heated oxygen sensor, bank 1, 2 sensor 1 (OXR, OXL), on the left.
There are some cases where, even though a malfunction exists, the MIL may either light up or not light up.

INSPECTION PROCEDURE

1	**Are there any other codes (besides DTC P0420) being output?**

YES → **Go to relevant DTC chart.**

NO

2	**Check heated oxygen sensor (bank 1, 2 sensor 1) (See page).**

NG → **Repair or replace.**

OK

3	Check heated oxygen sensor (bank 1 sensor 2) (See page SF–63).

NG → Repair or replace.

OK

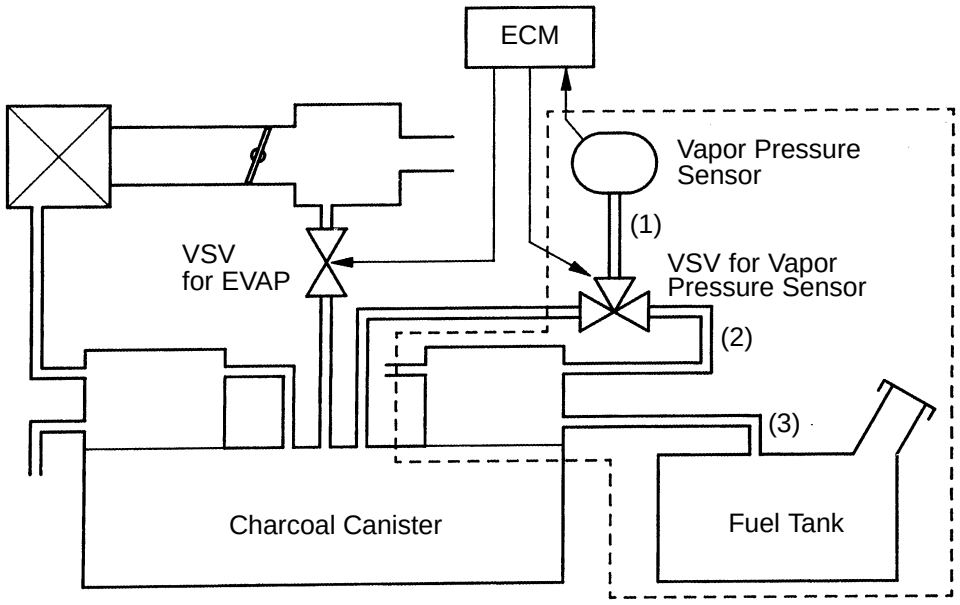
Replace three–way catalytic converter.

DTC	P0440	Evaporative Emission Control System Malfunction

CIRCUIT DESCRIPTION

The vapor pressure sensor and VSV for vapor pressure sensor are used to detect abnormalities in the evaporative emission control system.
The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.
DTC P0440 is recorded by the ECM when evaporative emissions leak from the components within the dotted line in fig. 1 below, or when the vapor pressure sensor malfunctions.

fig. 1



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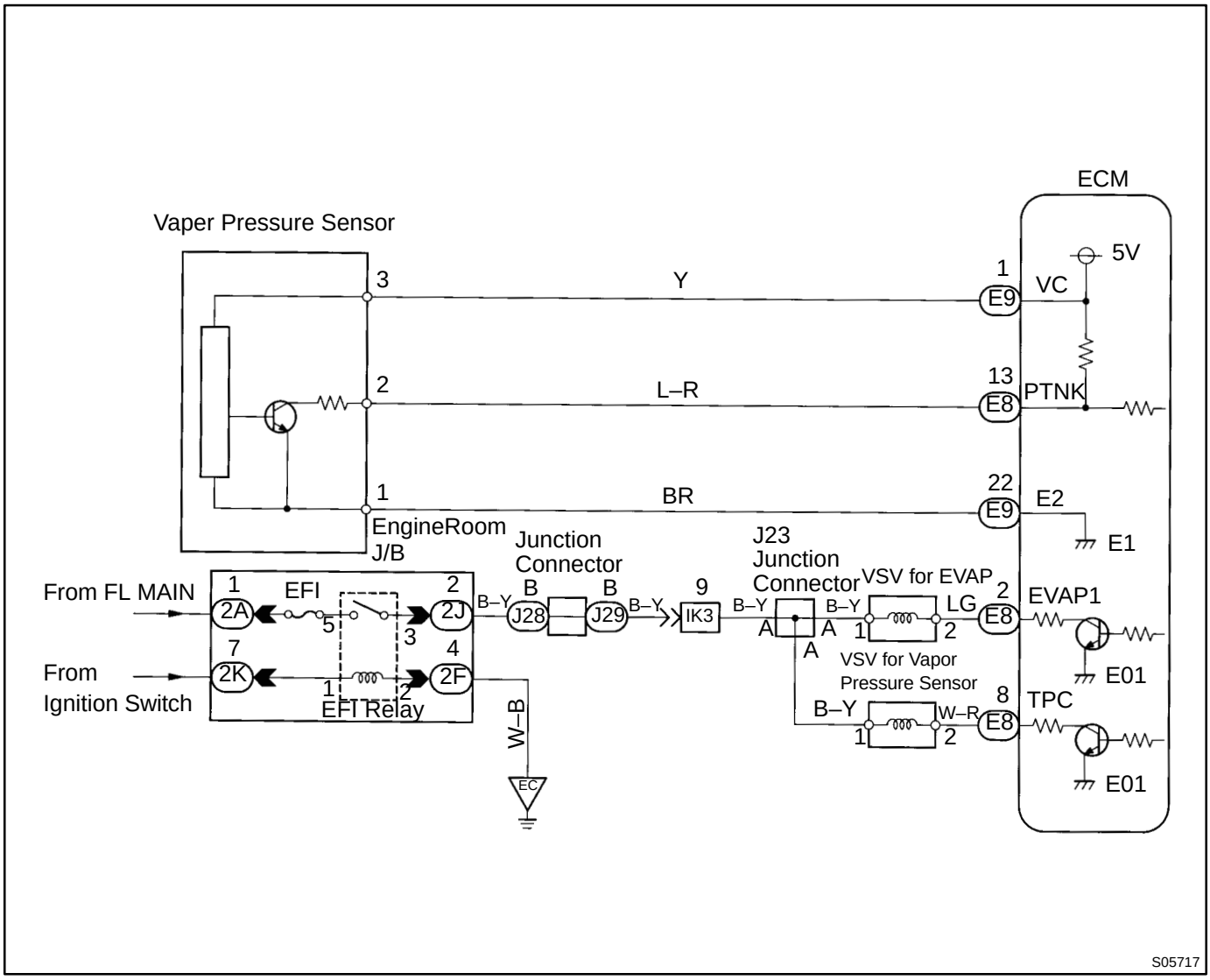
DTC No.	DTC Detecting Condition	Trouble Area
P0440	The fuel tank pressure is atmospheric pressure after the vehicle is driven for 20 min. (2 trip detection logic)	●Vapor pressure sensor ●Fuel tank cap incorrectly installed ●Fuel tank cap cracked or damaged ●Vacuum hose cracked, holed, blocked, damaged or disconnected ((1) or (2) in fig. 1) ●Hose or tube cracked, holed, damaged or loose seal ((3) in fig. 1) ●Fuel tank cracked, holed or damaged ●Charcoal canister cracked, holed or damaged

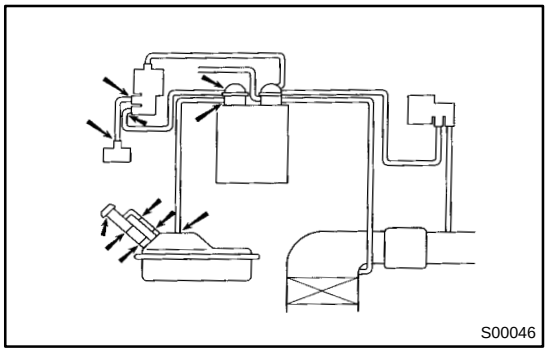
WIRING DIAGRAM



INSPECTION PROCEDURE

- If DTC P0441, P0446 or P0450 is output after DTC P0440, first troubleshoot DTC P0441, P0446 or P0450. If no malfunction is detected, troubleshoot DTC P0440 next.
- Ask the customer whether, after the MIL came on, the customer found the fuel tank cap loose and tightened it. Also ask the customer whether the fuel tank cap was loose when refuelling. If the fuel tank cap was not loose, it was the cause of the DTC. If the fuel tank cap was not loose or if the customer was not sure if it was loose, troubleshoot according to the following procedure.

1	**Check whether hose close to fuel tank have been modified, and check whether there are signs of any accident near fuel tank or charcoal canister.**



CHECK:

Check for cracks, deformation and loose connection of these parts:

- Fuel tank
- Charcoal canister
- Fuel tank filler pipe
- Hoses and tubes around the fuel tank and charcoal canister

NG → **Repair or replace.**

OK

2	**Check that fuel tank cap is LEXUS genuine parts.**

NG → **Replace to LEXUS genuine parts.**

OK

3	**Check that fuel tank cap is correctly installed.**

NG → **Correctly install fuel tank cap.**

OK

4	**Check fuel tank cap (See page EC–5).**

NG → **Replace fuel tank cap.**

OK

5	**Check filler neck for damage.**

PREPARATION:
Remove the fuel tank cap.
CHECK:
Visually inspect the filler neck for damage.

NG → **Replace filler pipe.**

OK ↓

6	**Check vacuum hoses between vapor pressure sensor and VSV for vapor pressure sensor, and VSV for vapor pressure sensor and charcoal canister.**

CHECK:
(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole and damage.

NG → **Repair or replace.**

OK ↓

7	**Check hose and tube between fuel tank and charcoal canister.**

CHECK:
(a) Check for proper connection of the fuel tank and fuel evap pipe (See page SF–1), fuel evap pipe and fuel tube under the floor, fuel tube under the floor and charcoal canister.
(b) Check the hose and tube for cracks, hole and damage.

NG → **Repair or replace.**

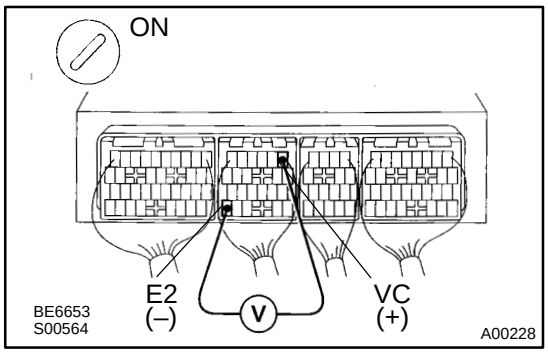
OK ↓

8	**Check charcoal canister for cracks, hole and damage (See page EC–5).**

NG → **Replace charcoal canister.**

OK ↓

9	Check voltage between terminals VC and E2 of ECM connector.



CHECK:

(a) Remove the glove compartment (See page SF–64).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals VC and E2 of ECM connector.

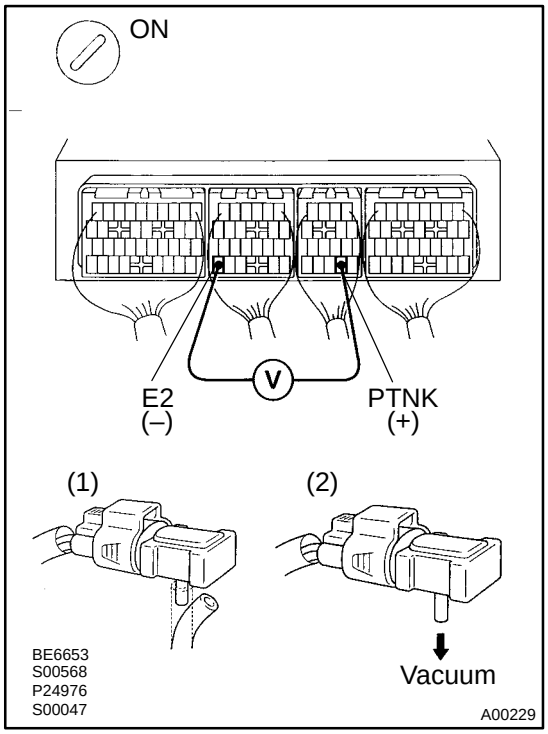
OK:

Voltage: 4.5 ~ 5.5 V

NG → **Check and replace ECM (See page IN–27).**

OK

10	Check voltage between terminals PTNK and E2 of ECM connectors.



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals PTNK and E2 of ECM connectors.

(1) Disconnect the vacuum hose from the vapor pressure sensor.

(2) Using the MITYVAC (Hand–Held Vacuum Pump), apply a vacuum of 4.0 kPa (30 mmHg, 1.18 in.Hg) to the vapor pressure sensor.

NOTICE: The vacuum applied to the vapor pressure sensor must be less than 66.7 kPa (500 mmHg, 19.7 in.Hg).

OK:

(1) Voltage: 2.9 ~ 3.7 V

(2) Voltage: 0.5 V or less

OK → **Go to step 12.**

NG

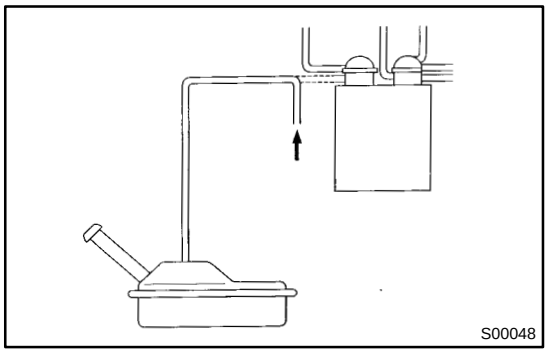
11	**Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK →

Replace vapor pressure sensor.

12	**Check fuel tank for cracks and damage.**



PREPARATION:

(a) Disconnect the vacuum hose from charcoal canister.
(b) Correctly install the fuel cap.
(c) Apply a pressure of 5 kPa (50 gf/cm^2, 0.7 psi) to the fuel tank.

CHECK:

Check whether the pressure is maintained after 1 minute.

OK:

Pressure applied to the fuel tank is maintained.

NG → **Replace fuel tank.**

OK →

It is likely that vehicle user did not properly close fuel tank cap.
Please explain to customer how to properly install fuel tank cap.

DTC	P0441	Evaporative Emission Control System Incorrect Purge Flow

DTC	P0446	Evaporative Emission Control System Vent Control Malfunction

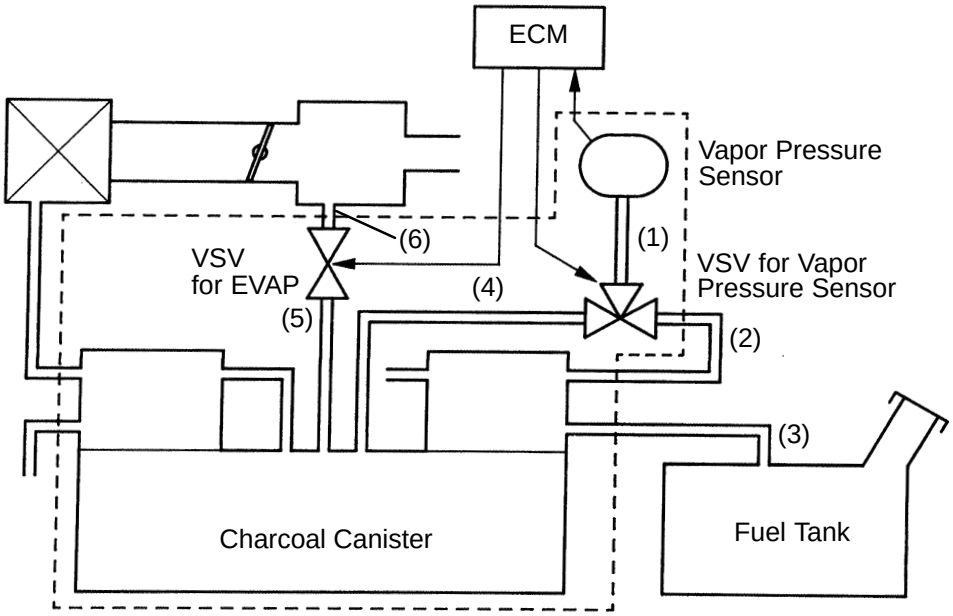
CIRCUIT DESCRIPTION

The vapor pressure sensor and VSV for vapor pressure sensor are used to detect abnormalities in the evaporative emission control system.

The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.

DTC P0441 and P0446 are recorded by the ECM when evaporative emissions leak from the components within the dotted line in fig. 1 below, or when there is a malfunction in either the VSV for EVAP, the VSV for vapor pressure sensor, or in the vapor pressure sensor itself.

fig. 1



DTC No.	DTC Detecting Condition	Trouble Area
P0441	The pressure in the charcoal canister does not drop during purge control (2 trip detection logic)	●Open or short in VSV circuit for EVAP ●Open or short in VSV circuit for vapor pressure sensor ●Open or short in vapor pressure sensor circuit ●VSV for EVAP ●VSV for vapor pressure sensor ●Vapor pressure sensor ●Vacuum hose cracks, holed blocked, damaged or disconnected ((1), (4), (5) and (6) in fig. 1) ●Charcoal canister cracks, holed or damaged
	During purge cut–off, the pressure in the charcoal canister is very low compared with atmospheric pressure (2 trip detection logic)	
P0446	When VSV for vapor pressure sensor is OFF, ECM judges that there is no continuity between vapor pressure sensor and charcoal canister (2 trip detection logic)	
	When VSV for vapor pressure sensor is ON, ECM judges that there is no continuity between vapor pressure sensor and fuel tank (2 trip detection logic)	
	After the purge cut off operates, the pressure in the charcoal canister is maintained at atmospheric pressure (2 trip detection logic)	

WIRING DIAGRAM

Refer to DTC P0440 on page DI–87 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

HINT:If DTC P0441, P0446 or P0450 is output after DTC P0440, first troubleshoot DTC P0441, P0446 or P0450. If no malfunction is detected, troubleshoot DTC P0440 next.

LEXUS hand–held tester

1	**Check VSV connector for EVAP, VSV connector for vapor pressure sensor and vapor pressure sensor connector for looseness and disconnection.**

NG → **Repair or connect VSV or sensor connector.**

OK

2	**Check vacuum hose between intake manifold and VSV for EVAP, VSV for EVAP and charcoal canister, charcoal canister and VSV for vapor pressure sensor, and VSV for vapor pressure sensor and vapor pressure sensor.**

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole, damage and blockage.

NG → **Repair or replace.**

OK

3	Check voltage between terminals VC and E2 of ECM connector (See page DI–87, IG–1).

NG → Check and replace ECM (See page IN–27).

OK

4	Check voltage between terminals PTNK and E2 of ECM connectors (See page DI–87, SF–6).

OK → Go to step 6.

NG

5	Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN–27).

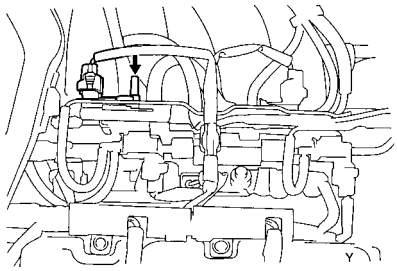
NG → Repair or replace harness or connector.

OK

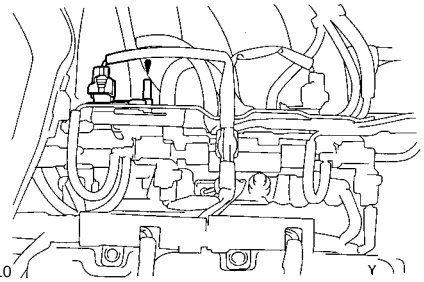
Replace vapor pressure sensor.

6	Check purge flow.

VSV is ON



VSV is OFF



S04610
S04609
A00230

PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Select the ACTIVE TEST mode on the LEXUS hand–held tester.
(c) Disconnect from the charcoal canister the vacuum hose to the VSV for EVAP.
(d) Start the engine.

CHECK:

When the VSV for EVAP is operated by the LEXUS hand–held tester, check whether the disconnected hose applies suction to your finger.

OK:

VSV is ON:
Disconnected hose applies suction to your finger.
VSV is OFF:
Disconnected hose applies no suction to your finger.

OK → **Go to step 10.**

NG

7	Check vacuum hose between intake manifold and VSV for EVAP, and VSV for EVAP and charcoal canister.

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole, damage and blockage.

NG → **Repair or replace.**

OK

8	Check operation of VSV for EVAP (See page SF–52).

NG → **Replace VSV for EVAP.**

OK

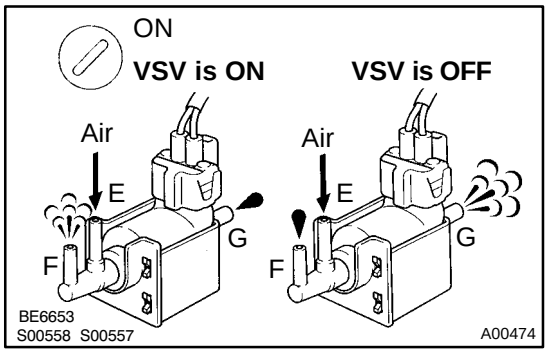
9	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for EVAP and ECM (See page IN–27).**

NG → **Repair or replace harness or connector**

OK

Check and replace ECM (See page IN–27).

10	**Check VSV for vapor pressure sensor.**



PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and OBD II scan tool or LEXUS hand–held tester main switch ON.
(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:

Check the VSV operation, when it is operated by LEXUS hand–held tester.

OK:

VSV is ON:
Air from pipe E is flowing out through pipe F.
VSV is OFF:
Air from pipe E is flowing out through pipe G.

OK → **Go to step 13.**

NG

11	**Check operation of VSV for vapor pressure sensor (See page SF–56).**

NG → **Replace VSV for vapor pressure sensor.**

OK

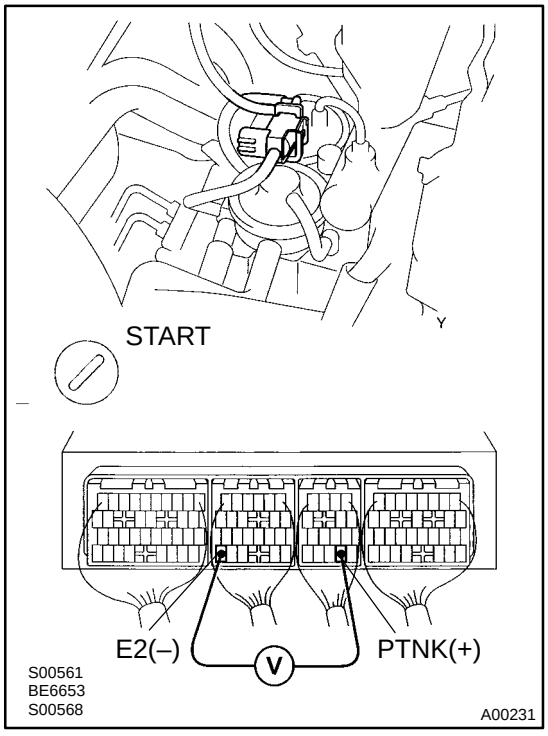
12	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for vapor pressure sensor and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN–27).

13	**Connect LEXUS hand–held tester, when VSV connector for vapor pressure sensor is disconnected and VSV for EVAP is ON, measure voltage between terminals PTNK and E2 of ECM connectors.**



PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Disconnect the VSV connector for vapor pressure sensor.
(c) Select the ACTIVE TEST mode on the LEXUS hand–held tester.
(d) Start the engine.

CHECK:

Measure voltage between terminals PTNK and E2 of ECM connectors, when VSV for EVAP is ON, using the LEXUS hand–held tester.

OK:

Voltage: 2.0 V or less

OK → **Go to step 15.**

NG

14	Check vacuum hose between charcoal canister and VSV for vapor pressure sensor, and vapor pressure sensor and VSV for vapor pressure sensor.

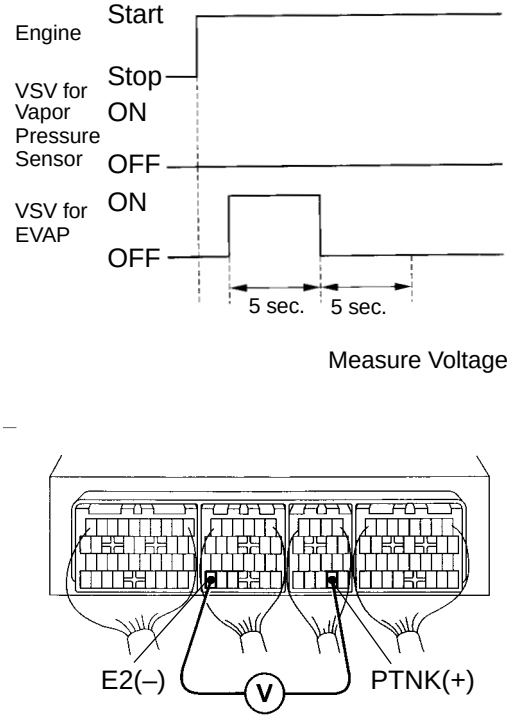
CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole, damage and blockage.

NG → **Repair or replace.**

OK

15	Check charcoal canister.



PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Remove the fuel tank cap.
(c) Disconnect the VSV connector for vapor pressure sensor.
(d) Select the ACTIVE TEST mode on the LEXUS hand–held tester.
(e) Start the engine.
(f) VSV for EVAP is ON by the LEXUS hand–held tester and remains on for 5 sec.

CHECK:

Measure voltage between terminals PTNK and E2 of ECM connectors 5 sec. after switching VSV for EVAP from ON to OFF.

OK:

Voltage: 2.5 V or less

NG → **Replace charcoal canister.**

OK

Check and replace ECM (See page IN–27).

OBD II scan tool (excluding LEXUS hand–held tester)

1	**Check VSV connector for EVAP, VSV connector for vapor pressure sensor and vapor pressure sensor connector for looseness and disconnection.**

NG → **Repair or connect VSV or sensor connector.**

OK

2	**Check vacuum hose between intake manifold and VSV for EVAP, VSV for EVAP and charcoal canister, charcoal canister and VSV for vapor pressure sensor, and VSV for vapor pressure sensor and vapor pressure sensor.**

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole, damage and blockage.

NG → **Repair or replace.**

OK

3	**Check voltage between terminals VC and E2 of ECM connector (See page DI–87, IG–1).**

NG → **Check and replace ECM (See page IN–27).**

OK

4	**Check voltage between terminals PTNK and E2 of ECM connectors (See page DI–87, SF–6).**

OK → **Go to step 6.**

NG

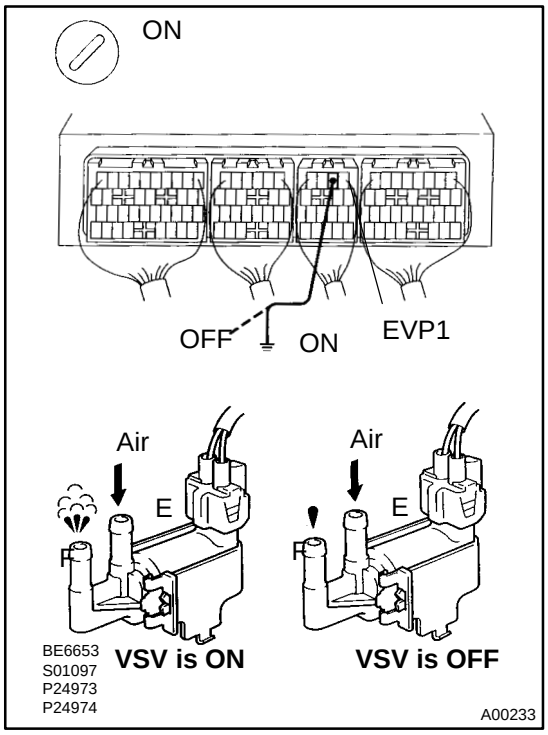
5	**Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Replace vapor pressure sensor.

6	**Check VSV for EVAP.**



PREPARATION:

(a) Remove the glove compartment (See page SF–65).

(b) Turn ignition switch ON.

CHECK:

Check VSV function.

(1) Connect between terminal EVP1 of ECM and body ground.

(2) Disconnect between terminal EVP1 of ECM and body ground.

OK:

(1) VSV is ON:
Air from pipe E is flowing out through pipe F.
(2) VSV is OFF:
Air does not flow from pipe E to pipe F.

OK → **Go to step 9.**

NG

7	**Check operation of VSV for EVAP (See page SF–52).**

NG → **Replace VSV for EVAP.**

OK

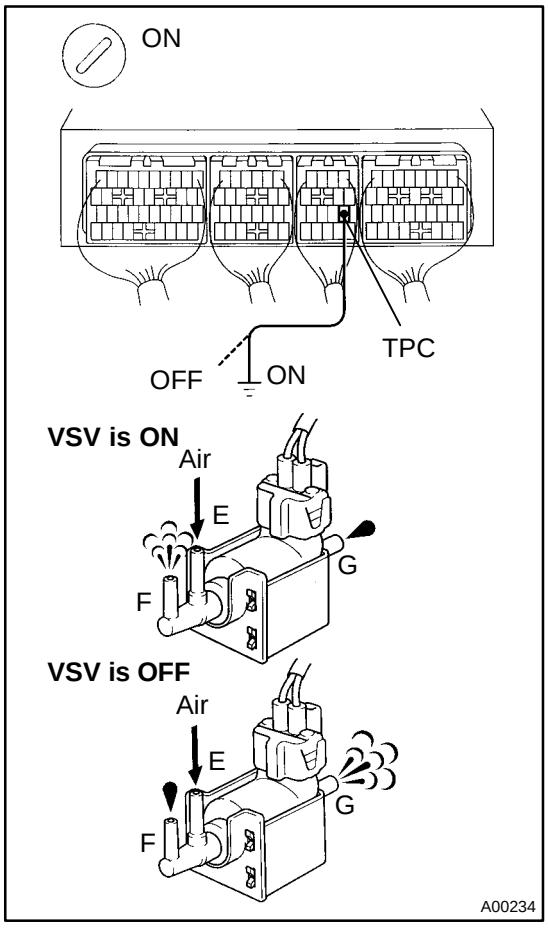
8	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for EVAP and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN–27).

9	**Check VSV for vapor pressure sensor.**



PREPARATION:

(a) Remove the glove compartment (See page SF–65).

(b) Turn ignition switch ON.

CHECK:

Check VSV function.

(1) Connect between terminal TPC of ECM and body ground (ON).

(2) Disconnect between terminal TPC of ECM and body ground (OFF).

OK:

(1) VSV is ON:
Air from pipe E is flowing out through pipe F.
(2) VSV is OFF:
Air from pipe E flows out through pipe G.

OK → **Check and replace charcoal canister (See page EC–5).**

NG

10	Check operation of VSV for vapor pressure sensor (See page SF–56).

NG → Replace VSV for vapor pressure sensor.

OK

11	Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for vapor pressure sensor and ECM (See page IN–27).

NG → Repair or replace harness or connector.

OK

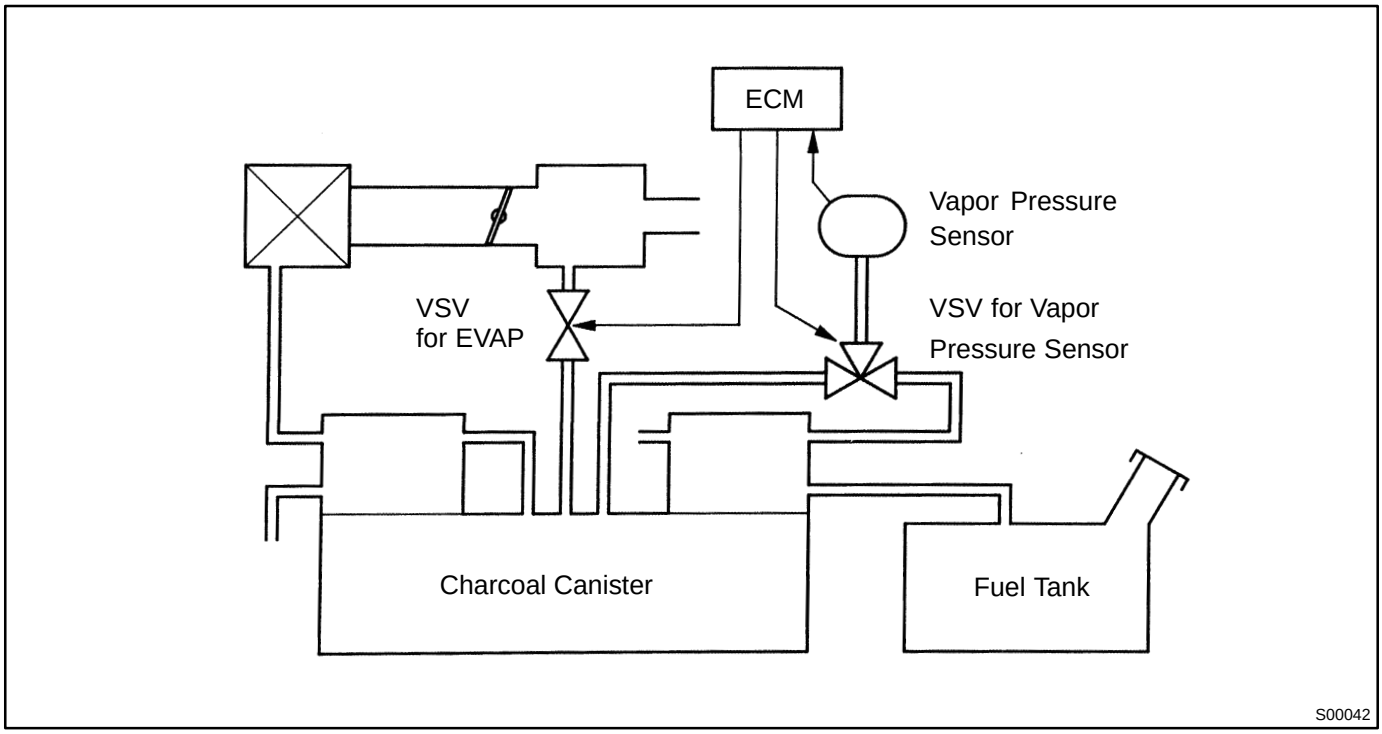
Check and replace ECM (See page IN–27).

DI09X–01

DTC	P0450	Evaporative Emission Control System Pressure Sensor Malfunction

CIRCUIT DESCRIPTION

The vapor pressure sensor and VSV for vapor pressure sensor are used to detect abnormalities in the evaporative emission control system.
The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.
DTC P0450 is recorded by the ECM when the vapor pressure sensor malfunction.



DTC No.	DTC Detecting Condition	Trouble Area
P0450	10 seconds or more after engine starting condition (a) or (b) continues for 7 seconds or more: (2 trip detection logic) (a) Vapor Pressure Sensor Value ∼ –3.5 kPa (–26 mmHg, –1.0 in.Hg) (b) Vapor Pressure Sensor Value ⊖ 1.5 kPa (11 mmHg, 0.4 in.Hg)	●Open or short in vapor pressure sensor circuit ●Vapor pressure sensor ●ECM

WIRING DIAGRAM

Refer to DTC P0440 on page DI–87 for the WIRING DIAGRAM.

INSPECTION PROCEDURE

HINT:If DTC P0441, P0446 or P0450 is output after DTC P0440, first troubleshoot DTC P0441, P0446 or P0450. If no malfunction is detected, troubleshoot DTC P0440 next.

1	**Check voltage between terminals VC and E2 of ECM connector (See page DI–87, IG–1).**

NG → **Check and replace ECM (See page IN–27).**

OK

2	**Check voltage between terminals PTNK and E2 of ECM connectors (See page DI–87, SF–6).**

OK → **Check and replace ECM (See page IN–27).**

NG

3	**Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

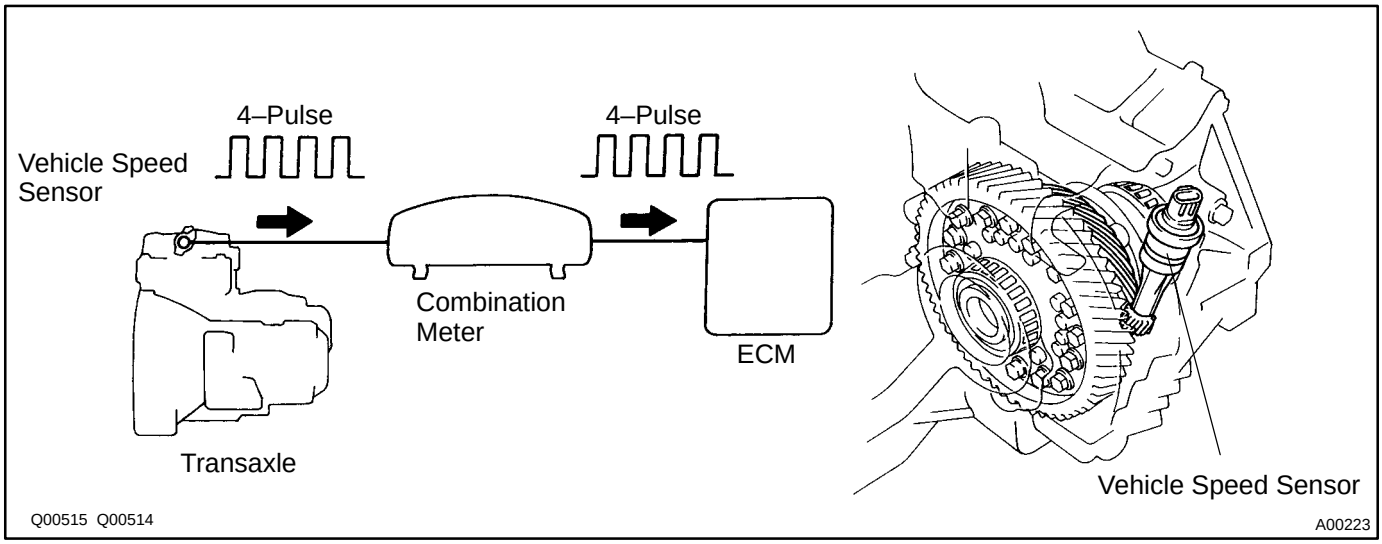
Replace vapor pressure sensor.

DI09Y–01

DTC	P0500	Vehicle Speed Sensor Malfunction

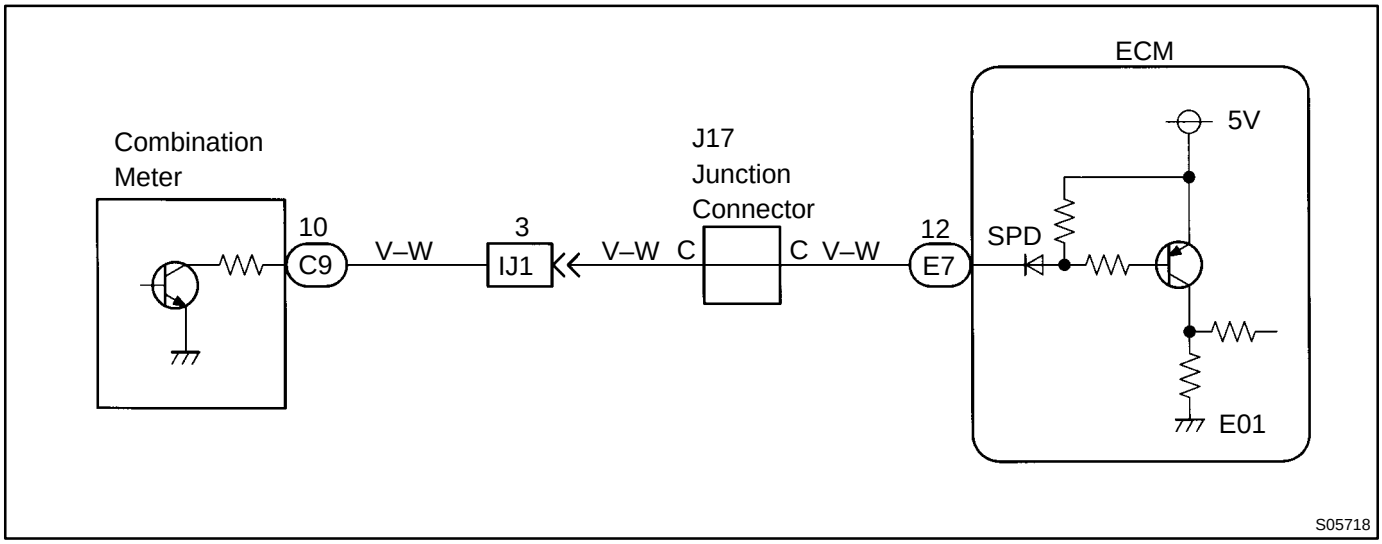
CIRCUIT DESCRIPTION

The vehicle speed sensor outputs a 4–pulse signal for every revolution of the rotor shaft, which is rotated by the transmission output shaft via the driven gear. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the ECM. The ECM determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detecting Condition	Trouble Area
P0500	No vehicle speed sensor signal to ECM under conditions (a) and (b): (2 trip detection logic) (a) Park/neutral position switch is OFF (b) Vehicle is being driven	●Open or short in vehicle speed sensor circuit ●Vehicle speed sensor ●Combination meter ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of speedometer.**

CHECK:

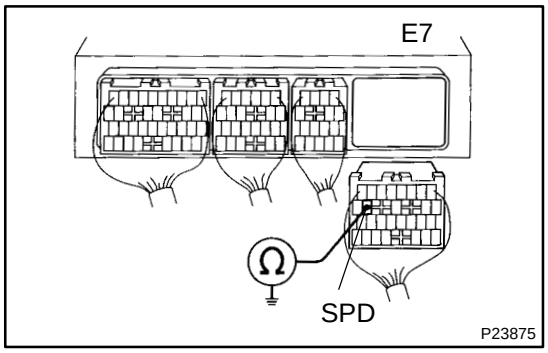
Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.

HINT:The vehicle speed sensor is operating normally if the speedometer display is normal.

NG → **Check speedometer circuit.**

OK

2	**Check for short in harness and connector between terminal SPD of ECM and body ground.**



PREPARATION:

(a) Remove the glove compartment (See page SF–65).

(b) Disconnect the E7 connector of ECM.

CHECK:

Check continuity between terminal SPD of ECM and body ground.

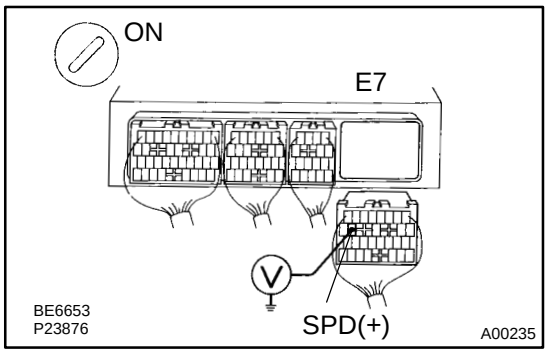
OK:

No continuity (1 MΩ or higher)

NG → **Repair or replace harness or connector.**

OK

3	**Check voltage between terminal SPD of ECM connector and body ground.**



PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminal SPD of ECM connector and body ground.
OK:
Voltage: 9 ~ 14 V

NG → **Check for open in harness and connector between junction connector (J17) and ECM (See page IN–27).**

OK

4	**Check for open in harness and connector between junction connector (J17) and combination meter (See page IN–27).**

NG → **Repair or replace harness or connector.**

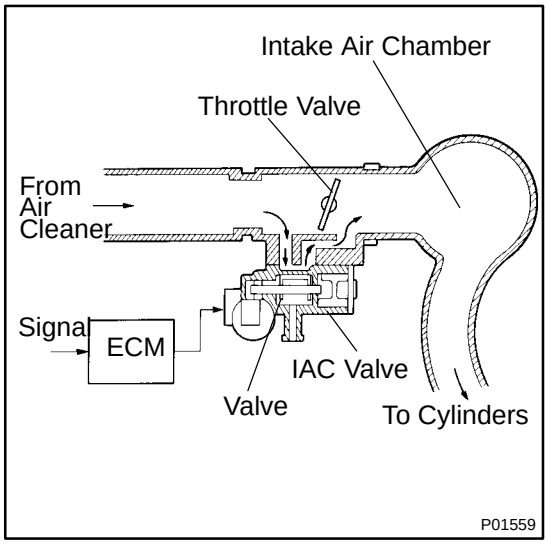
OK

Check and replace ECM (See page IN–27).

DI09Z–01

DTC	P0505	Idle Control System Malfunction

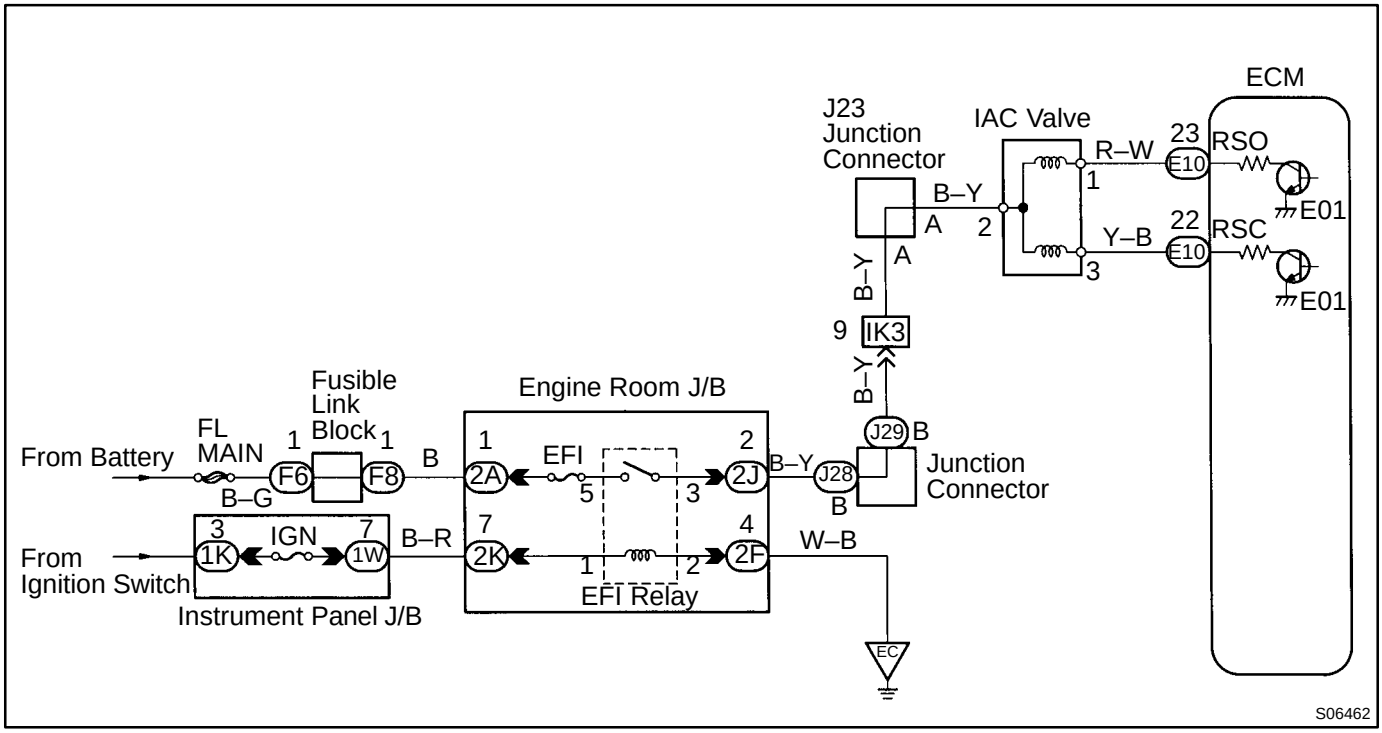
CIRCUIT DESCRIPTION



The rotary solenoid type IAC valve is located in front of the intake air chamber and intake air bypassing the throttle valve is directed to the IAC valve through a passage.
In this way the intake air volume bypassing the throttle valve is regulated, controlling the engine speed.
The ECM operates only the IAC valve to perform idle–up and provide feedback for the target idling speed.

DTC No.	DTC Detecting Condition	Trouble Area
P0505	Idle speed continues to vary greatly from the target speed (2 trip detection logic)	●IAC valve is stuck or closed ●Open or short in IAC valve circuit ●Open or short in A/C signal circuit ●Air intake (hose loose)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check air induction system (See page SF–63).

NG → Repair or replace.

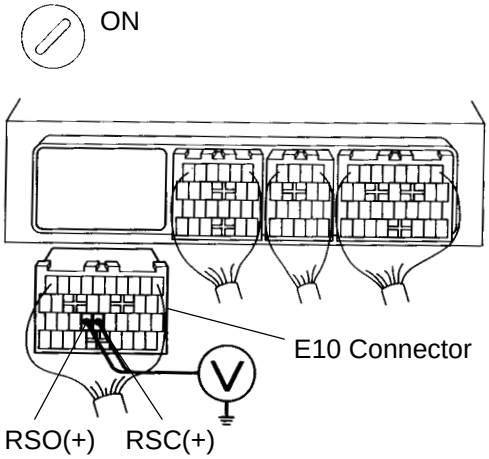
OK

2	Check A/C signal circuit (See page DI–569).

NG → Repair or replace.

OK

3	Check voltage terminals RSO, RSC of ECM connector and body ground.



PREPARATION:

(a) Remove the glove compartment (See page SF–65).
(b) Disconnect the E10 connector of ECM.
(c) Turn ignition switch ON.

CHECK:

Measure voltage between terminals RSO, RSC of ECM connector and body ground.

OK:

Voltage: 9 ~ 14 V

OK → Go to step 5.

NG

4	Check IAC valve (See page SF–36).

NG → Replace IAC valve.

OK →

Check for open and short in harness and connector between engine room J/B and IAC valve, IAC valve and ECM (See page IN–27).

5	Check operation of IAC valve (See page SF–40).

NG → Repair or replace IAC valve.

OK →

Check and replace ECM (See page IN–27).

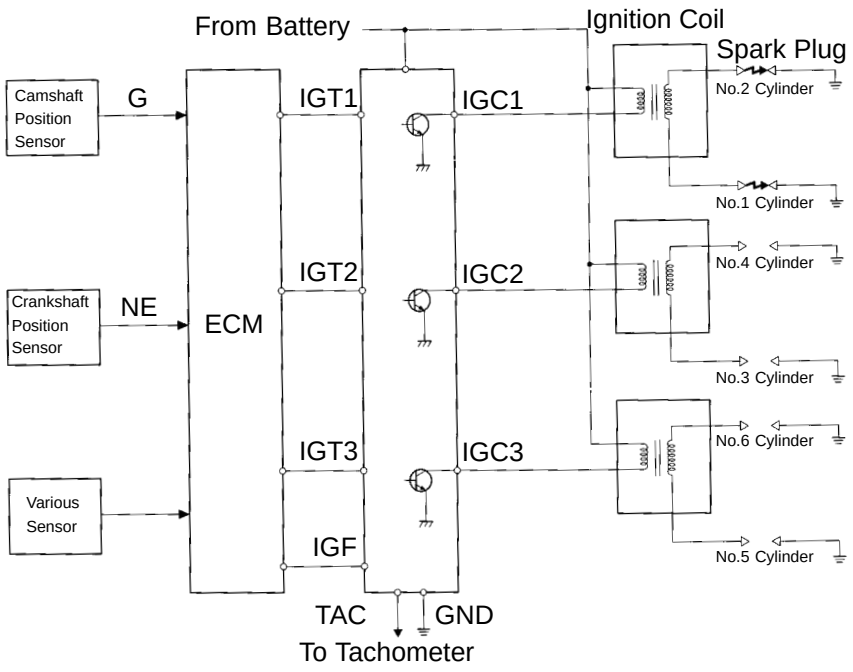
DI0A0–01

DTC	P1300	Igniter Circuit Malfunction

CIRCUIT DESCRIPTION

A DIS (Direct Ignition System) has been adopted. The DIS improves the ignition timing accuracy, reduces high–voltage loss, and enhances the overall reliability of the ignition system by eliminating the distributor. The DIS is a 2–cylinder simultaneous ignition system which ignites 2 cylinders simultaneously with one ignition coil. In the 2–cylinder simultaneous ignition system, each of the 2 spark plugs is connected to the end of the secondary winding. High voltage generated in the secondary winding is applied directly to the spark plugs. The sparks of the 2 spark plugs pass simultaneously from the center electrode to the ground electrode.

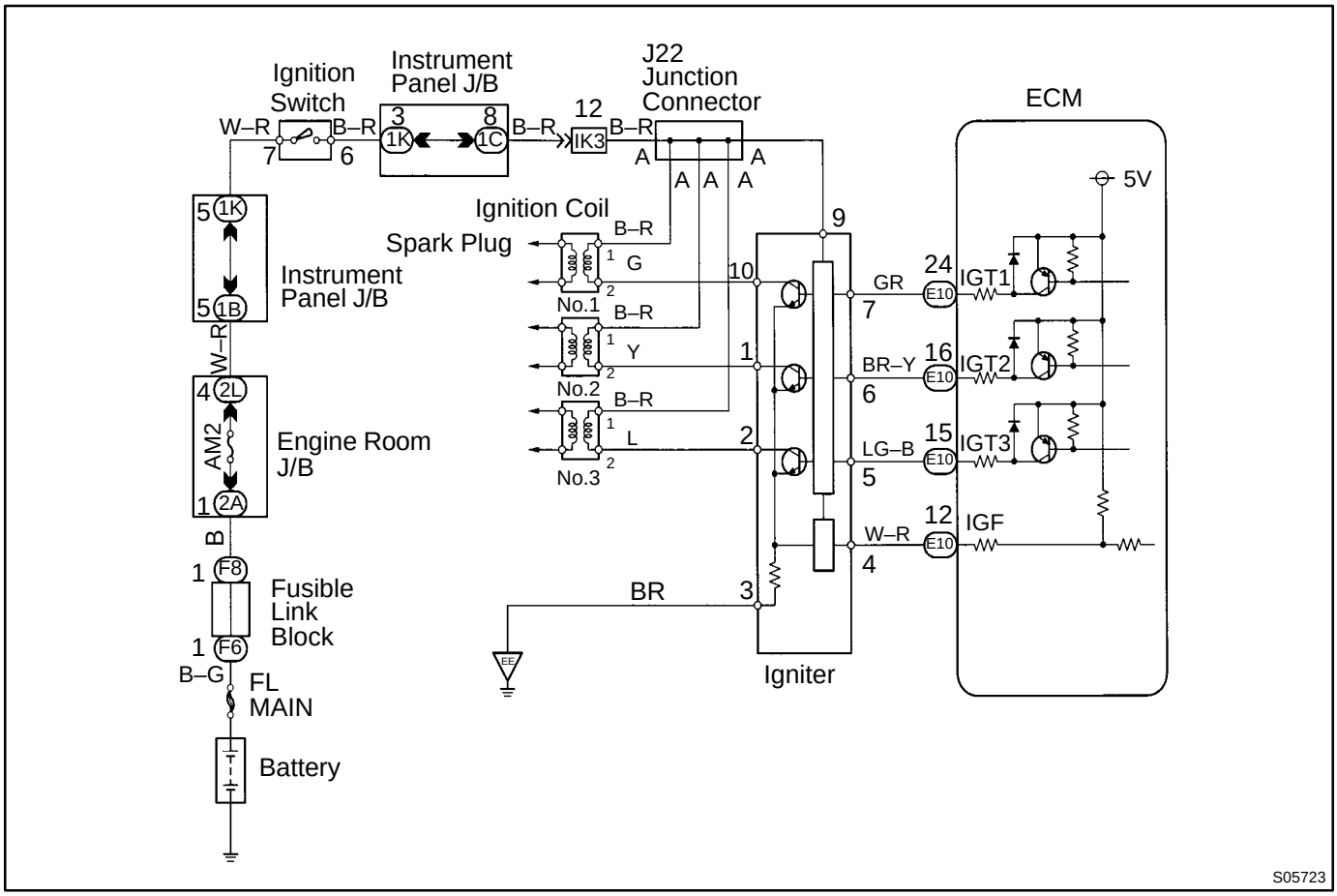
The ECM determines ignition timing and outputs the ignition signals (IGT) for each cylinder. Based on IGT signals, the igniter controls the primary ignition signals (IGC) for all ignition coils. At the same time, the igniter also sends an ignition confirmation signal (IGF) as a fail–safe measure to the ECM.



S00251

DTC No.	DTC Detecting Condition	Trouble Area
P1300	Condition (a) is repeated 3 times consecutively during 6 consecutively IGT signals while engine is running (a) IGF signal is not input to ECM for 2 or more ignitions	●Open or short in IGF or IGT circuit from igniter to ECM ●Igniter ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check spark plug and spark of misfiring cylinder (See page DI–57).**

NG → **Go to step 4.**

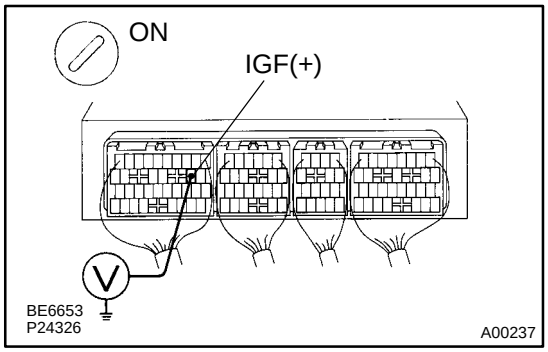
OK

2	**Check for open and short in harness and connector in IGF signal circuit between ECM and igniter (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

3	Disconnect igniter connector and check voltage between terminal IGF of ECM connector and body ground.



PREPARATION:
(a) Disconnect the igniter connector.
(b) Remove the glove compartment (See page SF–64).
(c) Turn ignition switch ON.

CHECK:
Measure voltage between terminal IGF of ECM connector and body ground.

OK:
Voltage: 4.5 ~ 5.5 V

OK	Replace igniter.

NG

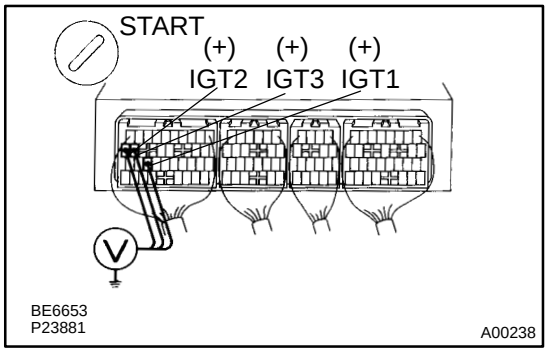
Check and replace ECM (See page IN–27).

4	Check for open and short in harness and connector in IGT 1 ~ 3 signal circuits between ECM and igniter (See page IN–27).

NG	Repair or replace harness or connector.

OK

5	Check voltage between terminals IGT 1 ~ 3 of ECM connector and body ground.

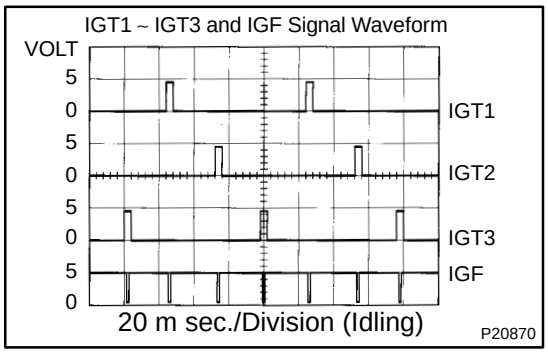


PREPARATION:
Remove the glove compartment (See page SF–64).

CHECK:
Measure voltage between terminals IGT 1 ~ 3 of ECM connector and body ground when engine is cranked.

OK:
Voltage: More than 0.1 V and less than 4.5 V

Reference INSPECTION USING OSCILLOSCOPE

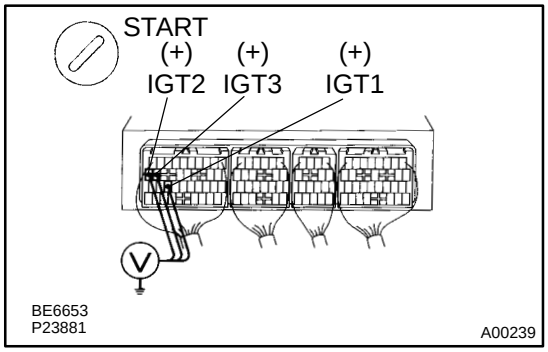


During idling, check waveform between terminals IGT 1 ~ 3, IGF and E1 of ECM.
HINT:The correct waveforms are as shown.

NG → **Check and replace ECM (See page IN–27).**

OK

6	**Disconnect igniter connector and check voltage between terminals IGT 1 ~ 3 of ECM connector and body ground.**



PREPARATION:
(a) Disconnect the igniter connector.
(b) Remove the glove compartment (See page SF–64).

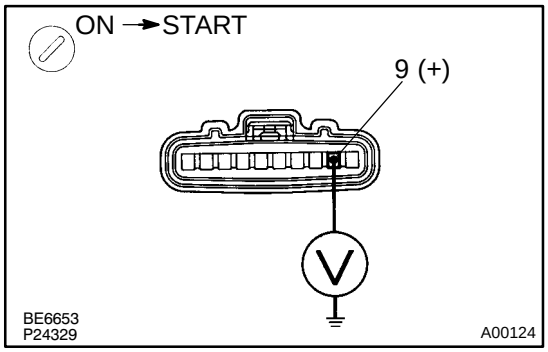
CHECK:
Measure voltage between terminals IGT 1 ~ 3 of ECM connector and body ground when engine is cranked.

OK:
Voltage: More than 0.1 V and less than 4.5 V

NG → **Check and replace ECM (See page IN–27).**

OK

7	**Check voltage between terminal 9 of igniter connector and body ground.**



PREPARATION:
Disconnect the igniter connector.

CHECK:
Measure voltage between terminal 9 of igniter connector and body ground, when ignition switch is turned to "ON" and "START" position.

OK:
Voltage: 9 ~ 14 V

NG → **Check and repair igniter power source circuit.**

OK

8	Check for open and short in harness and connector between ignition switch and ignition coil, ignition coil and igniter (See page IN–27).

NG → Repair or replace harness or connector.

OK ↓

9	Check ignition coil (See page IG–1).

NG → Replace ignition coil.

OK ↓

Replace igniter.

DTC	P1335	Crankshaft Position Sensor Circuit Malfunction (during engine running)

CIRCUIT DESCRIPTION

Refer to DTC P0335 (Crankshaft Position Sensor ”A” Circuit Malfunction) on page DI–66.

DTC No.	DTC Detecting Condition	Trouble Area
P1335	No crankshaft position sensor signal to ECM with engine speed 1,000 rpm or more	●Open or short in crankshaft position sensor circuit ●Crankshaft position sensor ●Starter ●ECM

WIRING DIAGRAM

Refer to DTC P0335 on page DI–66 for the WIRING DIAGRAM.

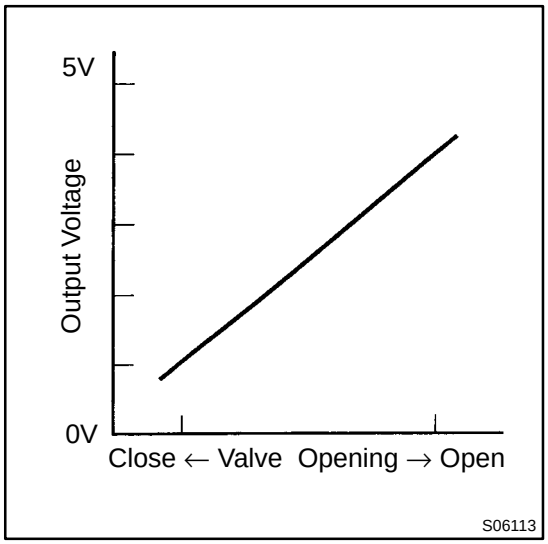
INSPECTION PROCEDURE

Refer to DTC P0335 (Crankshaft Position Sensor ”A” Circuit Malfunction) on page DI–66.

DI0A2–01

DTC	P1410	EGR Valve Position Sensor Circuit Malfunction

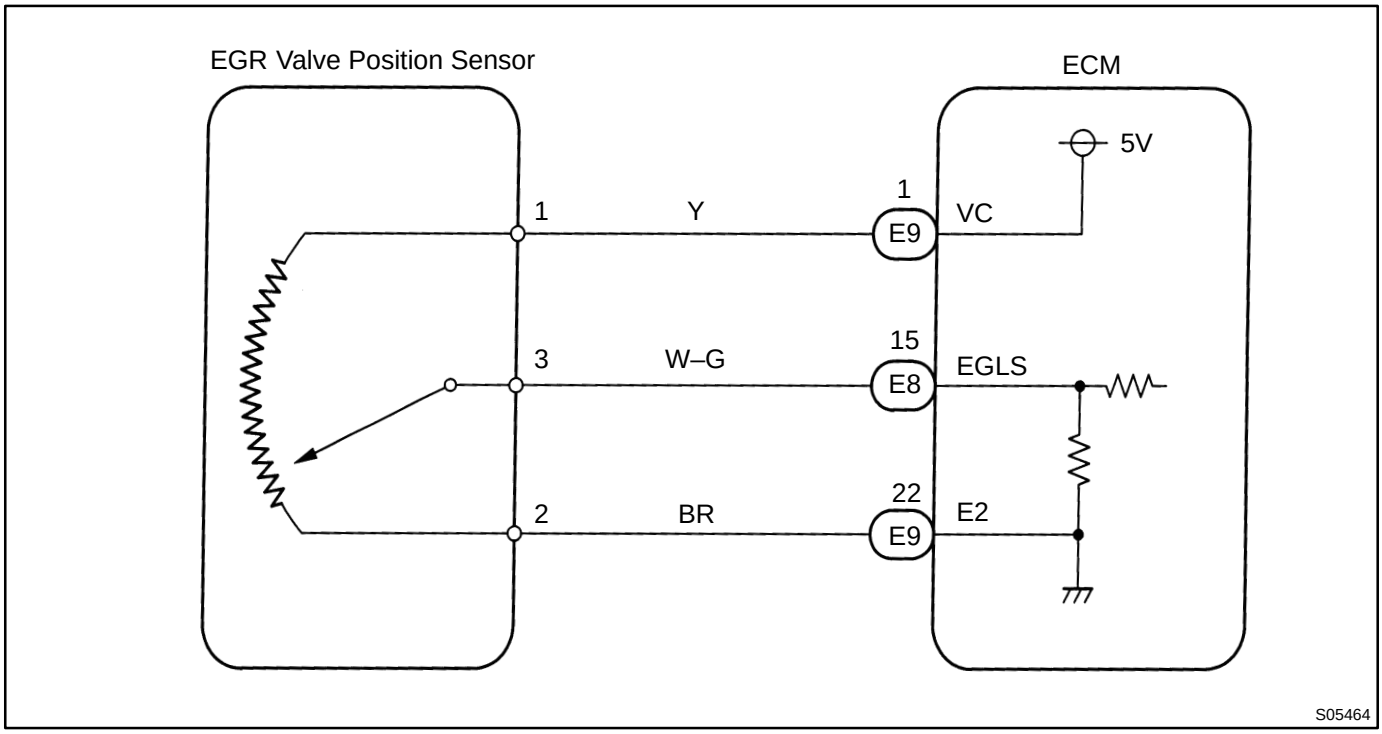
CIRCUIT DESCRIPTION



The EGR valve position sensor is mounted on the EGR valve and detects the lift amount of EGR valve. The lift amount of EGR valve which is detected by the EGR valve position sensor provides feedback to the ECM to control the lift amount of EGR valve in response to engine operating conditions.

DTC No.	DTC Detecting Condition	Trouble Area
P1410	Open or short in EGR valve position sensor circuit (2 trip detection logic)	●Open or short in EGR valve position sensor circuit ●EGR valve position sensor ●ECM

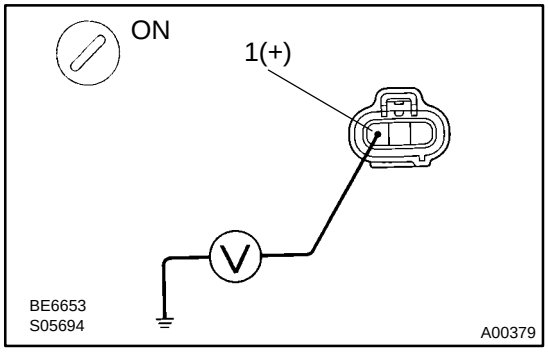
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:If DTC ”P0110” (Intake Air Temp. Circuit Malfunction), ”P0115” (Engine Coolant Temp. Circuit Malfunction), ”P0120” (Throttle/Pedal Position/Switch ”A” Circuit Malfunction), ”P1410” (EGR Valve Position Sensor Circuit Malfunction) are output simultaneously, E2 (Sensor Ground) may be open.

1	**Check voltage between terminal VC of wire harness side connector and body ground.**



PREPARATION:

(a) Disconnect the vacuum hose from EGR valve.
(b) Disconnect the EGR valve position sensor connector.
(c) Turn ignition switch ON.

CHECK:

Measure voltage between terminal 1 of wire harness side connector and body ground.

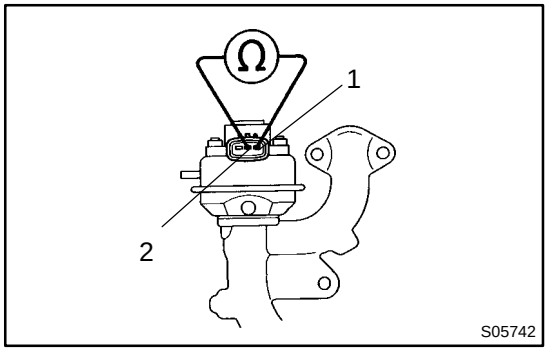
OK:

Voltage: 4.5 ~ 5.5 V

NG → **Go to step 4.**

OK

2	**Check EGR valve position sensor.**



PREPARATION:

Disconnect the EGR valve position sensor connector.

CHECK:

Measure resistance between terminals 1(VC) and 2(E2) of EGR valve position sensor.

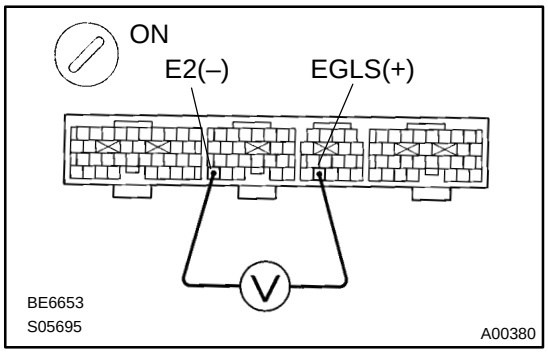
OK:

Resistance: 1.5 ~ 4.3 kΩ

NG → **Replace EGR valve position sensor.**

OK

3	Check voltage between terminals EGLS and E2 of ECM connectors.



PREPARATION:

(a) Disconnect the vacuum hose from EGR valve.
(b) Connect the hand–held vacuum pump to EGR valve.
(c) Remove the glove compartment (See page SF–64).
(d) Turn ignition switch ON.

CHECK:

Measure voltage between terminals EGLS and E2 of ECM connectors.

OK:

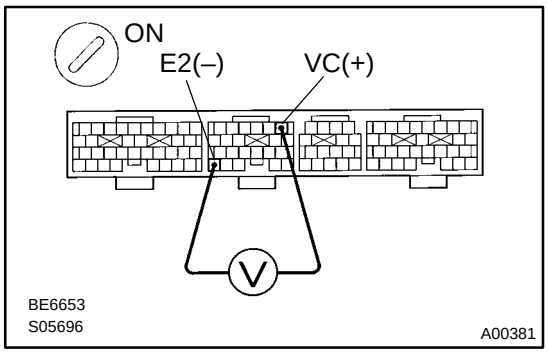
Condition	Condition	Voltage
EGR valve	Vacuum	Voltage
Fully closed	0 kPa (0 mmHg, 0 in.Hg)	0.4 ~ 1.6 V
Fully open	17.3 kPa (130 mmHg, 5.12 in.Hg)	3.2 ~ 5.1 V

NG → **Check for open and short in harness and connector between ECM and EGR valve position sensor (EGLS or E2 line).**

OK →

Check and replace ECM (See page IN–27).

4	Check voltage between terminals VC and E2 of ECM connector.



PREPARATION:

(a) Remove the glove compartment (See page SF–65).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals VC and E2 of ECM connector.

OK:

Voltage: 4.5 ~ 5.5 V

NG → **Check and replace ECM (See page IN–27).**

OK

Check for open and short in harness and connector between ECM and EGR valve position sensor (VC line).

DI0A3–01

DTC	P1411	EGR Valve Position Sensor Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P1410 (EGR Valve Position Sensor Circuit Malfunction) on page DI–118.

DTC No.	DTC Detecting Condition	Trouble Area
P1411	Conditions (a) and (b) continue for 7 sec. or more: (2 trip detection logic) (a) Engine Coolant Temp. < 55°C (131°F) (b) EGLS ~ 1.65 V or EGLS < 0.35 V	●EGR valve position sensor

INSPECTION PROCEDURE

1	Are there any other codes (besides DTC P1411) being output?

YES → Go to relevant DTC chart.

NO →

Replace EGR valve position sensor.

DI0A4–01

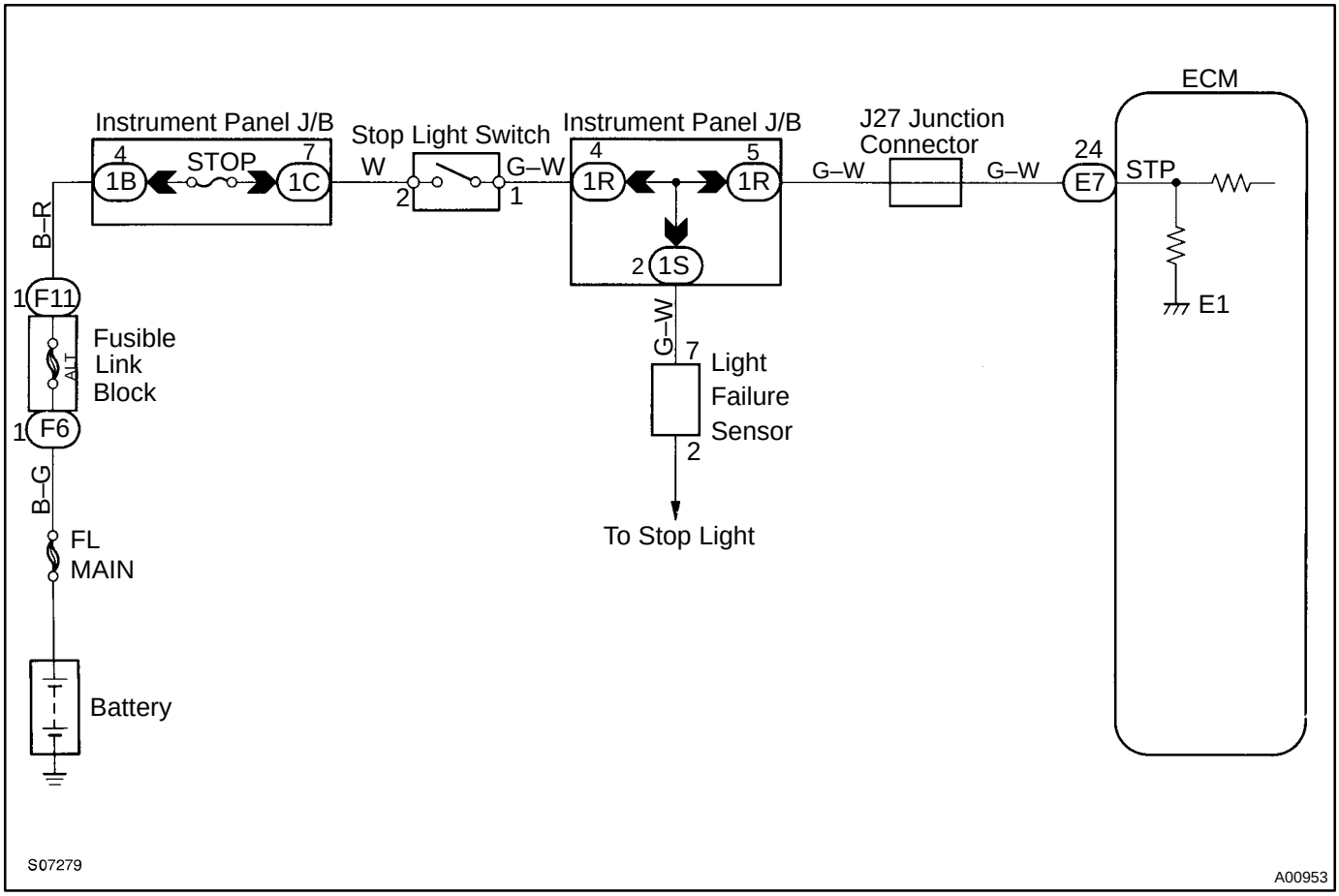
DTC	P1520	Stop Light Switch Signal Malfunction

CIRCUIT DESCRIPTION

This signal is used to detect when the brakes have been applied. The STP signal voltage is the same as the voltage supplied to the stop lights.
The STP signal is used mainly to control the fuel cut–off engine speed (The fuel cut–off engine speed is reduced slightly when the vehicle is braking.).

DTC No.	DTC Detecting Condition	Trouble Area
P1520	The stop light switch does not turn off even once the vehicle is driven (2 trip detection logic)	●Short in stop light switch signal circuit ●Stop light switch ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1997 LEXUS ES300 (RM511U)

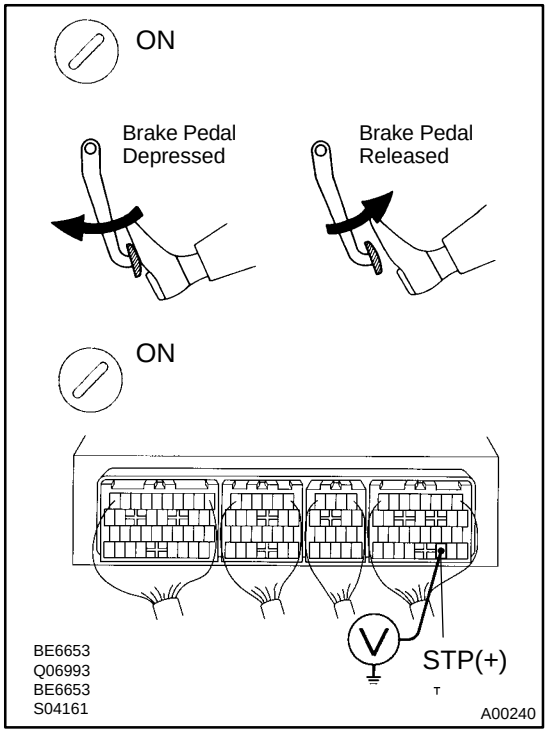
1	Check operation of stop light.

CHECK:
Check if the stop lights go on and off normally when the brake pedal is operated and released.

NG → **Check and repair stop light circuit.**

OK

2	Check STP signal.



When using LEXUS hand–held tester:
PREPARATION:
(a) Connect the LEXUS hand–held tester to the DLC3.
(b) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
CHECK:
Read the STP signal on the LEXUS hand–held tester.
OK:
Brake pedal is depressed: STP.....ON
Brake pedal is released: STP.....OFF
When not using LEXUS hand–held tester:
PREPARATION:
Turn ignition switch ON.
CHECK:
Check voltage between terminal STP of ECM and body ground.
OK:

Brake pedal	Voltage
Depressed	7.5 ~ 14 V
Released	Below 1.5 V

OK → **Check for intermittent problems (See page DI–3).**

NG

3	**Check harness and connector between ECM and stop light switch (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN–27).

DI0A5–01

DTC	P1600	ECM BATT Malfunction

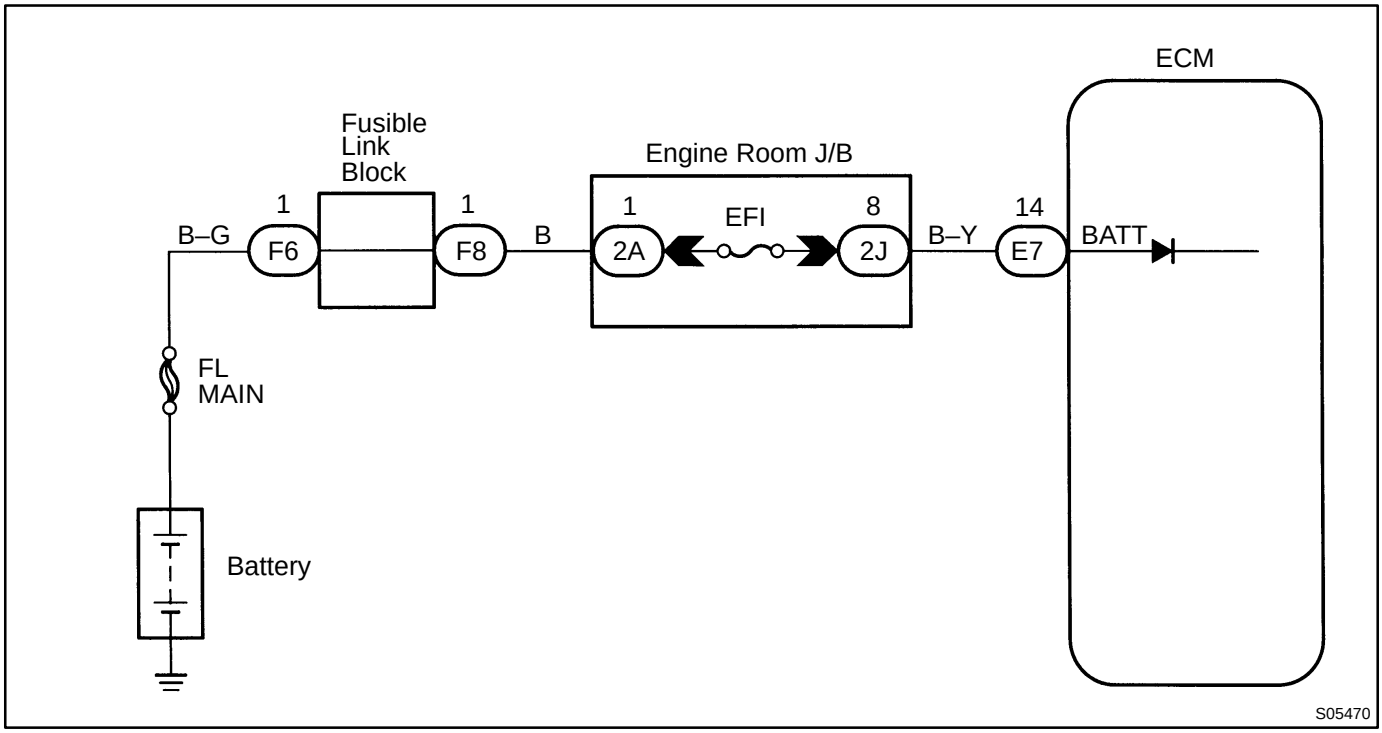
CIRCUIT DESCRIPTION

Battery positive voltage is supplied to terminal BATT of the ECM even when the ignition switch is OFF for use by the DTC memory and air–fuel ratio adaptive control value memory, etc.

DTC No.	DTC Detecting Condition	Trouble Area
P1600	Open in back up power source circuit	●Open in back up power source circuit ●ECM

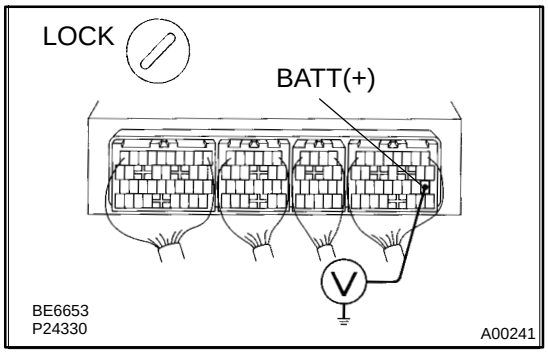
HINT:If DTC P1600 appear, the ECM does not store another DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal BATT of ECM connector and body ground.**

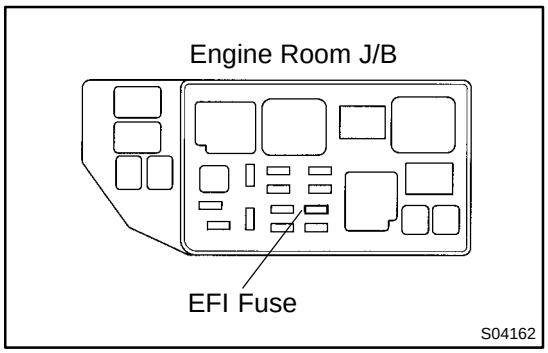


PREPARATION:
Remove the glove compartment (See page SF–64).
CHECK:
Measure voltage between terminal BATT of ECM connector and body ground.
OK:
Voltage: 9 ~ 14 V

OK	**Check and replace ECM (See page IN–27).**

NG

2	**Check EFI fuse.**



PREPARATION:
Remove the EFI fuse from the engine room J/B.
CHECK:
Check continuity of EFI fuse.
OK:
Continuity

NG	**Check for short in all harness and components connected to EFI fuse.**

OK

Check and repair harness or connector between battery, EFI fuse and ECM.

DI0A6–01

DTC	P1780	Park/Neutral Position Switch Malfunction

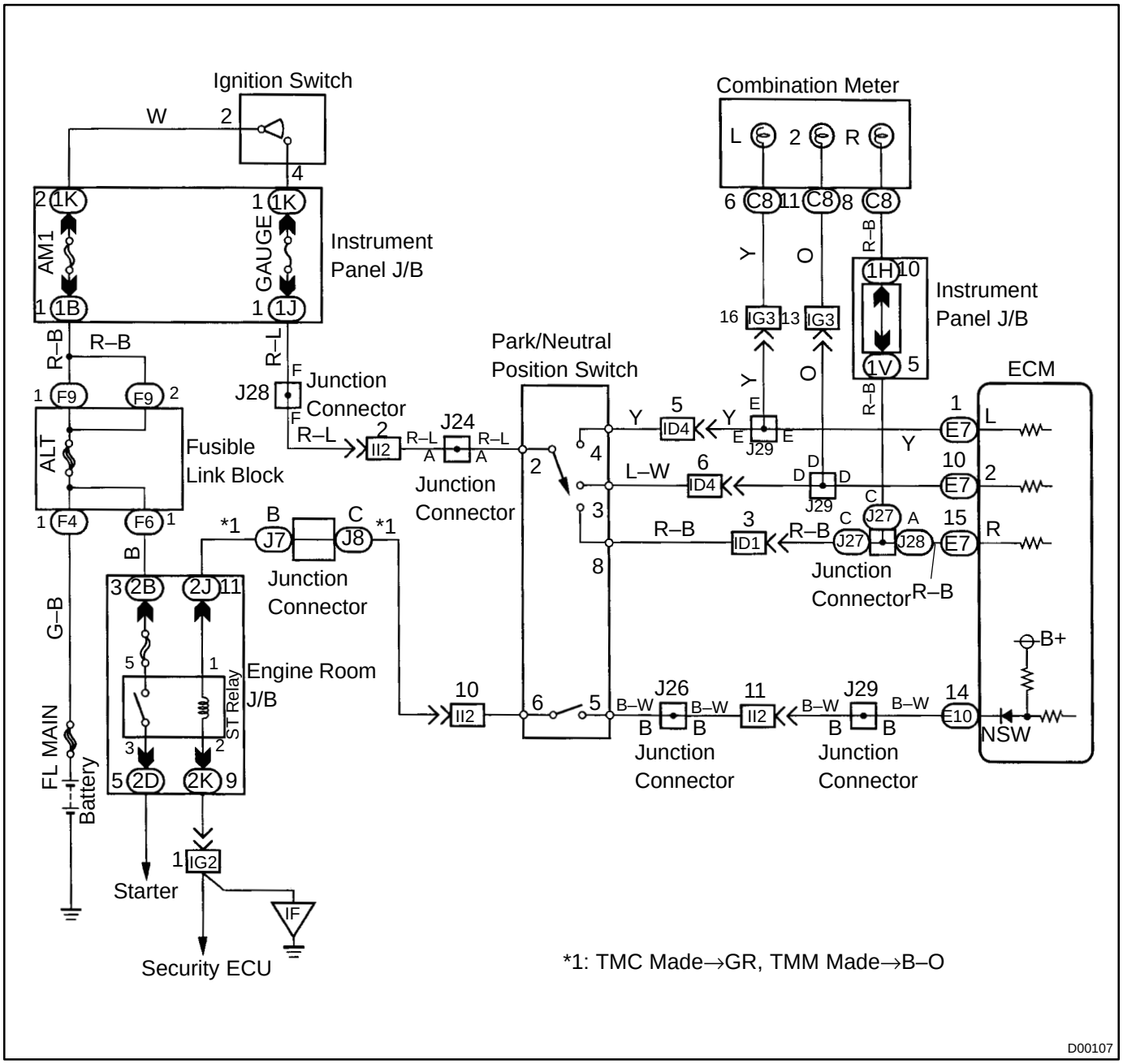
CIRCUIT DESCRIPTION

The park/neutral position switch go on when the shift lever is in the N or P shift position. When it goes on terminal NSW of the ECM is grounded to body ground via the starter relay, thus the terminal NSW voltage becomes 0V. When the shift lever is in the D, 2, L or R position, the park/neutral position switch goes off, so the voltage of ECM. Terminal NSW becomes battery voltage, the voltage of the ECM internal power source. If the shift lever is moved from the N position to the D position, this signal is used for air–fuel ratio correction and for idle speed control (estimated control), etc.

DTC No.	DTC Detecting Condition	Trouble Area
P1780	2 or more switches are ON simultaneously for ”N”, ”2”, ”L” and ”R” positions (2 trip detection logic)	●Short in park/neutral position switch circuit ●Park/neutral position switch ●ECM
	When driving under conditions (a) and (b) for 30 sec. or more the park/neutral position switch is ON (N position): (2 trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 1,500 ~ 2,500 rpm	

HINT:After confirming DTC P1780 use the LEXUS hand–held tester to confirm the PNP switch signal from ”CURRENT DATA”.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Read PNP, REVERSE, 2ND and LOW signals.**

When using LEXUS hand–held tester.

PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.

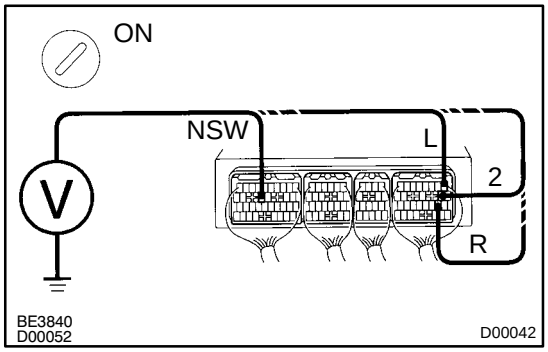
(b) Turn the ignition switch ON and LEXUS hand–held tester main switch ON.

CHECK:

Shift lever into the P, R, N, 2 and L positions, and read the PNP, REVERSE, 2ND and LOW signals on the LEXUS hand–held tester.

OK:

Shift position	Signal
2	2ND OFF → ON
L	LOW OFF → ON
R	REVERSE OFF → ON
P,N	NSW OFF → ON



When not using LEXUS hand–held tester.

PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between terminals NSW, 2, L and R of ECM and body ground when the shift lever is shifted to the following positions.

OK:

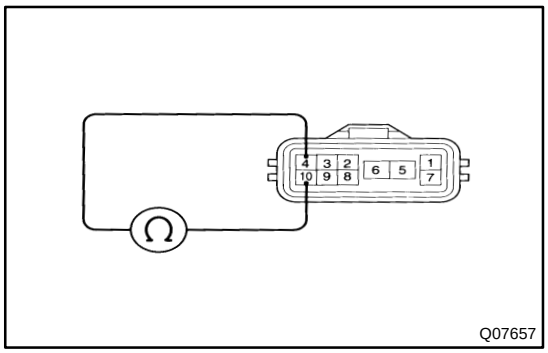
Position	NSW–Body ground	R–Body ground	2–Body ground	L–Body ground
P,N	0 V	0 V	0 V	0 V
R	9 ~ 14 V*	9 ~ 14 V*	0 V	0 V
D	9 ~ 14 V	0 V	0 V	0 V
2	9 ~ 14 V	0 V	9 ~ 14 V	0 V
L	9 ~ 14 V	0 V	0 V	9 ~ 14 V

HINT: The voltage will drop slightly due to lighting up of the back up light.

OK → **Proceed to next circuit inspection shown on matrix chart. (See page DI–164).**

NG

2	Check park/neutral position switch.



PREPARATION:

(a) Jack up the vehicle.

(b) Remove the park/neutral position switch.

CHECK:

Check continuity between each terminal shown below when the shift lever is moved to each position.

Shift Position	Terminal No. to continuity	
P	2 – 7	5 – 6
R	2 – 8	–
N	2 – 9	5 – 6
D	2 – 10	–
2	2 – 3	–
L	2 – 4	–

OK:

There is continuity.

NG → **Replace park/neutral position switch.**

OK ↓

3	Check harness and connector between battery and park/neutral position switch, park/neutral position switch and ECM (See page IN–27).

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace ECM (See page IN–27).

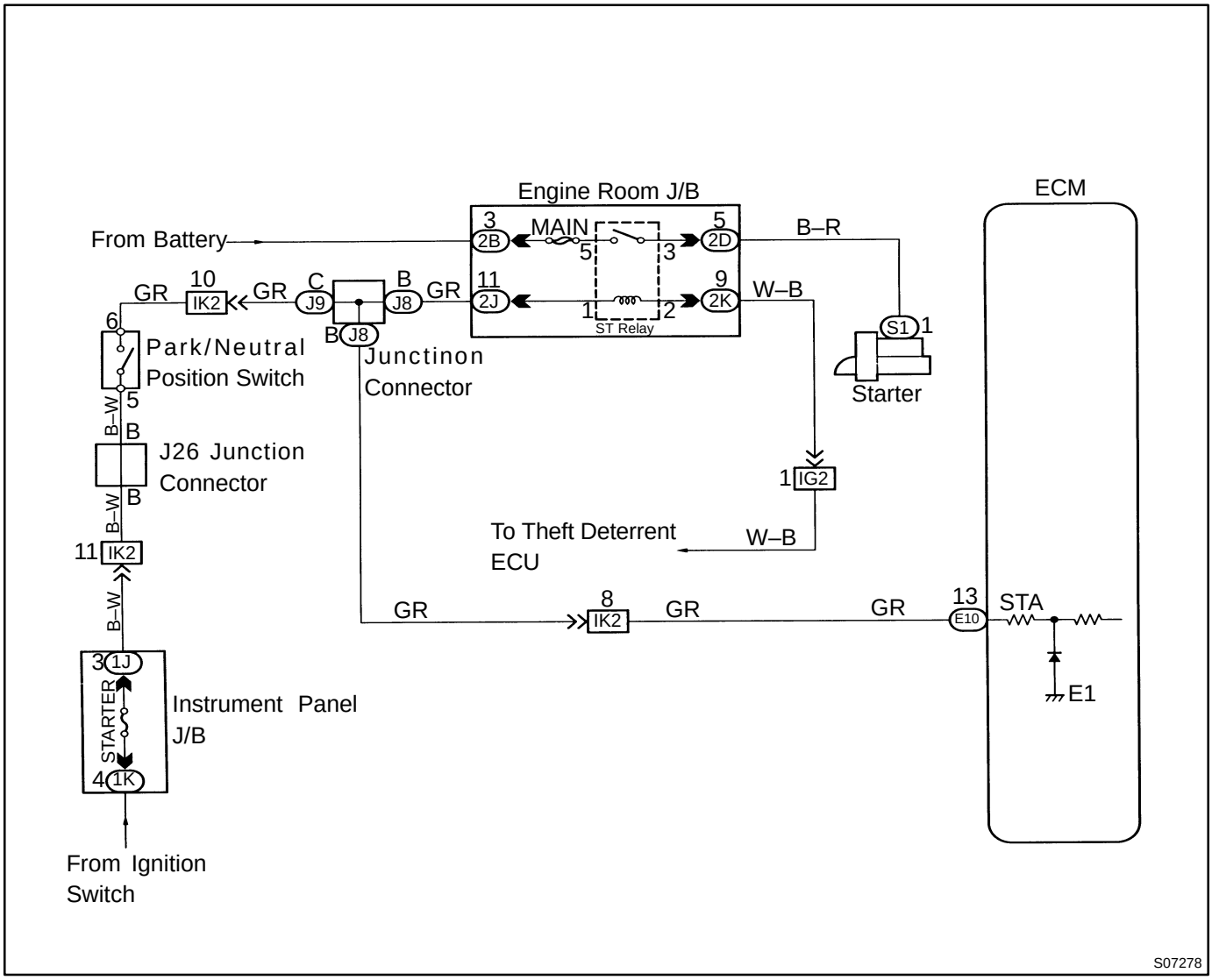
DI0A7–01

Starter Signal Circuit

CIRCUIT DESCRIPTION

When the engine is cranked, the intake air flow is slow, so fuel vaporization is poor. A rich mixture is therefore necessary in order to achieve good startability. While the engine is being cranked, the battery positive voltage is applied to terminal STA of the ECM. The starter signal is mainly used to increase the fuel injection volume for the starting injection control and after–start injection control.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:This diagnostic chart is based on the premise that the engine is cranked normally. If the engine is not cranked, proceed to the problem symptoms table on page DI–22.

hand–held tester

1	**Connect LEXUS hand–held tester and check STA signal.**

PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.

(b) Turn ignition switch ON and push the LEXUS hand–held tester main switch ON.

CHECK:

Read STA signal on the LEXUS hand–held tester while starter operates.

OK:

Ignition switch position	ON	START
STA signal	OFF	ON

OK → **Proceed to next circuit inspection shown on problem symptom table (See page DI–22).**

NG

2	**Check for open in harness and connector between ECM and starter relay (See page IN–27).**

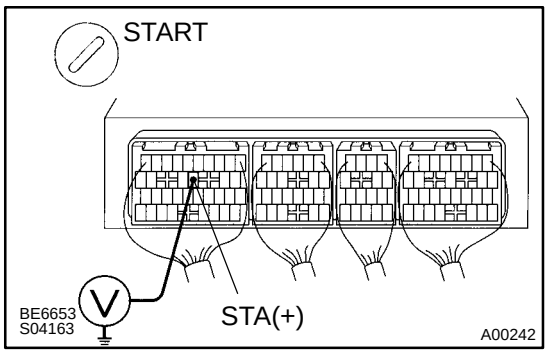
NG → **Repair or replace or connector.**

OK

Check and replace ECM (See page IN–27).

OBD II scan tool (excluding LEXUS hand–held tester)

1	**Check voltage between terminal STA of ECM connector and body ground.**



PREPARATION:

Remove the glove compartment (See page SF–65).

CHECK:

Measure voltage between terminal STA of ECM connector and body ground during engine cranking.

OK:

Voltage: 6 V or more

OK	**Proceed to next circuit inspection shown on problem symptom table (See page DI–22).**

NG

2	**Check for open in harness and connector between ECM and starter relay (See page IN–27).**

NG	**Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN–27).

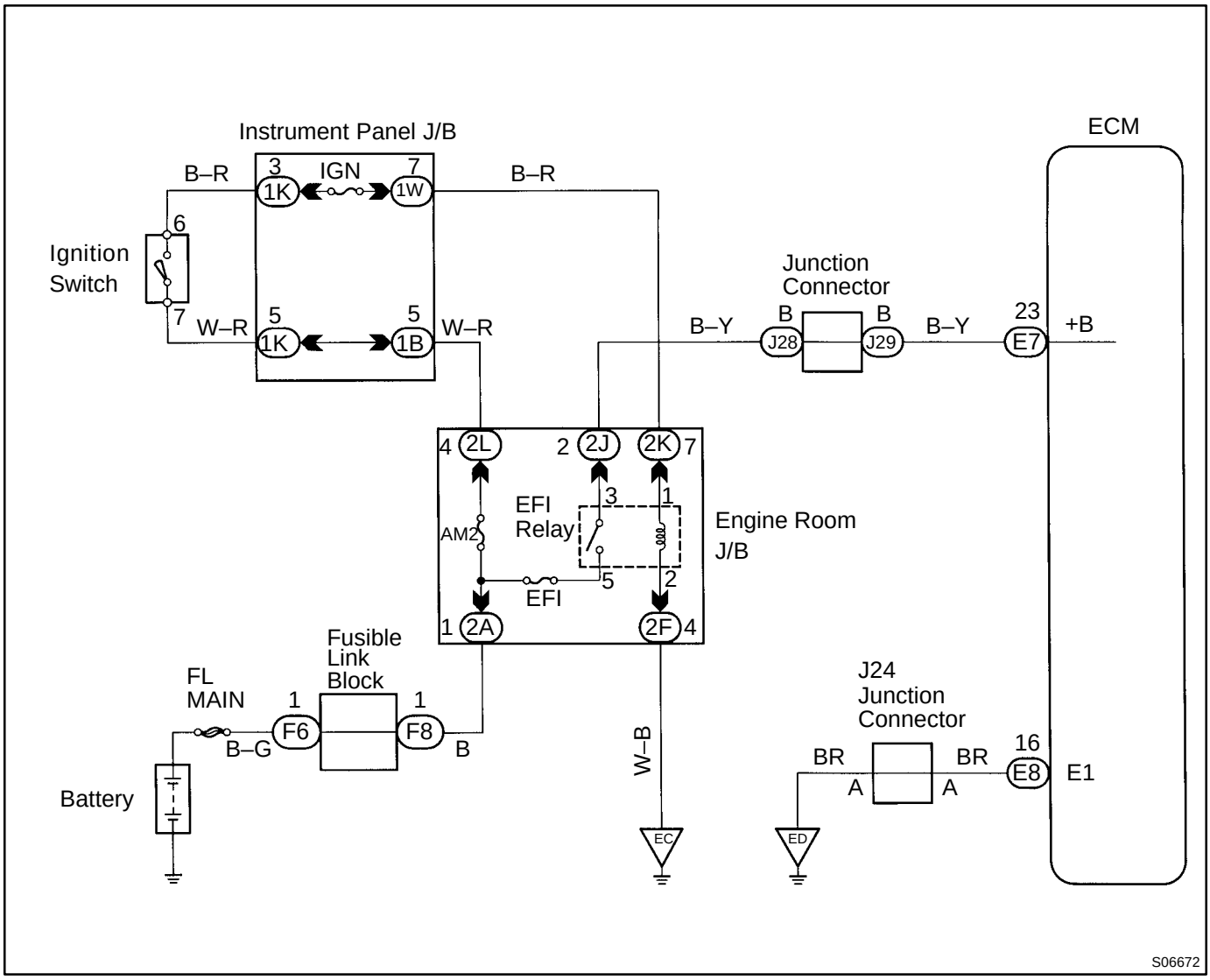
DI0A8–01

ECM Power Source Circuit

CIRCUIT DESCRIPTION

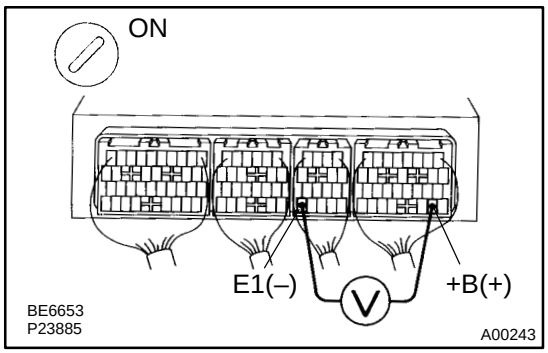
When the ignition switch is turned ON, battery positive voltage is applied to the coil, closing the contacts of the EFI main relay (Marking: EFI) and supplying power to the terminal +B of the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals + B and E1 of ECM connectors.**



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals + B and E1 of ECM connectors.

OK:

Voltage: 9 ~ 14 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–22).**

NG

2	**Check for open in harness and connector between terminal E1 of ECM and body ground (See page IN–27).**

NG	**Repair or replace harness or connector.**

OK

3	**Check EFI main relay (Marking: EFI) (See page SF–47).**

NG	**Replace EFI main relay.**

OK

4	**Check EFI fuse (See page DI–126, DI–3).**

NG	**Check for short in all the harness and components connected to EFI fuse.**

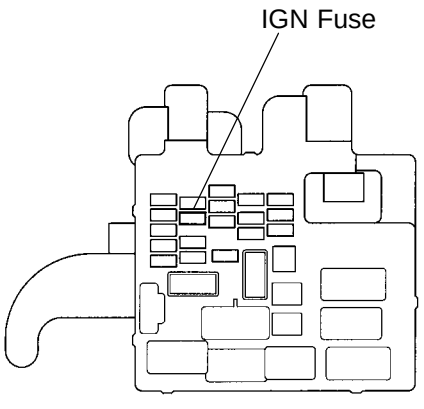
OK

5	**Check for open in harness and connector between EFI main relay (Marking: EFI) and battery, EFI main relay (Marking: EFI) and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

6	**Check IGN fuse.**



PREPARATION:
Remove the IGN fuse from the instrument panel J/B.
CHECK:
Check continuity of IGN fuse.
OK:
Continuity

NG → **Check for short in all the harness and components connected to IGN fuse.**

OK

7	**Check ignition switch (See page BE–19).**

NG → **Replace ignition switch.**

OK

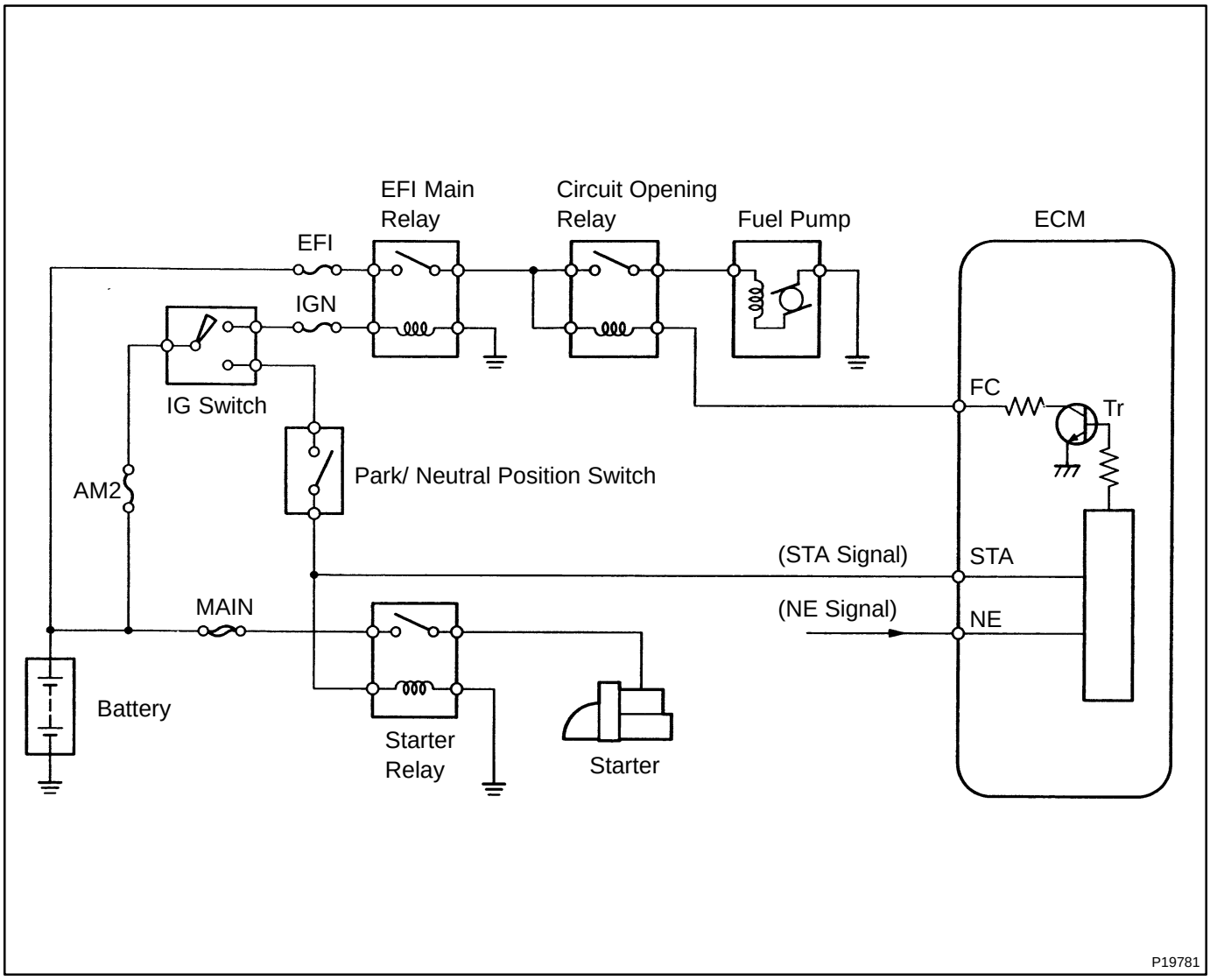
Check for open in harness and connector between IG switch and EFI main relay, EFI main relay and body ground (See page IN–27).

DI0A9–01

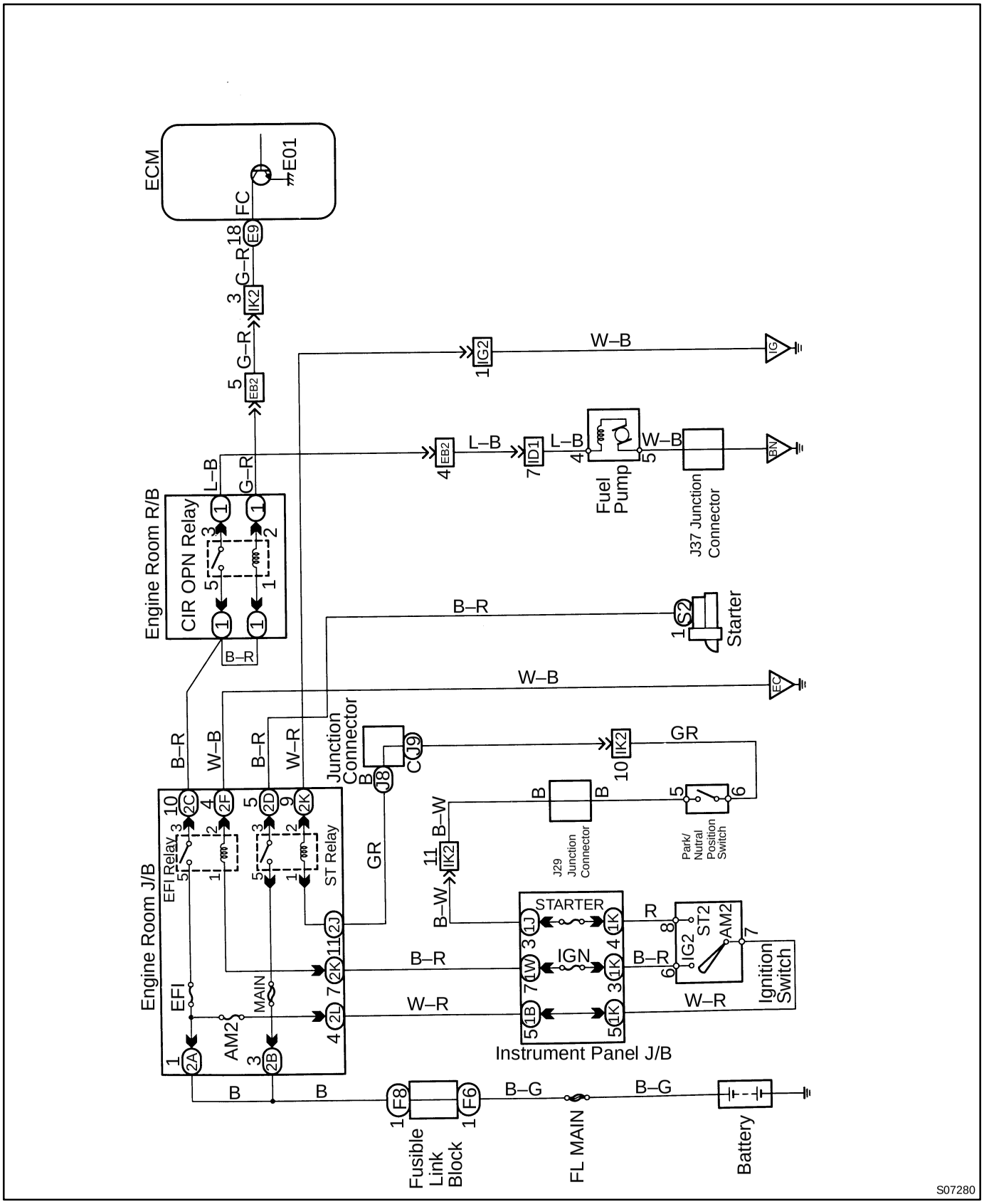
Fuel Pump Control Circuit

CIRCUIT DESCRIPTION

In the diagram below, when the engine is cranked, current flows from terminal ST of the ignition switch to the starter relay coil and also current flows to terminal STA of ECM (STA signal).
When the STA signal and NE signal are input to the ECM, Tr is turned ON, current flows to coil of the circuit opening relay, the relay switches on, power is supplied to the fuel pump and the fuel pump operates.
While the NE signal is generated (engine running), the ECM keeps Tr ON (circuit opening relay ON) and the fuel pump also keeps operating.



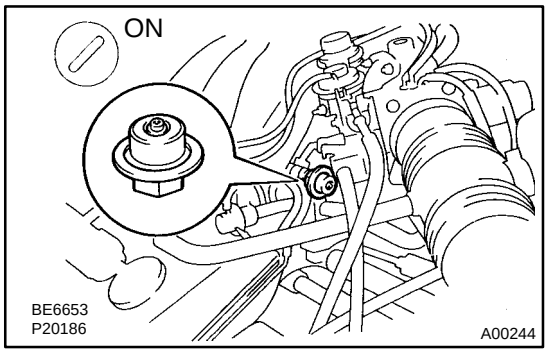
WIRING DIAGRAM



INSPECTION PROCEDURE

LEXUS hand–held tester

1	**Connect LEXUS hand–held tester and check operation of fuel pump.**



PREPARATION:

(a) Connect the LEXUS hand–held tester to the DLC3.

(b) Turn ignition switch ON and push the LEXUS hand–held tester main switch ON.

(c) Use ACTIVE TEST mode to operate the fuel pump.

CHECK:

Check that pulsation damper screw rises up when fuel pump is on by LEXUS hand–held tester.

OK:

The pulsation damper screw rises up.

OK	**Check for starter signal circuit (See page DI–132).**

NG

2	**Check for ECM power source circuit (See page DI–135).**

NG	**Repair or replace.**

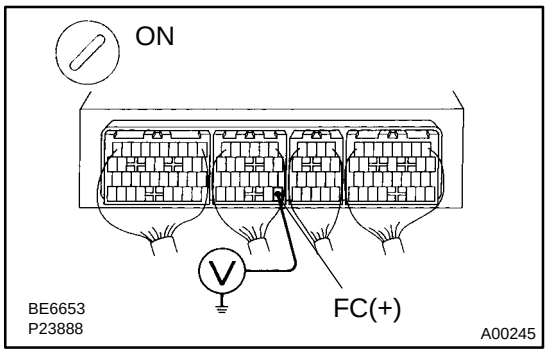
OK

3	**Check circuit opening relay (Marking: CIR OPN) (See page SF–48).**

NG	**Replace circuit opening relay.**

OK

4	**Check voltage between terminal FC of ECM and body ground.**



PREPARATION:

(a) Remove the glove compartment (See page SF–65).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal FC of ECM and body ground.

OK:

Voltage: 9 ~ 14 V

NG → **Check for open in harness and connector between EFI main relay and circuit opening relay, circuit opening relay and ECM.**

OK

5	**Check fuel pump (See page SF–6).**

NG → **Repair or replace fuel pump.**

OK

6	**Check for open in harness and connector between circuit opening relay (Marking:CIR OPN) and fuel pump, fuel pump and body ground (See page IN–27).**

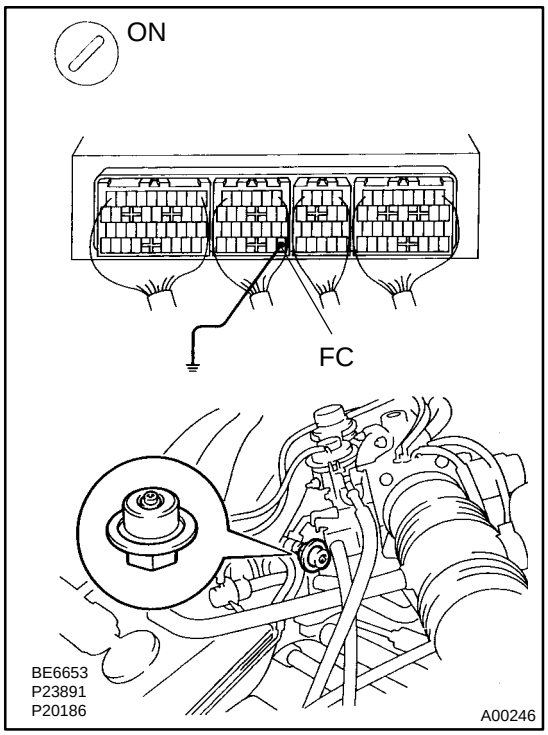
NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN–27).

OBD II scan tool (excluding LEXUS hand–held tester)

1	**Check operation of fuel pump.**



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Turn ignition switch ON.

CHECK:

(a) Connect between terminal FC of ECM and body ground.

(b) Check that pulsation damper screw rises up when connect between terminal FC of ECM and body ground.

OK:

The pulsation damper screw rises up.

OK → **Check for starter signal circuit (See page DI–132).**

NG

2	**Check for ECM power source circuit (See page DI–135).**

NG → **Repair or replace.**

OK

3	**Check circuit opening relay (Marking: CIR OPN) (See page SF–48).**

NG → **Replace circuit opening relay.**

OK

4	Check voltage between terminal FC of ECM and body ground (See page DI–138, DI–14).

NG → Check for open in harness and connector between EFI main relay and circuit opening relay, circuit opening relay and ECM.

OK

5	Check fuel pump (See page SF–6).

NG → Repair or replace fuel pump.

OK

6	Check for open in harness and connector between circuit opening relay and fuel pump, fuel pump and body ground (See page IN–27).

NG → Repair or replace harness or connector.

OK

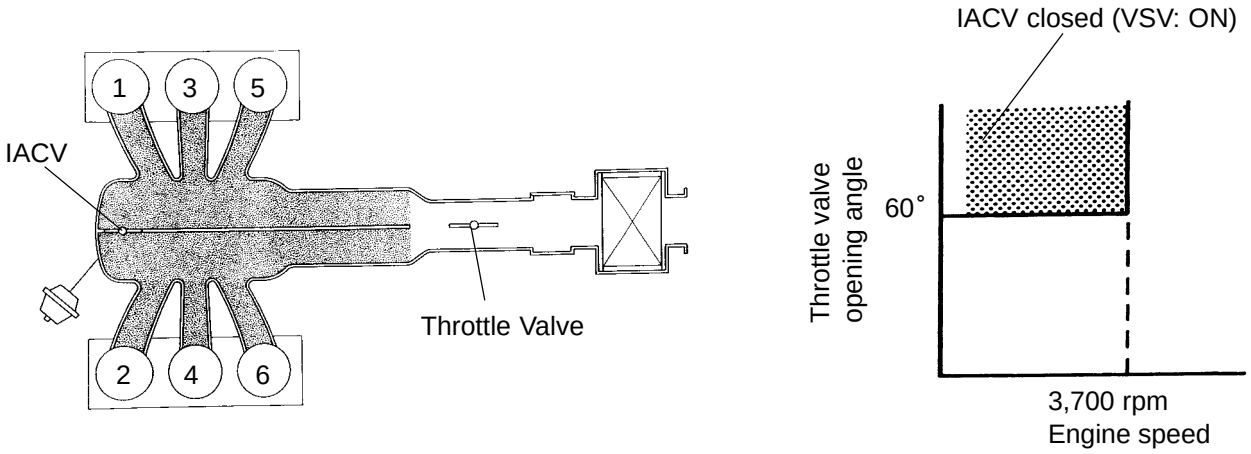
Check and replace ECM (See page IN–27).

DI0AA–01

IACV Control VSV Circuit

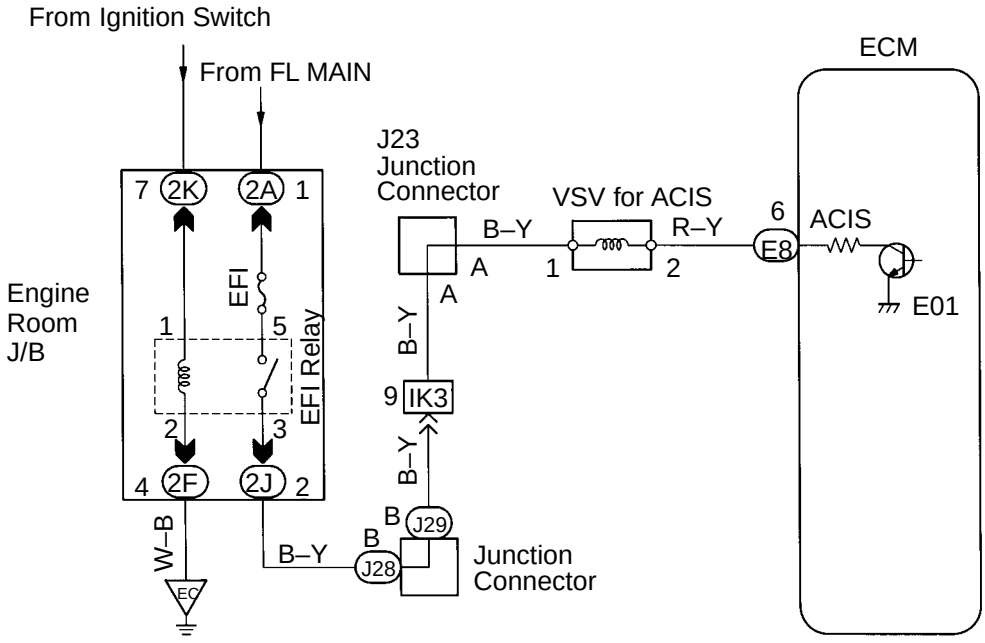
CIRCUIT DESCRIPTION

This circuit opens and closes the IACV (Intake Air Control Valve) in response to the engine load in order to increase the intake efficiency (ACIS: Acoustic Control Induction System).
When the engine speed is 3,700 rpm or less and the throttle valve opening angle is 60° or more, the ECM turns the VSV ON and closes the IACV. At all other times, the VSV is OFF, so the IACV is open.



FI7011 FI6570 A00306

WIRING DIAGRAM

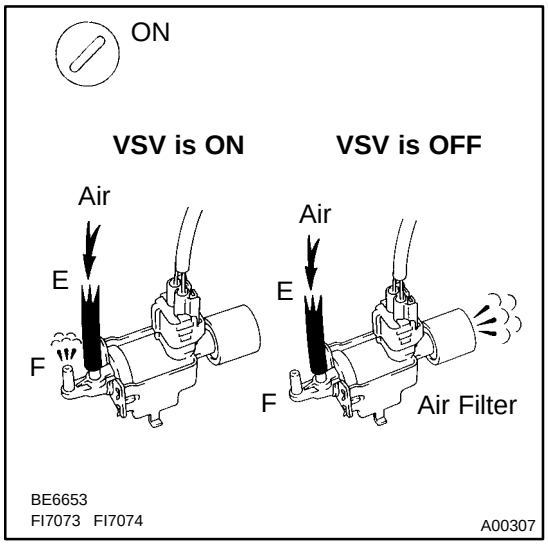


S06464

INSPECTION PROCEDURE

LEXUS hand–held tester

1	**Connect LEXUS hand–held tester and check operation of VSV for ACIS.**



PREPARATION:

(a) Remove the fuse cover on the instrument panel.
(b) Connect the LEXUS hand–held tester to the DLC3.
(c) Turn ignition switch ON and LEXUS hand–held tester main switch ON.
(d) Select the ACTIVE TEST mode on the LEXUS hand–held tester.

CHECK:

Check operation of VSV when VSV is operated by the LEXUS hand–held tester.

OK:

VSV is ON:
Air from pipe E is flowing out through pipe F.
VSV is OFF:
Air from pipe E is flowing out through the air filter.

OK	**Check for vacuum tank (See page SF–40).**

NG

2	**Check VSV for ACIS (See page SF–54).**

NG	**Replace VSV for ACIS.**

OK

3	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN–27).

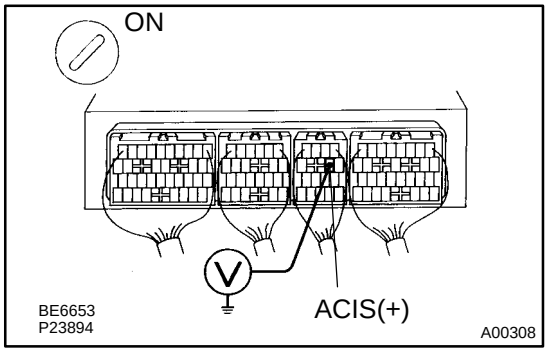
OBD II scan tool (excluding LEXUS hand–held tester)

1	**Check VSV for ACIS (See page SF–54).**

NG → **Replace VSV for ACIS.**

OK

2	**Check voltage between terminal ACIS of ECM connector and body ground.**



PREPARATION:

(a) Remove the glove compartment (See page SF–64).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal ACIS of ECM connector and body ground.

OK:

Voltage: 9 ~ 14 V

NG → **Check for open and short in harness and connector between EFI main relay and ECM (See page IN–27).**

OK

3	Check for vacuum tank (See page SF–45).

NG → Repair or replace.

OK

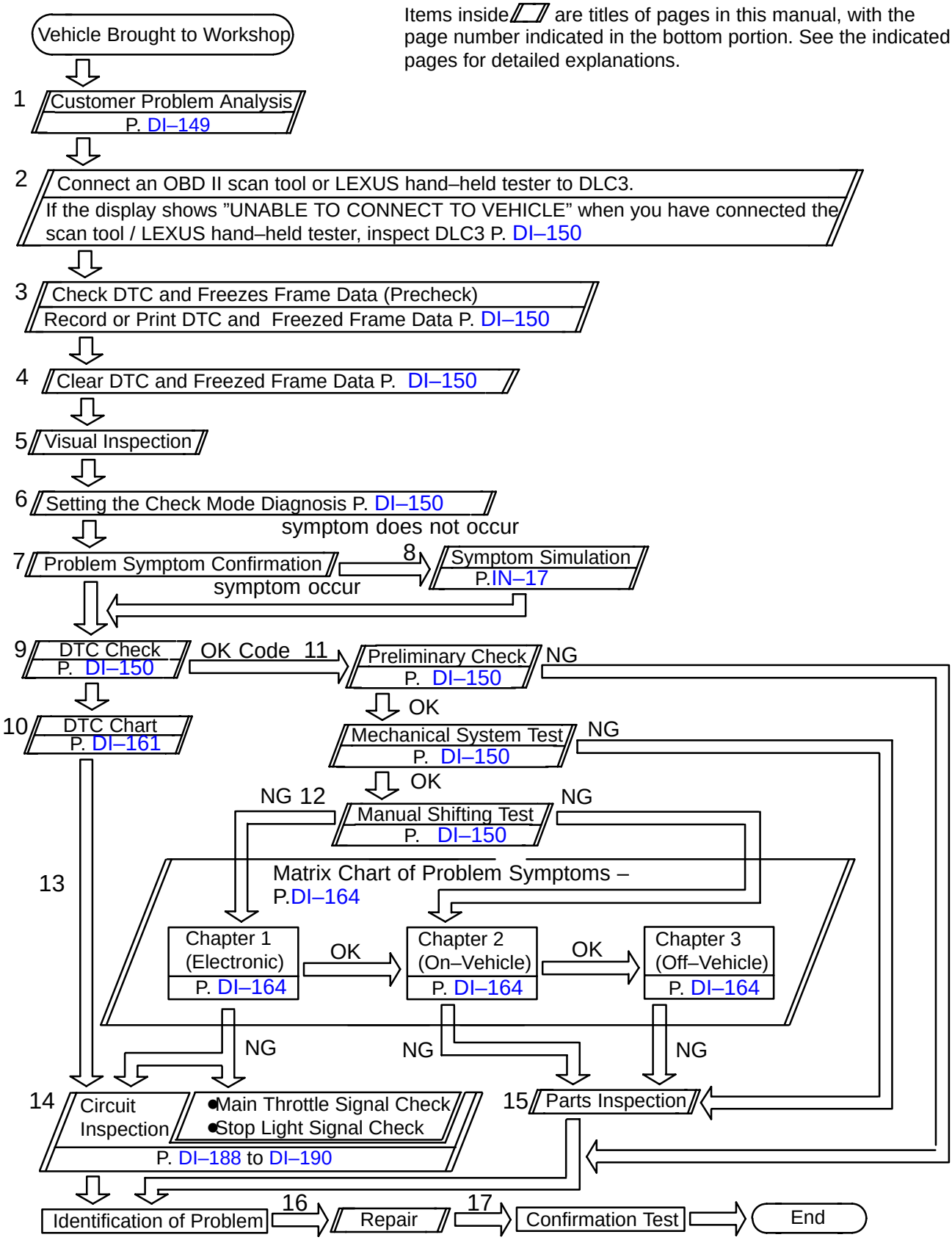
Check and replace ECM (See page IN–27).

AUTOMATIC TRANSAXLE

HOW TO PROCEED WITH TROUBLESHOOTING

DI0C9–01

Items inside ▱ are titles of pages in this manual, with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.



DI0CB–02

CUSTOMER PROBLEM ANALYSIS CHECK

Transaxle Control System Check Sheet	Inspector's Name :

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km mile

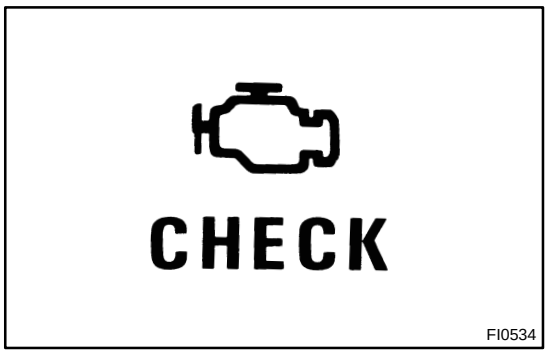
Date Problem Occurred	/ /
How Often Does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ Vehicle does not move (☐ Any position ☐ Particular position)
	☐ No up–shift (☐ 1st → 2nd ☐ 2nd → 3rd ☐ 3rd → O/D)
	☐ No down–shift (☐ O/D → 3rd ☐ 3rd → 2nd ☐ 2nd → 1st)
	☐ Lock–up malfunction
	☐ Shift point too high or too low
	☐ Harsh engagement (☐ N → D ☐ Lock–up ☐ Any drive position)
	☐ Slip or shudder
	☐ No kick–down
	☐ Others ( )

Check Item	Malfunction Indicator Lamp	☐ Normal	☐ Remains ON

DTC Check	1st Time	☐ Normal code	☐ Malfunction code (Code)
	2nd Time	☐ Normal code	☐ Malfunction code (Code)

DI0CF–01



PRE–CHECK

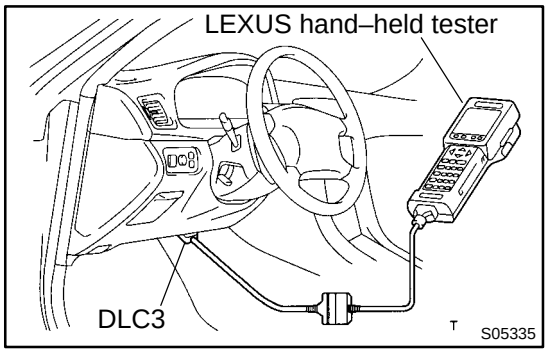
1. DIAGNOSIS SYSTEM

(a) DESCRIPTION

When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle an OBD II scan tool complying with SAE J1987 or LEXUS hand–held tester, and read off various data output from the vehicle's ECM.

OBD II regulations require that the vehicle's on–board computer lights up the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components which affect vehicle emissions. In addition to the MIL lighting up when a malfunction is detected, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory (See page DI–14).

If the malfunction only occurs in 3 trips, the MIL goes off but the DTCs remain recorded in the ECM memory.



To check the DTCs, connect an OBD II scan tool or LEXUS hand–held tester to DLC3 on the vehicle. The OBD II scan tool or LEXUS hand–held tester also enables you to erase the DTCs and check freeze frame data and various forms of engine data (For instruction book).

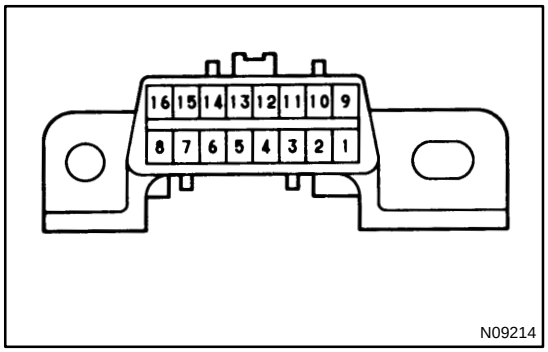
DTCs include SAE controlled codes and Manufacturer controlled codes.

SAE controlled codes must be set as prescribed by the SAE, while Manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits (See DTC chart on page DI–161).

The diagnosis system operates in normal mode during normal vehicle use, and also has a check mode for technicians to simulate malfunction symptoms and perform troubleshooting. Most DTCs use 2 trip detection logic(*) to prevent erroneous detection. By switching the ECM to check mode when troubleshooting, the technician can cause the MIL to light up and for a malfunction that is only detected once or momentarily.

(LEXUS hand–held tester) (See page DI–150)

*2 trip detection logic:
When a logic malfunction is first detected, the malfunction is temporarily stored in the ECM memory. If the same malfunction is detected again during the 2nd test drive, this 2nd detection causes the MIL to light up .

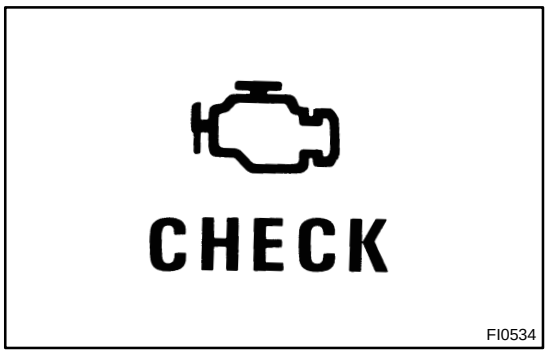


(b) DLC3 INSPECTION
The vehicle's ECM uses ISO 9141–2 for communication. The terminal arrangement of DLC3 complies with SAE J1962 and matches the ISO 9141–2 format.

Tester connection	Condition	Specified condition
7 (Bus ~ Line) – 5 (Signal ground)	During communication	Pulse generation
4 (Chassis Ground) – Body	Always	1 Ω or less
5 (Signal Ground) – Body	Always	1 Ω or less
16 (B+) – Body	Always	9 – 14 V

HINT:
If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of OBD II scan tool or LEX-US hand–held tester to DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

(1) If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
(2) If communication is still not possible when the tool is connected connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.



2. INSPECT DIAGNOSIS (NORMAL MODE)

(a) MIL CHECK

(1) The MIL comes on when the ignition switch is turned ON and the engine is not running.

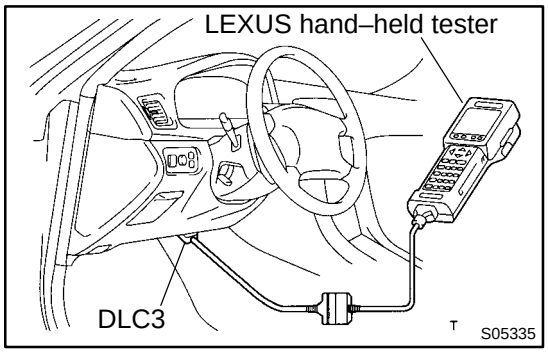
HINT:If the MIL does not light up, troubleshoot the combination meter (See page BE–58).

(2) When the engine is started, the MIL should go off. If the lamp remains on, the diagnosis system has detected a malfunction or abnormality in the system.

(b) DTC CHECK

NOTICE:NOTICE(LEXUS hand–held tester only): When the diagnostic system is switched from normal mode to check mode, it erases all DTCs and freeze frame data recorded in normal mode. So before switching modes, always check the DTCs and freeze frame data, and note them down.

(1) Prepare an OBD II scan tool (complying with SAE J1978) or LEXUS hand–held tester.



(2) Connect the OBD II scan tool or LEXUS hand–held tester to DLC3 at the lower of the instrument panel.

(3) Turn the ignition switch ON and turn the OBD II scan tool or LEXUS hand–held tester switch ON.

(4) Use the OBD II scan tool or LEXUS hand–held tester to check the DTCs and freeze frame data and note them down (For operating instructions, see the OBD II scan tool's instruction book).

(5) See page DI–161 to confirm the details of the DTCs.

NOTICE:

When simulating symptoms with an OBD II scan tool (excluding LEXUS hand–held tester) to check the DTCs, use normal mode. For codes on the DTCs chart subject to "2 trip detection logic", turn the ignition switch off after the symptoms have been simulated the 1st time. Them repeat the simulation process again. When the program has DTCs are recorded in the ECM.

3. INSPECT DIAGNOSIS (CHECK MODE)

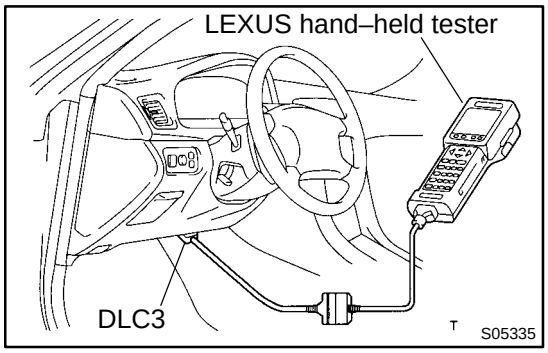
LEXUS hand–held tester only: Compared to the normal mode, the check mode has high sensing ability to detect malfunctions. Furthermore, the same diagnostic items which are detected in Normal mode can also be detected in Check mode.

(a) DTC CHECK

(1) Check the initial conditions.
- Battery positive voltage 11 V or more.
- Throttle valve fully closed.
- transaxle in P position.
- Air conditioning switched off.

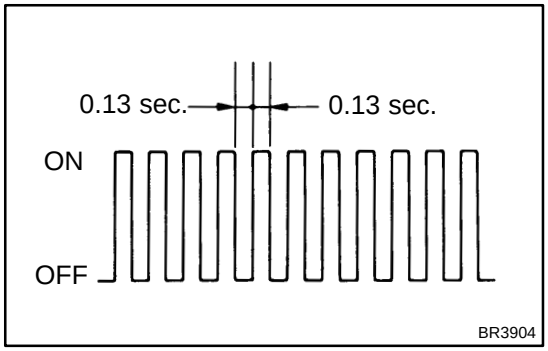
(2) Turn the ignition switch OFF.

(3) Prepare a LEXUS hand–held tester.



(4) Connect the LEXUS hand–held tester to DLC3 at the lower of the instrument panel.

(5) Turn the ignition switch ON and switch the LEXUS hand–held tester ON.



(6) Switch the LEXUS hand–held tester from Normal mode to Check mode (Check that the MIL flashes).

(7) Start the engine (MIL goes out after the engine starts).

(8) Simulate the conditions of the malfunction described by the customer.

NOTICE:Leave the ignition switch ON until you have checked the DTCs, etc..

(9) After simulating the malfunction conditions, use the LEXUS hand–held tester diagnosis selector to check the DTCs and freeze frame data, etc..

HINT:Take care not to turn the ignition switch OFF, as turning it off switches the diagnosis system from Check mode to Normal mode, so all DTCs, etc. are erased.

(10) After checking the DTC, inspect the applicable circuit.

(b) DTC CLEARANCE

The following actions will erase the DTC and freezed frame data. Operating an OBD II scan tool (complying with SAE J1978) or LEXUS hand–held tester to erase the codes.

(See the OBD II scan tool's instruction book for operating instructions.)

4. ROAD TEST

NOTICE:Perform the test at normal operating ATF temperature 50 – 80 ˚C (122 – 176 ˚F).

(a) D POSITION TEST

Shift into the D position and fully depress the accelerator pedal and and check the following points:

(1) Check up–shift operation.

1 → 2, 2 → 3 and 3 → O/D up–shift takes place, at the shift point shown in the automatic shift schedule (See page SS–24).

HINT:

- O/D Gear Up–shift Prohibition Control (1. Coolant temp. is 60 ˚C (140 ˚C) or less. 2. If there is a 10 km/h (6 mph) difference between the set cruise control speed and vehicle speed.)
- O/D Gear Lock–up Prohibition Control (1. Brake pedal is depressed. 2. Coolant temp. is 60 ˚C (140 ˚C) or less.)

(2) Check for shift shock and slip.

Check for shock and slip at the 1 → 2, 2 → 3 and 3 → O/D up–shifts.

(3) Check for abnormal noises and vibration.

Run at the D position lock–up or O/D gear and check for abnormal noises and vibration.

HINT:The check for the cause of abnormal noises and vibration must be done very thoroughly as it could also be due to loss of balance in the differential torque converter clutch, etc..

(4) Check kick–down operation.

While running in the D position, 2nd, 3rd and O/D gears, check to see that the possible kick–down vehicle speed limits for 2 → 1, 3 → 2 and O/D → 3 kick–downs conform to those indicated on the automatic shift schedule (See page SS–24).

(5) Check abnormal shock and slip at kick–down.

(6) Check the lock–up mechanism.

- Drive in D position, O/D gear, at a steady speed (lock–up ON) of about 60 km/h (37 mph).
- Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

If there is a big jump in engine speed, there is no lock–up.

(b) 2 POSITION TEST

Shift into the 2 position and fully depress the accelerator pedal and check the following points:

(1) Check up–shift operation.

Check to see that the 1 → 2 up–shift takes place and that the shift point conforms to the automatic shift schedule (See page SS–24).

HINT:There is no O/D up–shift and lock–up in the 2 position.

(2) Check engine braking.

While running in the 2 position and 2nd gear, release the accelerator pedal and check the engine braking effect.

(3) Check for abnormal noises during acceleration and deceleration, and for shock at up–shift and down–shift.

(c) L POSITION TEST

Shift into the 2 position and fully depress the accelerator pedal and check the following points:

(1) Check no up–shift.

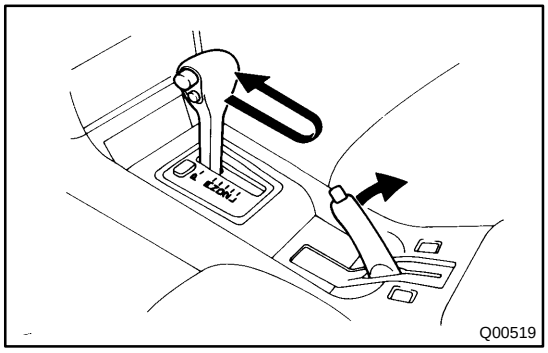
While running in the L position, check that there is no up–shift to 2nd gear.

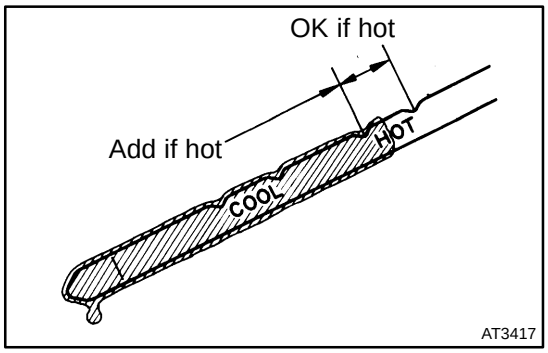
(2) Check engine braking.
While running in the L position, release the accelerator pedal and check the engine braking effect.
(3) Check for abnormal noises during acceleration and deceleration.

(d) R POSITION TEST
Shift into the R position and fully depress the accelerator pedal and check for slipping.

CAUTION:Before conducting this test ensure that the test area is free from people and obstruction.

(e) P POSITION TEST
Stop the vehicle on a grade (more than 5˚) and after shifting into the P position, release the parking brake. Then, check to see that the parking lock pawl holds the vehicle in place.


Q00519



AT3417

5. BASIC INSPECTION

(a) CHECK FLUID LEVEL

HINT:

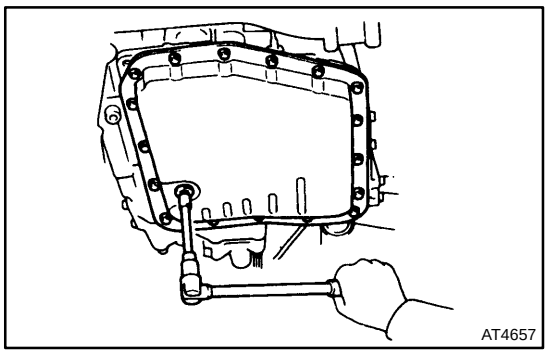
- Drive the vehicle so that the engine and transaxle are at normal operating temperature.
  Fluid temp.: 70 – 80 ˚C (158 – 176 ˚F)
- Only use the COOL range on the dipstick as a rough reference when the fluid is replaced or the engine does not run.

(1) Park the vehicle on a level surface and set the parking brake.
(2) With the engine idling and the brake pedal depressed, shift the shift lever into all positions from P to L position and return to P position.
(3) Pull out the dipstick and wipe it clean.
(4) Push it back fully into the pipe.
(5) Pull it out and check that the fluid level is in the HOT range.
If the level is at the low side, add new fluid.

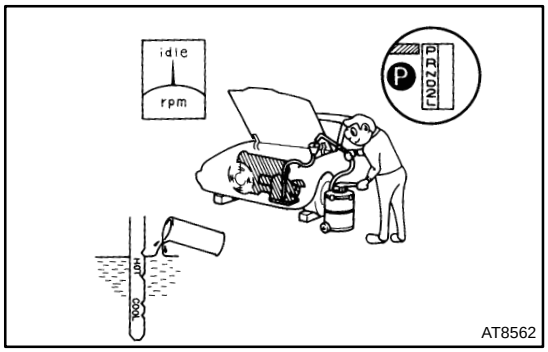
Fluid type: ATF D–II or DEXRON®III (DEXRON®II)

NOTICE:do not overfill.

(b) CHECK FLUID CONDITION
If the level is at the low side, add new fluid.


AT4657

(c) REPLACE ATF
(1) Remove the drain plug and drain the fluid.
(2) Reinstall the drain plug securely.

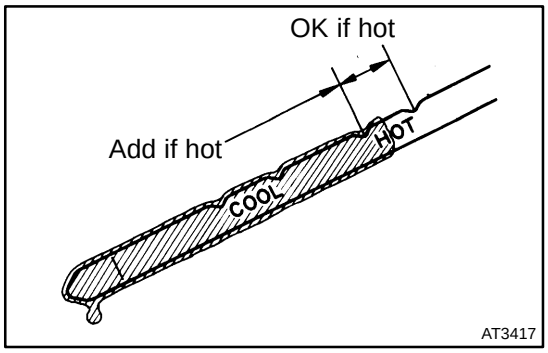


AT8562

(3) With the engine OFF add new fluid through the oil filler pipe.

Fluid type: ATF D–II or DEXRON®III (DEXRON®II)
Capacity: 3.5 liters (3.7 US qts, 3.1 Imp. qts)

(4) Start the engine and shift the shift lever into all positions from P to L position and then shift into P position.

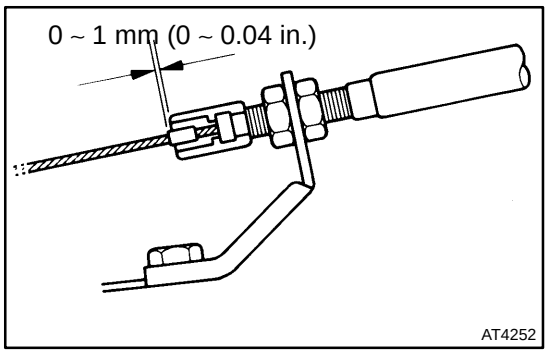


AT3417

(5) With the engine idling, check the fluid level. Add fluid up to the COOL level on the dipstick.
(6) Check the fluid level at the normal operating temperature, 70 – 80 ˚C (158 – 176 ˚F), and add as necessary.

NOTICE:Do not overfill.

(d) CHECK FLUID LEAKS
Check for leaks in the transaxle.
If there are leaks, it is necessary to repair or replace O–rings, FIPGs, oil seals, plugs or other parts.

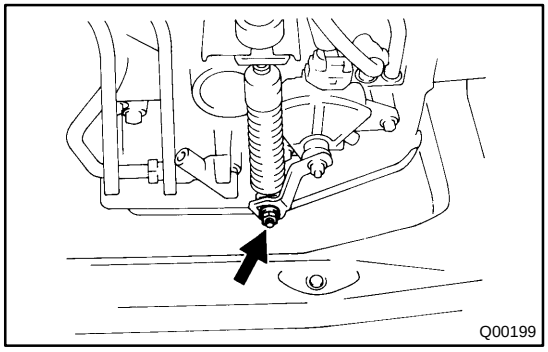


AT4252

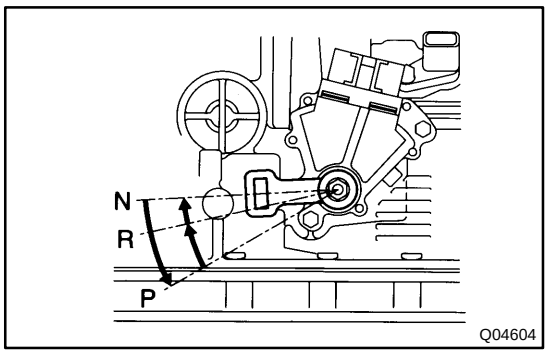
(e) INSPECT AND ADJUST THROTTLE CABLE
(1) Check that the accelerator pedal is fully released.
(2) Check that the inner cable is not slack.
(3) Measure the distance between the outer cable end and stopper on the cable.

Standard distance: 0 – 1 mm (0 – 0.04 in.)

If the distance is not standard, adjust the cable by the adjusting nuts.


Q00199

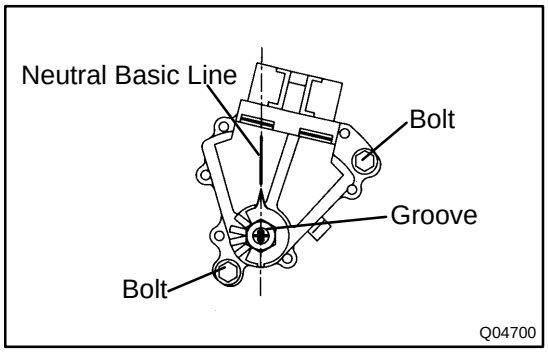
(f) INSPECT AND ADJUST SHIFT LEVER POSITION
When shifting the shift lever from the N position to other positions, check that the lever can be shifted smoothly and accurately to each position and that the position indicator is not aligned with the correct position.
If the indicator is not aligned with the correct position, carry out the following adjustment procedures.
(1) Loosen the nut on the shift lever.
(2) Push the control shaft fully rearward.



(3) Return the control shaft lever 2 notches to N position.
(4) Set the shift lever to N position.
(5) While holding the shift lever lightly toward the R position side, tighten the shift lever nut.

Torque:13 N·m (130 kgf·cm, 9 ft·lbf)

(6) Start the engine and make sure that the vehicle moves forward when shifting the lever from the N to D position and reverses when shifting it to the R position.



(g) INSPECT AND ADJUST PARK/NEUTRAL POSITION

Check that the engine can be started with the shift lever only in the N or P position, but not in other positions.

If it is not as stated above, carry out the following adjustment procedure.

(1) Loosen the park/neutral position switch bolt and set the shift lever to the N position.
(2) Align the groove and neutral basic line.
(3) Hold in position and tighten the bolt.

Torque:5.4 N·m (55 kgf·cm, 48 in·lbf)

For continuity inspection of the park/neutral position switch, see page DI–185.

(h) CHECK IDLE SPEED

Idle speed: 700 ± 50 rpm
(In N position and air conditioner OFF)

6. MECHANICAL SYSTEM TESTS

(a) MEASURE STALL SPEED

The object of this test is to check the overall performance of the transaxle and engine by measuring the stall speeds in the D and R positions.

NOTICE:

- **Do the test at normal operating fluid temperature 50 – 80 °C (122 – 176 °F).**
- **Do not continuously run this test longer than 5 seconds.**
- **To ensure safety, conduct this test in a wide, clear level area which provides good traction.**
- **The stall test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.**

(1) Chock the 4 wheels.
(2) Connect an OBD II scan tool or LEXUS hand–held tester to DLC3.
(3) Fully apply the parking brake.
(4) Keep your left foot pressed firmly on the brake pedal.
(5) Start the engine.
(6) Shift into the D position. Press all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

Stall speed: 2,600 ± 150 rpm

(7) Do the same test in R position.

Stall speed: 2,600 ± 150 rpm

Evaluation:

Problem	Possible cause
(a) Stall speed low in D and R positions	●Engine output may be insufficient ●Stator one–way clutch is operating properly HINT: If more than 600 rpm below the specified value, the torque converter could be faulty.
(b) Stall speed high in D position	●Line pressure too low ●Forward clutch slipping ●No.2 one–way clutch not operating properly ●O/D clutch slipping
(c) Stall speed high in R position	●Line pressure too low ●Direct clutch slipping ●1st and reverse brake slipping ●O/D clutch slipping
(d) Stall speed high in D and R positions	●Line pressure too low ●Improper fluid level ●O/D one–way clutch not operating properly

(b) MEASURE TIME LAG

When the shift lever is shifted while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the O/D direct clutch, forward clutch, and 1st and reverse brake.

NOTICE:

- **Do the test at normal operating fluid temperature 50 – 80 ˚C (122 – 176 ˚F).**
- **Be sure to allow 1 minute interval between tests.**
- **Take 3 measurements and take the average value.**

(1) Connect an OBD II scan tool or LEXUS hand–held tester to DLC3.

(2) Fully apply the parking brake.

(3) Start the engine and check idle speed.

Idle speed: 700 ± 50 rpm (In N position and air conditioner OFF)

(4) Shift the shift lever from N to D position. Using a stop watch, measure the time from when the lever is shifted until the shock is felt.

In the same manner, measure the time lag for N → R.

Time lag:

N → D Less than 1.2 seconds

N → R Less than 1.5 seconds

Evaluation (If N → D time or N → R time lag is longer than specified):

Problem	Possible cause
N → D time lag is longer	●Line pressure too low ●Forward clutch worn ●O/D one–way clutch not operating
N → R time lag is longer	●Line pressure too low ●Direct clutch worn ●1st and reverse brake worn ●O/D one–way clutch not operating properly

7. HYDRAULIC TEST

(a) MEASURE LINE PRESSURE

NOTICE:

- **Do the test at normal operation fluid temperature 50 – 80 ˚C (122 – 176 ˚F).**
- **The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.**
- **Be careful to prevent SST's hose from interfering with the exhaust pipe.**

(1) Warm up the ATF.

(2) Remove the test plug on the transaxle case front left side and connect SST.
(See page AX–18 for the location to connect SST)

SST 09992–00094 (09992–00230)

(3) Fully apply the parking brake and chock the 4 wheels.

(4) Connect an OBD II scan tool or LEXUS hand–held tester to DLC3.

(5) Start the engine and check idling speed.

(6) Keep your left foot pressed firmly on the brake pedal and shift into D position.

(7) Measure the line pressure when the engine is idling.

(8) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.

(9) In the same manner, do the test in R position.

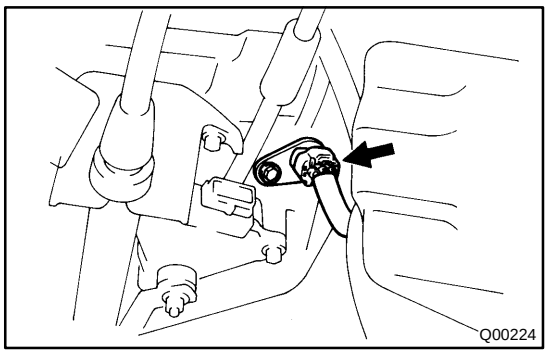
Specified line pressure:

Condition	D position kPa (kgf/cm^2, psi)	R position kPa (kgf/cm^2, psi)
Idling	401 – 461 (4.1 – 4.7, 58 – 66)	804 – 882 (8.2 – 9.0, 117 – 128)
Stall	1,138 – 1,236 (11.6 – 12.6, 165 – 179)	1,716 – 1,854 (17.5 – 18.9, 249 – 269)

If the measured pressure is not up to specified value, recheck the throttle cable adjustment and retest.

Evaluation

Problem	Possible cause
If the measured values at all position are higher	●Throttle cable out of adjustment ●Throttle valve defective ●Regulator valve defective
If the measured values at all position are lower	●Throttle cable out of adjustment ●Throttle valve defective ●Regulator valve defective ●Oil pump defective ●O/D direct clutch defective
If pressure is low in the D position only	●D position circuit fluid leakage ●Forward clutch defective
If pressure is low in the R position only	●R position circuit fluid leakage ●Direct clutch defective ●1st and reverse brake defective



8. MANUAL SHIFTING TEST

HINT:With this test, it can be determined whether the trouble is within the electrical circuit or is a mechanical problem in the transaxle.

(a) DISCONNECT SOLENOID WIRE

(b) INSPECT MANUAL DRIVING OPERATION

Check that the shift and gear positions correspond with the table below.

While driving, shift through the L, 2 and D positions. Check that the gear change corresponds to the shift position.

Shift Position	Gear Position
D	O/D
2	O/D
L	1st
R	Reverse
P	Pawl Lock

HINT:If the L, 2 and D position gear positions are difficult to positions are difficult to distinguish, do the following read test.

If any abnormality is found in the above test, the problem is in the transaxle itself.

(c) CONNECT SOLENOID WIRE

(d) CANCEL OUT DTC (See page DI–150).

DI0CH–01

DIAGNOSTIC TROUBLE CODE CHART

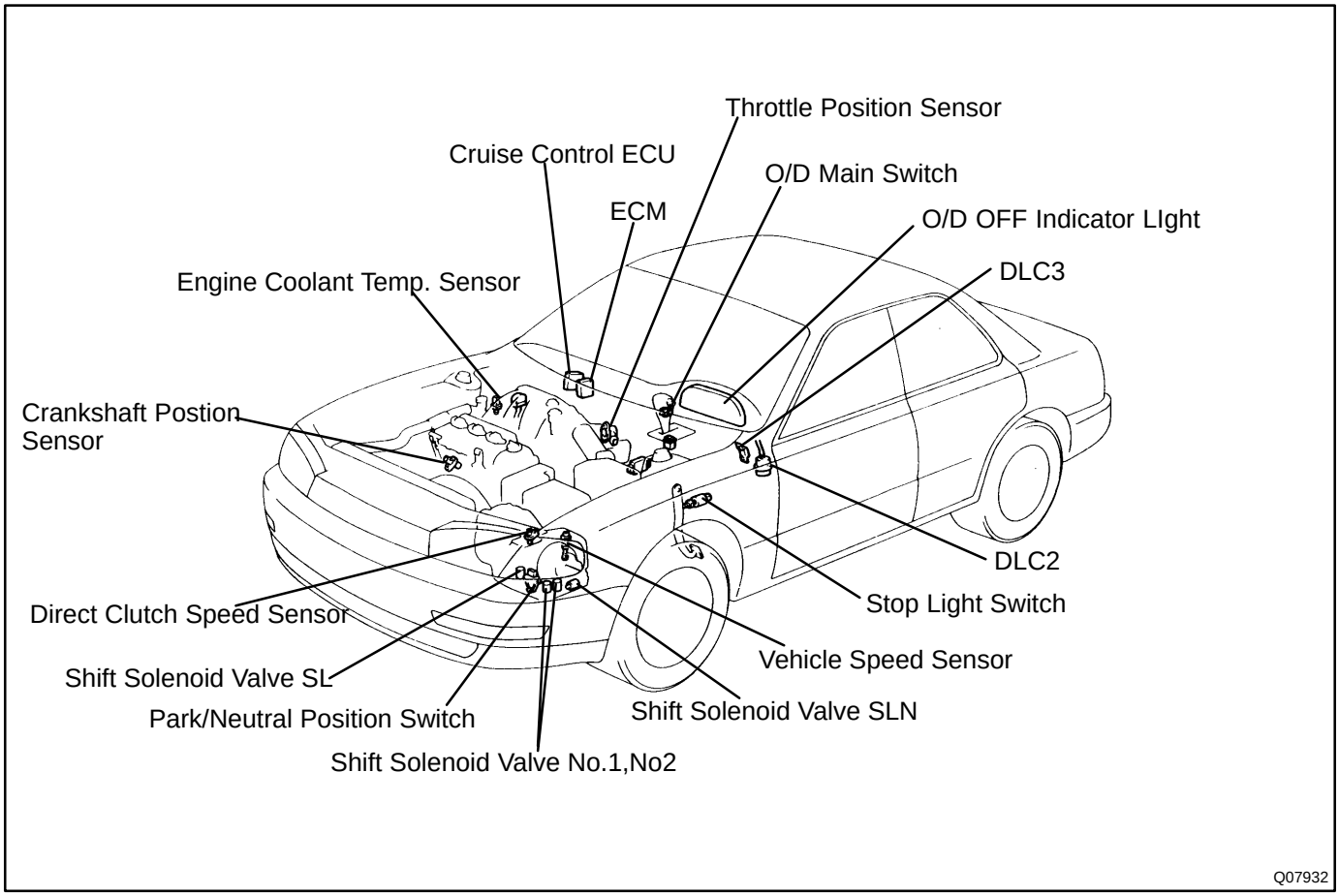
If a DTC is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the page given.

* : –...MIL does not light /● ...MIL light up

DTC No. (See Page)	Detection Item	Trouble Area	MIL *	Memory
P0500 (DI–106)	Vehicle Speed Sensor Malfunction (No.1 Vehicle Speed Sensor)	□Open or short in No.1 vehicle speed sensor circuit □No.1 vehicle speed sensor □Combination meter □ECM	●	○
P0750 (DI–169)	Shift Solenoid A Malfunction (Shift Solenoid Valve No.1)	□Shift solenoid valve No.1 is stuck open or closed □Valve body is blocked up or stuck	●	○
P0753 (DI–170)	Shift Solenoid A Electrical Malfunction (Shift Solenoid Valve No.1)	□Open or short in shift solenoid valve No.1 circuit □Shift solenoid valve No.1 □ECM	●	○
P0755 (DI–169)	Shift Solenoid B Malfunction (Shift Solenoid Valve No.2)	□Shift solenoid valve No.2 is stuck open or closed □Valve body is blocked up or stuck	●	○
P0758 (DI–170)	Shift Solenoid B Electrical Malfunction (Shift Solenoid Valve No.2)	□Open or short in shift solenoid valve No.2 circuit □Shift solenoid valve No.2 □ECM	●	○
P0770 (DI–174)	Shift Solenoid E Malfunction (Shift Solenoid Valve SL)	□Shift solenoid valve SL is stuck open or closed □Valve body is blocked up or stuck □Lock–up clutch	●	○
P0773 (DI–176)	Shift Solenoid E Electrical Malfunction (Shift Solenoid Valve SL)	□Open or short in shift solenoid valve SL circuit □Shift solenoid valve SL □ECM	●	○
P1520 (DI–179)	Stop Light Switch Signal Malfunction	□Open or short in stop light switch circuit □Stop light switch □ECM	●	○
P1705 (DI–180)	NC2 Revolution Sensor Circuit Malfunction (Direct Clutch Speed Sensor)	□Open or short in direct clutch speed sensor circuit □Direct clutch speed sensor □ECM	●	○
P1765 (DI–182)	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (Shift Solenoid Valve SLN)	□Open or short in shift solenoid valve SLN circuit □Shift solenoid valve SLN □ECM	●	○
P1780 (DI–185)	Park/Neutral Position Switch Malfunction	□Short in park/neutral position switch circuit □Park/neutral position switch □ECM	●	○

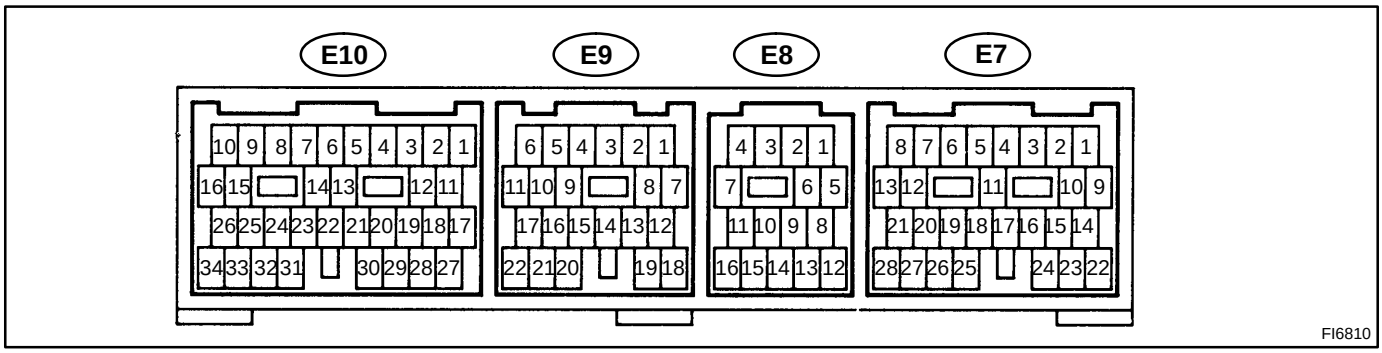
DI0CJ–01

PARTS LOCATION



DI0CL–01

TERMINALS OF ECM



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SPD ↔ E1 (E7–12 ↔ E8–16)	V–W ↔ BR	IG ON and Vehicle stationary	Below 1
		IG ON and Turn one rear wheel slowly	Pulse signal is output Below 1 ↔ 5
S1 ↔ E1 (E10–11 ↔ E8–16)	V ↔ BR	IG ON	10 ~ 14
		1st or 2nd gear	10 ~ 14
		3rd or O/D gear	Below 1
S2 ↔ E1 (E10–17 ↔ E8–16)	L–B ↔ BR	IG ON	Below 1
		1st or 2nd gear	10 ~ 14
		3rd or O/D gear	Below 1
SL ↔ E1 (E10–27 ↔ E8–16)	P–L ↔ BR	IG ON	Below 1
		Vehicle driving under lock–up position	10 ~ 14
$NC2^{+}$ ↔ $NC2^{-}$ (E9–9 ↔ E9–4)	Y–B ↔ W–L	Engine is running	Pulse signal is output Below 1 ↔ 4 ~ 5
SLN^{+} ↔ SLN^{-} (E10–2 ↔ E 8–2)	B–O ↔ LG–R	IG ON	10 ~ 14
OD1 ↔ E1 (E7–7 ↔ E8–16)	Y–B ↔ BR	IG ON	5 ~ 6
OD2 ↔ E1 (E7–6 ↔ E8–16)	G–O ↔ BR	O/D main switch ON	10 ~ 14
		O/D main switch OFF	Below 1
L ↔ E1 (E7–1 ↔ E8–16)	Y ↔ BR	IG ON and Shift lever L position	10 ~ 14
		IG ON and Shift lever other than L position	Below 1
2 ↔ E1 (E7–10 ↔ E8–16)	O ↔ BR	IG ON and Shift lever 2 position	10 ~ 14
		IG ON and Shift lever other than 2 position	Below 1
R ↔ E1 (E7–15 ↔ E8–16)	R–B ↔ BR	IG ON and Shift lever R position	10 ~ 14
		IG ON and Shift lever other than R position	Below 1
NSW ↔ E1 (E10–14 ↔ E8–16)	B–W ↔ BR	IG ON and Shift lever P or N position	10 ~ 14
		IG ON and Shift lever other than P or N position	Below 1
STP ↔ E1 (E7–24 ↔ E8–16)	G–W ↔ BR	IG ON and Brake pedal is depressed	7.5 ~ 14
		IG ON and Brake pedal is released	Below 1

DI0CO–01

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the diagnostic trouble code check but the trouble still occurs, check the circuits for each symptom in the order given in the charts on the following pages and proceed to the page given for troubleshooting.

The Matrix Chart is divided into 3 chapters.

Chapter 1: Electronic Circuit Matrix Chart

Chapter 2: On–vehicle Repair Matrix Chart

Chapter 3: Off–vehicle repair Matrix Chart

- ☐ If the instruction ”Proceed to next circuit inspection shown on matrix chart” is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- ☐ If the trouble still occurs even though there are no abnormalities in any of the other circuits, then check and replace the ECM.

1. Chapter 1: Electronic Circuit Matrix Chart

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse position	1. On–vehicle repair matrix chart 2. Off–vehicle repair matrix chart	DI–164 DI–164
No up–shift (1st → 2nd)	1. Shift solenoid valve No.1 and No.2 circuit 2. Throttle position sensor circuit 3. Vehicle speed sensor circuit 4. On–vehicle repair matrix chart 5. Off–vehicle repair matrix chart 6. ECM	DI–170 DI–38 DI–106 DI–164 DI–164 IN–27
No up–shift (2nd → 3rd)	1. Shift solenoid valve No.1 and No.2 circuit 2. Throttle position sensor circuit 3. Vehicle speed sensor circuit 4. On–vehicle repair matrix chart 5. Off–vehicle repair matrix chart 6. ECM	DI–170 DI–38 DI–106 DI–164 DI–164 IN–27
No up–shift (3rd → O/D)	1. O/D main switch circuit 2. O/D cancel signal circuit 3. Shift solenoid valve No.1 and No.2 circuit 4. Throttle position sensor circuit 5. Vehicle speed sensor circuit 6. On–vehicle repair matrix chart 7. Off–vehicle repair matrix chart 8. ECM	DI–190 DI–188 DI–170 DI–38 DI–106 DI–164 DI–164 IN–27
No down–shift (O/D → 3rd)	1. Throttle position sensor circuit 2. Shift solenoid valve No.1 and No.2 circuit 3. Vehicle speed sensor circuit 4. On–vehicle repair matrix chart 5. ECM	DI–38 DI–170 DI–106 DI–164 IN–27
No down–shift (3rd → 2nd)	1. Throttle position sensor circuit 2. Shift solenoid valve No.1 and No.2 circuit 3. Vehicle speed sensor circuit 4. On–vehicle repair matrix chart 5. ECM	DI–38 DI–170 DI–106 DI–164 IN–27
No down–shift (2nd → 1st)	1. Throttle position sensor circuit 2. Shift solenoid valve No.1 and No.2 circuit 3. Vehicle speed sensor circuit 4. On–vehicle repair matrix chart 5. ECM	DI–38 DI–170 DI–106 DI–164 IN–27

No lock–up or No lock–up off	1. Shift solenoid valve SL circuit 2. Stop light switch circuit 3. Throttle position sensor circuit 4. Vehicle speed sensor circuit 5. On–vehicle repair matrix chart 6. Off–vehicle repair matrix chart 7. ECM	DI–176 DI–123 DI–38 DI–106 DI–164 DI–164 IN–27
Shift point too high or too low	1. Throttle position sensor circuit 2. Vehicle speed sensor circuit 3. ECM	DI–38 DI–106 IN–27
Up–shift to 2nd while in L position	1. Park/neutral position switch circuit 2. ECM	DI–185 IN–27
Up–shift to 3rd while in L position	1. Park/neutral position switch circuit 2. ECM	DI–185 IN–27
Up–shift to O/D from 3rd	1. O/D main switch circuit 2. ECM	DI–190 IN–27
Up–shift to O/D from 3rd while engine is cold	1. Engine coolant temp. sensor circuit 2. ECM	DI–33 IN–27
Harsh engagement (N → D)	1. On–vehicle repair matrix chart 2. Off–vehicle repair matrix chart 3. ECM	DI–164 DI–164 IN–27
Harsh engagement (Lock–up)	1. Shift solenoid valve SL circuit 2. Throttle position sensor circuit 3. Vehicle speed sensor circuit 4. On–vehicle repair matrix chart 5. Off–vehicle repair matrix chart 6. ECM	DI–176 DI–38 DI–106 DI–164 DI–164 IN–27
Harsh engagement (Any driving position)	1. Throttle position sensor circuit 2. Vehicle speed sensor circuit 3. On–vehicle repair matrix chart 4. Off–vehicle repair matrix chart 5. ECM	DI–38 DI–106 DI–164 DI–164 IN–27
Slip or shudder (Forward and reverse)	1. On–vehicle repair matrix chart 2. Off–vehicle repair matrix chart	DI–164 DI–164
No engine braking	1. On–vehicle repair matrix chart 2. Off–vehicle repair matrix chart	DI–164 DI–164
Poor acceleration	1. Throttle position sensor circuit 2. Vehicle speed sensor circuit 3. Shift solenoid valve No.1 and No.2 circuit 4. Shift solenoid valve SL circuit 5. Off–vehicle repair matrix chart 6. ECM	DI–38 DI–106 DI–170 DI–176 DI–164 IN–27
Large shift shock or engine stalls when starting off or stopping	1. Shift solenoid valve SL circuit 2. Off–vehicle repair matrix chart 3. ECM	DI–176 DI–164 IN–27

2. Chapter 2: On–Vehicle Repair (● : A541E AUTOMATIC TRANSAXLE Repair Manual Pub. No. RM530U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse position	1. Manual valve 2. Throttle valve 3. Primary regulator valve 4. Off–vehicle repair matrix chart	● ● ● DI–164
Vehicle does not move in R position	1. Off–vehicle repair matrix chart	DI–164
No up–shift (1st → 2nd)	1. 1–2 shift valve 2. Off–vehicle repair matrix chart	● DI–164
No up–shift (2nd → 3rd)	1. 2–3 shift valve 2. Off–vehicle repair matrix chart	● DI–164
No up–shift (3rd → O/D)	1. 3–4 shift valve 2. Off–vehicle repair matrix chart	● DI–164
No down–shift (O/D → 3rd)	1. 3–4 shift valve	●
No down–shift (3rd → 2nd)	1. 2–3 shift valve	●
No down–shift (2nd → 1st)	1. 1–2 shift valve	●
No lock–up or No lock–up off	1. Lock–up relay valve 2. Off–vehicle repair matrix chart	● DI–164
Harsh engagement (N → D)	1. C_1 accumulator 2. Off–vehicle repair matrix chart	● DI–164
Harsh engagement (N → R)	1. C_2 accumulator 2. No.1 accumulator control valve 3. Off–vehicle repair matrix chart	● ● DI–164
Harsh engagement (N → L)	1. Low coast modulator valve	●
Harsh engagement (Lock–up)	1. Lock–up relay valve 2. Off–vehicle repair matrix chart	● DI–164
Harsh engagement (1st → 2nd → 3rd → O/D)	1. Throttle modulator valve 2. Cut back valve 3. Throttle valve	● ● ●
Harsh engagement (2nd → 3rd)	1. C_2 accumulator	●
Harsh engagement (3rd → O/D)	1. B_0 accumulator	●
Harsh engagement (O/D → 3rd)	1. C_0 accumulator 2. B_0 accumulator	● ●
Slip or shudder (Forward and reverse)	1. Throttle valve 2. Oil strainer 3. Off–vehicle repair matrix chart	● ● DI–164
No engine braking (1st: L position)	1. Low coast modulator valve 2. Off–vehicle repair matrix chart	● DI–164
No engine braking (2nd: 2 position)	1. 2nd coast modulator valve 2. Off–vehicle repair matrix chart	● DI–164
No kick–down	1. 1–2 shift valve 2. 2–3 shift valve 3. 3–4 shift valve	● ● ●

3. Chapter 3: Off–Vehicle Repair (● : A541E AUTOMATIC TRANSAXLE Repair Manual Pub. No. RM530U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse position	1. Front and rear planetary gear 2. O/D planetary gear 3. O/D one–way clutch (F_0) 4. O/D direct clutch (C_0) 5. Forward clutch (C_1) 6. O/D brake (B_0)	● ● ● ● ● ●
Vehicle does not move in R position	1. Front and rear planetary gear unit 2. Direct clutch (C_2) 3. O/D direct clutch (C_0) 4. 1st and reverse brake (B_3)	● ● ● ●
No up–shift (1st → 2nd)	1. No. 1 one–way clutch (F_1) 2. 2nd brake (B_2)	● ●
No up–shift (2nd → 3rd)	1. Direct clutch (C_2)	●
No up–shift (3rd → O/D)	1. O/D brake (B_0)	●
No lock–up or No lock–up off	1. Torque converter clutch	●
Harsh engagement (N → D)	1. Forward clutch (C_1) 2. O/D one–way clutch (F_0) 3. No. 2 one–way clutch (F_2)	● ● ●
Harsh engagement (N → R)	1. Direct clutch (C_2) 2. 1st and reverse brake (B_3)	● ●
Harsh engagement (Lock–up)	1. Torque converter clutch	●
Slip or shudder (Forward position: After warm–up)	1. Torque converter clutch 2. O/D direct clutch (C_0) 3. Forward clutch (C_1) 4. O/D one–way clutch (F_0)	● ● ● ●
Slip or shudder (R position)	1. Direct clutch (C_2) 2. 1st and reverse brake (B_3) 3. O/D direct clutch (C_0)	● ● ●
Slip or shudder (1st)	1. No. 2 one–way clutch (F_2)	●
Slip or shudder (2nd)	1. No. 1 one–way clutch (F_1) 2. 2nd brake (B_2)	● ●
Slip or shudder (3rd)	1. Direct clutch (C_2)	●
Slip or shudder (O/D)	1. O/D brake (B_0)	●
No engine braking (1st ~ 3rd: D position)	1. 2nd brake (B_2)	●
No engine braking (1st: L position)	1. 1st and reverse brake (B_3)	●
No engine braking (2nd: 2 position)	1. 2nd coast brake (B_1)	●
Poor acceleration (All position)	1. Torque converter clutch 2. O/D planetary gear	● ●
Poor acceleration (O/D)	1. O/D direct clutch (C_0) 2. O/D planetary gear	● ●
Large shift shock or engine stalls when starting off or stopping	1. Torque converter clutch	●

DI0CQ–01

CIRCUIT INSPECTION

DTC	P0500	Vehicle Speed Sensor Malfunction (No.1 Vehicle Speed Sensor)

See page DI–106.

DTC	P0750, P0755	Shift Solenoid A/B Malfunction (Shift Solenoid Valve No.1/No.2)

SYSTEM DESCRIPTION

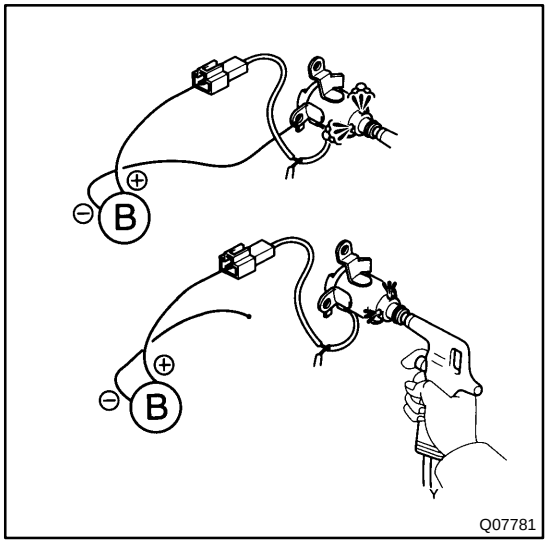
The ECM uses signals from the vehicle speed sensor to detect the actual gear position (1st, 2nd, 3rd or O/D gear).
Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical trouble of the shift solenoid valves and valve body.

DTC No.	DTC Detecting Condition	Trouble Area
P0750 P0755	During normal driving, the gear required by the ECM does not match the actual gear (2 trip detection logic)	●Shift solenoid valve No.1/No.2 is stuck open or closed ●Valve body is blocked up or stuck

Check the shift solenoid valve No.1 when DTC P0750 is output and check the shift solenoid valve No.2 when DTC P0755 is output.

INSPECTION PROCEDURE

1	Check shift solenoid valve No.1 or No.2 operation.



PREPARATION:
(a) Remove the oil pan.
(b) Remove the shift solenoid valve No.1 or No.2.

CHECK:
(a) Applying 490 kPa (5 kgf/cm^2, 71 psi) of compressed air, check that the solenoid valve does not leak air.
(b) When battery positive voltage is supplied to the shift solenoid valve, check that the valve opens.

NG → **Replace the shift solenoid valve No.1 or No.2.**

OK →

Check the valve body (See page DI–164).

DTC	P0753, P0758	Shift Solenoid A/B Electrical Malfunction (Shift Solenoid Valve No.1/No.2)

CIRCUIT DESCRIPTION

Shifting from 1st to O/D is performed in combination with ON and OFF of the shift solenoid valves No.1 and No.2 controlled by ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

Fail Safe Function:

If either of the shift solenoid valve circuits develops an open or short, the ECM turns the other shift solenoid ON and OFF to shift to the gear positions shown in the table below. The ECM also turns the shift solenoid valve SL OFF at the same time. If both solenoids are malfunction, hydraulic control cannot be performed electronically and must be done manually.

Manual shifting as shown in the following table must be done (In the case of a short circuit, the ECM stops sending current to the short circuited solenoid).

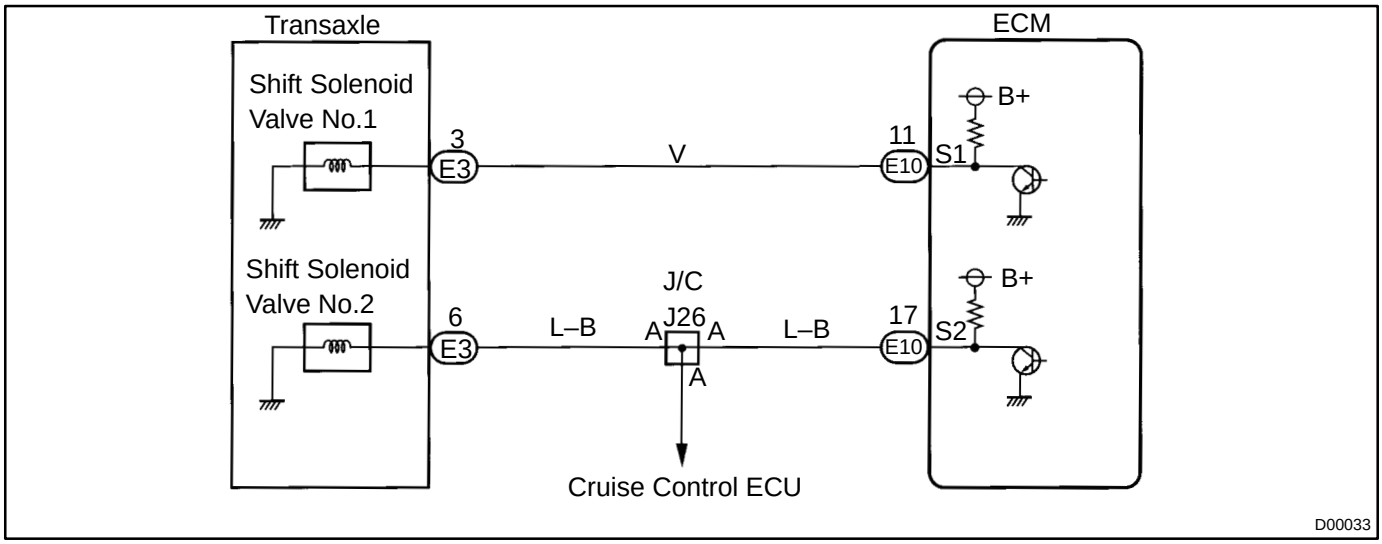
Position	NORMAL			SHIFT SOLENOID NO.1 MALFUNCTIONING			SHIFT SOLENOID NO.2 MALFUNCTIONING			BOTH SOLENOIDS MALFUNCTIONING
	Solenoid valve		Gear	Solenoid valve		Gear	Solenoid valve		Gear	Gear when shift selector is manually operated
	No.1	No.2		No.1	No.2		No.1	No.2		
D	ON	OFF	1st	X	ON	3rd	ON	X	1st	O/D
	ON	ON	2nd	X	ON	3rd	OFF	X	O/D	O/D
	OFF	ON	3rd	X	ON	3rd	OFF	X	O/D	O/D
	OFF	OFF	O/D	X	OFF	O/D	OFF	X	O/D	O/D
2	ON	OFF	1st	X	ON	3rd	ON	X	1st	O/D
	ON	ON	2nd	X	ON	3rd	OFF	X	O/D	O/D
	OFF	ON	3rd	X	ON	3rd	OFF	X	O/D	O/D
L	ON	OFF	1st	X	OFF	1st	ON	X	1st	1st
	ON	ON	2nd	X	ON	2nd	ON	X	1st	1st

X: Malfunctions

Check the shift solenoid valve No.1 when DTC P0753 is output and check the shift solenoid valve No.2 when DTC P0758 is output.

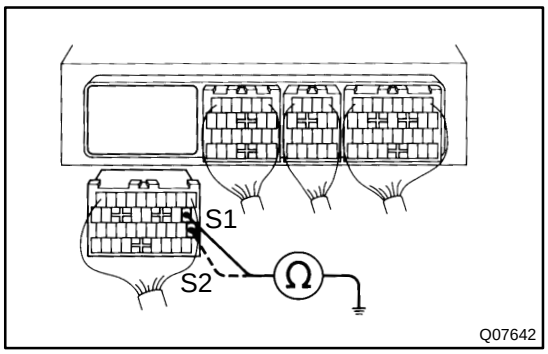
DTC No.	DTC Detecting Condition	Trouble Area
P0753 P0758	The ECM checks for an open or short circuit in the shift solenoid valves No.1 and No.2 circuit when it changes. The ECM records DTC P0753 or P0758 if condition (a) or (b) is detected once, but it does not light up MIL. After ECM detects condition a) or b) continuously 8 times or more in a trip and the MIL light up. (a) When the solenoid is energized, the solenoid resistance is 8 Ω or less and is counted. (b) When the solenoid is not energized, the solenoid resis tance is 100 kΩ or more and is counted.	●Open or short in shift solenoid valve No.1/No.2 circuit ●Shift solenoid valve No.1/No.2 ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Measure resistance between terminal S1 or S2 of ECM and body ground.**

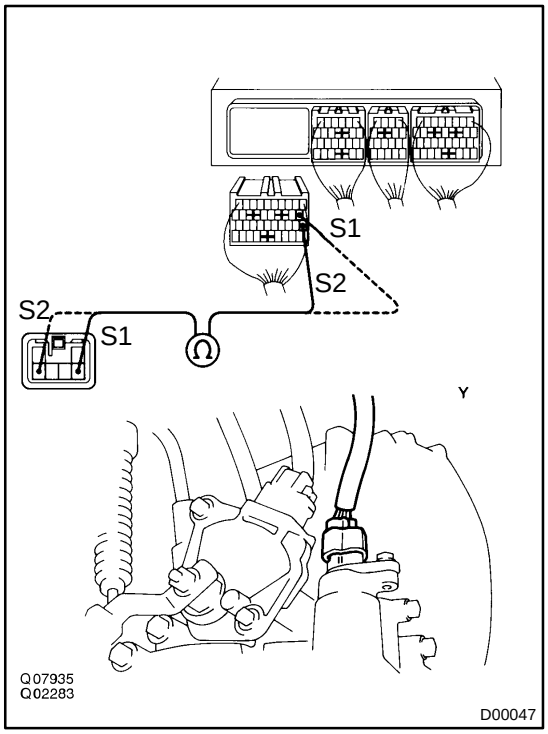


PREPARATION:
Disconnect the connector from ECM.
CHECK:
Measure resistance between terminal S1 or S2 of ECM and body ground.
OK:
Resistance: 11 ~ 15 Ω

OK → **Check and replace the ECM.**

NG

2	**Check harness and connector between ECM and automatic transaxle solenoid connector.**



PREPARATION:

Disconnect the solenoid connector from the automatic transaxle.

CHECK:

Check the harness and connector between terminal S1 or S2 of ECM and terminal S1 or S2 of solenoid connector.

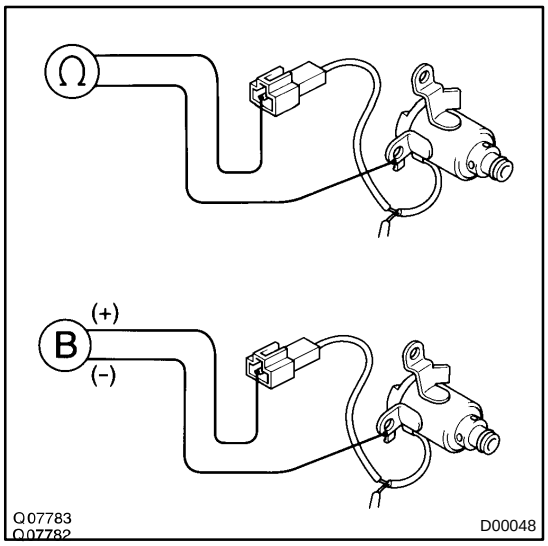
OK:

There is no open and no short circuit.

NG → **Repair or replace the harness or connector.**

OK

3	Check shift solenoid valve No.1 or No.2.



PREPARATION:

(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Disconnect the solenoid connector.
(d) Remove the shift solenoid valve No.1 or No.2.

CHECK:

(a) Measure resistance between solenoid connector and body ground.
(b) Connect the positive ~ lead to terminal of solenoid connector, negative ⊖ lead to solenoid body.

OK:

(a) Resistance: 11 ~ 15 Ω
(b) The solenoid makes an operating noise.

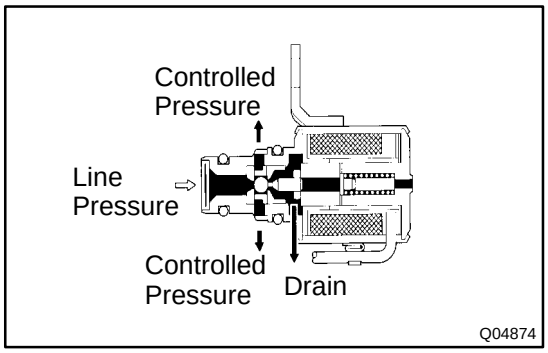
NG → **Replace the solenoid valve.**

OK

Repair or replace the solenoid wire.

DI0CU–01

DTC	P0770	Shift Solenoid E Malfunction (Shift Solenoid Valve SL)



SYSTEM DESCRIPTION

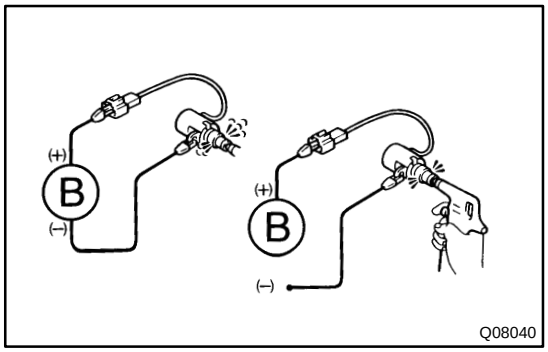
The ECM uses the signals from the Throttle position sensor, Air–flow meter and crankshaft position sensor to monitor the engagement condition of the lock–up clutch.

Then the ECM compares the engagement condition of the lock–up clutch with the lock–up schedule in the ECM memory to detect mechanical trouble of the shift solenoid valve SL, valve body and torque converter clutch.

DTC No.	DTC Detecting Condition	Trouble Area
P0770	Lock–up does not occur when driving in the lock–up range (normal driving at 80 km/h [50 mph]), or lock–up remains ON in the lock–up OFF range. (2 trip detection logic)	●Shift solenoid valve SL is stuck open or closed ●Valve body blocked up or stuck ●Lock–up clutch

INSPECTION PROCEDURE

1	Check solenoid valve SL operation.



PREPARATION:

(a) Remove the oil pan.

(b) Remove the shift solenoid valve SL.

CHECK:

(a) Applying 490 kPa (5 kgf/cm^2, 71 psi) of compressed air, check that the solenoid valve does not leak air.

(b) When battery positive voltage is supplied to the shift solenoid valve, check that the solenoid valve opens.

NG → **Replace the solenoid valve SL.**

OK

2	Check valve body (See page DI–164).

NG → Repair or replace the valve body.

OK →

Replace the torque converter clutch (See page AX–18).

DTC	P0773	Shift Solenoid E Electrical Malfunction (Shift Solenoid Valve SL)

CIRCUIT DESCRIPTION

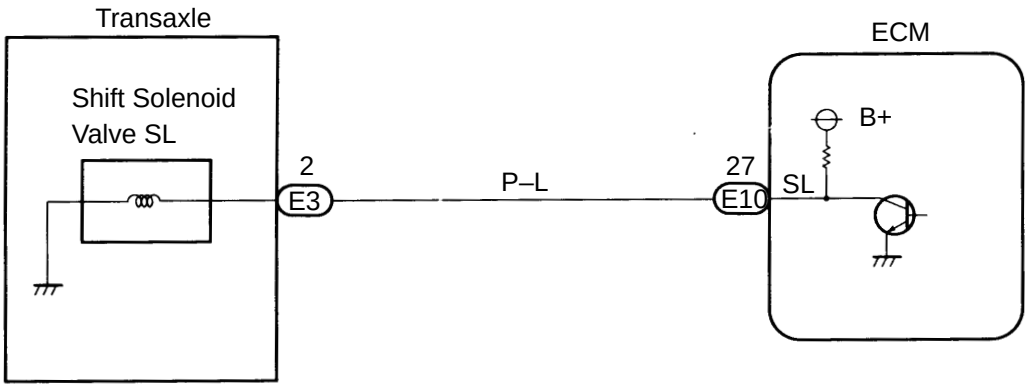
The shift solenoid valve SL is turned ON and OFF by signals from the ECM to control the hydraulic pressure acting on the lock–up relay valve, which then controls operation of the lock–up clutch.

Fail safe function

If the ECM detects a malfunction, it turns the shift solenoid valve SL OFF.

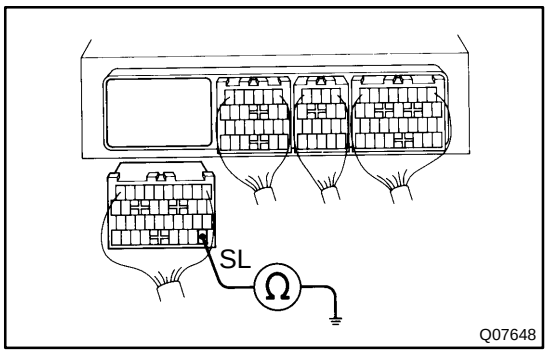
DTC No.	DTC Detecting Condition	Trouble Area
P0773	Either (a) or (b) are detected for 1 time. (2 trip detection logic) (a) Solenoid resistance is 8 Ω or less short circuit when sole noid is energized. (b) Solenoid resistance is 100 kΩ or more open circuit when solenoid is not energized.	●Open or short in shift solenoid valve SL circuit ●Shift solenoid valve SL ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Measure resistance between terminal SL of ECM and body ground.**

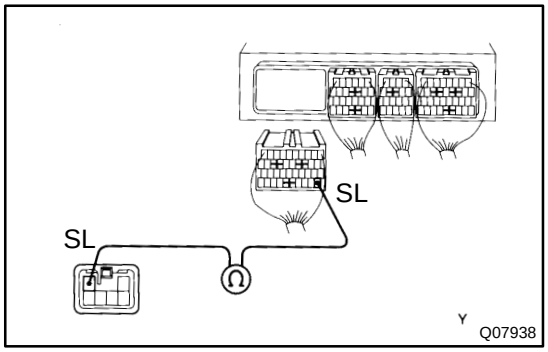


PREPARATION:
Disconnect the connector from ECM.
CHECK:
Measure resistance between terminal SL of ECM and body ground.
OK:
Resistance: 8 ~ 100,000 Ω

OK	**Check and replace the ECM.**

NG

2	**Check harness and connector between ECM and automatic transaxle solenoid connector (See page IN–27).**

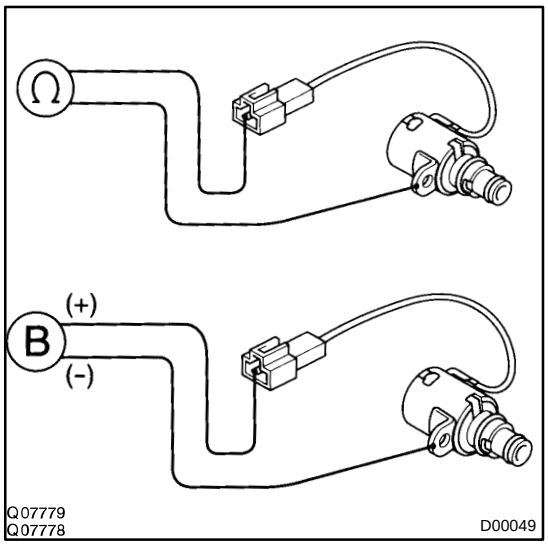


PREPARATION:
Disconnect the solenoid connector from the transaxle.
CHECK:
Check the harness and connector between terminal SL of ECM and terminal SL of solenoid connector.
OK:
There is no open or short circuit.

NG	**Repair or replace the harness or connector.**

OK

3	Check shift solenoid valve SL.



PREPARATION:

(a) Jack up the vehicle.
(b) Remove the oil pan.
(c) Disconnect the shift solenoid valve SL connector.
(d) Remove the shift solenoid valve SL.

CHECK:

(a) Measure resistance between terminal SL of shift solenoid valve and solenoid body.
(b) Connect positive ⊕ lead to terminal of solenoid connector, negative ⊖ lead to solenoid body.

OK:

(a) Resistance: 11 ~ 15 Ω
(b) The shift solenoid valve SL makes operation noise.

NG → **Replace the shift solenoid valve SL.**

OK

Check and replace or repair the solenoid wire.

DI0CW–04

DTC	P1520	Stop Light Switch Signal Malfunction

CIRCUIT DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling, while driving in lock–up condition, when brakes are suddenly applied.
When the brake pedal is operated, this switch sends a signals to ECM. Then the ECM cancels operation of the lock–up clutch while braking is in progress.

DTC No.	DTC Detecting Condition	Trouble Area
P1520	No stop light switch signal to ECM during driving. (2 trip detection logic)	●Open or short in stop light switch circuit ●Stop light switch ●ECM

WIRING DIAGRAM

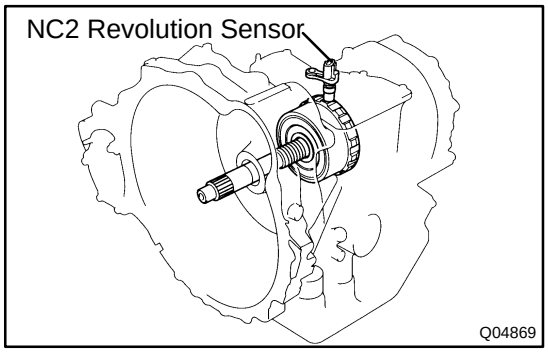
See page DI–123.

INSPECTION PROCEDURE

See page DI–123.

DTC	P1705	NC2 Revolution Sensor Circuit Malfunction (Direct Clutch Speed Sensor)

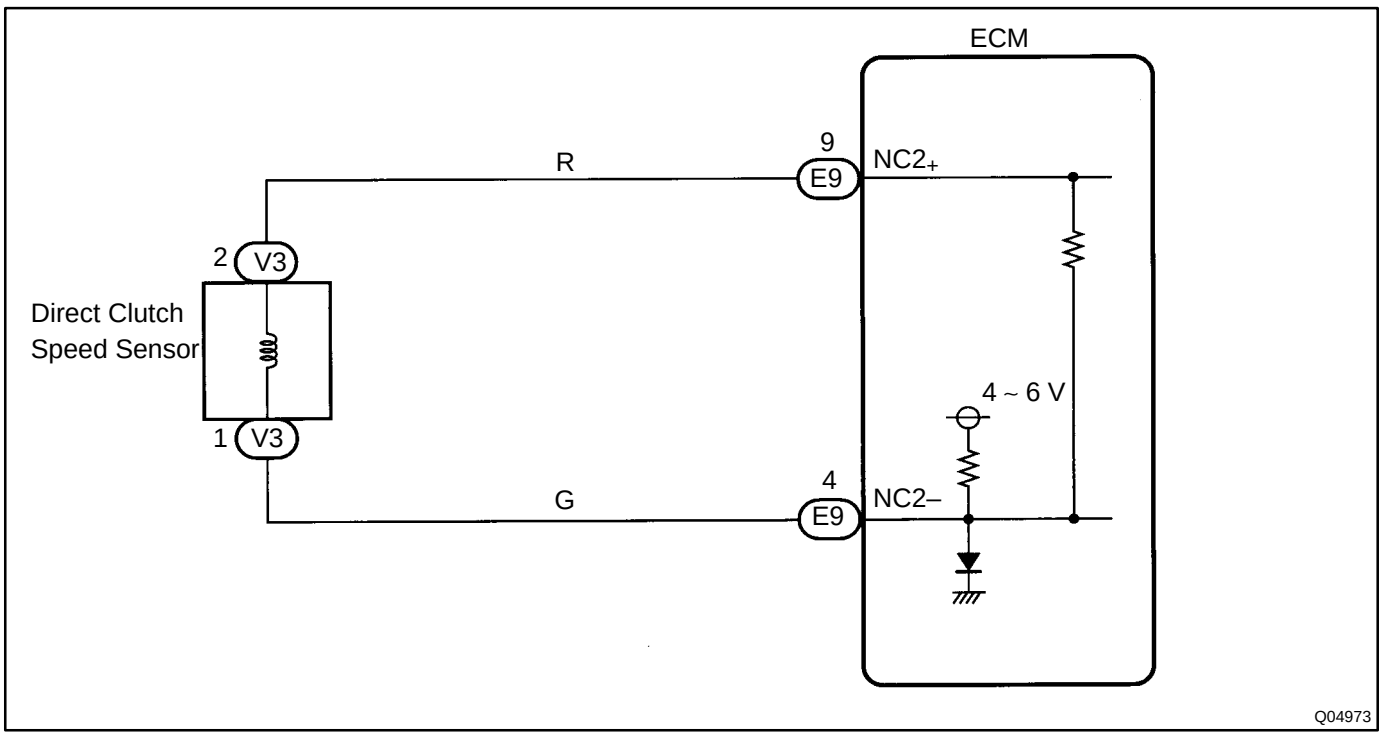
CIRCUIT DESCRIPTION



This sensor detects the rotation speed of the direct clutch drum. By comparing the direct clutch speed signal and the vehicle speed sensor signal, the ECM detects the shift timing of the gears and appropriately controls the engine torque and hydraulic pressure in response to various conditions, thus performing smooth gear shifting.

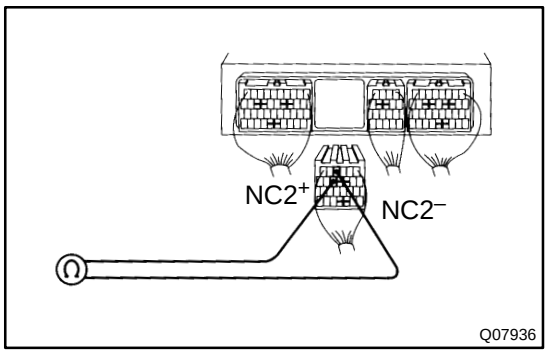
DTC No.	DTC Detecting Condition	Trouble Area
P1705	The ECM detects conditions (a), (b), (c), (d), (e) and f) continuity for 4 secs or more. (2 trip detection logic) (a) Vehicle speed : 32 km/h (20 mph) or more (b) 3rd or 4th gear (c) NC2 < 300 rpm (d) Park/neutral position switch: OFF (e) Solenoid valves and vehicle speed sensor are normal (f) L position: OFF	●Open or short in direct clutch speed sensor circuit ●Direct clutch speed sensor ●ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check resistance between terminals NC2+ and NC2– of ECM.

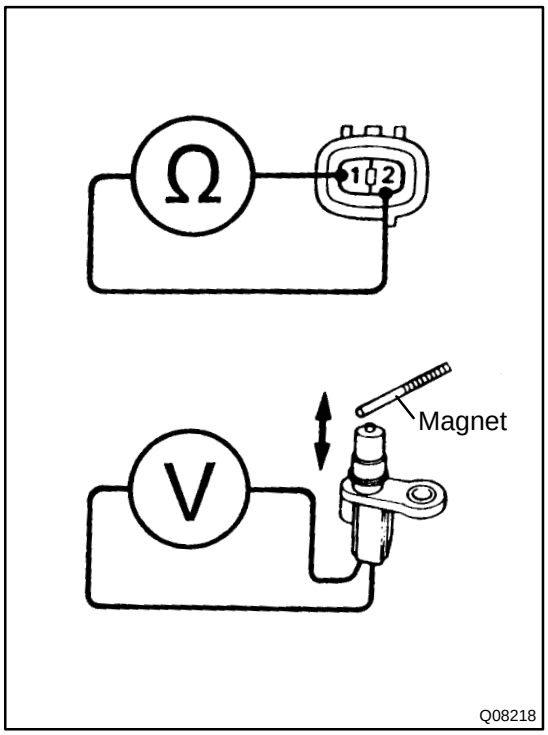


PREPARATION:
Disconnect the connector from ECM.
CHECK:
Check resistance between terminals NC2+ and NC2– of ECM.
OK:
Resistance: 560 ~ 680 Ω

OK → **Check and replace the ECM.**

NG

2	Check No.2 vehicle speed sensor.



PREPARATION:
Remove the Direct clutch speed sensor from transaxle.
CHECK:
(a) Measure resistance between terminals 1 and 2 of speed sensor.
(b) Check voltage between terminals 1 and 2 of the speed sensor when a magnet is put close to the front end of the speed sensor then taken away quickly.
OK:
(a) Resistance: 560 ~ 680 Ω
(b) Voltage is generated intermittently.
HINT:The voltage generated is extremely low.

NG → **Replace the Direct clutch speed sensor.**

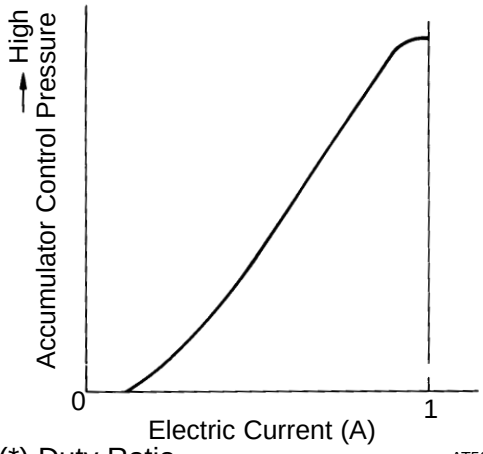
OK

Check and repair the harness and connector between ECM and Direct clutch speed sensor (See page IN–27).

DI0CY–01

DTC	P1765	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (Shift Solenoid Valve SLN)

CIRCUIT DESCRIPTION

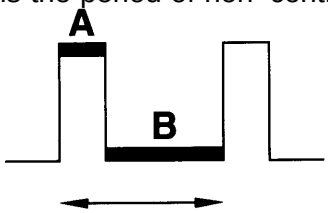


AT5608

The shift solenoid valve SLN controls the hydraulic pressure acting on the accumulator control valve when gears are shifted and performs smooth gear shifting.
The ECM determines optimum operating pressure according to the signals from the throttle position sensor, vehicle speed sensor and direct clutch speed sensor and controls the volume of current flow to the solenoid valve.
The amount of current to the solenoid is controlled by the (*) duty ratio of ECM output signals, causing a momentary change to the hydraulic pressure acting on the clutches during gear shifting.
When the duty ratio is high, the hydraulic pressure acting on the clutches is low.

(*) Duty Ratio
The duty ratio is the ratio of the period of continuity in one cycle.
For example, if A is the period of continuity in one cycle, and B is the period of non–continuity, then

$$\text{Duty Ratio} = \frac{A}{A+B} \times 100\ (\%)$$



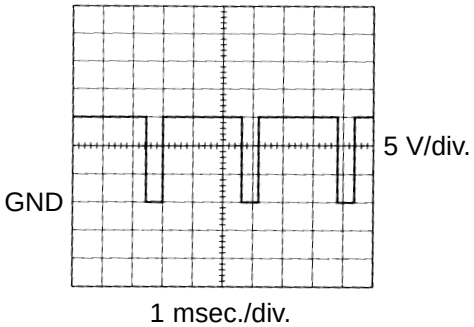
D00061 BE4056

D00060

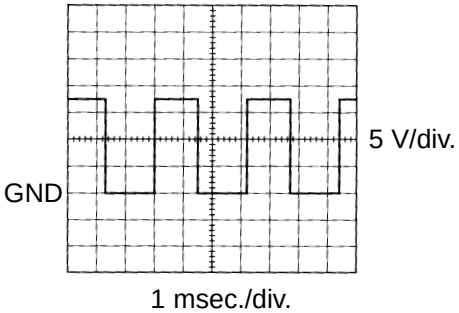
DTC No.	DTC Detecting Condition	Trouble Area
P1765	After the engine is warmed up, the current flow to the shift solenoid valve SLN for 1 sec or more under condition (a) or (b): (a) Engine speed: 500 rpm or more (b) Park/neutral position switch: ON (P or N position)	●Open or short in shift solenoid valve SLN circuit ●Shift solenoid valve SLN ●ECM

Reference

Waveform between terminals SLN^+ and SLN^- when engine is idling.



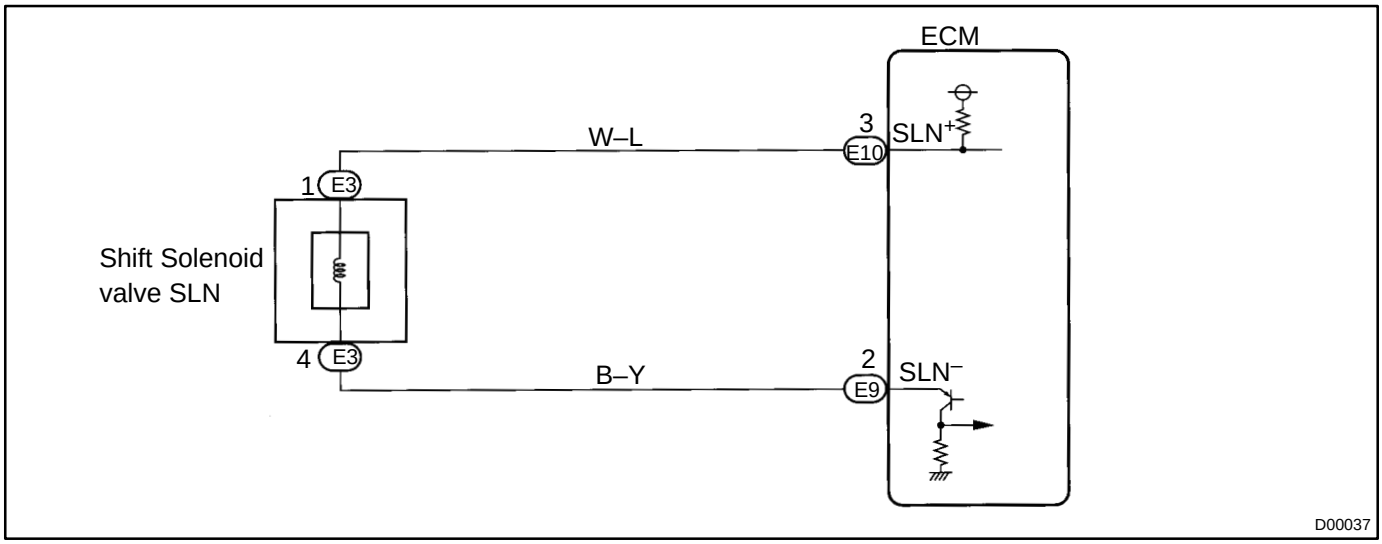
Waveform between terminals SLN^+ and SLN^- when during shift change.



AT8764 AT8766

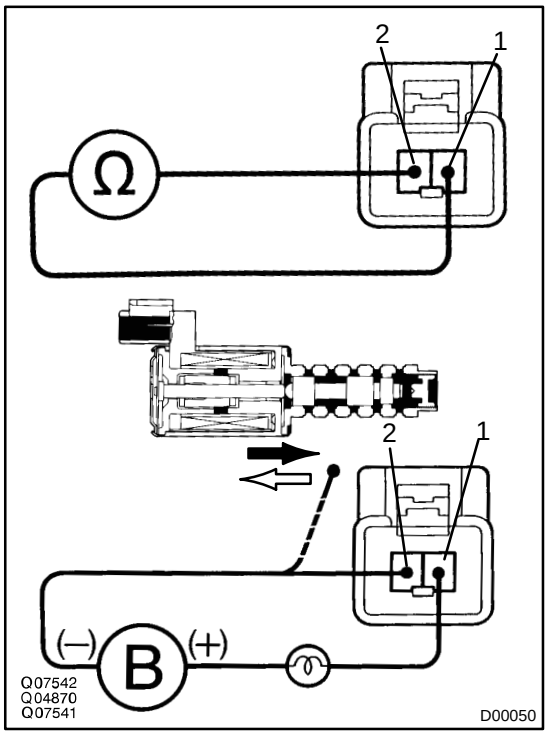
D00062

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check shift solenoid valve SLN.**



PREPARATION:

Disconnect the shift solenoid valve SLN connector.

CHECK:

(a) Measure resistance between terminals 1 and 2 of solenoid connector.

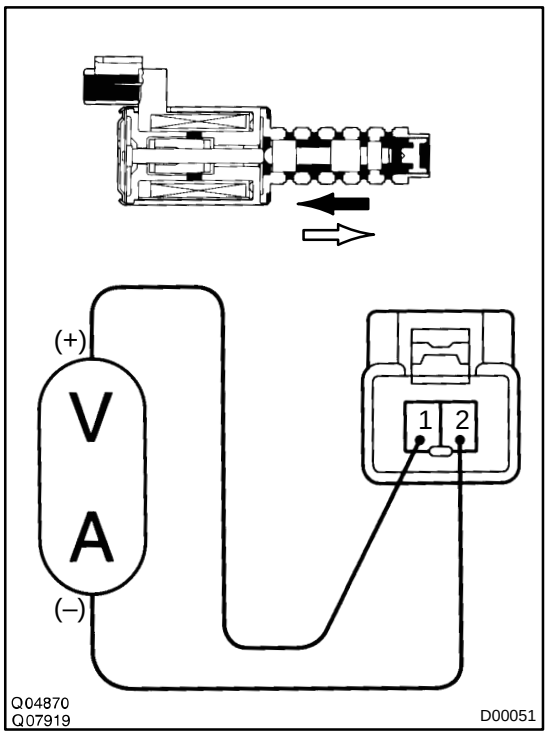
(b) Connect positive ⊕ lead with an 8 ~10 W bulb to terminal 1 of solenoid connector and negative ⊖ lead to terminal 2, then check the movement of the valve.

OK:

(a) Resistance: 5.1 ~ 5.5 Ω

(b)

When battery positive voltage is applied.	Valve move in direction in illustration. (on the left)
When battery positive voltage is cut off.	Valve move in direction in illustration. (on the right)



<Reference>

PREPARATION:

Connect positive ⊕ lead of the variable power supply to terminal 1 of solenoid connector and negative ⊖ lead to terminal 2.

CHECK:

(a) Check the movement of the valve when the voltage is gradually increased.
(A current greater than 1A should not be supplied.)

(b) Check the movement of the valve when the voltage is cut off.

OK:

(a) As the voltage is increased, the valve should move slowly in the ⇐ direction.
(b) The valve should return in the ⇒ direction.

NG	**Replace the shift solenoid valve SLN.**

OK

2	**Check harness and connector between battery and shift solenoid valve SLN, shift solenoid valve SLN and ECM (See page IN–27).**

NG	**Repair or replace the harness or connector.**

OK

Check and replace the ECM.

DI0CZ–01

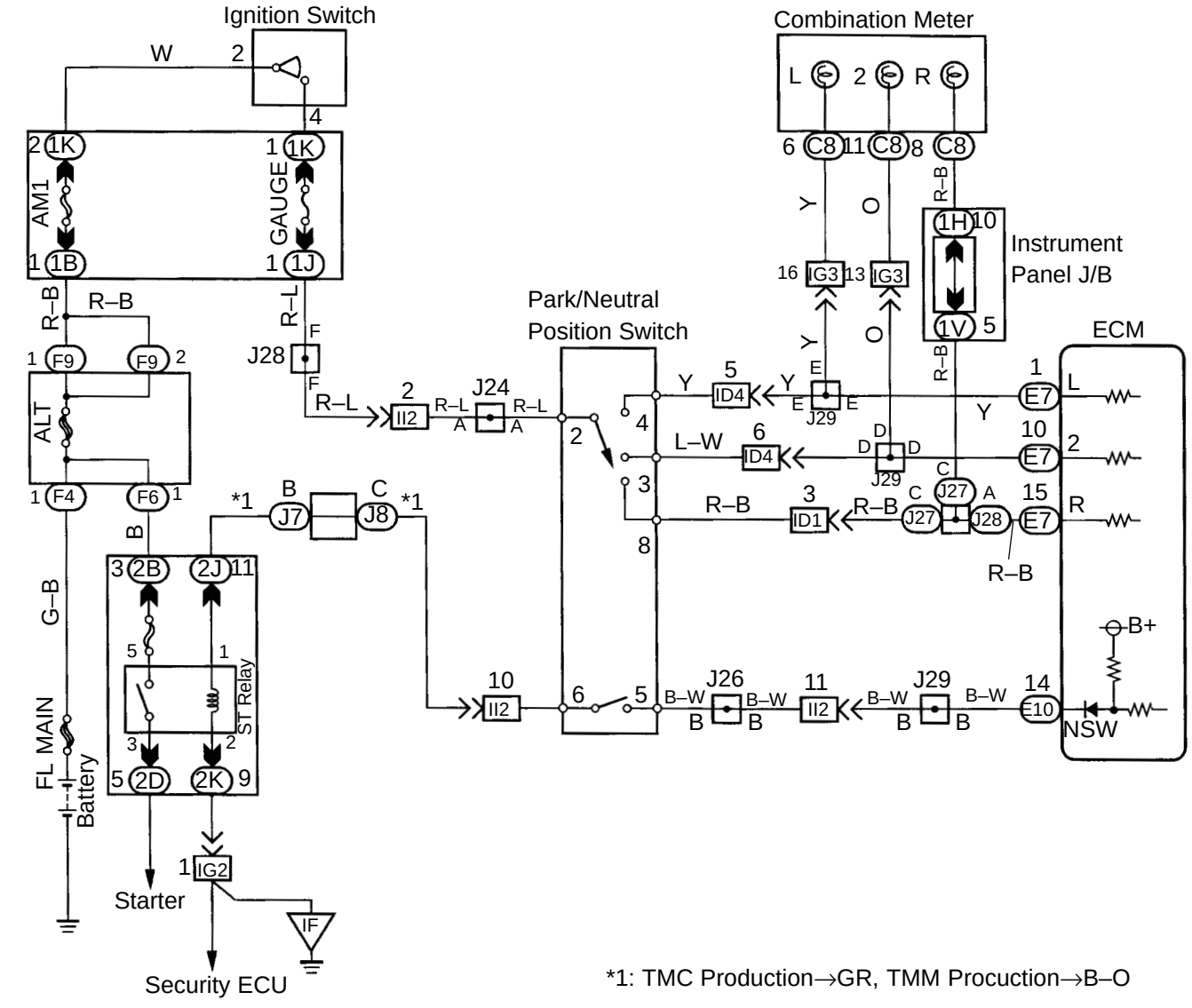
DTC	P1780	Park/Neutral Position Switch Malfunction

CIRCUIT DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECM.
The ECM receives signals (NSW, R, 2 and L) from the park/neutral position switch. When the signal is not sent to the ECM from the park/neutral position switch, the ECM judges that the shift lever is in D position.

DTC No.	DTC Detection Condition	Trouble Area
P1780	When driving under conditions (a) and (b) for 30 seconds or more, the park/neutral position switch is ON (N position). (2 trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 1,500 ~ 2,500 rpm	●Short in park/neutral position switch circuit ●Park/neutral position switch ●ECM

WIRING DIAGRAM



1997 LEXUS ES300 (RM511U)

D00107

INSPECTION PROCEDURE

1	**Read PNP, REVERSE, 2ND and LOW signals.**

When using LEXUS hand–held tester.

PREPARATION:

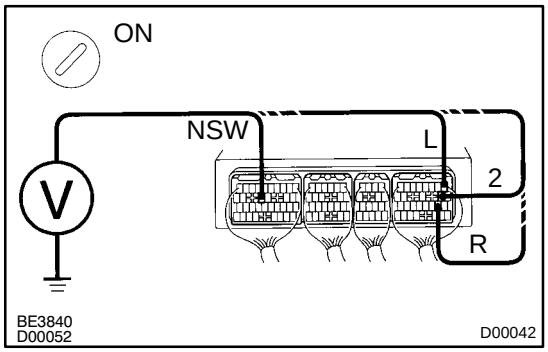
(a) Remove the DLC3 cover.
(b) Connect a LEXUS hand–held tester to the DLC3.
(c) Turn the ignition switch ON and LEXUS hand–held tester main switch ON.

CHECK:

Shift lever into the P, R, N, 2 and L positions, and read the PNP, REVERSE, 2ND and LOW signals on the LEXUS hand–held tester.

OK:

Shift position	Signal
2	2ND OFF → ON
L	LOW OFF → ON
R	REVERSE OFF → ON
P,N	NSW OFF → ON



When not using LEXUS hand–held tester.

PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between terminals NSW, 2, L and R of ECM and body ground when the shift lever is shifted to the following positions.

OK:

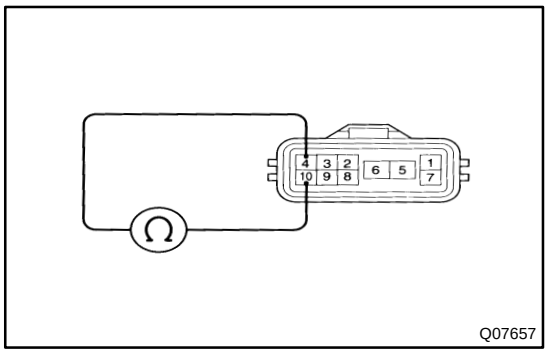
Position	NSW–Body ground	R–Body ground	2–Body ground	L–Body ground
P,N	0 V	0 V	0 V	0 V
R	9 ~ 14 V*	9 ~ 14 V*	0 V	0 V
D	9 ~ 14 V	0 V	0 V	0 V
2	9 ~ 14 V	0 V	9 ~ 14 V	0 V
L	9 ~ 14 V	0 V	0 V	9 ~ 14 V

HINT: The voltage will drop slightly due to lighting up of the back up light.

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–164).**

NG

2	Check park/neutral position switch.



PREPARATION:

(a) Jack up the vehicle.

(b) Remove the park/neutral position switch.

CHECK:

Check continuity between each terminal shown below when the shift lever is moved to each position.

Shift Position	Terminal No. to continuity	
P	2 – 7	5 – 6
R	2 – 8	–
N	2 – 9	5 – 6
D	2 – 10	–
2	2 – 3	–
L	2 – 4	–

OK:

There is continuity.

NG → **Replace the park/neutral position switch.**

OK ↓

3	Check harness and connector between battery and park/neutral position switch, park/neutral position switch and ECM (See page IN–27).

NG → **Repair or replace the harness and connector.**

OK ↓

Check and replace the ECM.

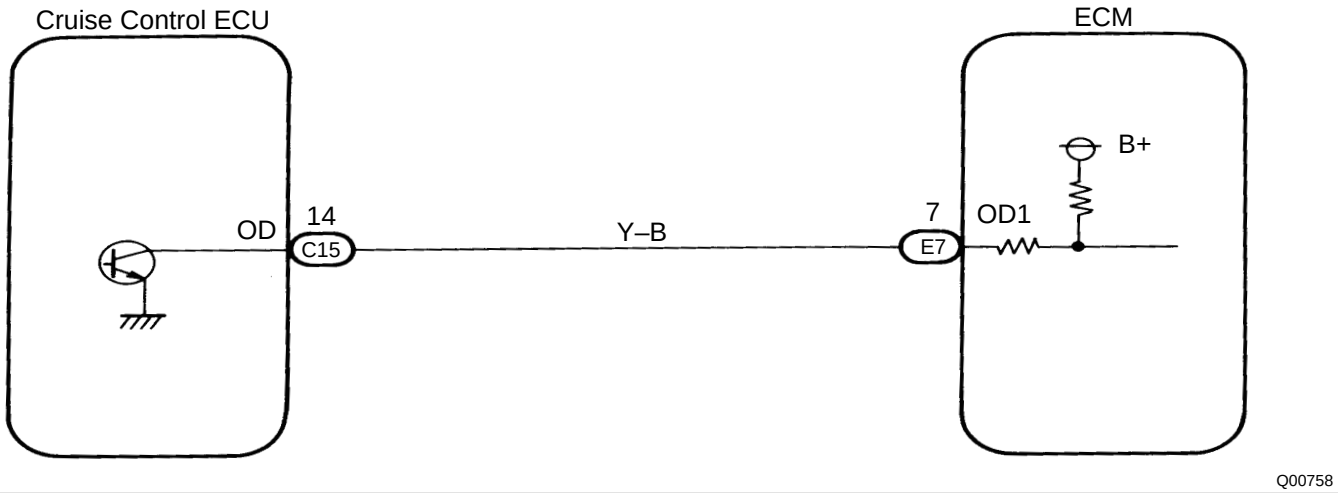
DI0D0–01

O/D Cancel Signal Circuit

CIRCUIT DESCRIPTION

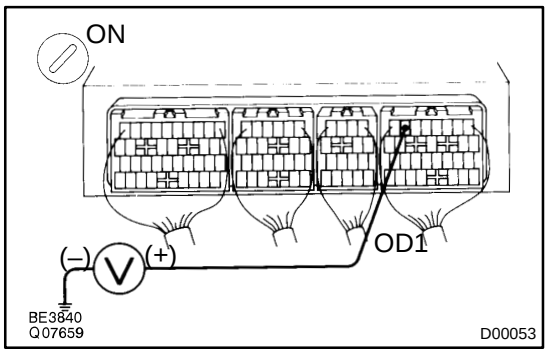
While driving uphill with cruise control activated, in order to minimize gear shifting and provide smooth cruising overdrive may be prohibited temporarily under some condition.
The cruise control ECU sends O/D cut signals to the ECM as necessary and the ECM cancels overdrive shifting until these signals are discontinued.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal OD1 of ECM and body ground.**

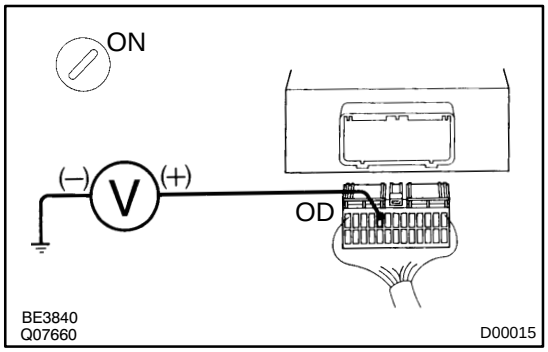


PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure voltage between terminal OD1 of ECM and body ground.
OK:
Voltage: 10 ~ 14 V

OK	**Proceed to next circuit inspection shown on matrix chart (See page DI–164).**

NG

2	**Check voltage between terminal OD of cruise control ECU harness side connector and body ground.**



PREPARATION:

(a) Disconnect the cruise control ECU connector.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal OD of cruise control ECU harness side connector and body ground.

OK:

Voltage: 10 ~ 14 V

OK → **Check and replace the cruise control ECU.**

NG

3	**Check harness and connector between cruise control ECU and ECM.**

NG → **Repair or replace the harness or connector.**

OK

Check and replace the ECM.

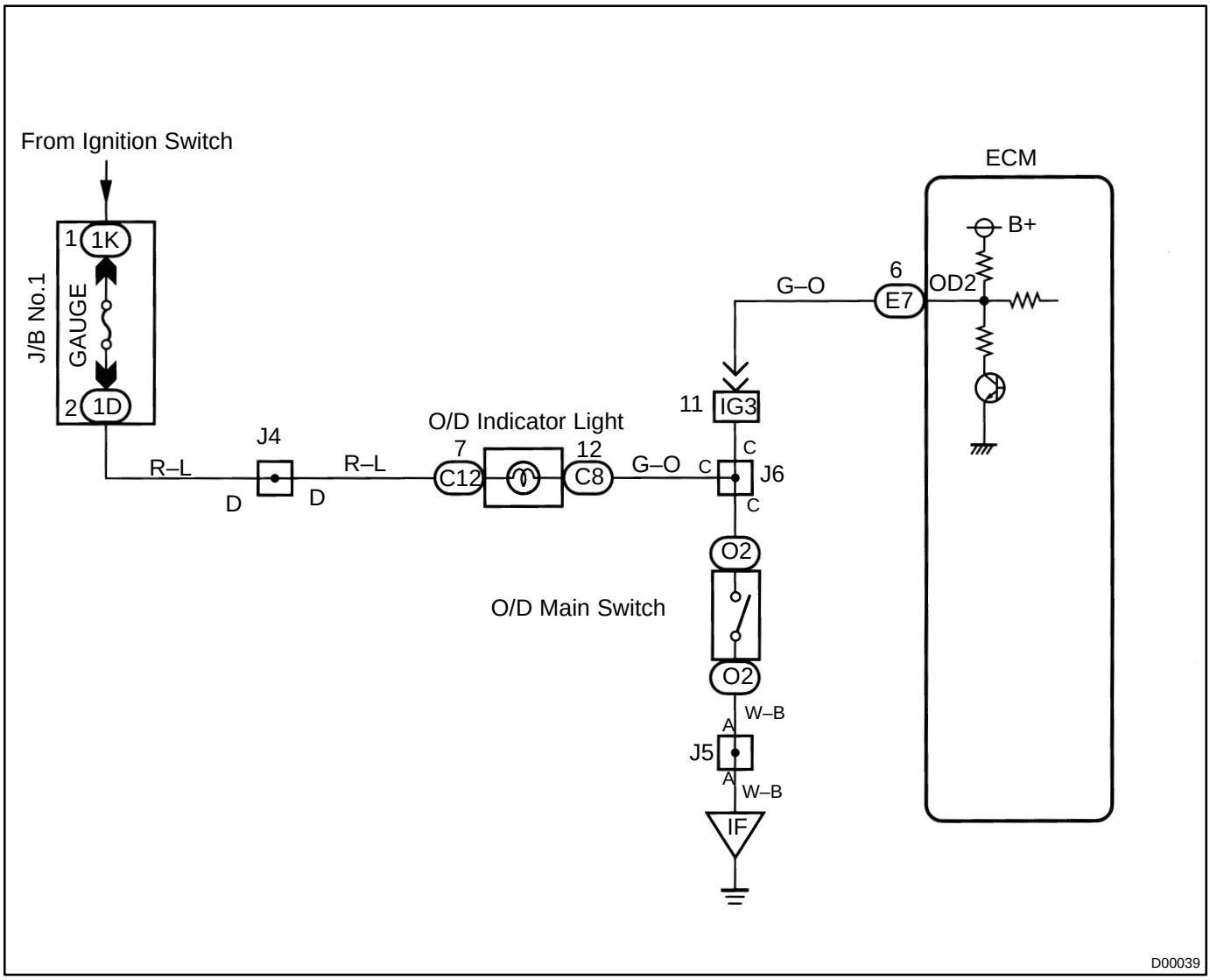
DI0D1–01

O/D Main Switch & O/D OFF Indictor Light Circuit

CIRCUIT DESCRIPTION

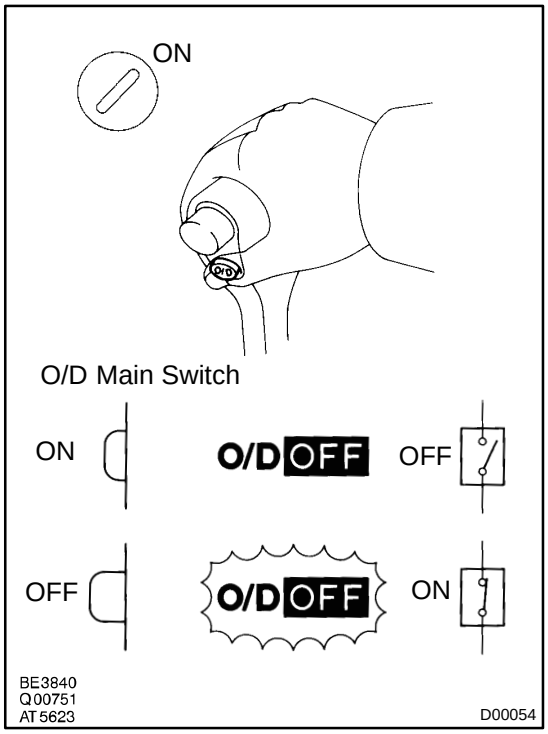
The O/D main switch contacts go open when the switch is pushed in and go closed when it is pushed out. In O/D main switch at OFF position, the O/D OFF indicator light lights up, and the ECM prohibits shifting overdrive.

WIRING DIAGRAM



INSPECTION PROCEDURE
O/D OFF indicator light does not light up

1	**Check operation of O/D main switch.**



PREPARATION:
Turn the ignition switch ON.
CHECK:
(a) Check the O/D OFF indicator light when O/D main switch is pushed in to ON.
(b) Check the O/D OFF indicator light when O/D main switch is pushed again to OFF.
OK:
(a) O/D OFF indicator light goes off
(b) O/D OFF indicator light lights up

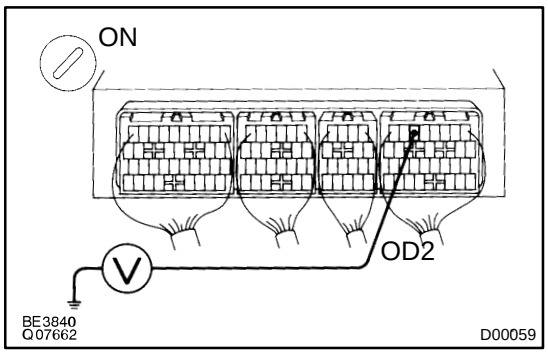
NG → **Go to step 4.**

OK

2	**Check OVRDRIVE CUT SW2 signal.**

When using LEXUS hand–held tester
PREPARATION:
(a) Remove the DLC3 cover.
(b) Connect a LEXUS hand–held tester to the DLC3.
(c) Turn the ignition switch ON and LEXUS hand–held tester main switch ON.
CHECK:
Read the OVRDRIVE CUT SW2 signal on the LEXUS hand–held tester.
OK:

O/D main switch condition	OVRDRIVE CUT SW2 signal
Pushed in	OFF
Pushed out	ON



When not using LEXUS hand–held tester

PREPARATION:

Turn the ignition switch ON.

CHECK:

Check voltage between terminal OD2 of ECM and body ground.

OK:

O/D main switch	Voltage
OFF	Below 1 V
ON	10 ~ 14 V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–164).**

NG

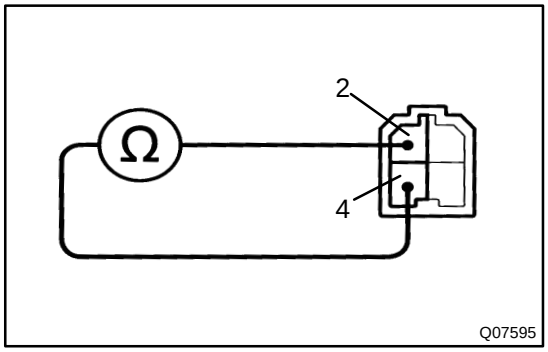
3	Check harness and connector between O/D OFF indicator light and ECM (See page IN–27).

NG → **Repair or replace the harness or connector.**

OK

Check the O/D main switch.

4	Check O/D main switch.



PREPARATION:

Disconnect the O/D main switch connector.

CHECK:

Check continuity between terminals 2 and 4 of O/D main switch connector.

OK:

O/D main switch	Resistance
ON	∞ Ω (open)
OFF	0 Ω (continuity)

NG → **Replace the O/D main switch.**

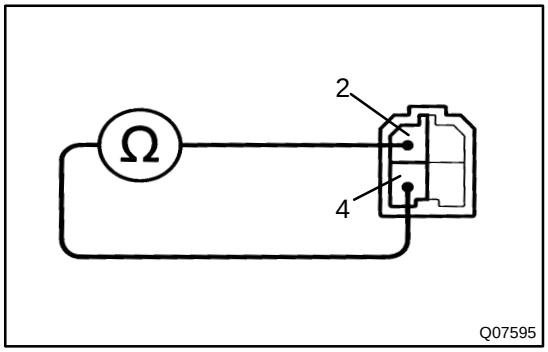
OK

Check and replace the combination meter (See page BE–58).

INSPECTION PROCEDURE

O/D OFF indicator light does not light up

1	**Check O/D main switch.**



PREPARATION:

Disconnect the O/D main switch connector.

CHECK:

Check continuity between terminals 2 and 4 of O/D main switch connector.

OK:

O/D main switch	Resistance
ON	∞ Ω (open)
OFF	0 Ω (continuity)

NG → **Replace the O/D main switch.**

OK

2	**Check harness and connector between O/D OFF indicator light and O/D main switch, O/D OFF indicator light and ECM (See page IN–27).**

NG → **Repair or replace the harness or connector.**

OK

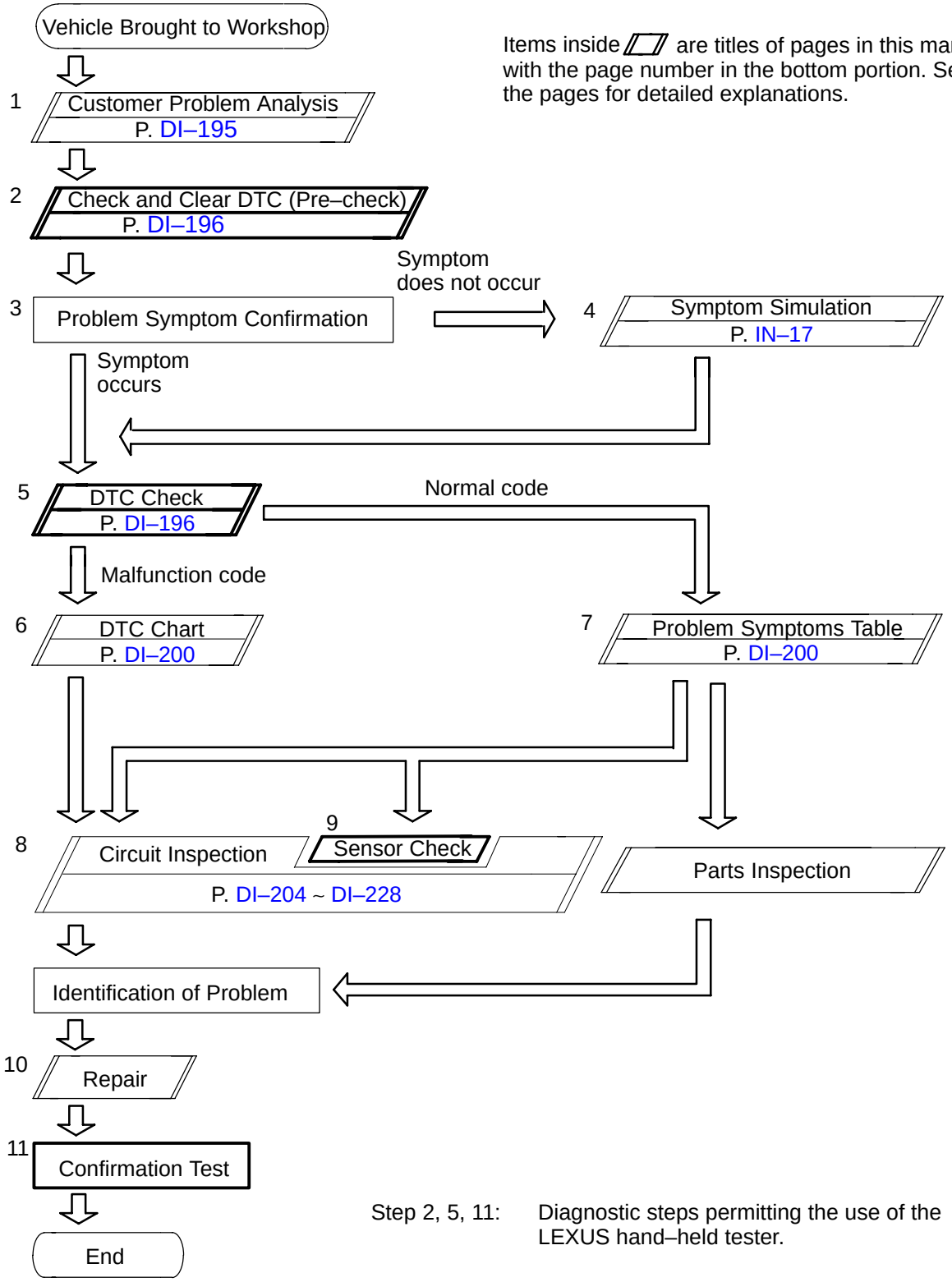
Check and replace the ECM.

ELECTRIC MODULATED SUSPENSION

DI0AB–01

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoooting in accordance with the procedure on the following pages.



Items inside ▱ are titles of pages in this manual, with the page number in the bottom portion. See the pages for detailed explanations.

Step 2, 5, 11: Diagnostic steps permitting the use of the LEXUS hand–held tester.

DI0AC–01

CUSTOMER PROBLEM ANALYSIS CHECK

ELECTRONIC MODULATED SUSPENSION Check Sheet

Inspector's Name :

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

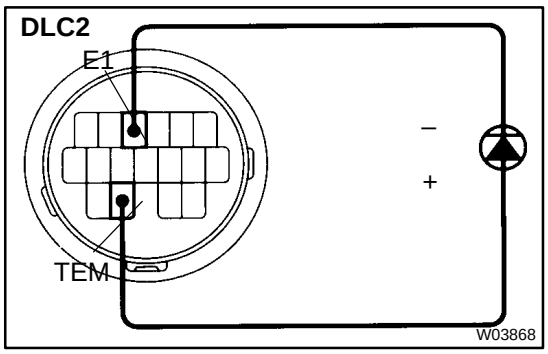
Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (times per day, month) ☐ Once only
Condtions at Time of Problem Occurrence	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/ Others
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F(°C))
	Place	☐ Highway ☐ Suburbs ☐ Inner City ☐ Hill (Up, Down) ☐ Rough Road ☐ Others ( )

Symptoms	☐ Malfunction in damping force control	☐ Anti–roll control does not operate ☐ Anti–squat control does not operate ☐ Anti–dive control does not operate ☐ High speed control does not operate ☐ Bounding control does not operate ☐ Others ( )
	☐ Others	

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI0AD–01

PRE–CHECK



1. DIAGNOSIS SYSTEM

(a) TEM OUTPUT CHECK (LED LIGHTENING CHECK)

(1) Connect the LED to terminals TEM and E1 of DLC2.

NOTICE:If connected reversely, the LED does not light.

HINT:Use the LED whose recommended operating current is 10 – 20 mA.

(2) Turn the ignition switch ON, and check that the LED lights for about 2 seconds.

HINT:

If the LED does not light, inspect the TEM circuit (See page DI–224).

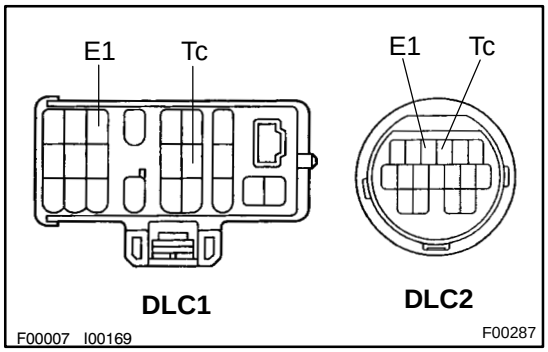
(b) DTC CHECK

(1) Check the battery positive voltage.

Battery positive voltage: 10 – 14 V (When is stopped the engine)

(2) After driving the vehicle, using SST, connect between terminals Tc and E1of DLC2 or DLC1.

SST 09843–18020

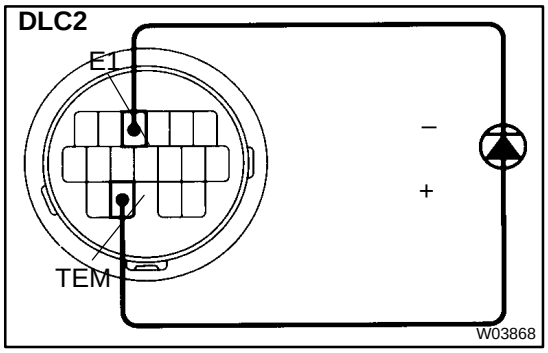


HINT:

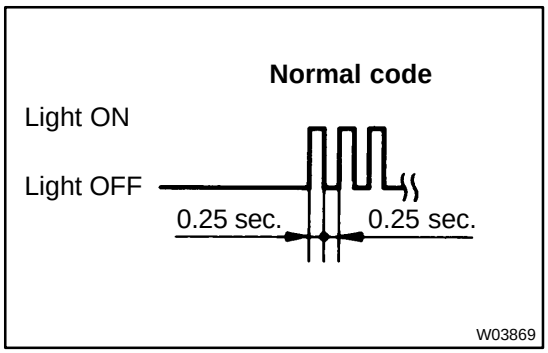
- Do not stop the engine.
- In this condition, the ignition switch is ON.

NOTICE:The wrong connection of the connector may cause malfunction. Use extreme caution when connecting the connector.

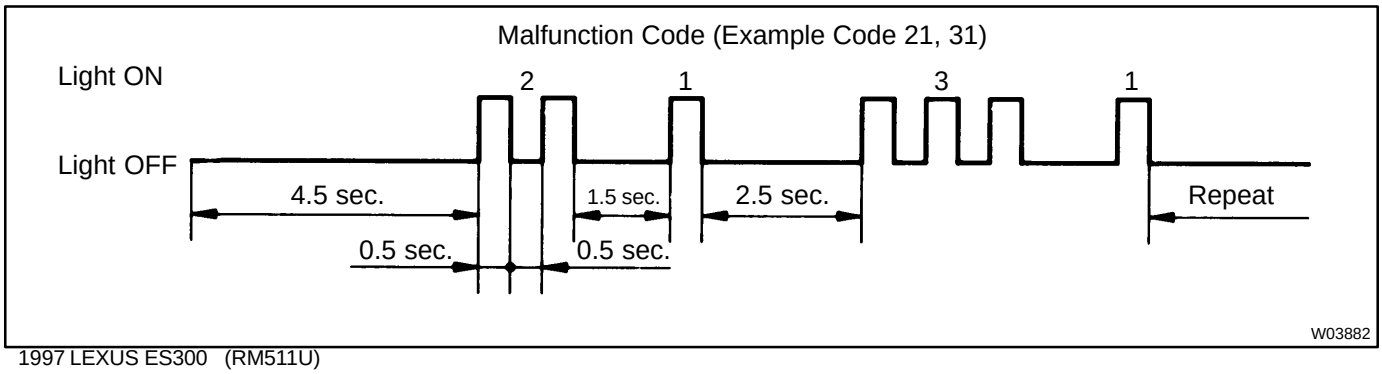
(3) Connect the LED to terminals TEM and E1 of DLC2.



(4) Check the number that the LED blinks.



- When the code is normal, the LED comes on for 0.25 sec. and goes off for 0.25 sec. repeatedly.
- When more than 2 diagnosis codes are detected, the diagnosis codes are displayed in the order form the smallest number.
- If no code appears, inspect the diagnostic circuit (See page DI–226).
- Code are explained in the code table on page DI–200.

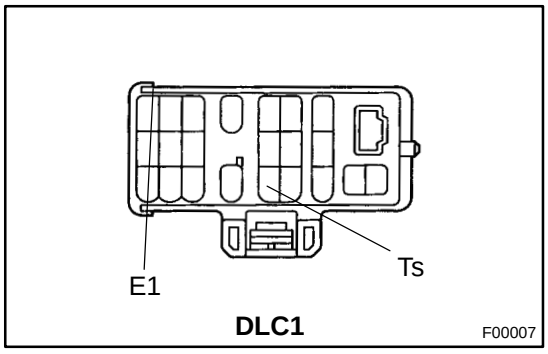


(5) Disconnect the SST from the terminals Tc and E1 of DLC2 or DLC1.

SST 09843–18020

Confirm that the connected LED is off.

(6) When the abnormal code is output, inspect the function, absorber control ECU and input signal.



(c) DAMPING FORCE CONTROLLING CONDITION CHECK

(1) Using SST, connect terminals Ts and E1 of DLC1 with the ignition switch OFF. (TEST mode)

SST 09843–18020

(2) Start the engine.

In this condition, the absorber control actuator position becomes 1 (Soft).

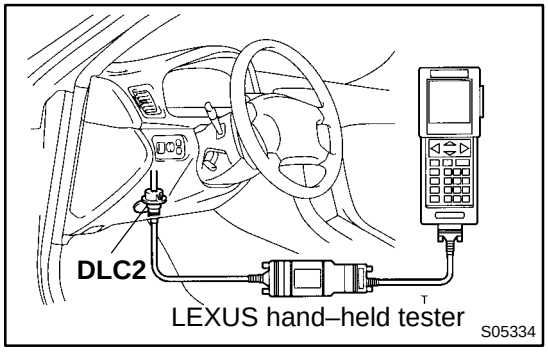
(3) Starting from the above mentioned position, as the brake pedal is depressed, the absorber control actuator position increase (1 → 2 → 3 → ... 15 → 16). At this time, bounce the vehicle and check that the shock absorber is becoming harder.

HINT:

- To hold the shock absorber control actuator at a specific position, adjust it to the position using the above mentioned procedure then increase the vehicle speed to over 5 km/h.
  After that the shock absorber control actuator position does not change until the ignition switch is turned OFF.
- If the absorber control actuator does not operate, inspect the absorber control actuator circuit and absorber control ECU.

(4) Disconnect the SST from the terminals Ts and E1 of DLC1.

SST 09843–18020



(d) FAIL–SAFE FUNCTION

(1) When the short circuit of an shock absorber control actuator is detected, the shock absorber control actuator located on the other side of the detected drive shaft is held at step 8. The shock absorber control actuator remains uninterrogated until the ignition switch is OFF.

(e) DTC CHECK BY USING LEXUS HAND–HELD TESTER

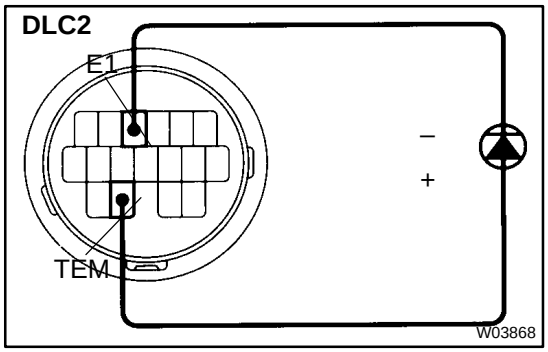
(1) Hook up the LEXUS hand–held tester to the DLC2.

(2) Monitor the ECU data by following the prompts on the tester screen.
Please refer to the LEXUS hand–held tester operator's manual.

LEXUS hand–held tester has a "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems.

(f) DTC CLEARANCE

The diagnosis memory is erased by turning the ignition switch off.



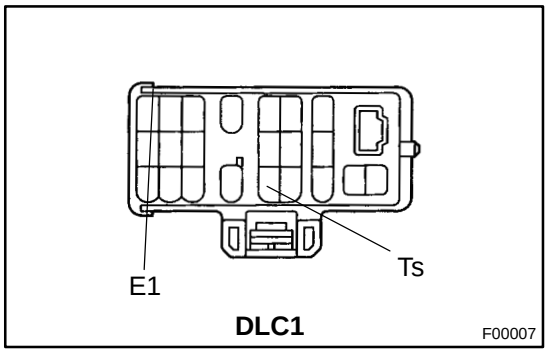
(g) INPUT SIGNAL CHECK (TEST MODE CHECK)

This function check if signals from the steering sensor and stop light switch etc. are being input normally to the ECU.

(1) Check the battery positive voltage.
Battery positive voltage: 10 – 14 V (When stop the engine)
(2) Turn ignition switch off.
(3) Connect the LED to terminals TEM and E1 of DLC2.
(4) Set each of the check items in the table below to the condition in Operation (A).
(5) Using SST, connect between terminals Ts and E1 of DLC1. (TEST mode)

SST 09843–18020

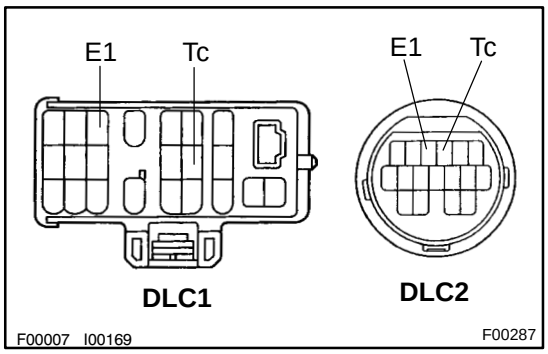
(6) Start the engine.
(7) Each of the check items is set to the condition in Operation (B).



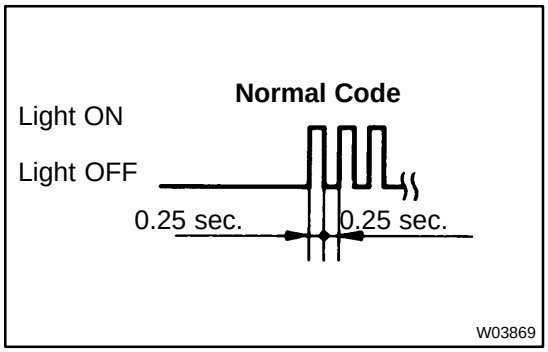
- The LED lights for 1 sec. before it blinks.
- If the operation (B) has not been tone, DTC will indicate.

NOTICE:Do not turn off the ignition switch. Diagnosis code are erased by turning the ignition switch off.

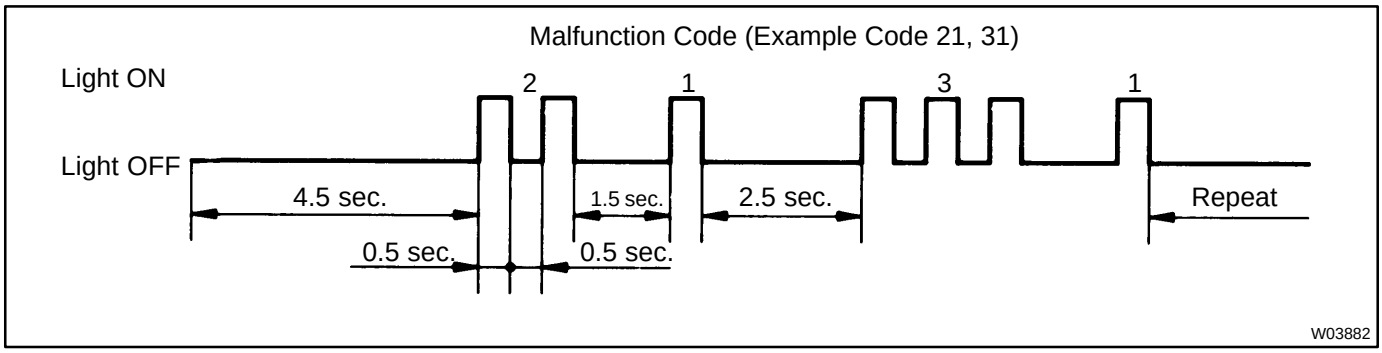
Check Item	Operation (A)	Operation (B)
Steering Sensor Signal	Steering wheel straight ahead	Steering wheel angle 36˚ degrees or larger
Vehicle Speed Sensor Signal	Vehicle speed below 12 mph (20 km/h)	Vehicle speed 12 mph (20 km/h) or higher
Stop Light Switch Signal	OFF (Brake pedal not depressed)	ON (Brake pedal depressed)
Crankshaft Position Sensor Signal	Engine speed below 2,000 rpm or more	Engine speed 2,000 rpm or higher
Absorber Control Switch Signal	–	Slowly move the absorber control switch "COMFORT" ↔ "SPORT" both ways once



(8) Using SST, connect terminals Tc and E1 of DLC2 or DLC1.
SST 09843–18020



(9) Check the number that the LED blinks.
HINT:When the code is normal, the LED come on for 0.25 sec. and goes off for 0.25 sec. repeatedly.



(h) DESERT FROM INPUT SIGNAL CHECK MODE
(1) With the ignition switch off, disconnect the SST from the terminals Ts and E1 of DLC2 or DLC1.
SST 09843–18020

DI0AE–01

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check identify the DTC code and check the circuit listed that the code. For details for each code, turn to the page referred to under the ”See page” for respective ”DTC No.” in the DTC chart.

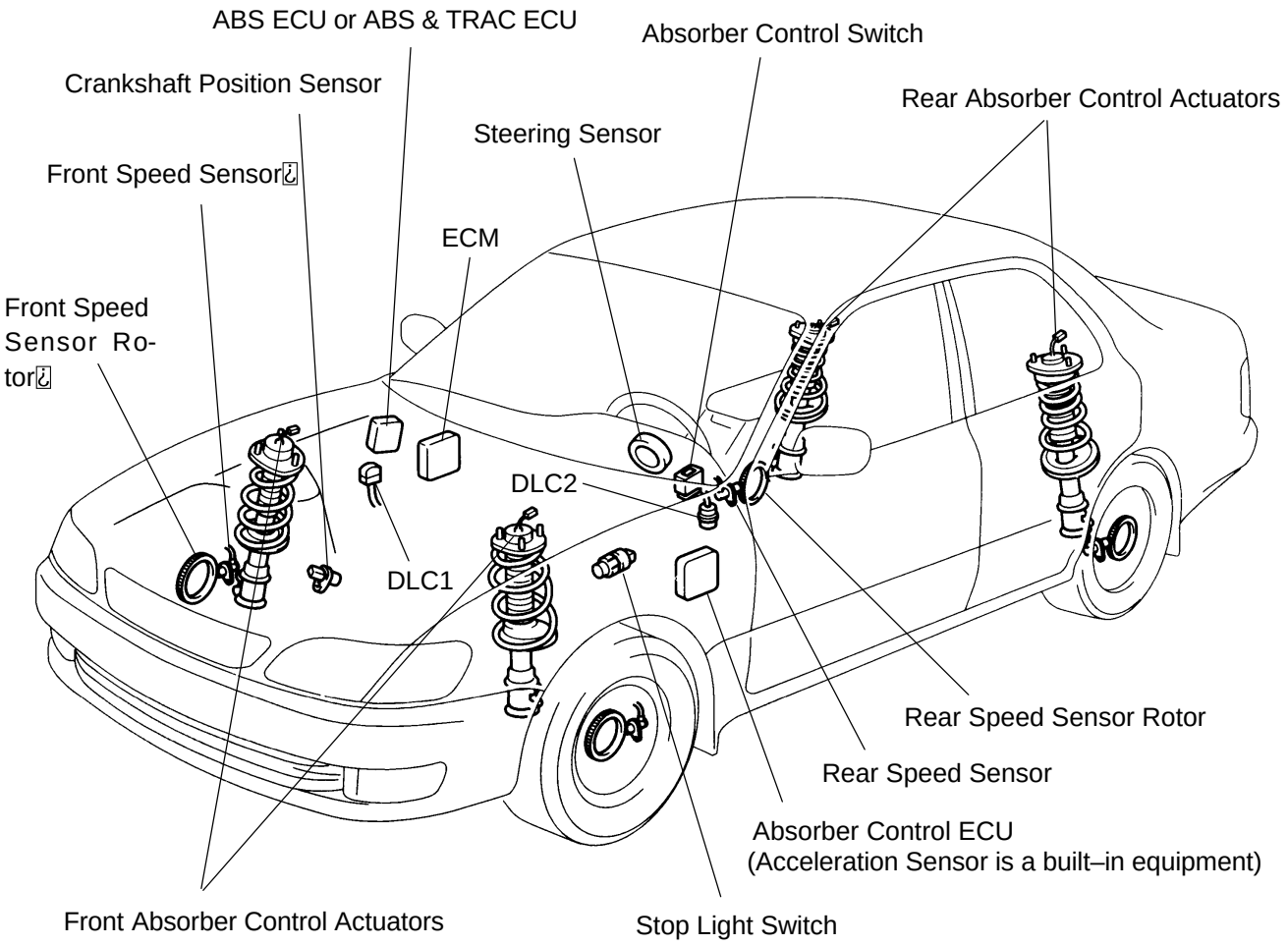
DTC No. (See Page)	Detection Item	Trouble Area
21 DI–204	Open or short in front absorber control actuator circuit	●Left front, right front, left rear and right rear absorber control actuator ●Short circuit in between absorber control actuator and absorber control ECU ●Absorber control ECU
23 DI–204	Open or short in rear absorber control actuator circuit	
31 DI–208	Acceleration sensor signal malfunction	●Absorber control ECU (Acceleration sensor is a built–in equipment)
34 DI–209	Front speed sensor signal malfunction	●Right front and right rear speed sensor ●Open or short circuit in between absorber control ECU and ABS ECU or ABS & TRAC ECU ●Open or short circuit in between ABS ECU or ABS & TRAC ECU and ABS speed sensor ●Error in other system that uses the same speed sensor signal ●ABS ECU or ABS & TRAC ECU ●Absorber control ECU
35 DI–209	Rear speed sensor signal malfunction	
36 DI–211	Steering sensor signal malfunction	●Battery ●Steering sensor ●Open or short circuit in between absorber control ECU and steering sensor ●Absorber control ECU
41 DI–214	Crankshaft position sensor signal malfunction	●Open or short circuit in between absorber control ECU and ECM ●ECM ●Absorber control ECU
42 DI–216	Stop light switch signal does not input	●Stop light switch ●Open or short circuit in between absorber control ECU and stop light switch ●Error in other system that uses the same stop light switch ●Absorber control ECU
52 DI–218	Absorber control switch signal malfunction	●Absorber control switch ●Open or short circuit in between absorber control switch and absorber control ECU ●Absorber control ECU

NOTICE:

- **DTCs 36, 42, and 52 can be detected only in the input signal inspecting mode.**
- **All DTCs are erased when the ignition switch is turned off.**

DI0AF–01

PARTS LOCATION

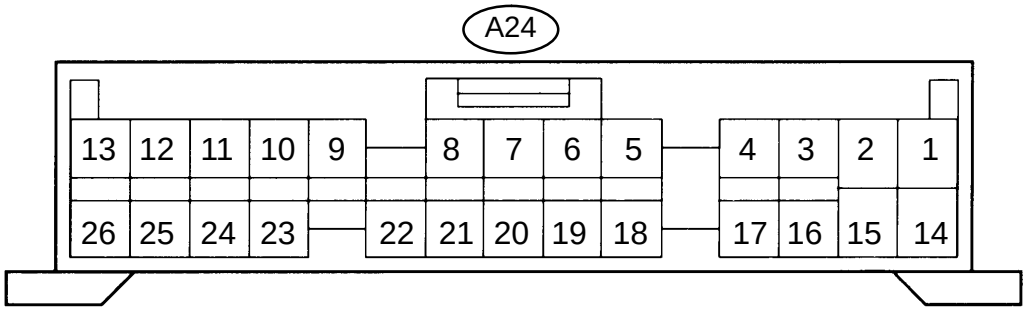


1997 LEXUS ES300 (RM511U)

W04370

DI0AG–01

TERMINALS OF ECM



W03883

Symbols (Terminals No.)	STD Voltage (V)	Condition
GND (A24 – 1) – Body ground	Continuity	Always
+B (A24 – 2) – Body ground	10 – 14	IG switch ON
SW2 (A24 – 3) – Body ground	8 V or more	IG switch ON, Absorber control switch 1
	Below 1.5	IG switch ON, Absorber control switch 2
TEM (A24 – 4) – Body ground	10 – 14	Connect between terminals TEM and E1 of DLC2 for 2 sec. after the ignition
RB– (A24 – 5) – Body ground RB+ (A24 – 6) – Body ground RA– (A24 – 7) – Body ground RA+ (A24 – 8) – Body ground FB– (A24 – 10) – Body ground FB+ (A24 – 11) – Body ground FA– (A24 – 12) – Body ground FA+ (A24 – 13) – Body ground	Continuity	Always
NEO (A24 – 14) – Body ground	1 – 8	Start the engine, run it at idle
SS1 (A24 – 16) – Body ground	1 – 3.5	IG switch ON, Steering wheel is being turned slowly
SS2 (A24 – 17) – Body ground		
RRO (A24 – 18) – Body ground	1.5 – 8	While driving
Ts (A24 – 19) – Body ground	Below 1.5	IG switch ON, Connect between terminals Ts and E1 of DLC1
	10 – 14	IG switch ON, Disconnect terminals Ts and E1 of DLC1
FRO (A24 – 20) – Body ground	1.5 – 8	While driving
SW1 (A24 – 21) – Body ground	Below 1.5	IG switch ON, Absorber control switch 3
	8 V or more	IG switch ON, Absorber control switch 4
Tc (A24 – 22) – Body ground	Below 1.5	IG switch ON, Connect between terminals Tc and E1 of DLC1
	10 – 14	IG switch ON, Disconnect terminals Tc and E1 of DLC1
STP (A24 – 26) – Body ground	10 – 14	IG switch ON, Brake pedal is released
	Below 1.5	IG switch ON, Brake pedal is depressed

DI0AH–01

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

Symptom	Inspection Circuit	See page
Damping force control do not operate at all	1. Absorber control actuator circuit 2. TEM terminal circuit 3. Tc terminal circuit 4. Ts terminal circuit 5. Shock absorber 6. Absorber control ECU	DI–204 DI–224 DI–226 DI–228 SA–24 SA–50 –
Only anti–roll control does not operate	1. Steering sensor circuit 2. Speed sensor circuit 3. Absorber control ECU	DI–211 DI–209 –
Only anti–squat control does not operate	1. Crankshaft position sensor circuit 2. Speed sensor circuit 3. Absorber control ECU	DI–214 DI–209 –
Only anti–dive control does not operate	1. Stop light switch circuit 2. Speed sensor circuit 3. Absorber control ECU	DI–216 DI–209 –
Only semi–active control does not operate	1. Speed sensor circuit 2. Absorber control ECU (Deceleration sensor is a built–in equipment)	DI–209 –
Only speed sensing control does not operate	1. Speed sensor circuit 2. Absorber control ECU	DI–209 –
Only unsprung damping control does not operate	1. Speed sensor circuit 2. Absorber control ECU	DI–209 –

DI0AI–01

CIRCUIT INSPECTION

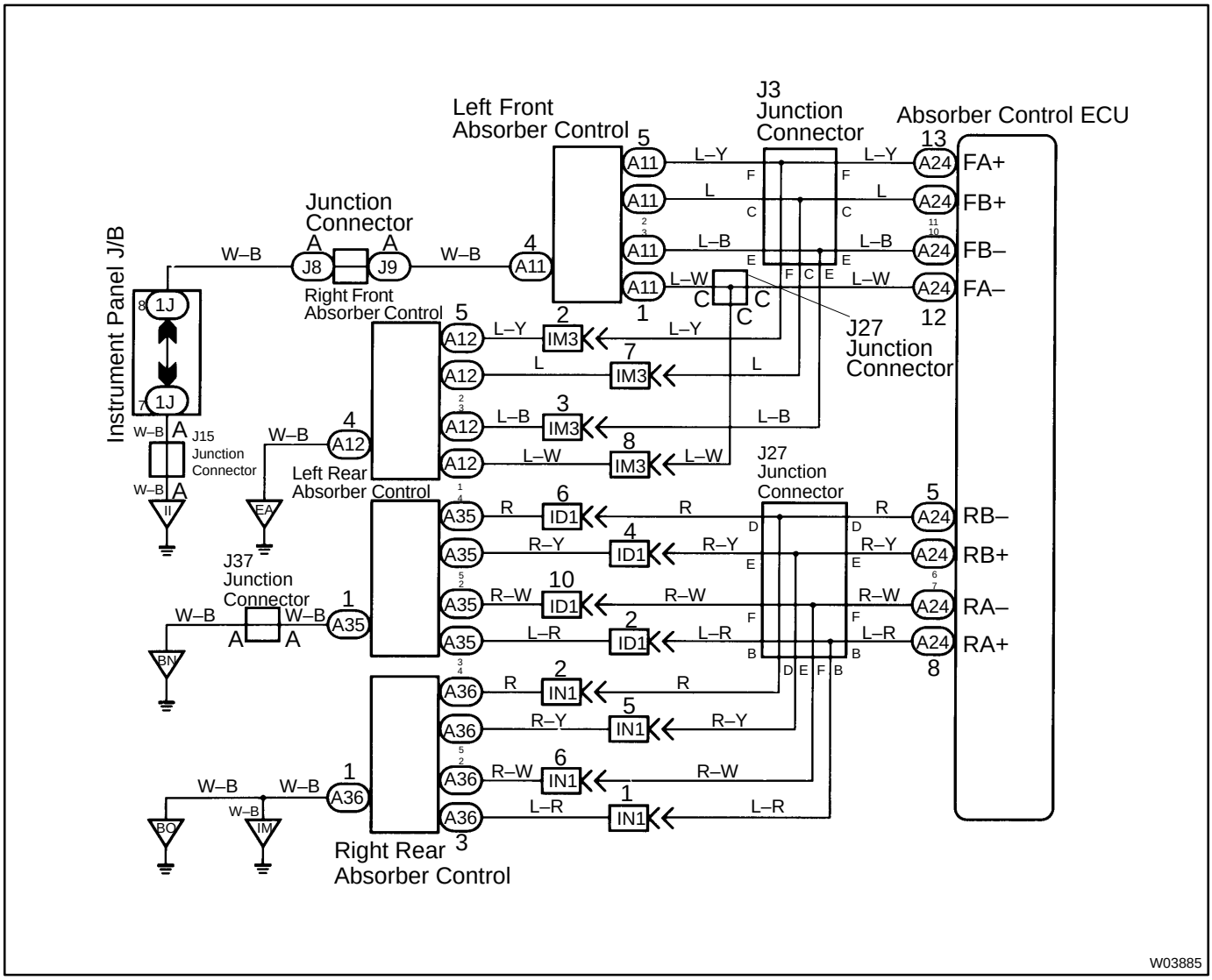
DTC	21, 23	Absorber Control Actuator Circuit

CIRCUIT DESCRIPTION

DTC No.*	DTC Detecting Condition	Trouble Area
21 23	When the absorber control actuator is activated, over current flows through the front or rear driving circuit.	●Left front, right front, left rear and right rear absorber control actuator ●Short circuit in between absorber control actuator and absorber control ECU ●Absorber control ECU

*: Code 21 corresponds to the left front and right front absorber control actuator circuit.
Code 23 corresponds to the left rear and right rear absorber control actuator circuit.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of absorber control actuator.**

CHECK:

Using the same method as used for the clamping force control, check that clamping force of the absorber control actuator changes.

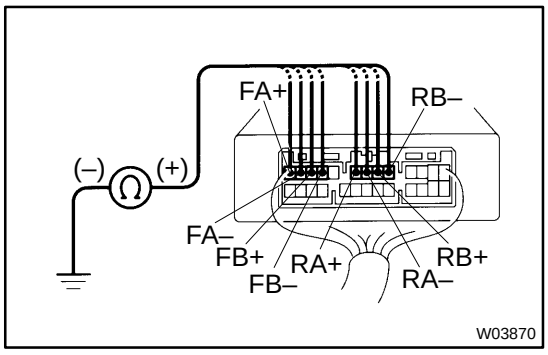
OK:

Bounce the vehicle and check that the shock absorber is becoming harder.

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–203).**

NG

2	**Check continuity between terminals RB–, RB+, RA–, RA+, FB–, FB+, FA– and FA+ of absorber control ECU connector and body ground.**



PREPARATION:

Remove the No.1 lower panel (See page BO–82).

CHECK:

Check continuity between terminals RB–, RB+, RA–, RA+, FB–, FB+, FA–, and FA+ of absorber control ECU connector and body ground.

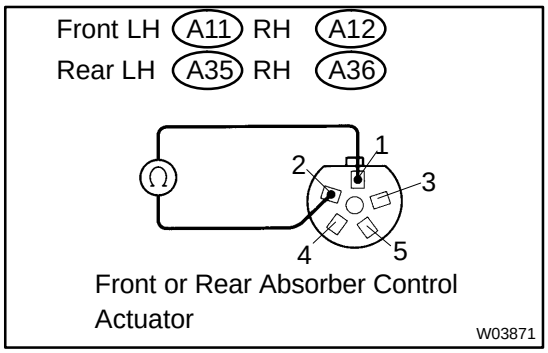
OK:

Continuity

NG → **Check and replace absorber control ECU**

OK

3	Check absorber control actuator.



PREPARATION:

Front absorber control actuator:

(a) Remove the shock absorber cap (See page SA–25).

(b) Remove the absorber control actuator connector.

Rear absorber control actuator:

(a) Remove the rear seat cushion, rear seatback, roof side inner garnish, high mounted stop light and seat belt.

(b) Remove the absorber control actuator connector (See page SA–51).

CHECK:

Measure resistance between each terminal of front or rear absorber control actuator.

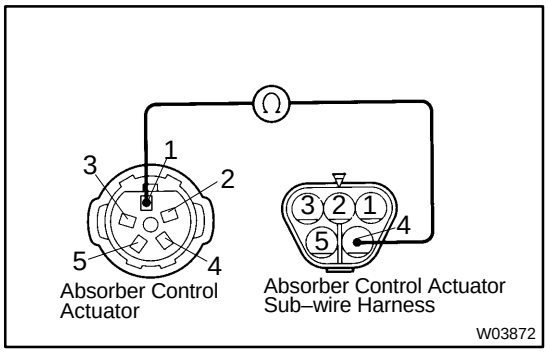
OK:

Front absorber control actuator:

Terminal A11 or A12 – 1 and A11 or A12 – 2	12.4 – 13.6 Ω
Terminal A11 or A12 – 1 and A11 or A12 – 3	12.4 – 13.6 Ω
Terminal A11 or A12 – 1 and A11 or A12 – 4	12.4 – 13.6 Ω
Terminal A11 or A12 – 1 and A11 or A12 – 5	12.4 – 13.6 Ω

Rear absorber control actuator:

Terminal A35 or A36 – 1 and A35 or A36 – 2	12.4 – 13.6 Ω
Terminal A35 or A36 – 1 and A35 or A36 – 3	12.4 – 13.6 Ω
Terminal A35 or A36 – 1 and A35 or A36 – 4	12.4 – 13.6 Ω
Terminal A35 or A36 – 1 and A35 or A36 – 5	12.4 – 13.6 Ω



CHECK:

Front absorber control actuator:

Check continuity between each terminal of absorber control actuator and sub–wire harness.

OK:

Terminals 1 and 4	Continuity
Terminals 2 and 5	Continuity
Terminals 3 and 1	Continuity
Terminals 4 and 2	Continuity
Terminals 5 and 3	Continuity

NG → **Replace absorber control actuator or absorber control actuator sub–wire harness.**

OK

4	**Check harness and connectors between absorber control ECU and absorber control actuator, absorber control actuator and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI–203).*

*: However, when DTC 21 or 23 is displayed, check and replace absorber control ECU.

DI0AJ–01

DTC	31	Acceleration Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
31	Acceleration sensor signal malfunction.	●Absorber control ECU (Acceleration sensor is a built–in the equipment)

INSPECTION PROCEDURE

As the deceleration sensor is a built–in the equipment for absorber control ECU, replace them as a unit.

DI0AK–01

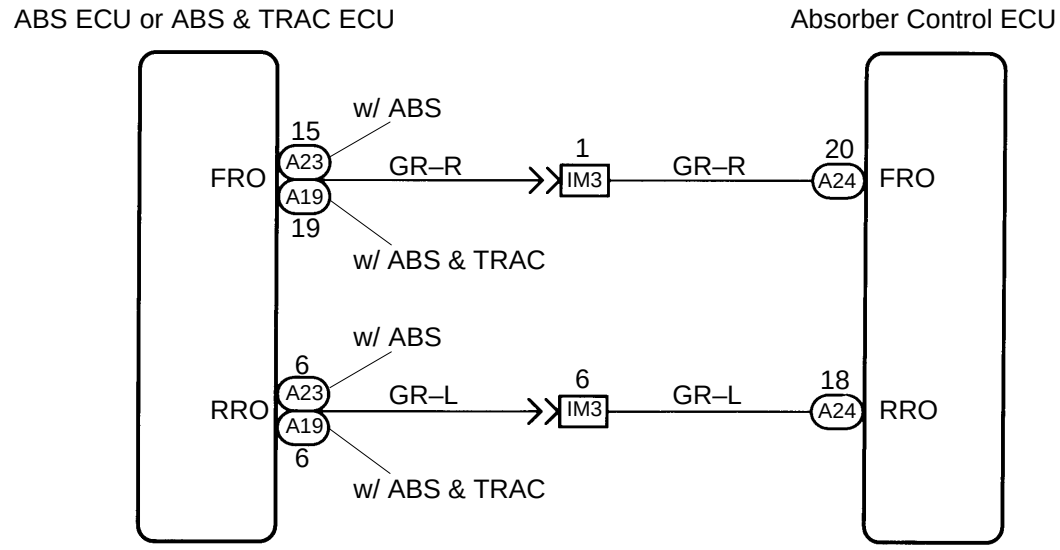
DTC	34, 35	Speed Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.*	DTC Detecting Condition	Trouble Area
34 35	Vehicle speed is 12 mph (20 km/h) or higher signal is not input.	●Right front and right rear speed sensor ●Open or short circuit in between absorber control ECU and ABS ECU or ABS & TRAC ECU ●Open or short circuit in between ABS ECU or ABS & TRAC ECU and ABS speed sensor ●Error in other system that uses the same speed sensor signal ●ABS ECU or ABS & TRAC ECU ●Absorber control ECU

*: Code 34 corresponds to right front speed sensor circuit.
Code 35 corresponds to right rear speed sensor circuit.

WIRING DIAGRAM

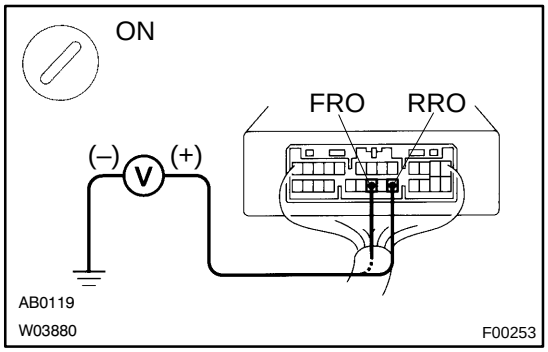


INSPECTION PROCEDURE

HINT:

- When DTC ”34” is displayed, check the right front speed sensor circuit.
- When DTC ”35” is displayed, check the right rear speed sensor circuit.

1	**Check voltage between terminals RRO and FRO of absorber control ECU connector and body ground.**



PREPARATION:

(a) Remove the No.1 lower panel (See page BO–82).

(b) Start the engine.

CHECK:

Measure voltage between terminals RRO and FRO of absorber control ECU connector and body ground while driving.

OK:

Voltage: 1.5 – 8 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–203).**

NG

2	**Check speed sensor (See page DI–232 or DI–273).**

NG → **Repair or replace harness, connector, speed sensor or rotor.**

OK

3	**Check harness and connectors between absorber control ECU and ABS ECU or ABS & TRAC ECU (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace absorber control ECU, ABS ECU or ABS & TRAC ECU.

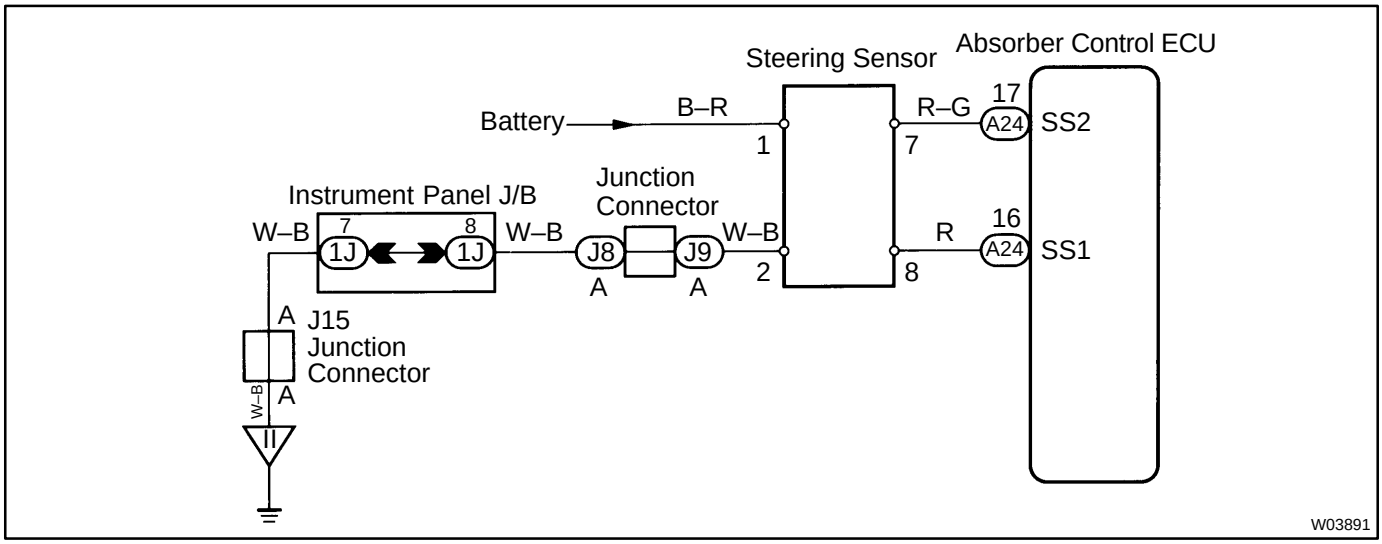
DI0AL–01

DTC	36	Steering Sensor Circuit

CIRCUIT DESCRIPTION

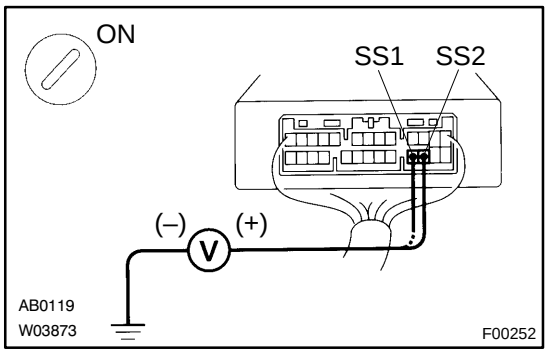
DTC No.	DTC Detecting Condition	Trouble Area
36	Steering angle is 36˚ or larger signal is not input.	●Battery ●Steering sensor ●Open or short circuit in between absorber control ECU and steering sensor ●Absorber control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals SS1 and SS2 of absorber control ECU connector and body ground.**



PREPARATION:

(a) Remove the No.1 lower panel (See page BO–82).

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals SS1 and SS2 of absorber control ECU connector and body ground when steering wheel is turned slowly.

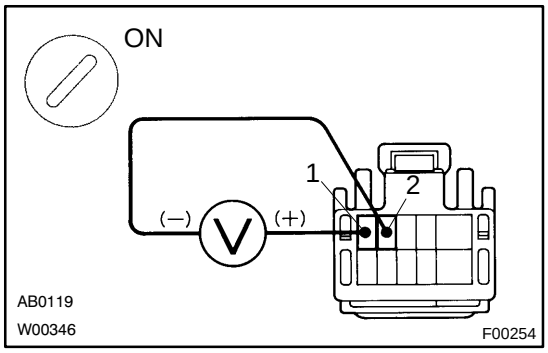
OK:

Changes between 1 V and approx. 3.5 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–203).**

NG

2	Check voltage between terminals 1 and 2 of steering sensor connector.



PREPARATION:

(a) Remove the steering wheel lower No.2 and No.3 covers, steering wheel pad, steering wheel column upper and lower covers (See page SR–11).

(b) Disconnect the steering sensor connector.

(c) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals 1 and 2 of steering sensor connector.

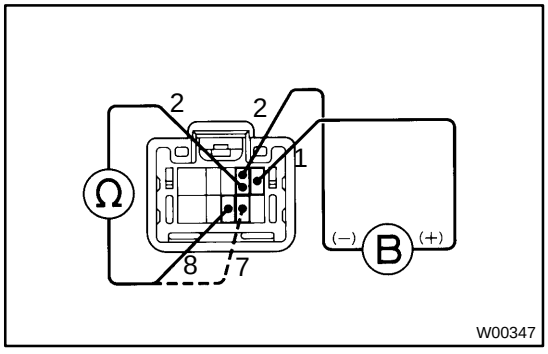
OK:

Voltage: 10 – 14 V

NG	Check and repair harness and connectors between battery and steering sensor.

OK

3	Check steering sensor.



PREPARATION:

Apply battery positive voltage between terminals 1 and 2.

CHECK:

Measure the resistance between the terminal 2 and terminals 7 and 8 of steering sensor connector when the rotating part of steering sensor is turned slowly.

OK:

Changes between 0 Ω and ∞ Ω

NG	Replace steering sensor.

OK

4	Check harness and connectors between absorber control ECU and steering sensor (See page IN–27).

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace absorber control ECU.

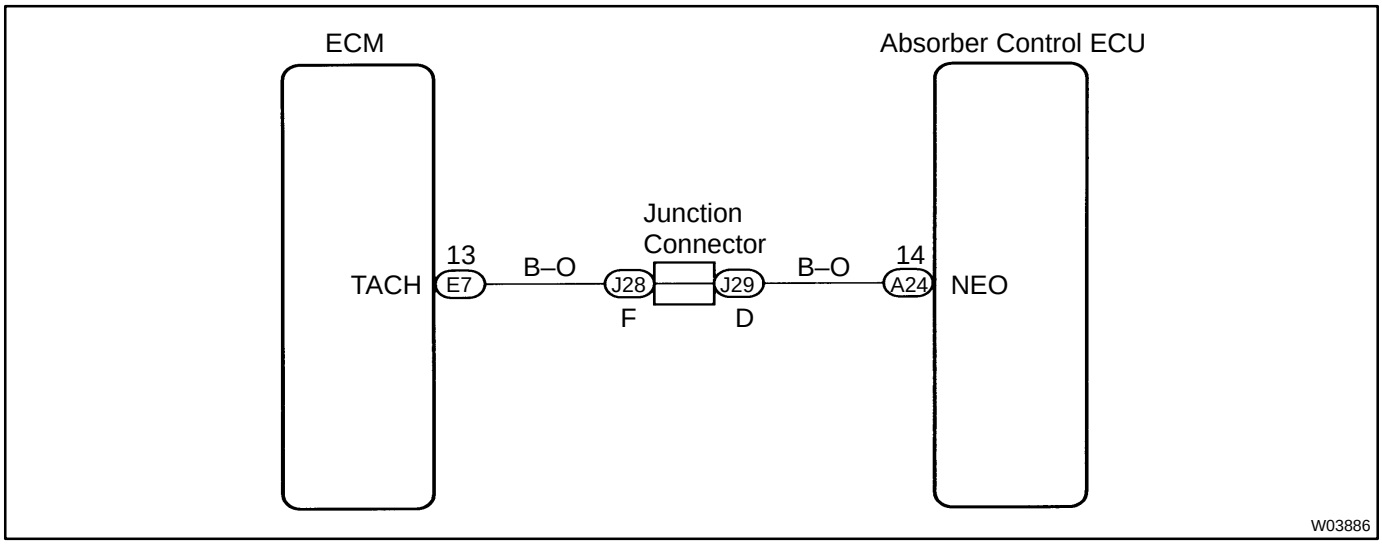
DI0AM–01

DTC	41	Crankshaft Position Sensor Circuit

CIRCUIT DESCRIPTION

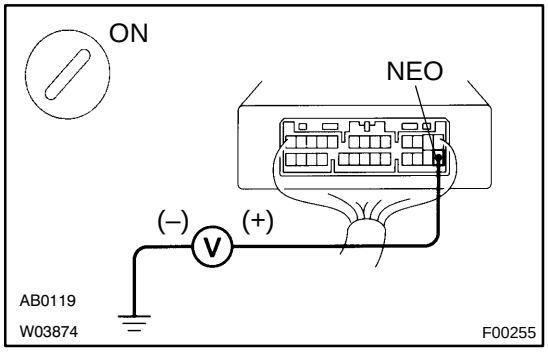
DTC No.	DTC Detecting Condition	Trouble Area
41	Engine speed 2,000 rpm or higher signal does not input.	●Open or short circuit in between absorber control ECU and ECM ●ECM ●Absorber control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal NEO of absorber control ECU connector and body ground.**



PREPARATION:

(a) Remove the No.1 lower panel (See page BO–82).

(b) Start the engine, run it at idle.

CHECK:

Measure voltage between terminal NEO of absorber control ECU connector and body ground.

OK:

Voltage: 1 – 8 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–203).**

NG

2	Check crankshaft position sensor (See page DI–66).

OK → Go to step 4.

NG

3	Check harness and connectors between absorber control ECU and ECM (See page IN–27).

NG → Repair or replace harness or connector.

OK

Check and replace absorber control ECU.

4	Does malfunction disappear when a known good absorber control ECU is installed?

YES → Check and replace absorber control ECU.

NO

Check and replace ECM.

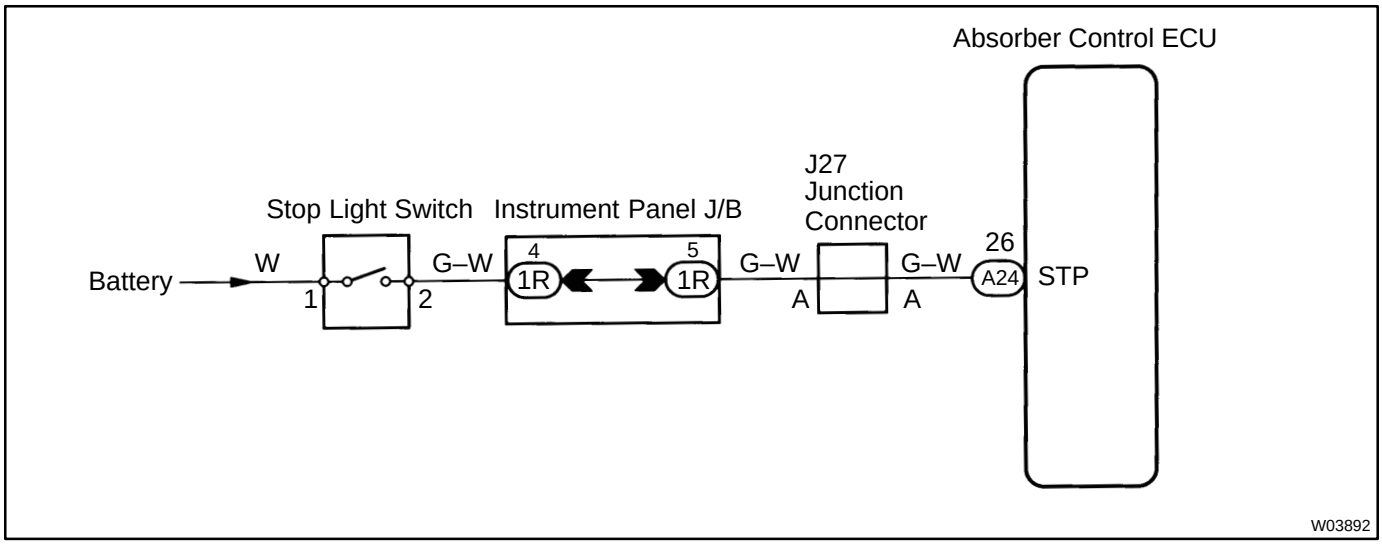
DI0AN–01

DTC	42	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
42	Stop light switch signal does not change.	●Stop light switch ●Open or short circuit in between absorber control ECU and stop light switch ●Error in other system that uses the same stop light switch ●Absorber control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of stop light.

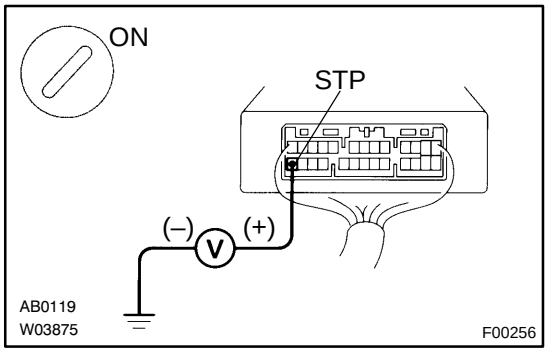
CHECK:

Check that stop light comes on when brake pedal is depressed and goes off when brake pedal is released.

NG → **Check stop light circuit (See page BE–51).**

OK

2	Check voltage between terminal STP of absorber control ECU connector and body ground.



PREPARATION:

(a) Remove the No.1 lower panel (See page BO–82).

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal STP of absorber control ECU connector and body ground when brake pedal is released and depressed.

OK:

Released	10 – 14 V
Depressed	Below 1.5 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–203).**

NG

3	Check harness and connectors between absorber control ECU and stop light switch (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

Check and replace absorber control ECU.

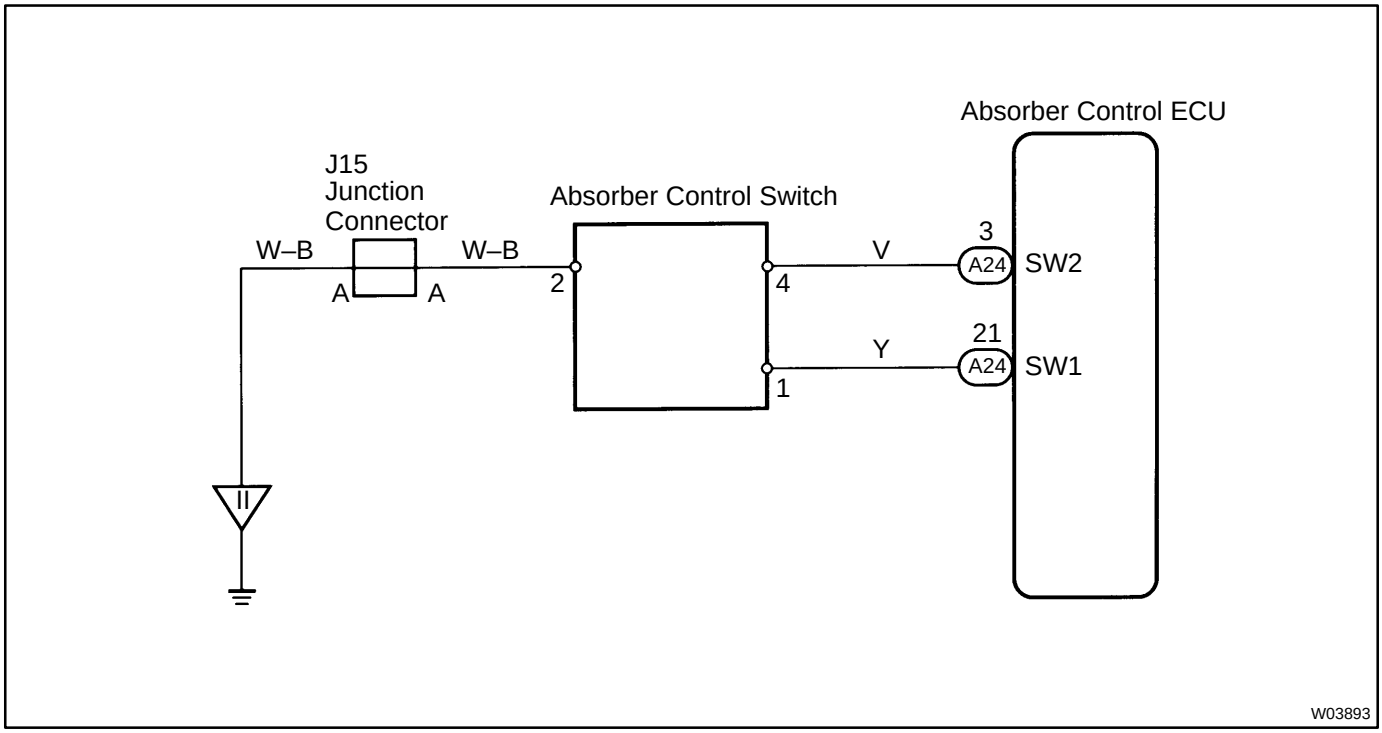
DI0AO–01

DTC	52	Absorber Control Switch Circuit

CIRCUIT DESCRIPTION

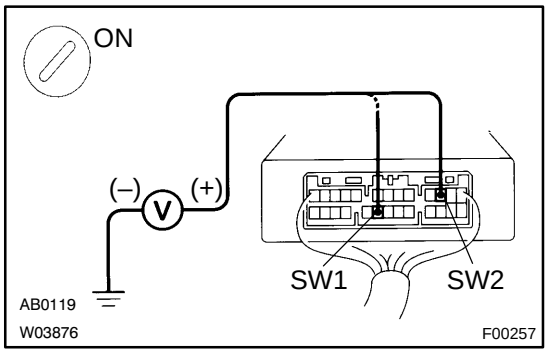
DTC No.	DTC Detecting Condition	Trouble Area
52	SW1 and SW2 of absorber control switch signal do not change.	●Absorber control switch ●Open or short circuit in between absorber control switch and absorber control ECU ●Absorber control ECU

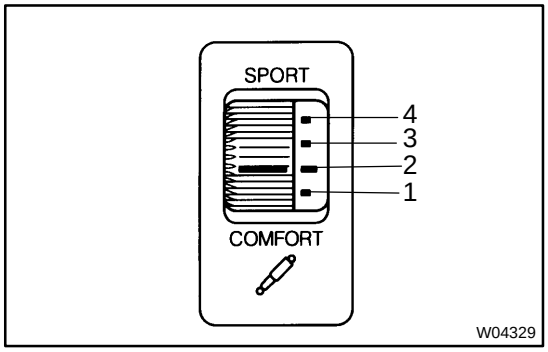
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals SW1 and SW2 of absorber control ECU connector and body ground.**





PREPARATION:

(a) Remove the No.1 lower panel (See page BO–82).

(b) Using SST, connect between terminals Ts and E1 of DLC1.
SST 09843–18020

(c) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals SW1 and SW2 of absorber control ECU connector and body ground when move slowly moving the absorber control switch "COMFROT" ↔ "SPORT" both ways one.

OK:

SW1:

Absorber control switch 1	8 V or more
Absorber control switch 2	Below 1.5 V

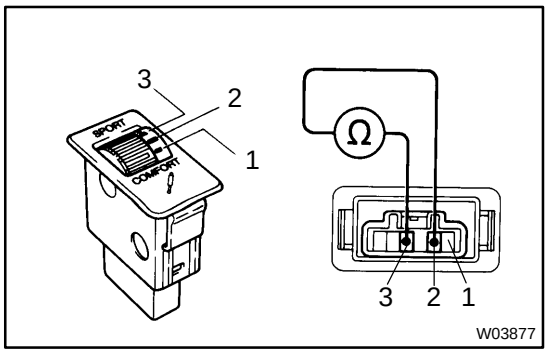
SW2:

Absorber control switch 3	8 V or more
Absorber control switch 4	Below 1.5 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–203).**

NG

2	Check absorber control switch.



PREPARATION:

(a) Remove the upper control panel (See page BO–82).

(b) Disconnect the absorber control switch connector.

CHECK:

Check continuity between each terminal of absorber control switch when each switch position.

OK:

Absorber control switch 3:

Terminals 2 and 3	Continuity

Absorber control switch 2:

Terminals 1 and 2	Continuity
Terminals 2 and 3	Continuity

Absorber control switch 1:

Terminals 1 and 2	Continuity

NG → **Replace absorber control switch.**

OK ↓

3	Check harness and connectors between absorber control ECU and absorber control switch and body ground (See page IN–27).

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace absorber control ECU.

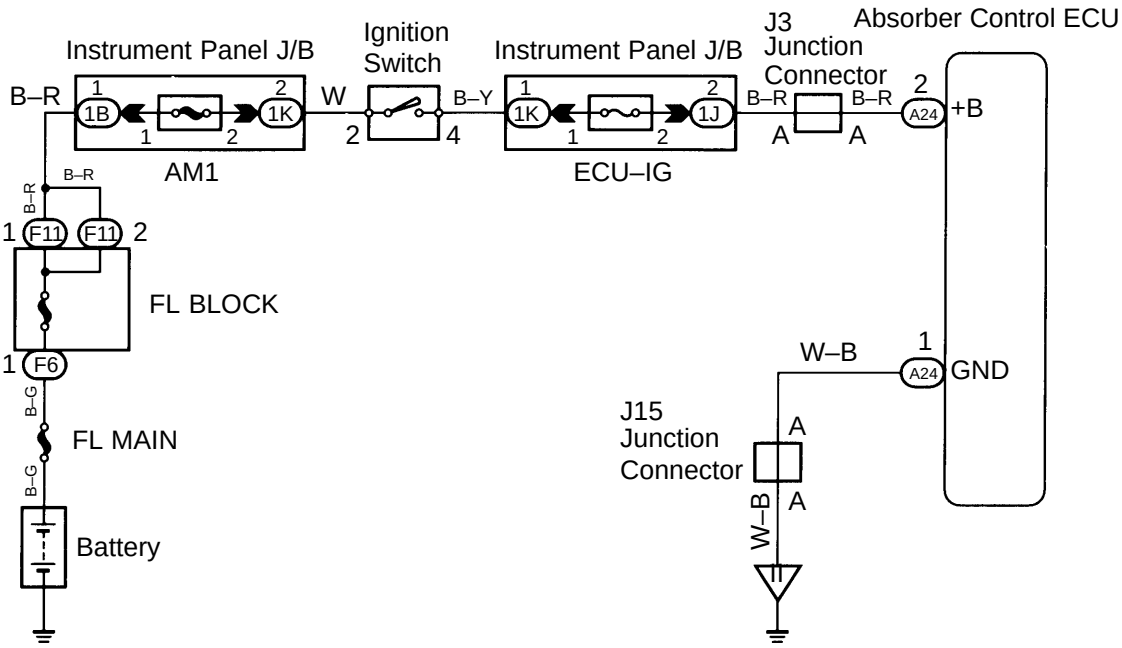
DI0AP–01

Power Source Circuit

CIRCUIT DESCRIPTION

This is the power source for the absorber control ECU, hence the absorber control actuator.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check battery positive voltage.**

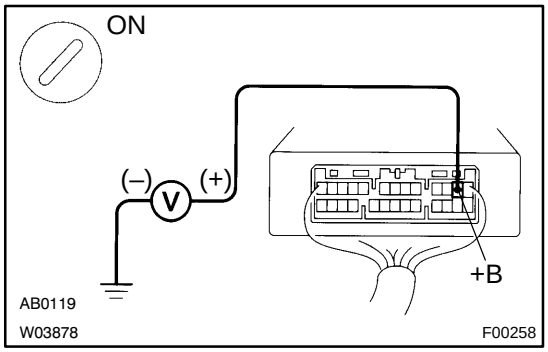
OK:

Voltage: 10 – 14 V

NG → **Charge or replace battery.**

OK

2	Check voltage between terminal +B of absorber control ECU connector and body ground.



PREPARATION:

(a) Remove the No.1 lower panel (See page BO–82).

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal +B of absorber control ECU and body ground.

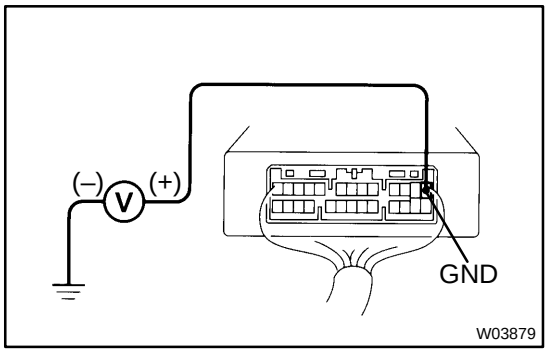
OK:

Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–203).**

NG

3	Check continuity between terminal GND of absorber control ECU connector and body ground.



CHECK:

Measure continuity between terminal GND of absorber control ECU connector and body ground.

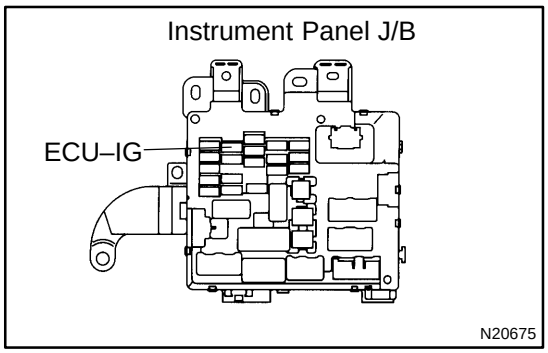
OK:

Continuity

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–203).**

NG

4	**Check ECU–IG fuse.**



PREPARATION:
Remove ECU–IG fuse from instrument panel J/B.
CHECK:
Check continuity of ECU–IG fuse.
OK:
Continuity

NG → **Check for short in all the harness and components connected to ECU–IG fuse (See attached wiring diagram).**

OK

Check for open in harness and connector between absorber control ECU and battery (See page IN–27).

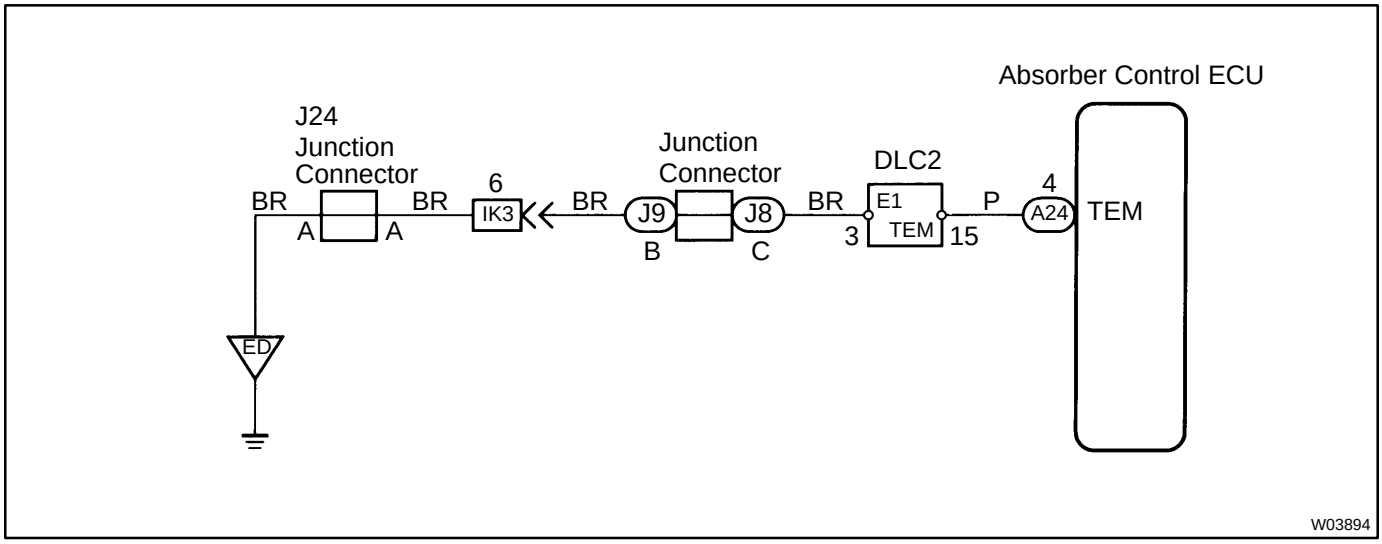
DI0AQ–01

TEM Terminal Circuit

CIRCUIT DESCRIPTION

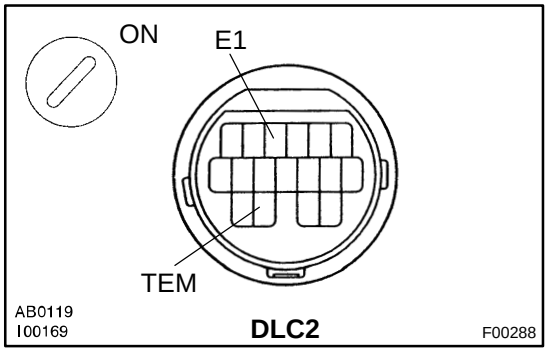
By connecting LED to the between terminals TEM and E1 of DLC2, a TEM output check can be performed (See page DI–196).

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals TEM and E1 of DLC2.**



CHECK:

Measure the voltage between terminals TEM and E1 of DLC2 for 2 sec. after the ignition switch is ON.

OK:

Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–203).**

NG

2	**Check for open in harness and connectors between terminals E1 of DLC2 and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

3	**Check harness and connectors between absorber control ECU and DLC2 (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check replace absorber control ECU.

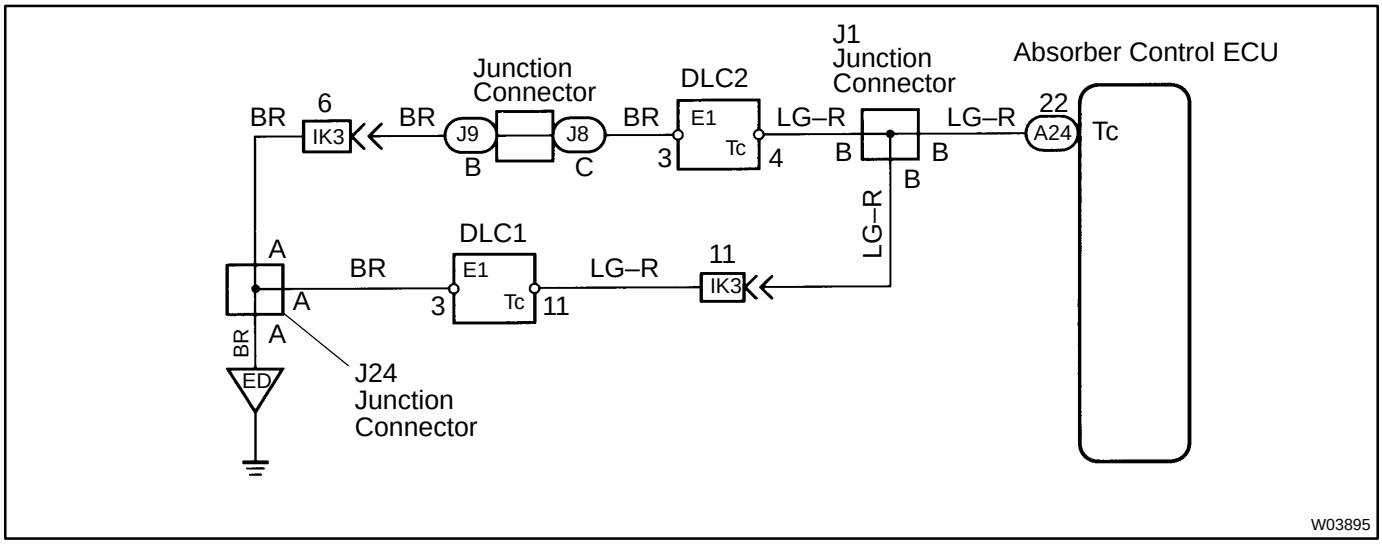
DI0AR–01

Tc Terminal Circuit

CIRCUIT DESCRIPTION

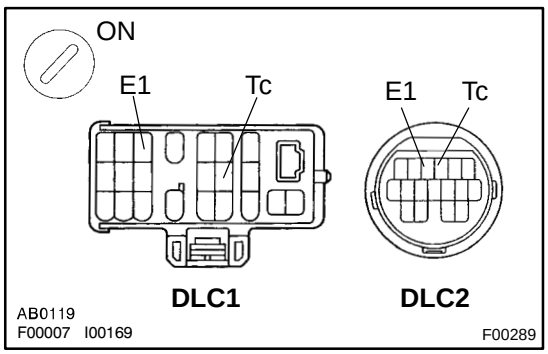
By connecting terminal Tc and E1 of DLC1 or DLC2, the DTC mode can be performed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals Tc and E1 of DLC1 or DLC2.**



PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure the voltage between terminals Tc and E1 of DLC2 or DLC1.
OK:
Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–203).**

NG

2	**Check for open in harness and connectors between terminals E1 of DLC1, DLC2 and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

3	**Check harness and connectors between absorber control ECU and DLC1 absorber control ECU and DLC2 (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace absorber control ECU.

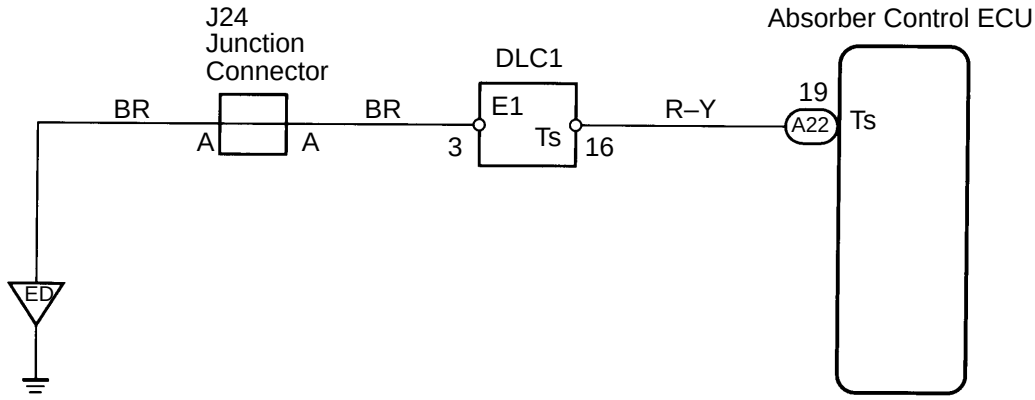
DI0AS–01

Ts Terminal Circuit

CIRCUIT DESCRIPTION

By connecting terminal Ts and E1 of DLC1, an input signal check can be performed.

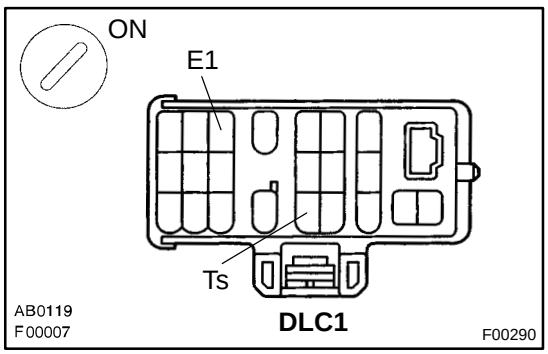
WIRING DIAGRAM



W03888

INSPECTION PROCEDURE

1	**Check voltage between terminals Ts and E1 of DLC1.**



PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals Ts and E1 of DLC1.

OK:

Voltage: 10 – 14 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–203).**

NG

2	**Check for open in harness and connectors between terminals E1 of DLC1 and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

3	**Check harness and connectors between absorber control ECU and DLC1 (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

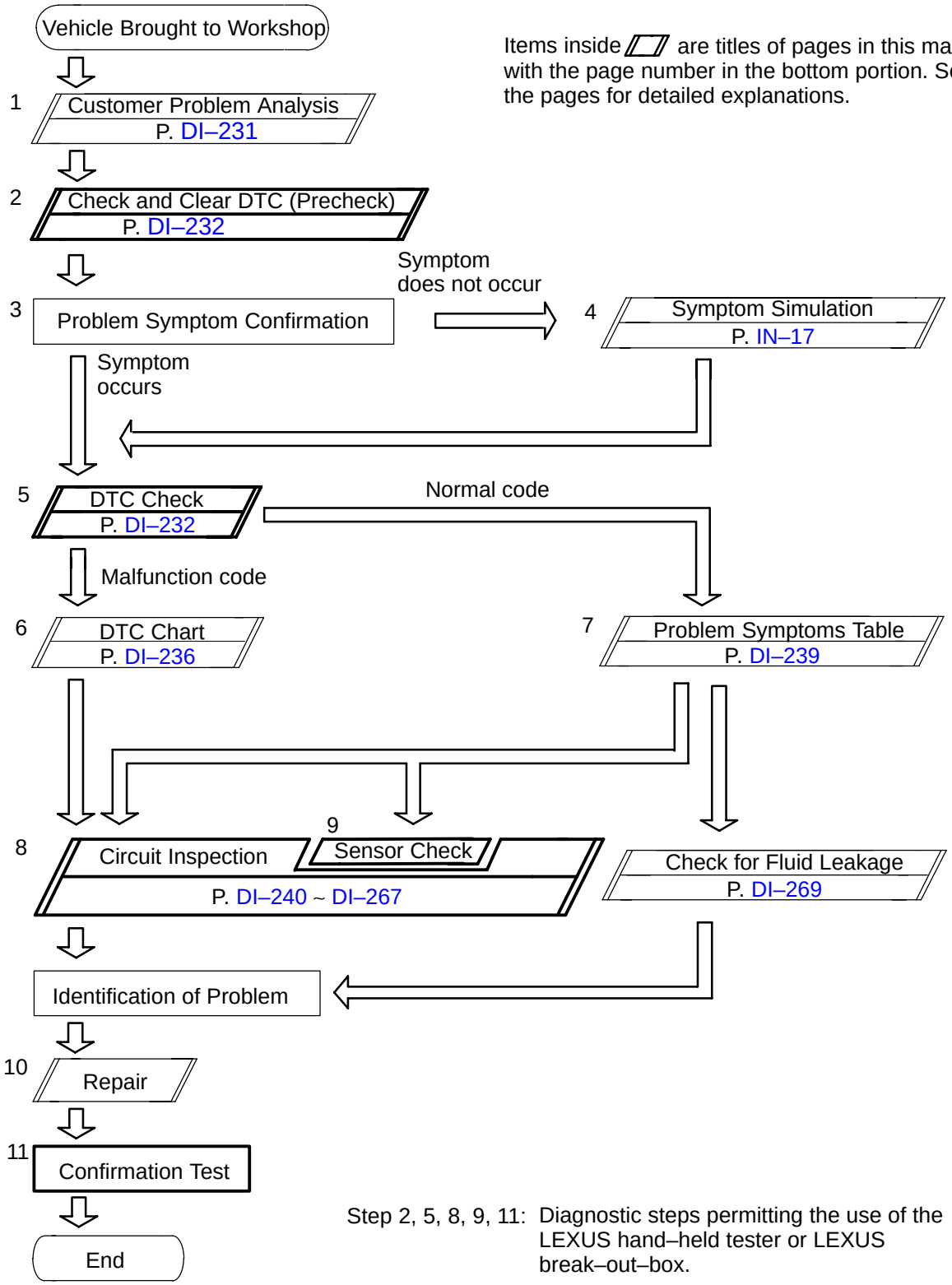
Check and replace absorber control ECU.

ANTI–LOCK BRAKE SYSTEM

DI0BB–01

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoooting in accordance with the procedure on the following pages.



Items inside ▱ are titles of pages in this manual, with the page number in the bottom portion. See the pages for detailed explanations.

Step 2, 5, 8, 9, 11: Diagnostic steps permitting the use of the LEXUS hand–held tester or LEXUS break–out–box.

DI0BC–01

CUSTOMER PROBLEM ANALYSIS CHECK

ABS Check Sheet

Inspector's Name :

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI0BD–01

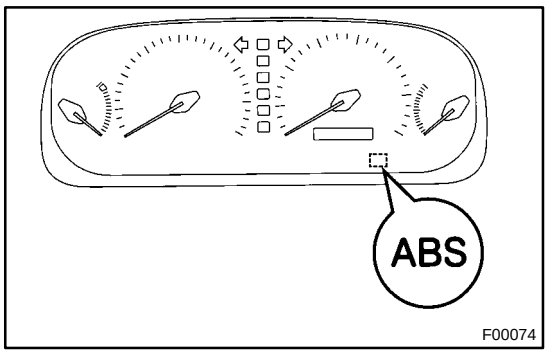
PRE–CHECK

1. DIAGNOSIS SYSTEM

(a) INDICATOR CHECK

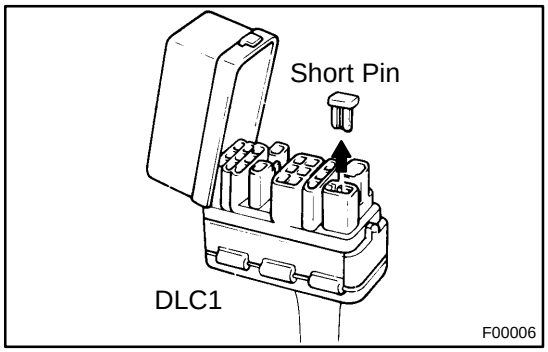
When the ignition switch is turned ON, check that the ABS warning light goes on for 3 seconds.

HINT: If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit (See page DI–262).



(b) DTC CHECK

(1) Disconnect the short pin from DLC1.



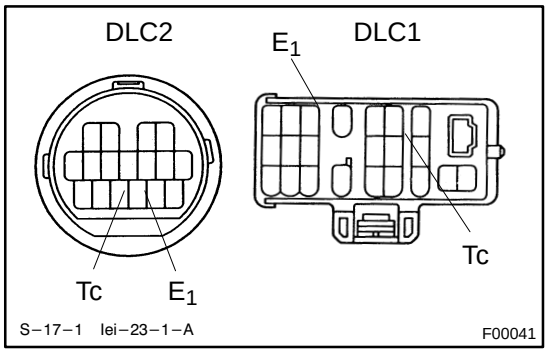
(2) Using SST, connect terminals Tc and E_1 of DLC2 or DLC1.

SST 09843 – 18020

(3) Turn the ignition switch ON.

(4) Read the DTC from the ABS warning light on the combination meter.

HINT: If no code appears, inspect the diagnostic circuit or ABS warning light circuit (See page DI–265 or DI–262).

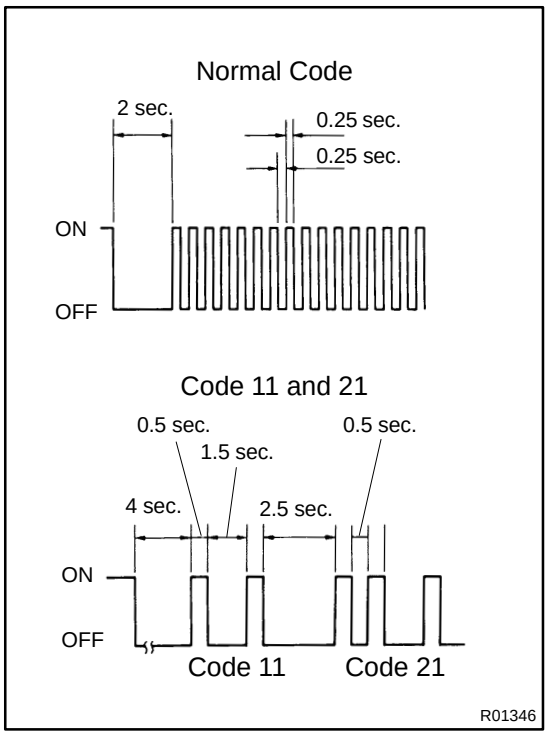


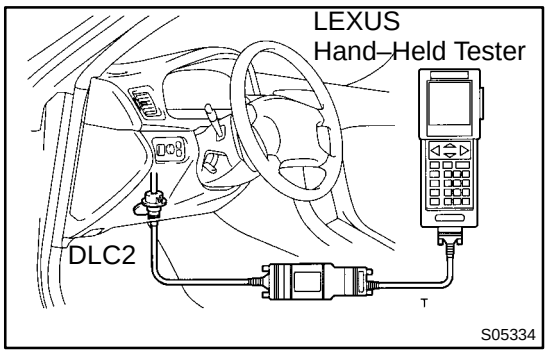
As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.

(5) Code are explained in the code table on page DI–231.

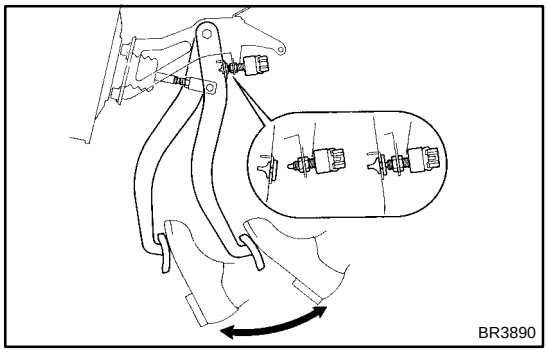
(6) After completing the check, disconnect terminals Tc and E_1, and turn off the display.

If 2 or more malfunctions are indicated at the same time the lowest numbered DTC will be displayed 1st.

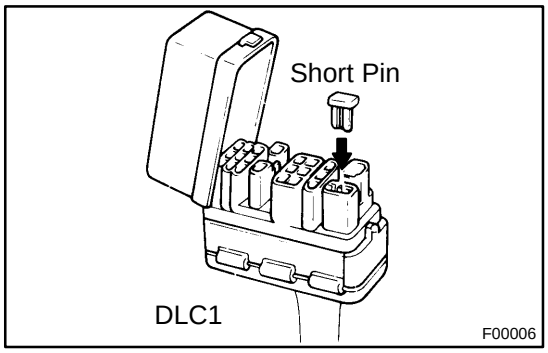




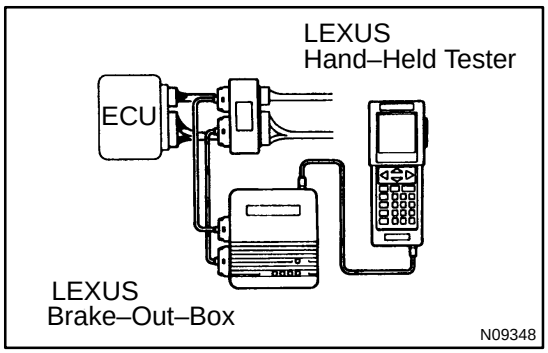
(c) DTC CHECK USING LEXUS HAND–HELD TESTER
(1) Hook up the LEXUS hand–held tester to the DLC2.
(2) Read the DTC by following the prompts on the tester screen.
Please refer to the LEXUS hand–held tester operator's manual for further details.



(d) DTC CLEARANCE
(1) Using SST, connect terminals Tc and E_1 of DLC2 or DLC1 and remove the short pin from DLC1.
SST 09843 – 18020
(2) IG switch ON.
(3) Clear the DTC stored in ECU by depressing the brake pedal 8 or more times within 5 seconds.

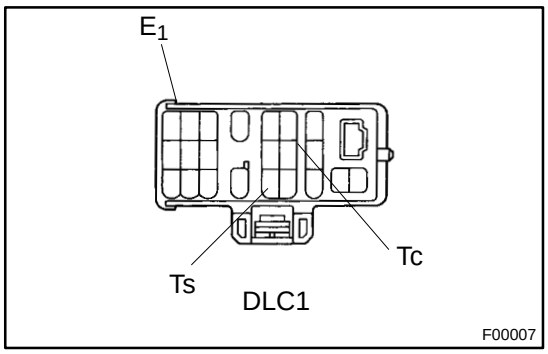


(4) Check that the warning light shows the normal code.
(5) Remove the SST from the terminals of DLC2 or DLC1.
SST 09843 – 18020
(6) Connect the short pin to DLC1.



(e) ECU TERMINAL VALUES MEASUREMENT USING LEXUS BREAK –OUT–BOX AND LEXUS HAND–HELD TESTER
(1) Hook up the LEXUS hand–held tester and LEXUS break–out–box to the vehicle.
(2) Read the ECU input/output values by following the prompts on the tester screen.

HINT:LEXUS hand–held tester has a "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems.
Please refer to the LEXUS hand–held tester/LEXUS break–out–box operator's manual for further details.



2. SPEED SENSOR SIGNAL

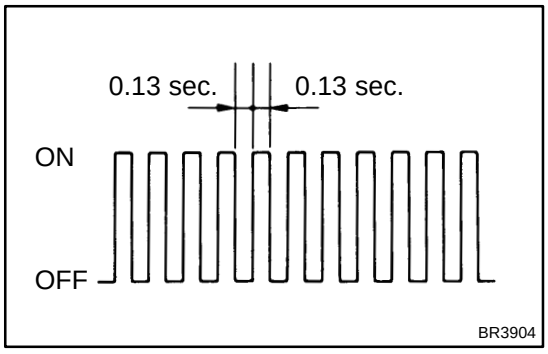
(a) SPEED SENSOR SIGNAL CHECK

(1) Turn the ignition switch OFF.

(2) Using SST, connect terminals Ts and E_1 of DLC1.

SST 09843 – 18020

(3) Start the engine.



(4) Check that the ABS warning light blinks.

HINT:If the ABS warning light does not blink, inspect the ABS warning light circuit (See page DI–262).

(5) Drive vehicle straight forward.

HINT:Drive vehicle faster than 45 km/h (28 mph) for several seconds.

(6) Stop the vehicle.

(7) Using SST, connect terminals Tc and E_1 of DLC1.

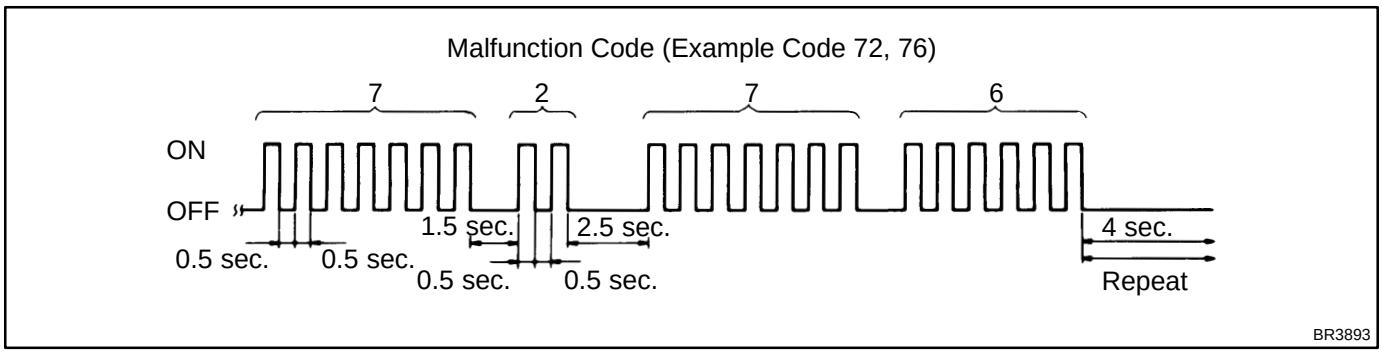
SST 09843 – 18020

(8) Read the number of blinks of the ABS warning light.

HINT:See the list of DTC shown on the next page.

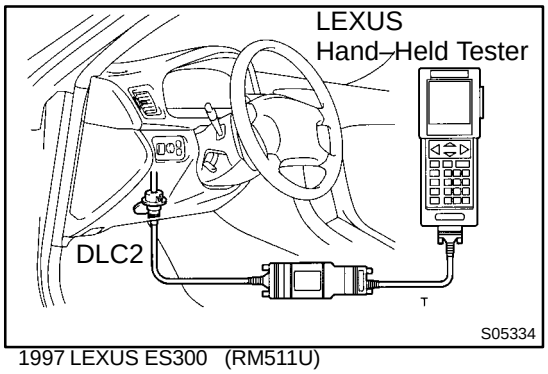
If every sensor is normal, a normal code is output (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated).

If 2 or more malfunction are indicated at the same time, the lowest numbered code will be displayed 1st.



(9) After doing the check, disconnect the SST from terminals Ts and E_1, Tc and E_1 of DLC1, and turn ignition switch OFF.

SST 09843 – 18020



(b) DTC CHECK USING LEXUS HAND–HELD TESTER

(1) Do step 1. ~ 6. on the previous page.

(2) Hook up the LEXUS hand–held tester to the DLC2.

(3) Read the DTC by following the prompts on the tester screen.

Please refer to the LEXUS hand–held tester operator's manual for further details.

(c) DTC OF SPEED SENSOR CHECK FUNCTION

Code No.	Diagnosis	Trouble Area
71	Low output voltage of right front speed sensor	●Right front speed sensor ●Sensor installation ●Right front speed sensor rotor
72	Low output voltage of left front speed sensor	●Left front speed sensor ●Sensor installation ●Left front speed sensor rotor
73	Low output voltage of right rear speed sensor	●Right rear speed sensor ●Sensor installation ●Right rear speed sensor rotor
74	Low output voltage of left rear speed sensor	●Left rear speed sensor ●Sensor installation ●Left rear speed sensor rotor
75	Abnormal change in output voltage of right front speed sensor	●Right front speed sensor rotor
76	Abnormal change in output voltage of left front speed sensor	●Left front speed sensor rotor
77	Abnormal change in output voltage of right rear speed sensor	●Right rear speed sensor rotor
78	Abnormal change in output voltage of left rear speed sensor	●Left rear speed sensor rotor

DI0BE–01

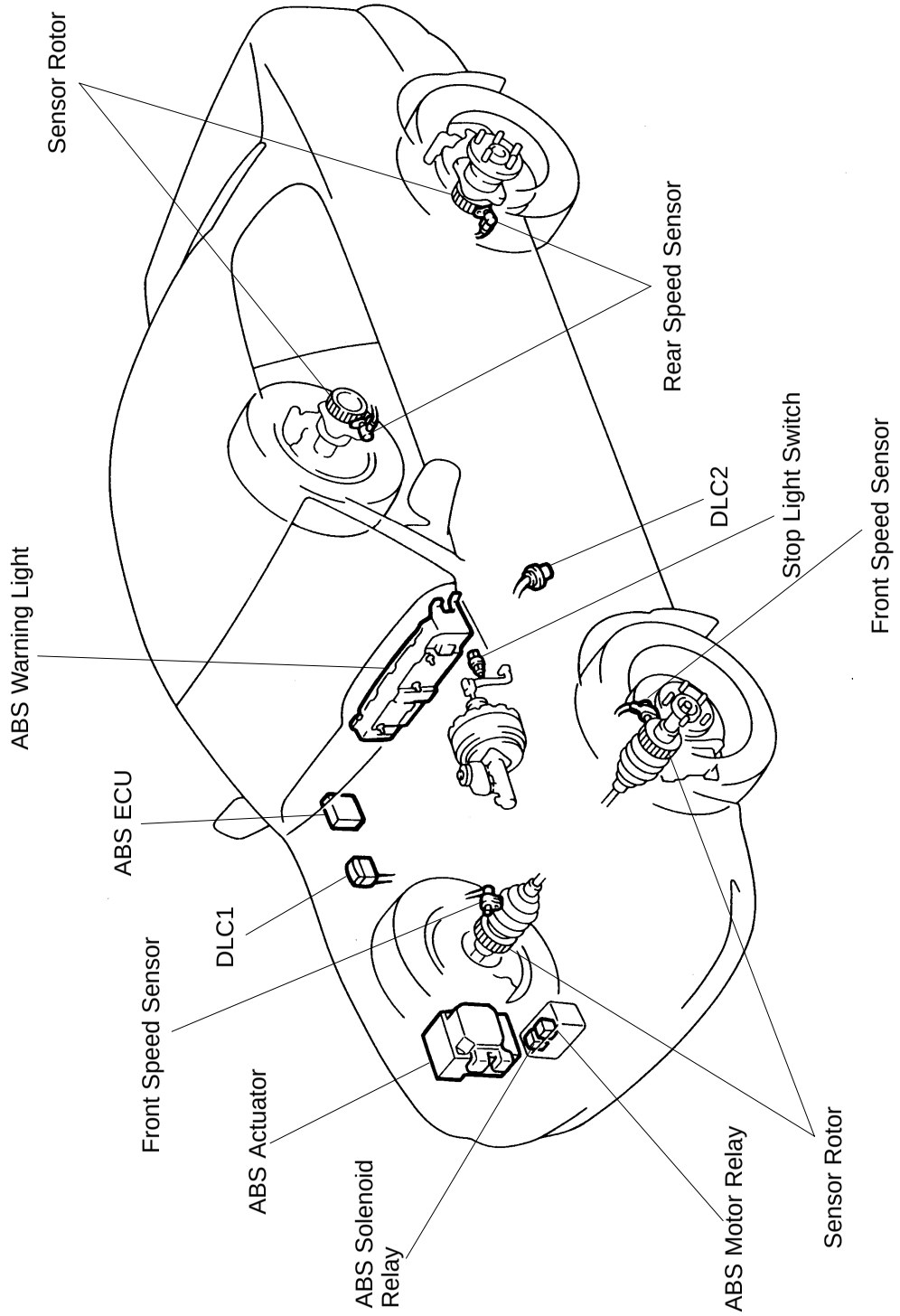
DIAGNOSTIC TROUBLE CODE CHART

HINT:Using SST 09843 –18020, connect the terminals Tc and E_1, and remove the short pin.
If a malfunction code is displayed during the DTC check, check the circuit listed that the code. For details of each code, turn to the page referred to under the ”See page” for respective ”DTC No.” in the DTC chart.

DTC No. (See Page)	Detection Item	Trouble Area
11 (DI–240)	Open circuit in ABS solenoid relay circuit	●ABS solenoid relay ●ABS solenoid relay circuit
12 (DI–240)	Short circuit in ABS solenoid relay circuit	
13 (DI–243)	Open circuit in ABS motor relay circuit	●ABS motor relay ●ABS motor relay circuit
14 (DI–243)	Short circuit in ABS motor relay circuit	
21 (DI–246)	Open or short circuit in 2–position solenoid circuit for right front wheel	●ABS actuator ●SFRR or SFRH circuit
22 (DI–246)	Open or short circuit in 2–position solenoid circuit for left front wheel	●ABS actuator ●SFLR or SFLH circuit
23 (DI–246)	Open or short circuit in 2–position solenoid circuit for right rear wheel	●ABS actuator ●SRRR or SRRH circuit
24 (DI–246)	Open or short circuit in 2–position solenoid circuit for left rear wheel	●ABS actuator ●SRLR or SRLH circuit
31 (DI–248)	Right front wheel speed sensor signal malfunction	●Right front, left front, right rear and left rear speed sensor ●Each speed sensor circuit ●Speed sensor rotor
32 (DI–248)	Left front wheel speed sensor signal malfunction	
33 (DI–248)	Right rear wheel speed sensor signal malfunction	
34 (DI–248)	Left rear wheel speed sensor signal malfunction	
33, 34 (DI–253)	Rear speed sensor rotor faulty	●Rear axle hub ●Right rear, left rear speed sensor ●Rear speed sensor circuit
41 (DI–254)	Power source voltage down	●Battery ●IC regulator ●Power source circuit
49 (DI–257)	Open circuit in stop light switch circuit	●Stop light switch ●Stop light switch circuit
51 (DI–259)	Pump motor is locked	●ABS pump motor
Always ON (DI–260)	Malfunction in ECU	●ECU ●Battery

DI0BF–01

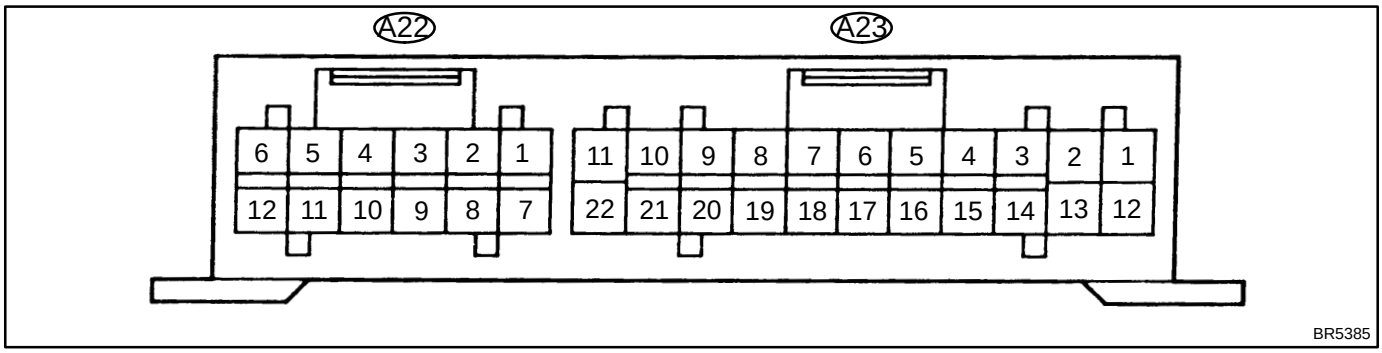
PARTS LOCATION



F00077

DI0BG–01

TERMINALS OF ECM



Symbols (Terminals No.)	STD Voltage (V)	Condition
IG1(A22 – 2) – GND (A23 – 2, 13)	10 – 14	IG switch ON
R+ (A23 – 8) – SR (A23 – 18)	9 – 14	IG switch ON, ABS warning light OFF
R+ (A23 – 8) – MR (A23 – 7)	Below 1.0	IG switch ON
SFRR (A23 – 1) – GND (A23 – 2, 13)	10 – 14	IG switch ON, ABS warning light OFF
SFRH (A23 – 4) – GND (A23 – 2, 13)	10 – 14	IG switch ON, ABS warning light OFF
SFLR (A23 – 11) – GND (A23 – 2, 13)	10 – 14	IG switch ON, ABS warning light OFF
SFLH (A23 – 10) – GND (A23 – 2, 13)	10 – 14	IG switch ON, ABS warning light OFF
SRRR (A23 – 22) – GND (A23 – 2, 13)	10 – 14	IG switch ON, ABS warning light OFF
SRRH (A23 – 21) – GND (A23 – 2, 13)	10 – 14	IG switch ON, ABS warning light OFF
SRLR (A23 – 12) – GND (A23 – 2, 13)	10 – 14	IG switch ON, ABS warning light OFF
SRLH (A23 – 5) – GND (A23 – 2, 13)	10 – 14	IG switch ON, ABS warning light OFF
AST (A23 – 16) – GND (A23 – 2, 13)	10 – 14	IG switch ON, ABS warning light OFF
WA (A22 – 4) – GND (A23 – 2, 13)	Below 2.0	IG switch ON, ABS warning light ON
	10 – 14	IG switch ON, ABS warning light OFF
STP (A22 – 12) – GND (A23 – 2, 13)	Below 1.5	Stop light switch OFF
	8 – 14	Stop light switch ON
D/G (A22 – 11) – GND (A23 – 2, 13)	10 – 14	IG switch ON, ABS warning light OFF
Tc (A22 – 9) – GND (A23 – 2, 13)	8 – 14	IG switch ON
Ts (A22 – 8) – GND (A23 – 2, 13)	8 – 14	IG switch ON
FR+ (A23 – 3) – FR– (A23 – 14)	AC generation	IG switch ON Slowly turn right front wheel
FL+ (A23 – 19) – FL– (A23 – 20)	AC generation	IG switch ON Slowly turn left front wheel
RR+ (A22 – 1) – RR– (A22 – 7)	AC generation	IG switch ON Slowly turn right rear wheel
RL+ (A22 – 3) – RL– (A22 – 10)	AC generation	IG switch ON Slowly turn left rear wheel
MT (A23 – 9) – GND (A23 – 2, 13)	Below 1.5	IG switch ON

DI0BH–01

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

Symptoms	Inspection Circuit	See page
ABS does not operate.	Only when 1. ~ 4. are all normal and the problem is still occurring, replace the ABS ECU. 1. Check the DTC reconfirming that the normal code is output. 2. IG power source circuit. 3. Speed sensor circuit. 4. Check the ABS actuator with a checker. If abnormal, check the hydraulic circuit for leakage (See page DI–269).	 DI–232 DI–254 DI–248 BR–46
ABS does not operate efficiently.	Only when 1. ~ 4. are all normal and the problem is still occurring, replace the ABS ECU. 1. Check the DTC reconfirming that the normal code is output. 2. Speed sensor circuit. 3. Stop light switch circuit. 4. Check the ABS actuator with a checker. If abnormal, check the hydraulic circuit for leakage (See page DI–269).	 DI–232 DI–248 DI–257 BR–46
ABS warning light abnormal.	1. ABS warning light circuit. 2. ABS ECU.	DI–262 DI–260
DTC check cannot be done.	Only when 1. and 2. are all normal and the problem is still occurring, replace the ABS ECU. 1. ABS warning light circuit. 2. Tc terminal circuit.	 DI–262 DI–265
Speed sensor signal check cannot be done.	1. Ts terminal circuit. 2. ABS ECU.	DI–267 DI–260

DI0BI–01

CIRCUIT INSPECTION

DTC	11, 12	ABS Solenoid Relay Circuit

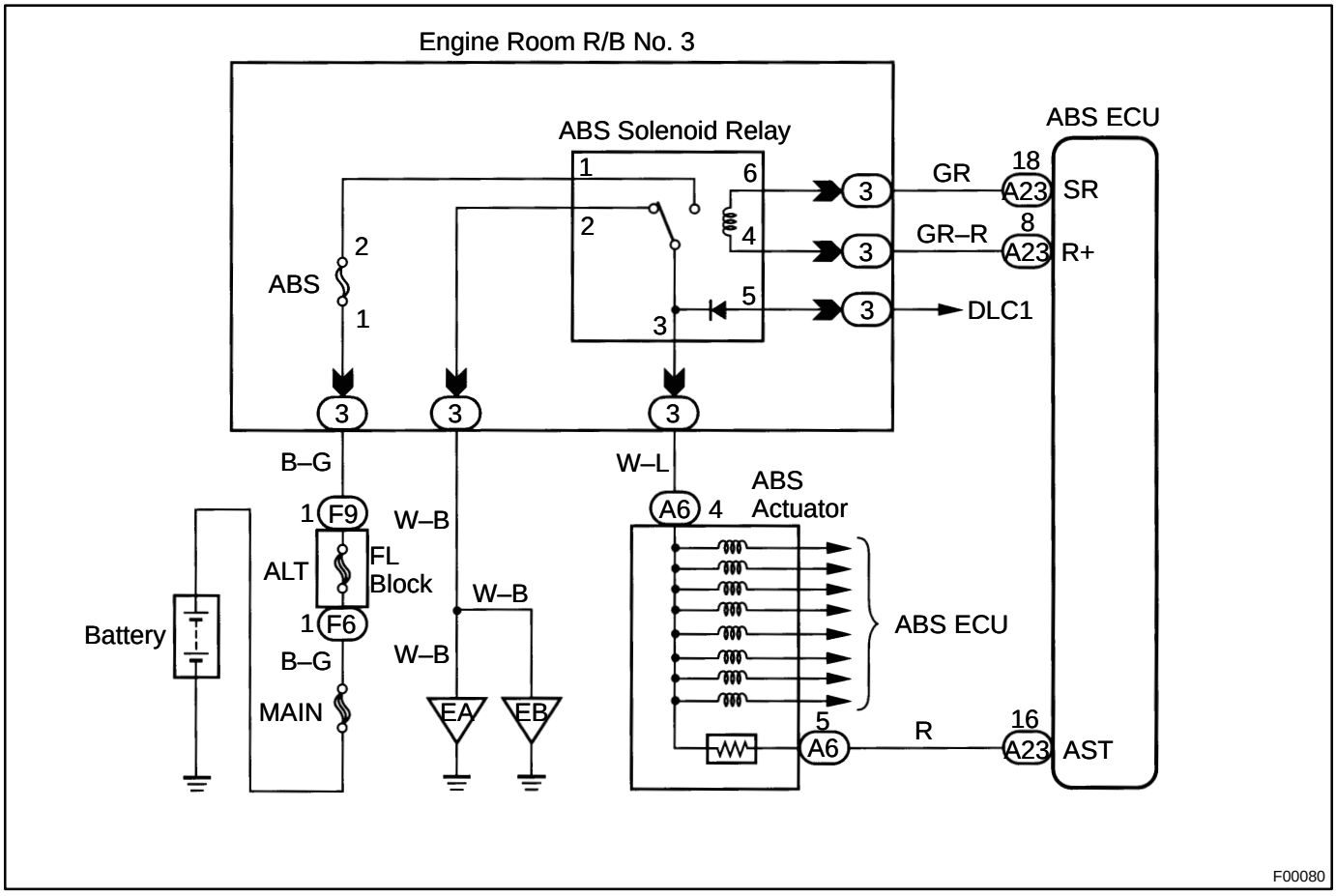
CIRCUIT DESCRIPTION

This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
11	Condition (1) or (2) continue for 0.2 sec. or more: (1) ABS ECU terminal IG1 voltage is 9.5 V to 18.0 V, and when solenoid relay is ON, ABS ECU terminal AST voltage is less than 4 V. (2) With solenoid relay is ON driving, ABS ECU terminal IG1 voltage becomes 9.5 V or less, and ABS ECU terminal AST voltage is less than 4 V.	●ABS solenoid relay ●ABS solenoid relay circuit
12	Immediately after turning ignition switch ON, and when solenoid relay is OFF, ABS ECU terminal AST voltage is 4 V or more continues for 0.2 sec. or more.	

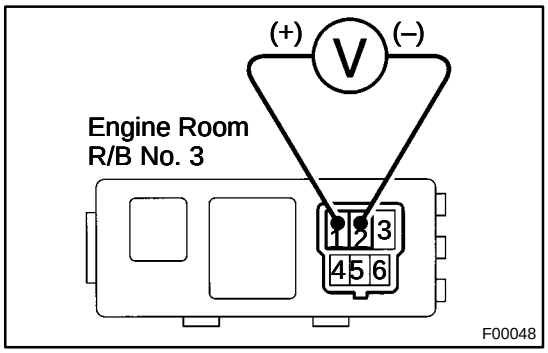
Fail safe function: If trouble in the ABS solenoid relay circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals 1 and 2 of Engine Room R/B No. 3 (for ABS solenoid relay).**



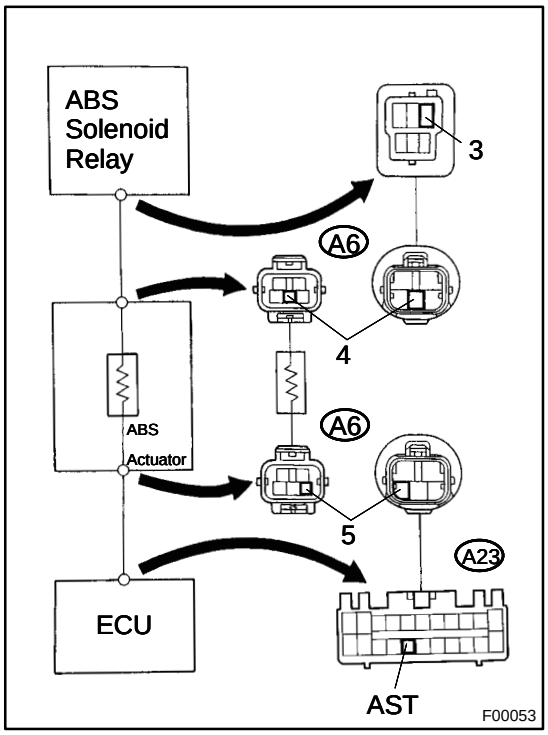
PREPARATION:
Remove ABS solenoid relay from Engine Room R/B No. 3.
CHECK:
Measure the voltage between terminals 1 and 2 of Engine Room R/B No. 3 (for ABS solenoid relay).
OK:

Voltage: 10 – 14 V

NG	**Check and repair harness or connector.**

OK

2	**Check continuity between terminal 3 of ABS solenoid relay and terminal AST of ABS ECU.**



CHECK:
Check continuity between terminal 3 of ABS solenoid relay and terminal AST of ABS ECU.
OK:

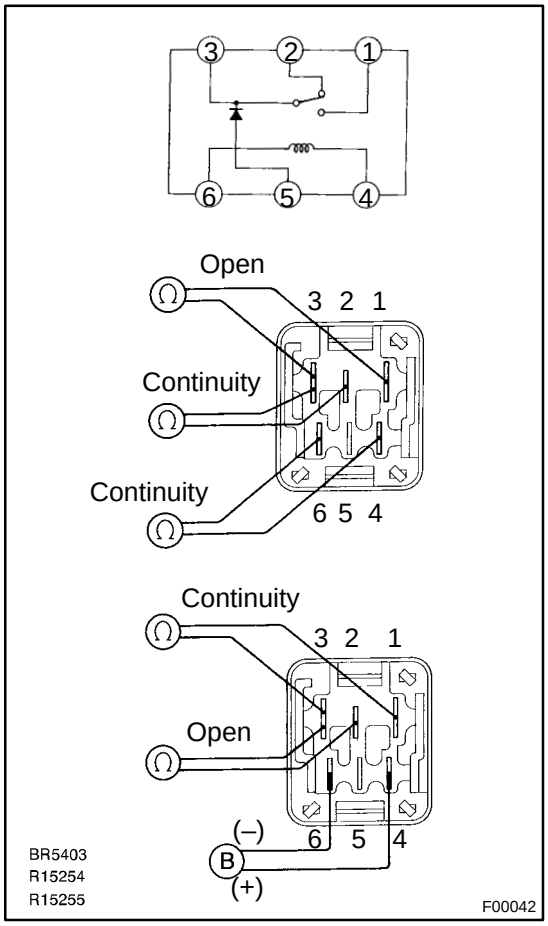
Continuity

HINT:There is a resistance of 4 ~ 6 Ω between terminals A6 – 4 and A6 – 5 of ABS actuator.

NG	**Repair or replace harness or ABS actuator.**

OK

3	Check ABS solenoid relay.



PREPARATION:

Remove ABS solenoid relay from Engine Room R/B No. 3.

CHECK:

Check continuity between each terminal of ABS solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

(a) Apply battery positive voltage between terminals 4 and 6.

(b) Check continuity between each terminal of ABS solenoid relay.

OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

NG → **Replace ABS solenoid relay.**

OK

4	Check for open and short in harness and connector between ABS solenoid relay and ABS ECU (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection.
If the connector are normal, the ECU may be defective.

DI0BJ–01

DTC	13, 14	ABS Motor Relay Circuit

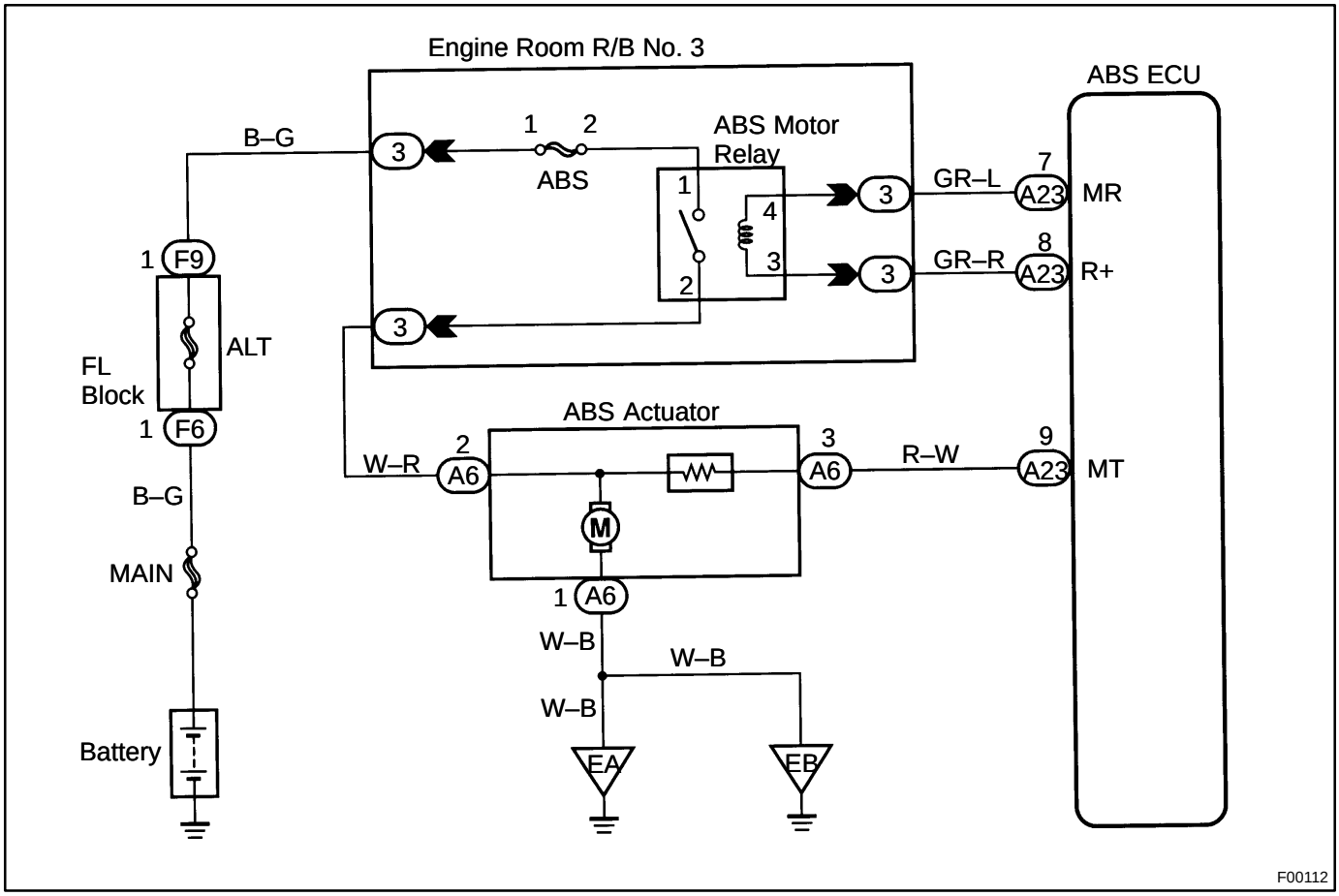
CIRCUIT DESCRIPTION

The ABS motor relay supplies power to the ABS pump motor. While the ABS is activated, the ECU switches the ABS motor relay ON and operates the ABS pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
13	Condition (1) or (2) continued for 0.2 sec. or more: (1) ABS ECU terminal IG1 voltage is 9.5 V to 18.0 V, and when motor relay is ON in the midst of initial check or in operation of ABS control, ABS ECU terminal MT voltage is less than 4 V. (2) Motor relay is ON driving in the midst of initial check or in operation of ABS control, ABS ECU terminal IG1 voltage becomes 9.5 V or less and ABS ECU terminal MT voltage is less than 4 V.	●ABS motor relay ●ABS motor relay circuit
14	When motor relay is OFF, ABS ECU terminal MT voltage is 4 V or more continues for 0.2 sec. or more.	

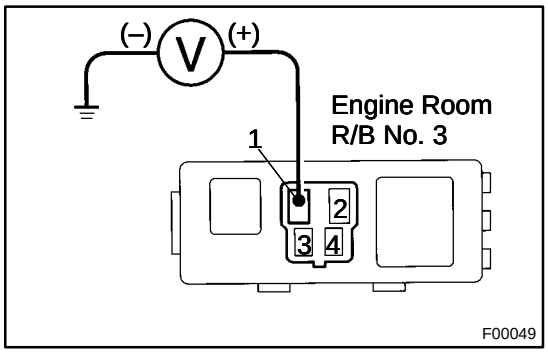
Fail safe function: If trouble occurs in the ABS motor relay circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal 1 of Engine Room R/B No. 3 (for ABS motor relay) and body ground.**



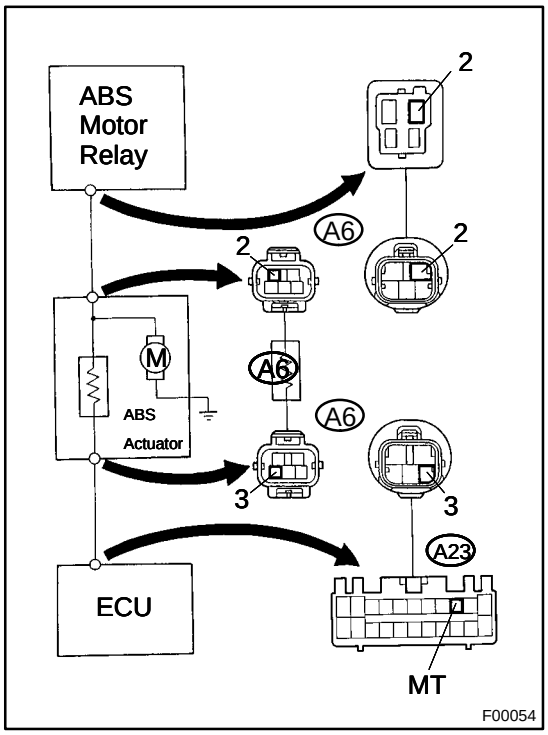
PREPARATION:
Remove ABS motor relay from Engine Room R/B No. 3.
CHECK:
Measure voltage between terminal 1 of Engine Room R/B No. 3 (for ABS motor relay) and body ground.
OK:

Voltage: 10 – 14 V

NG → **Check and repair harness or connector.**

OK ↓

2	**Check continuity between terminal 2 of ABS motor relay and terminal MT of ABS ECU.**



CHECK:
Check continuity between terminal 2 of ABS motor relay and terminal MT of ABS ECU.
OK:

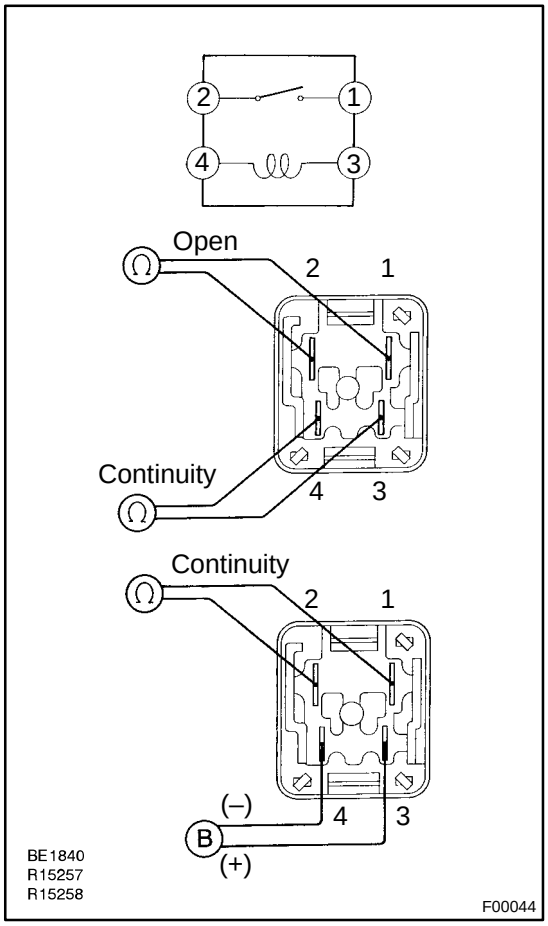
Continuity

HINT:There is a resistance of 4 ~ 6 Ω between terminals A6 – 2 and A6 – 3 of ABS actuator.

NG → **Repair or replace harness or ABS actuator.**

OK ↓

3	Check ABS motor relay.



PREPARATION:
Remove ABS motor relay from Engine Room R/B No. 3.

CHECK:
Check continuity between each terminal of ABS motor relay.
OK:

Terminals 3 and 4	Continuity (Reference value 62 Ω)
Terminals 1 and 2	Open

CHECK:
(a) Apply battery positive voltage between terminals 3 and 4.
(b) Check continuity between terminals of ABS motor relay.
OK:

Terminals 1 and 2	Continuity

NG → **Replace ABS motor relay.**

OK ↓

4	Check for open and short in harness and connector between ABS motor relay and ABS ECU (See page IN–27).

NG → **Repair or replace harness or connector.**

OK ↓

If the same code is still output after the DTC is deleted, check the contact condition of each connection.
If the connections are normal, the ECU may be defective.

DI0BK–01

DTC	21, 22, 23, 24	ABS Actuator Solenoid Circuit

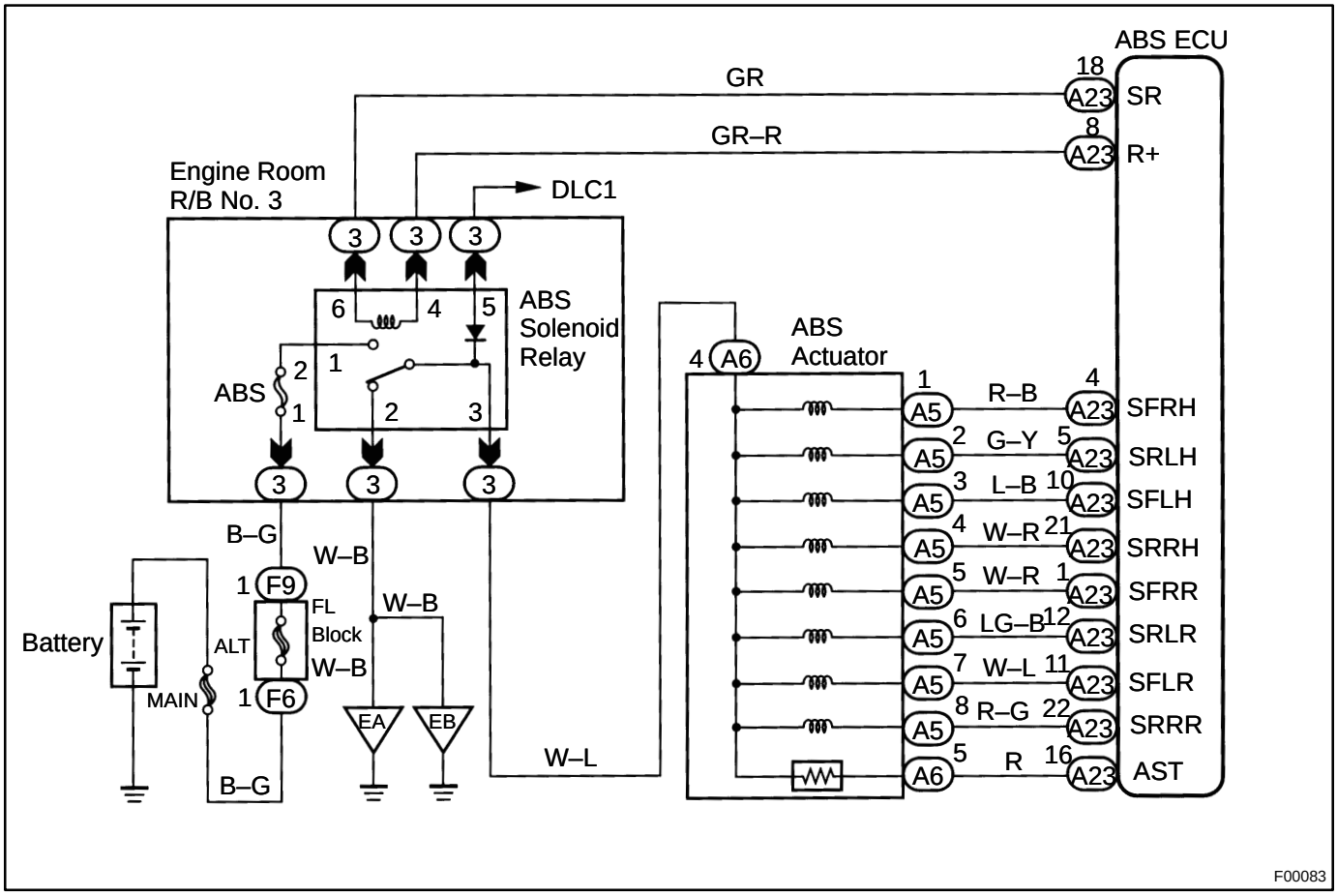
CIRCUIT DESCRIPTION

This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders thus controlling the braking force.

DTC No.	DTC Detecting Condition	Trouble Area
21	Actuator solenoid SFRR or SFRH is open or short circuit continues for 0.05 sec. or more.	●ABS actuator ●SFRR or SFRH circuit
22	Actuator solenoid SFLR or SFLH is open or short circuit continues for 0.05 sec. or more.	●ABS actuator ●SFLR or SFLH circuit
23	Actuator solenoid SRRR or SRRH is open or short circuit continues for 0.05 sec. or more.	●ABS actuator ●SRRR or SRRH circuit
24	Actuator solenoid SRLR or SRLH is open or short circuit continues for 0.05 sec. or more.	●ABS actuator ●SRLR or SRLH circuit

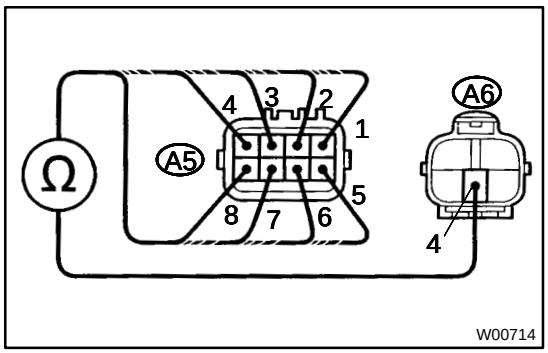
Fail safe function: If trouble occurs in the actuator solenoid circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ABS actuator solenoid.**



PREPARATION:
Disconnect the 2 connectors from ABS actuator.
CHECK:
Check continuity between terminals A6 – 4 and A5 – 1, 2, 3, 4, 5, 6, 7, 8 of ABS actuator connector.
OK:

Continuity

HINT:Resistance of each solenoid coil is 1.2 Ω.

NG → **Replace ABS actuator.**

OK

2	**Check for open and short in harness and connector between ABS ECU and actuator (See page IN–27).**

NG → **Repair or replace harness or connector.**

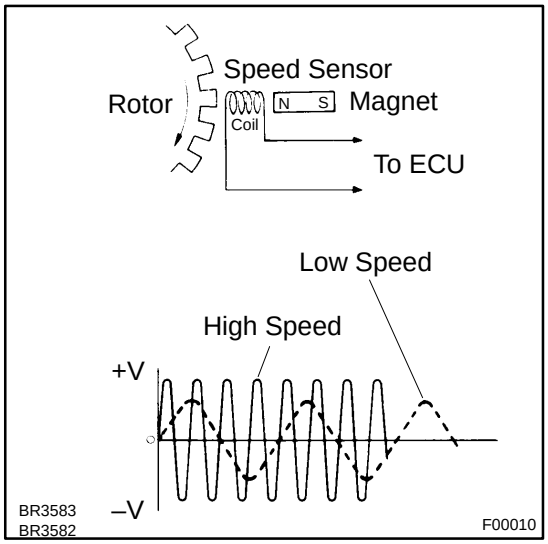
OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection.
If the connections are normal, the ECU may be defective.

DI0BL–01

DTC	31, 32, 33, 34	Speed Sensor Circuit

CIRCUIT DESCRIPTION



The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control of the ABS system. The front and rear rotors each have 48 serrations.

When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
31, 32, 33, 34	Detection of any of conditions from (1) through (4): (1) Vehicle speed is at 10 km/h (6 mph) or more and the speed sensor signal circuit is open or short circuit continues for 15 sec. or more. (2) Momentary interruption of the speed sensor signal occurs 7 times or more. (3) Vehicle speed is at 20 km/h (12mph) or more and interference on the speed sensor signal continues for 5 sec. or more. (4) Open circuit condition of the speed sensor signal circuit continues for 0.5 sec. or more.	●Right front, left front, right rear, left rear speed sensor ●Each speed sensor circuit ●Speed sensor rotor

HINT:

DTC No. 31 is for the right front speed sensor.

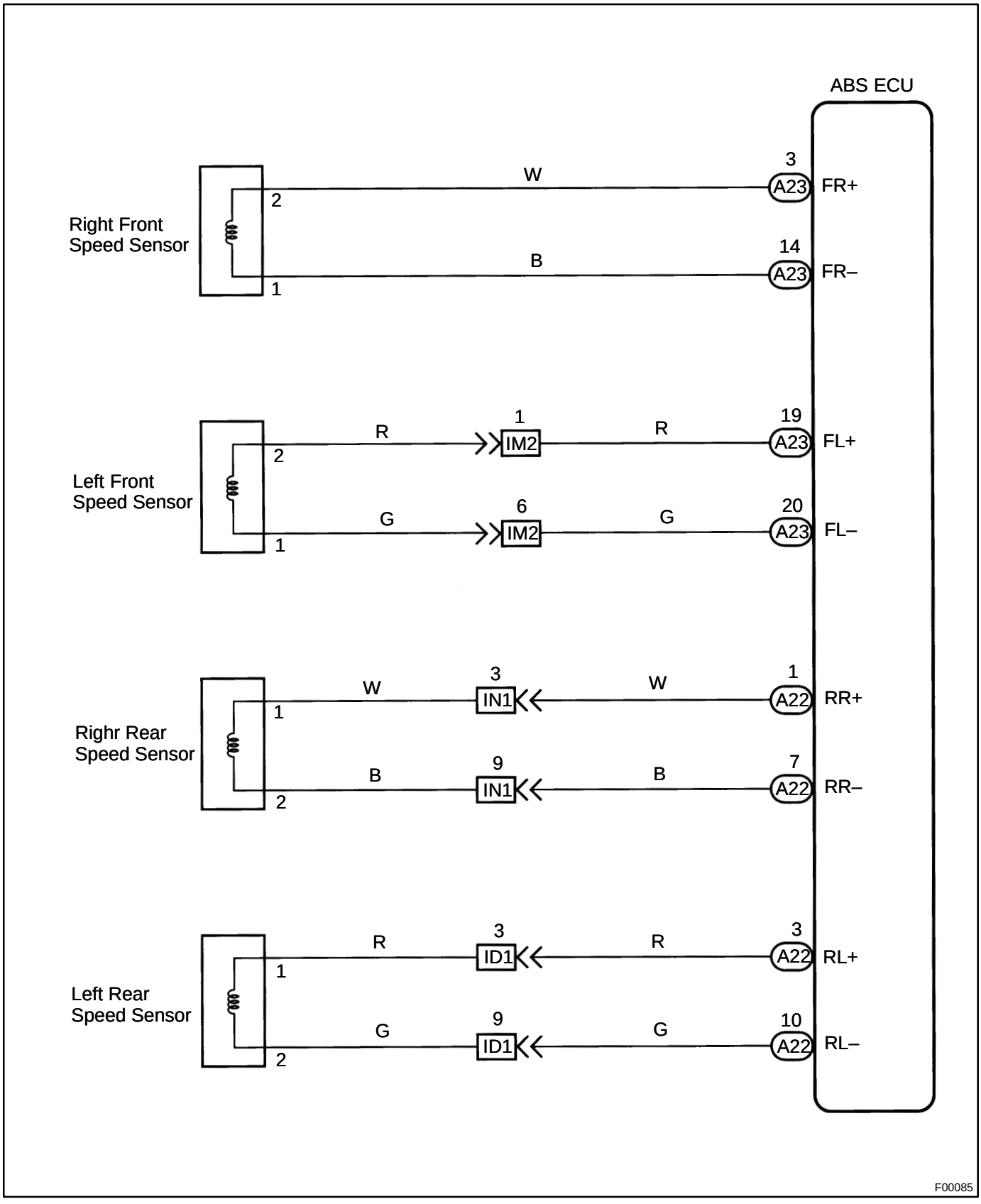
DTC No. 32 is for the left front speed sensor.

DTC No. 33 is for the right rear speed sensor.

DTC No. 34 is for the left rear speed sensor.

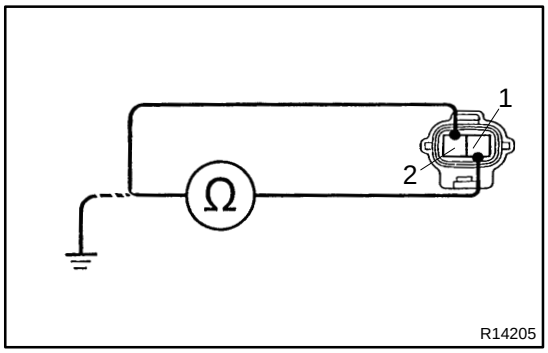
Fail safe function: If trouble occurs in the speed sensor circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check speed sensor.**



Front

PREPARATION:

(a) Remove front fender liner.

(b) Disconnect speed sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of speed sensor connector.

OK:

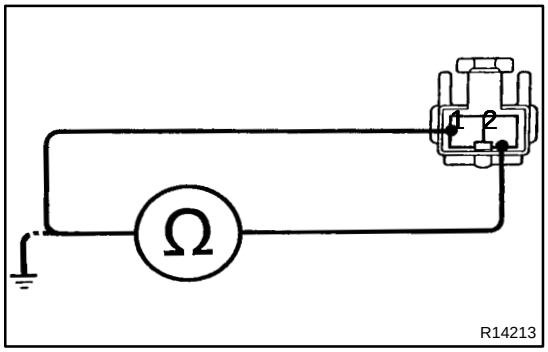
Resistance: 0.6 – 2.5 kΩ

CHECK:

Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher



Rear

PREPARATION:

(a) Remove the seat cushion and seat back.

(b) Disconnect speed sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of speed sensor connector.

OK:

Resistance: 1.2 – 2.3 kΩ

CHECK:

Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher

NG → **Replace speed sensor.**

NOTICE:Check the speed sensor signal last (See page DI–232).

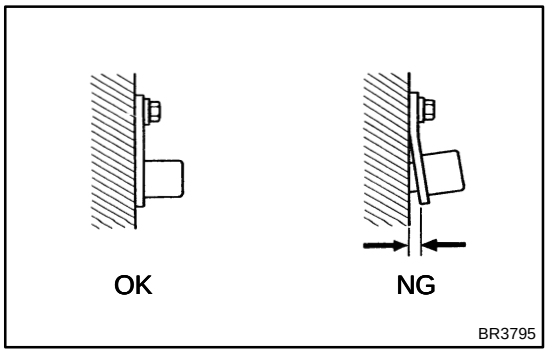
OK

2	**Check for open and short in harness and connector between each speed sensor and ECU (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

3	**Check sensor installation.**



CHECK:
Check the speed sensor installation.
OK:

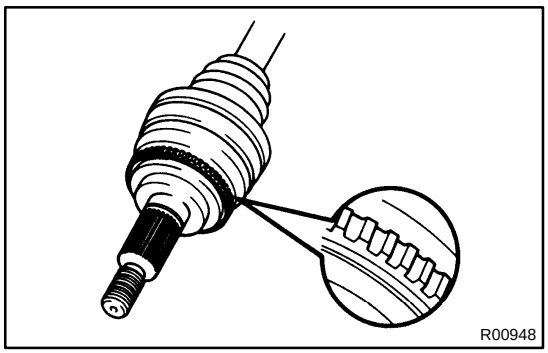
The installation bolt is tightened properly and there is no clearance between the sensor and rear axle carrier.

NG → **Replace speed sensor.**

NOTICE:Check the speed sensor signal last (See page DI–232).

OK

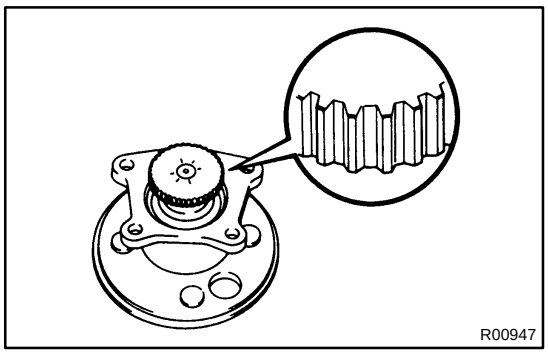
4	**Check sensor rotor and sensor tip.**



Front
PREPARATION:
Remove front drive shaft (See page SA–16).
CHECK:
Check sensor rotor serrations.
OK:

No scratches or missing teeth or foreign objects.
PREPARATION:
Remove the front speed sensor (See page BR–59).
CHECK:
Check the sensor tip.
OK:

No scratches or foreign objects on the sensor tip.



Rear

PREPARATION:

Remove the axle hub (See page SA–46).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches or missing teeth or foreign objects.

PREPARATION:

Remove the rear speed sensor (See page BR–62).

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

NG → **Replace speed sensor or rotor.**

NOTICE:Check the speed sensor signal last (See page DI–232).

OK

Check and replace ABS ECU.

DI0BM–01

DTC	33, 34	Rear Speed Sensor Rotor Faulty

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
33, 34	The condition that both rear side wheels' speed is lower than front wheels' speed at 20 km/h (12 mph) or more for 20 sec. or more when IG switch turns ON and OFF is repeated in a sequence more than 8 times.	●Rear axle hub ●Right rear, left rear speed sensor ●Rear speed sensor circuit

INSPECTION PROCEDURE

1	Check rear axle hub (See page SA–45).

NG → Replace rear axle hub.

OK

2	Check rear speed sensor (See page DI–248).

NG → Replace rear speed sensor.

OK

3	Check for open or short in harness and connector between rear speed sensor and ECU (See page IN–27).

NG → Repair or replace harness and connector.

OK

Check and replace ABS ECU.

DI0BN–01

DTC	41	IG Power Source Circuit

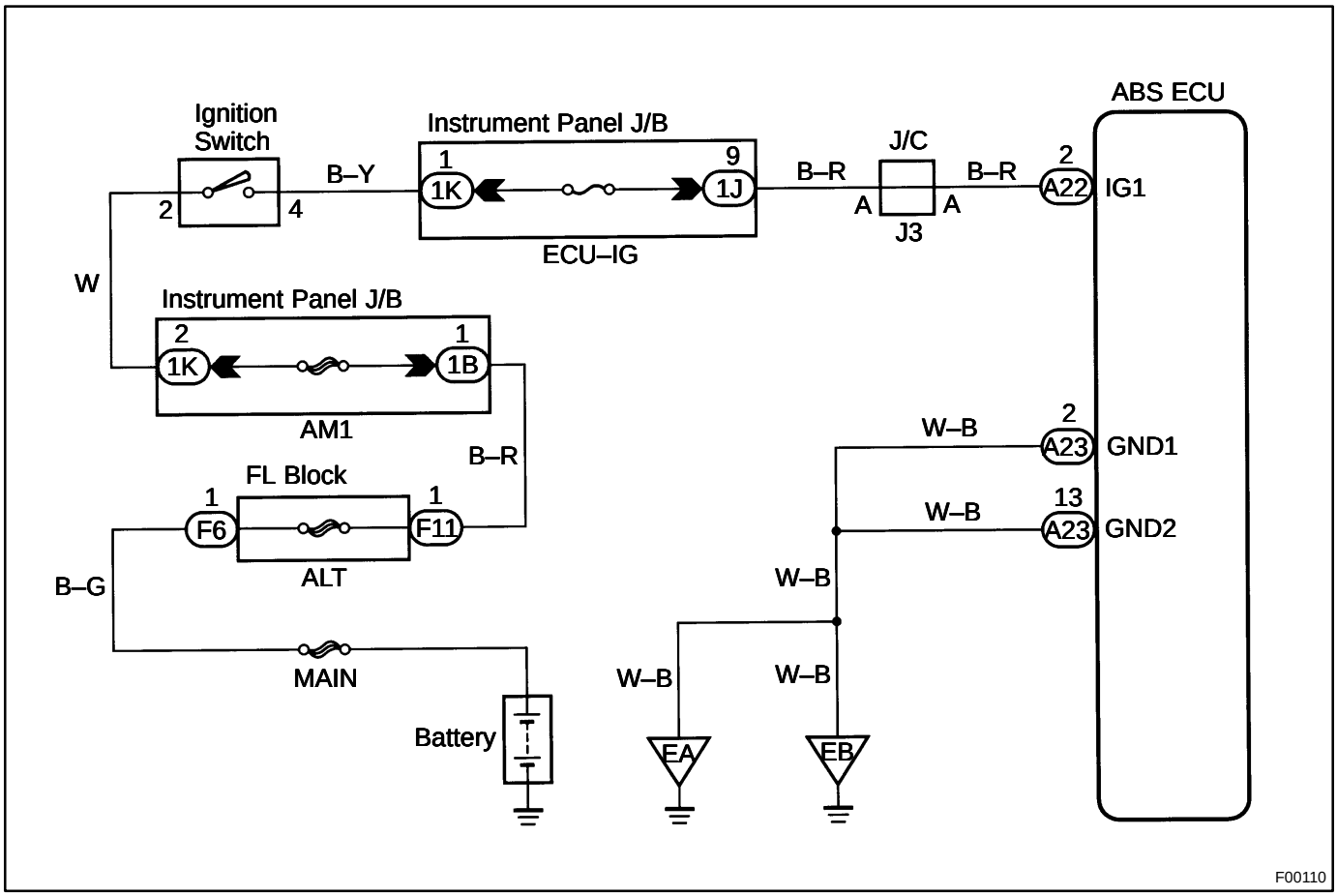
CIRCUIT DESCRIPTION

This is the power source for the ECU, hence the actuators.

DTC No.	DTC Detecting Condition	Trouble Area
41	Condition (1) or (2) is detected: (1) Vehicle speed is at 3 km/h (1.9 mph) or more and ECU terminal IG1 voltage is 9.5 V or less continues for 10 sec. or more. (2) While ABS solenoid or motor relay is ON, ABS ECU terminal IG1 voltage becomes 9.5 V or less and when ABS ECU terminal AST or MT voltage is less than 4 V continues for 0.2 sec. or more.	●Battery ●IC regulator ●Power source circuit

Fail safe function: If trouble occurs in the power source circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check battery positive voltage.**

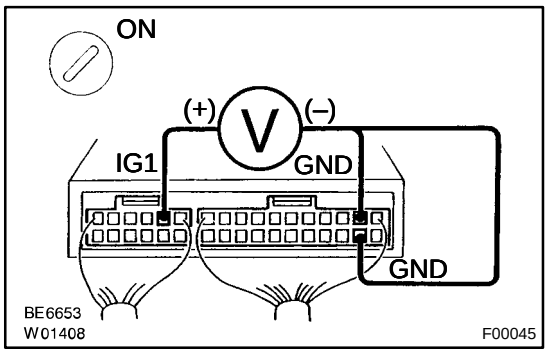
OK:

Voltage: 10 – 14 V

NG → **Check and repair the charging system.**

OK

2	**Check voltage between terminals IG1 and GND of ABS ECU connector.**



PREPARATION:

Remove ABS ECU with connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals IG1 and GND of ABS ECU connector.

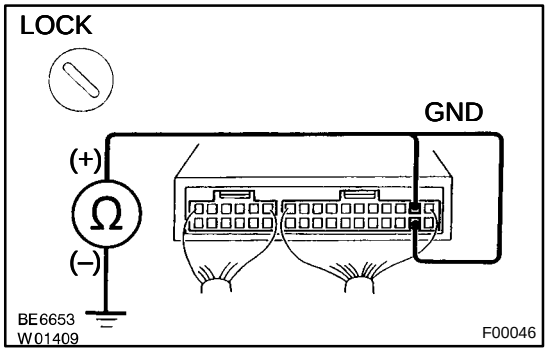
OK:

Voltage: 10 – 14 V

NG → **Check and replace ABS ECU.**

OK

3	**Check continuity between terminals GND of ABS ECU connector and body ground.**



CHECK:

Measure resistance between terminal GND of ABS ECU connector and body ground.

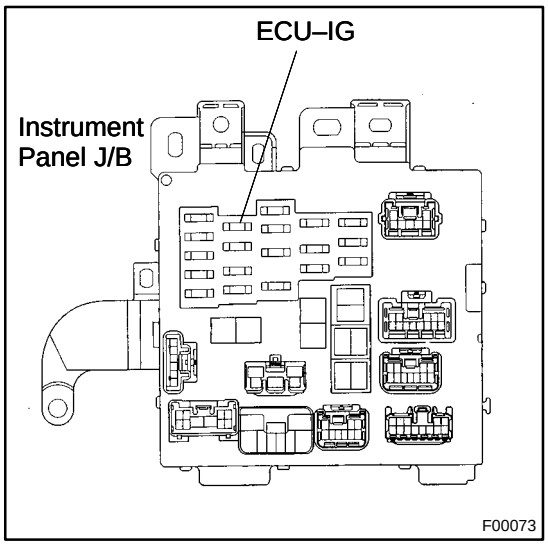
OK:

Resistance: 1 Ω or less

NG → **Repair or replace harness or connector.**

OK

4	Check ECU–IG fuse.



PREPARATION:
Remove ECU–IG fuse from Instrument Panel J/B.
CHECK:
Check continuity of ECU–IG fuse.
OK:

Continuity

NG → **Check for short in all the harness and components connected to ECU–IG fuse (See attached wiring diagram.**

OK →

Check for open in harness and connector between ABS ECU and battery (See page IN–27).

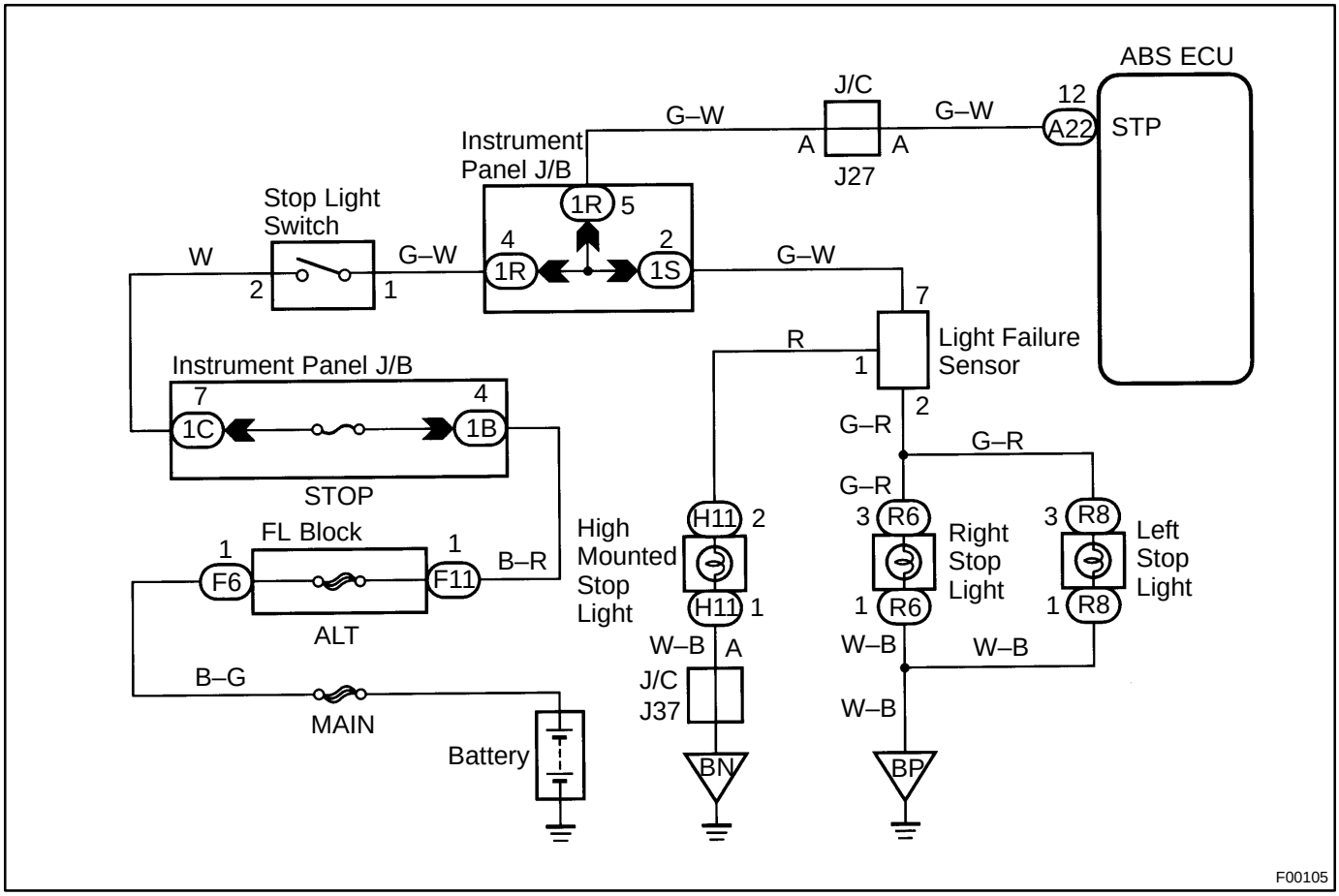
DI0BO–01

DTC	49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
49	ABS ECU terminal IG1 voltage is 9.5 V to 18.0 V and ABS is in non–operation, the open circuit of the stop light switch circuit continues for 0.3 sec. or more.	●Stop light switch ●Stop light switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of stop light.**

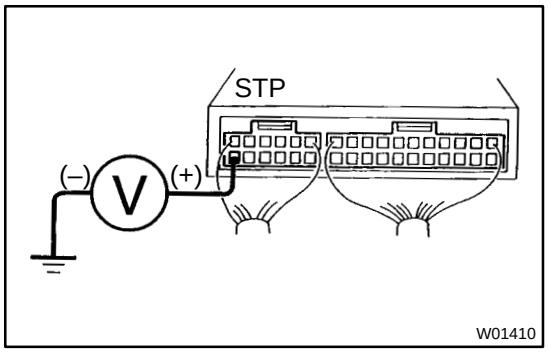
CHECK:

Check that stop light lights up when brake pedal is depressed and turns off when brake pedal is released.

NG	**Repair stop light circuit (See page BE–50).**

OK

2	**Check voltage between terminal STP of ABS ECU and body ground.**



PREPARATION:
Remove ABS ECU with connectors still connected.
CHECK:
Measure voltage between terminal STP of ABS ECU and body ground when brake pedal is depressed.
OK:

Voltage: 8 – 14 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI–239).**

NG

3	**Check for open in harness and connector between ABS ECU and stop light Switch (See page IN–27).**

NG	**Repair or replace harness or connector.**

OK

Check and replace ABS ECU.

DI0BP–01

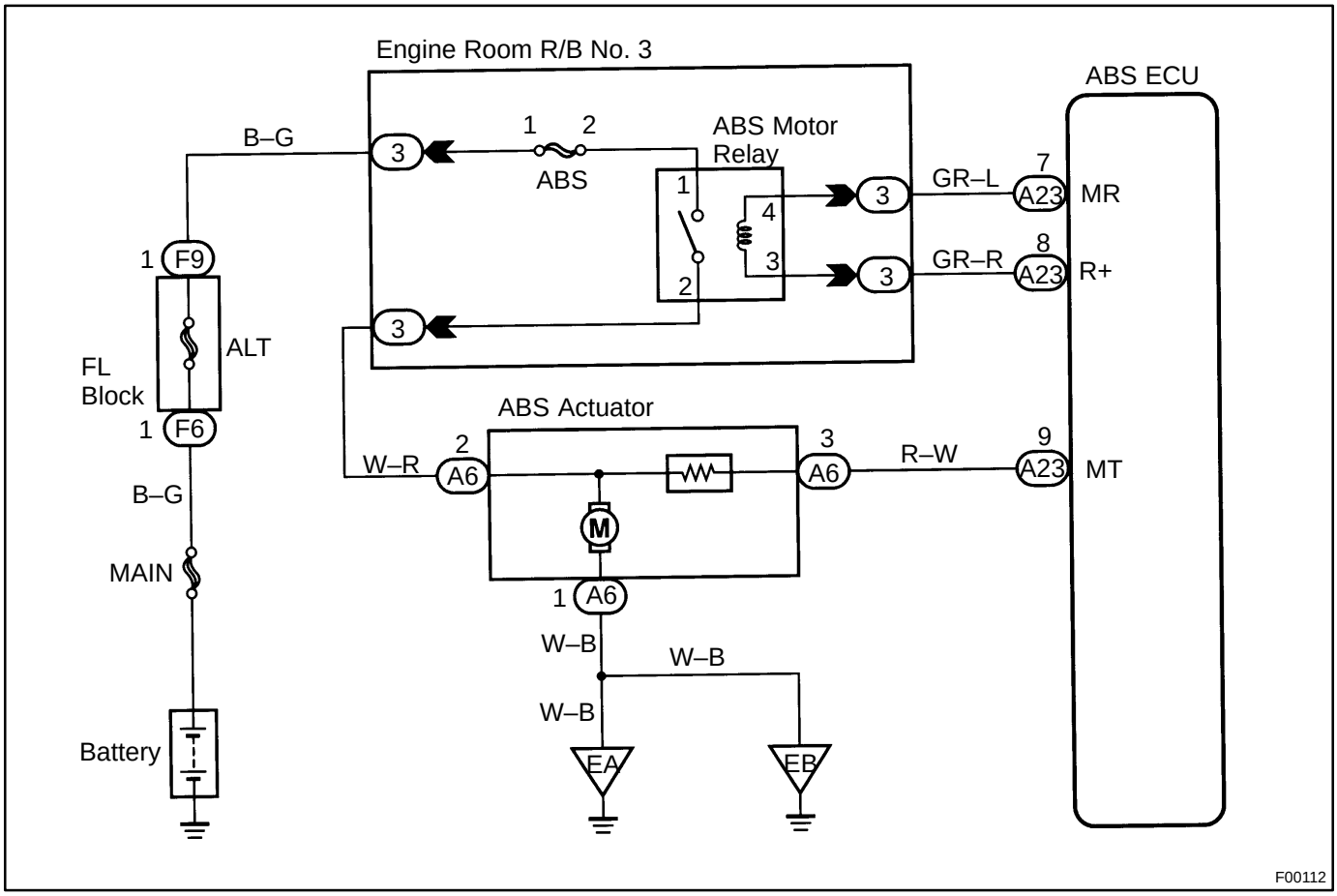
DTC	51	ABS Pump Motor Lock

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
51	ABS actuator pump motor is not operating normally.	●ABS pump motor

Fail safe function: If trouble occurs in the ABS pump motor, the ECU cuts off current to the ABS solenoid relay and prohibits ABS control.

WIRING DIAGRAM



DI0BQ–01

DTC	Always ON	ABS ECU Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	ABS ECU internal malfunction is detected.	●ECU ●Battery

Fail safe function: If trouble occurs in the power source circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS control.

INSPECTION PROCEDURE

1	**Is DTC output?**

Check DTC on page DI–232.

YES → **Repair circuit indicated by the code output.**

NO

2	**Is normal code displayed?**

YES → **Check ABS solenoid relay. Check for short in harness and connector between ABS solenoid relay and DLC1 (See page IN–27).**

NO

3	**Is ABS warning light go off?**

YES → **Check for open or short in harness and connector between ECU–IG fuse and ABS ECU (See page IN–27).**

NO

4	**Check battery positive voltage.**

PREPARATION:
Start the engine.
CHECK:
Check the battery positive voltage.
OK:
10 – 14 V

NG → **Check and repair the charging system.**

OK

5	**Check ABS warning light.**

PREPARATION:
(a) Turn the ignition switch OFF.
(b) Disconnect the connector from the ABS ECU.
(c) Turn the ignition switch ON.
CHECK:
Check the ABS warning light goes off.

OK → **Check and replace ABS ECU.**

NG

Check for short in harness and connector between ABS warning light, DLC1, DLC2, and ABS ECU (See page IN–27).

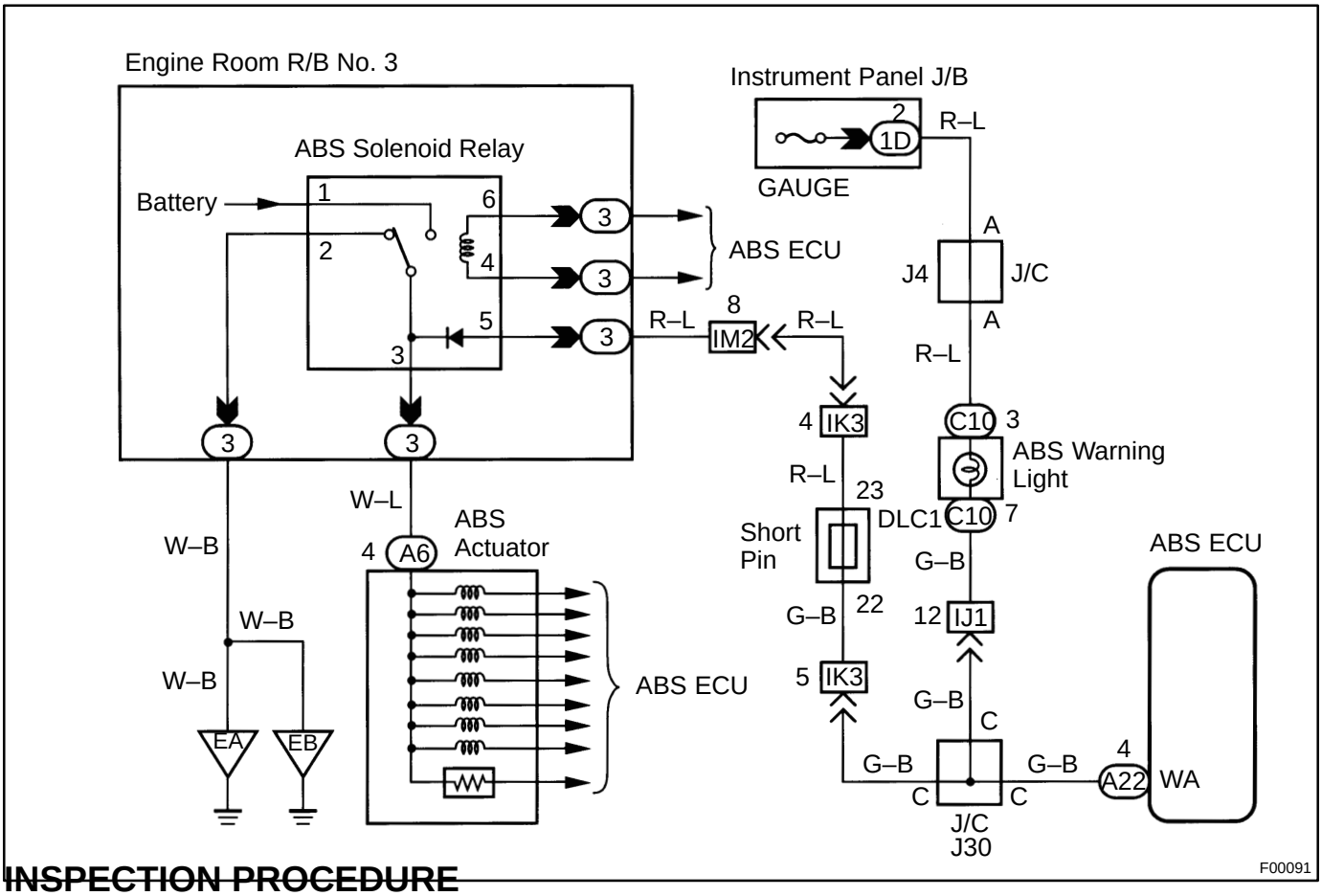
DI0BR–01

ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU detects trouble, it lights the ABS warning light while at the same time prohibiting ABS control. At this time, the ECU records a DTC in memory.
After removing the short pin of the DLC1, connect terminals Tc and E_1 of the DLC1 or DLC2 make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

Troubleshooting in accordance with the chart below for each trouble symptom.

ABS warning light does not light up	Go to step 1
ABS warning light remains on	Go to step 3

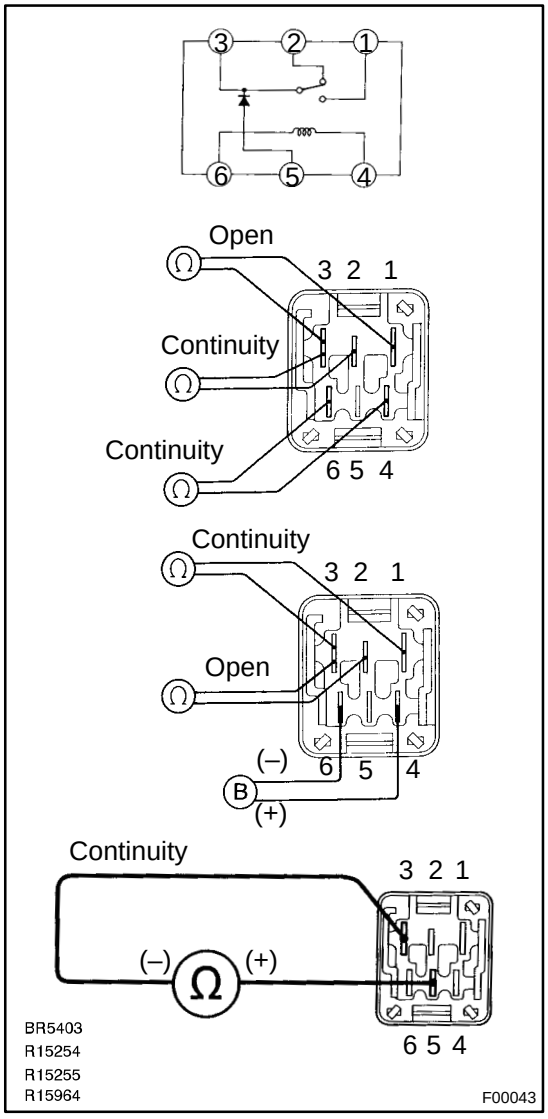
1	**Check ABS warning light.**

See Combination Meter Troubleshooting on page BE–58.

NG → **Repair bulb or combination meter assembly.**

OK

2	Check ABS solenoid relay.



PREPARATION:

Remove ABS solenoid relay from Engine Room R/B No. 3.

CHECK:

Check continuity between each terminal of ABS solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

(a) Apply battery positive voltage between terminals 4 and 6.

(b) Check continuity between each terminal of ABS solenoid relay.

OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

CHECK:

Connect the ~ test lead to terminal 5 and the ⊖ lead to terminal 3. Check continuity between the terminals.

OK:

Continuity

If there is no continuity, connect the ⊖ test lead to terminal 5 and the ~ lead to terminal 3. Recheck continuity between terminals.

NG → **Replace ABS solenoid relay.**

OK →

Check for open in harness and connector between DLC1, ABS solenoid relay and body ground (See page IN–27).

3	**Is DTC output?**

Check DTC on page DI–232.

YES → **Repair circuit indicated by the code output.**

NO

4	**Does ABS warning light go off if short pin is removed?**

NO → **Check for short in harness and connector between ABS warning light, DLC1 and ABS ECU (See page IN–27).**

YES

5	**Check ABS solenoid relay (See step 2).**

NG → **Replace ABS solenoid relay.**

OK

Check for short in harness and connector between DLC1 and ABS solenoid relay (See page IN–27).

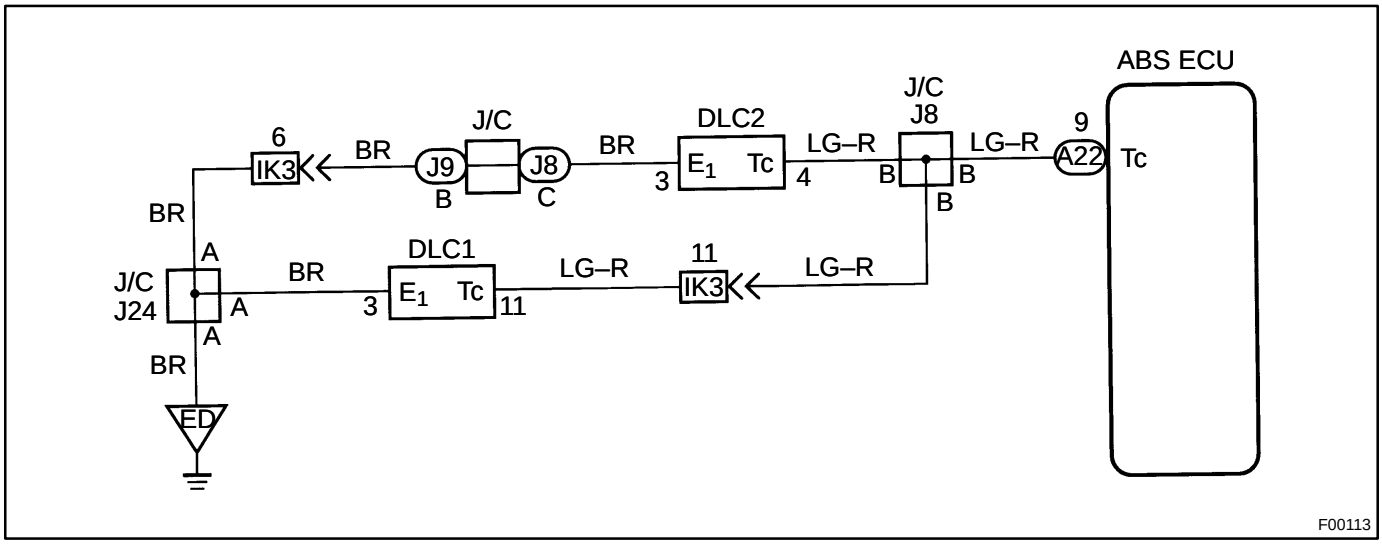
DI0BS–01

Tc Terminal Circuit

CIRCUIT DESCRIPTION

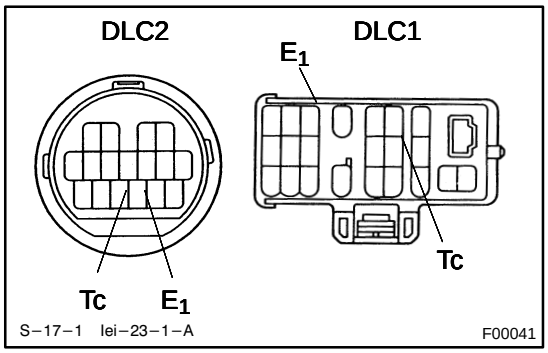
Connecting between terminals Tc and E_1 of the DLC1 or the DLC2 causes the ECU to display the DTC by flashing the ABS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals Tc and E_1 of DLC2 or DLC1.**



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Tc and E_1 of DLC2 or DLC1.

OK:

Voltage: 10 – 14 V

OK	**If ABS warning light does not blink even after Tc and E_1 are connected, the ECU may be defective.**

NG

2	**Check for open and short in harness and connector between ABS ECU and DLC2 or DLC1, DLC2 or DLC1 and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ABS ECU.

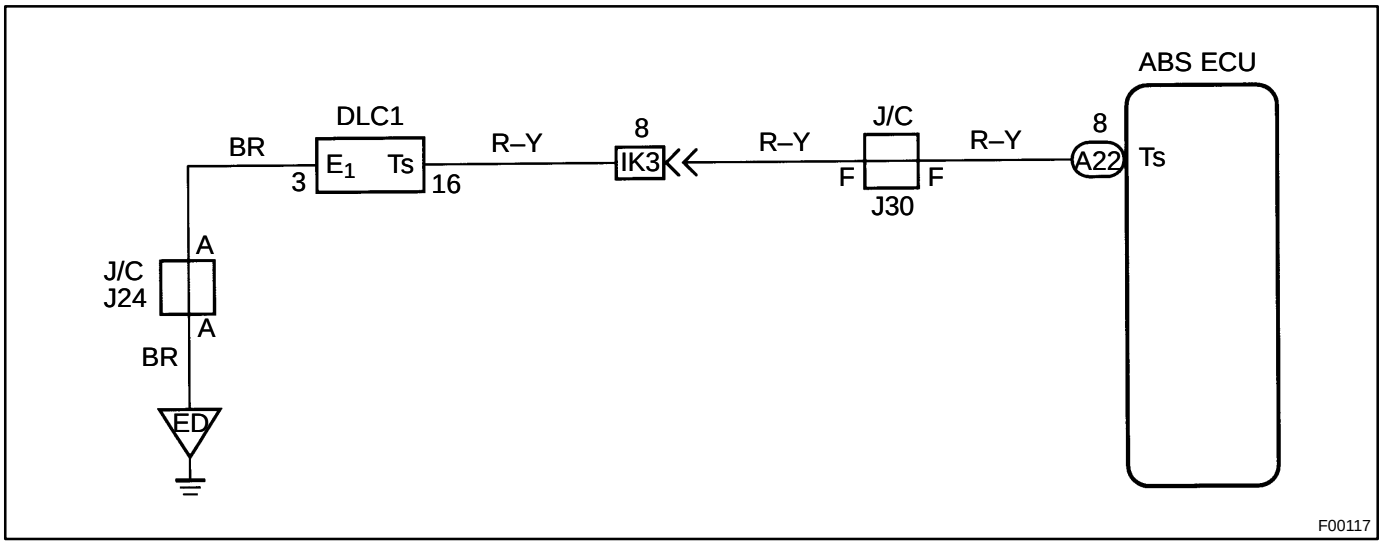
DI0BT–01

Ts Terminal Circuit

CIRCUIT DESCRIPTION

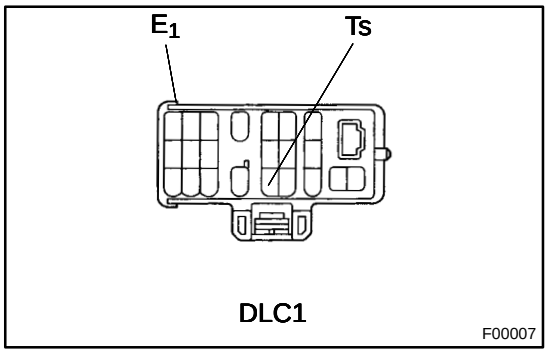
The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected with the DTC check.
Connecting terminals Ts and E_1 of the DLC1 in the engine compartment starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals Ts and E_1 of DLC1.**



CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals Ts and E_1 of DLC1.

OK:

Voltage: 10 – 14 V

OK → **If ABS warning light does not blink even after Ts and E_1 are connected, the ECU may be defective.**

NG

2	**Check for open and short in harness and connector between ABS ECU and DLC1, DLC1 and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

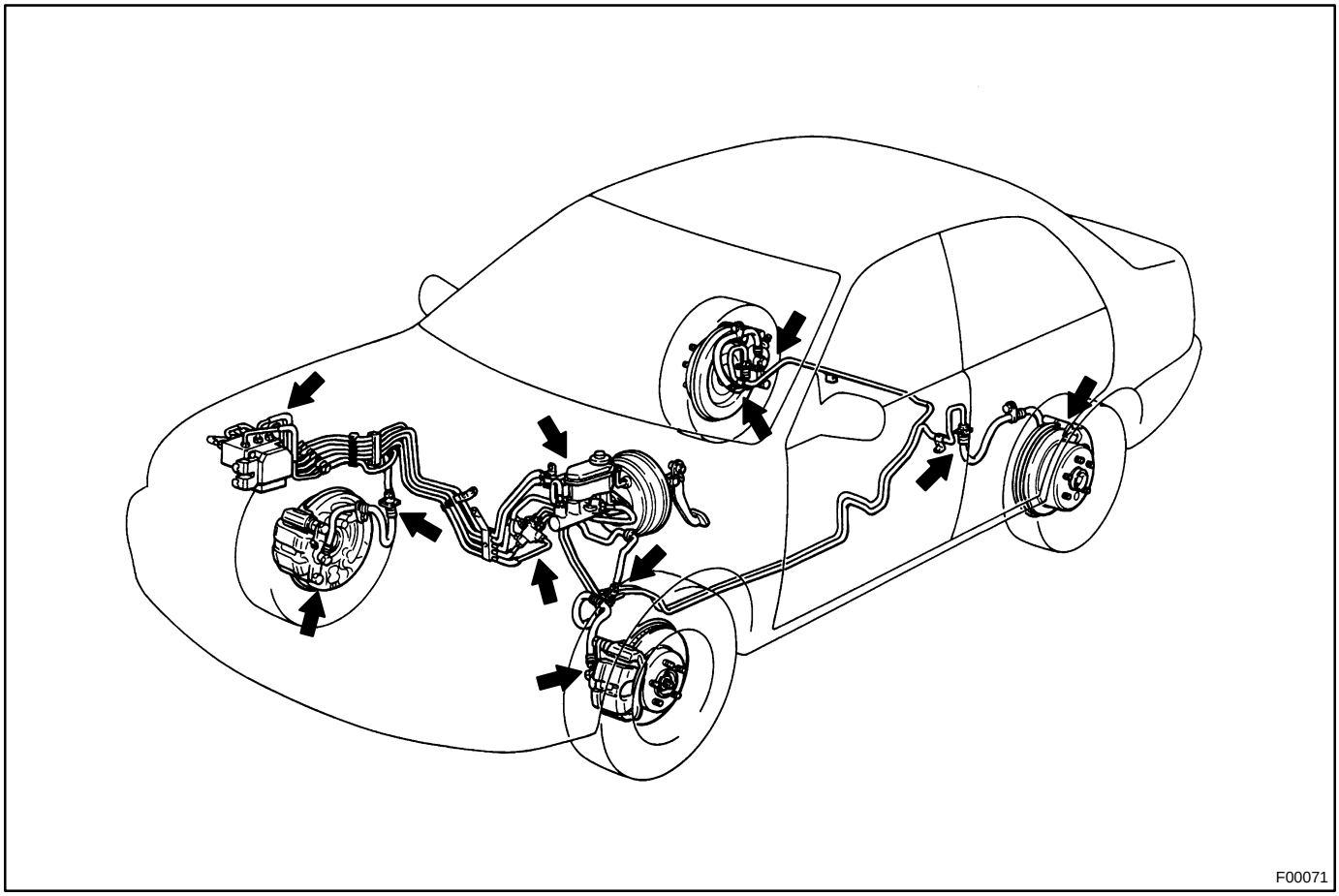
OK

Check and replace ABS ECU.

DI0BU–01

Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.



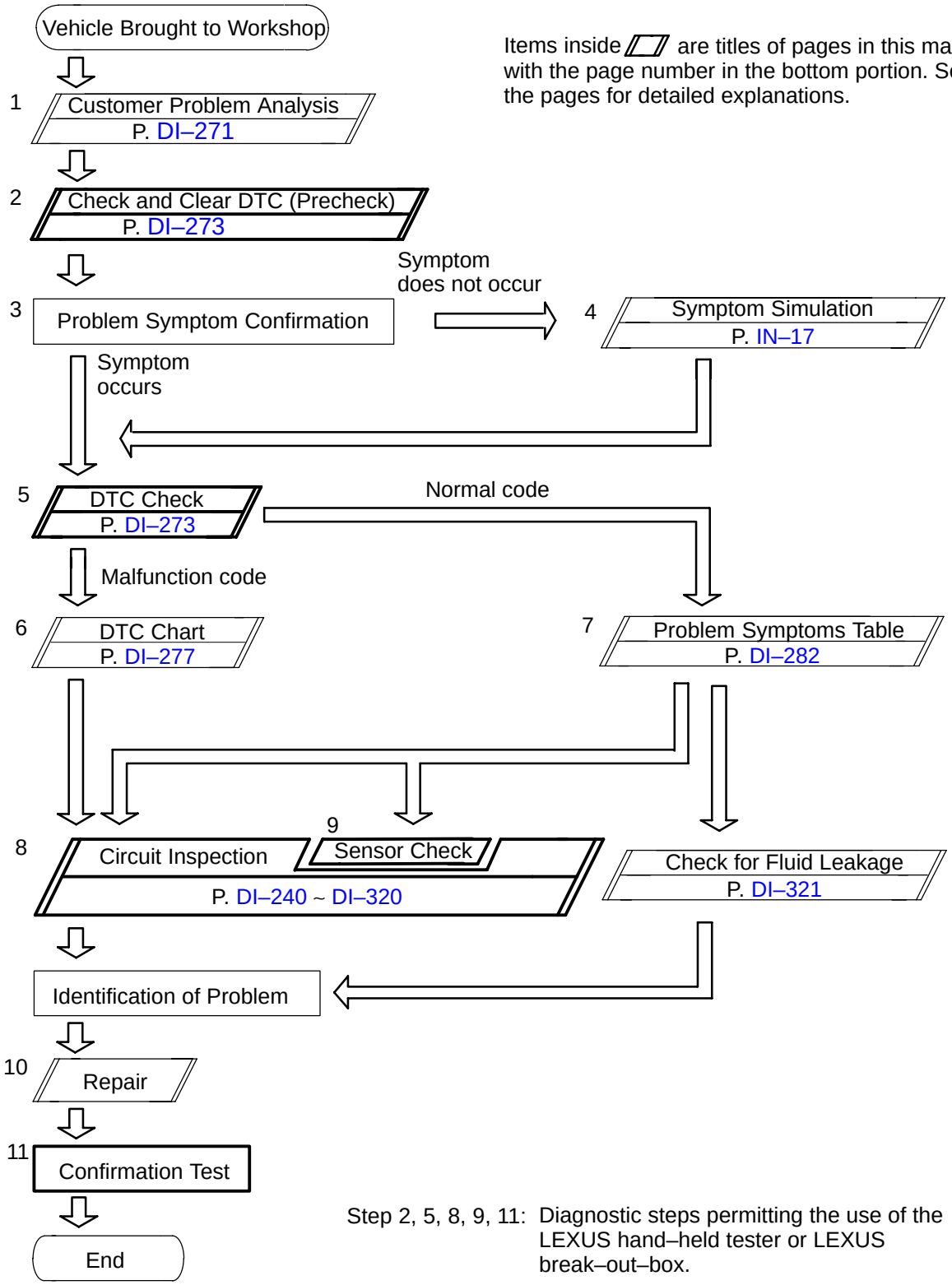
F00071

ABS & TRACTION CONTROL SYSTEM

DI0BV–01

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoooting in accordance with the procedure on the following pages.



Items inside ▱ are titles of pages in this manual, with the page number in the bottom portion. See the pages for detailed explanations.

Step 2, 5, 8, 9, 11: Diagnostic steps permitting the use of the LEXUS hand–held tester or LEXUS break–out–box.

DI0BW–01

CUSTOMER PROBLEM ANALYSIS CHECK

ABS Check Sheet

Inspector's Name :

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up

Check Item	**TRAC OFF Indicator Light**	☐ Normal ☐ Does not Light Up

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

TRAC Check Sheet

Inspector's Name :

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ TRAC does not operate. (Wheels spin when starting rapidly.)	
	TRAC OFF Indicator Light Abnormal	☐ Remains ON ☐ Blinks ☐ Does not Light Up
	SLIP Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up

Check Item	**ABS Warning Light**	☐ Normal ☐ Malfunction Code (Code)
	Malfunction Indicator Lamp	☐ Normal ☐ Malfunction Code (Code)

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI0BX–01

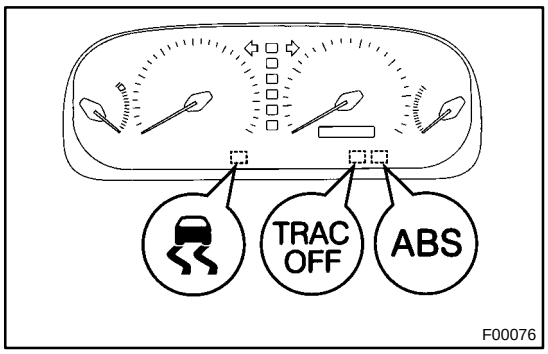
PRE–CHECK

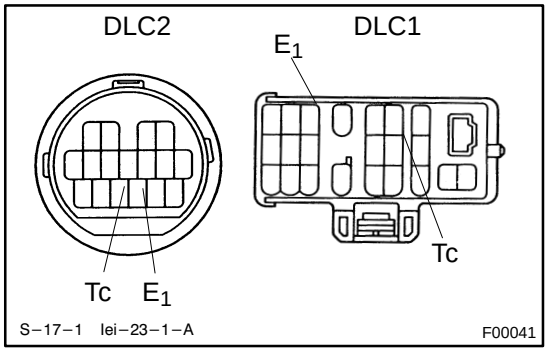
1. DIAGNOSIS SYSTEM

(a) INDICATOR CHECK

When the ignition switch is turned ON, check that the ABS warning light, TRAC OFF indicator light and SLIP indicator light goes on for 3 seconds.

HINT:If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit, TRAC OFF indicator light circuit, SLIP indicator light circuit
(See page DI–310, DI–317, DI–320).





(b) DTC CHECK

(1) Using SST, connect terminals Tc and E_1 of DLC2 or DLC1.

SST 09843 – 18020

(2) Turn the ignition switch ON.

(3) Read the DTC from the ABS warning light and TRAC OFF indicator light on the combination meter.

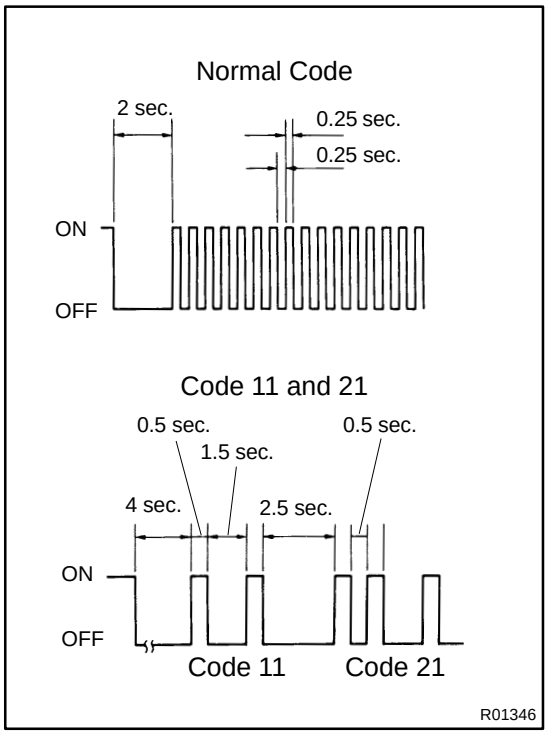
HINT:If no code appears, inspect the diagnostic circuit or ABS warning light circuit, TRAC OFF indicator light circuit
(See page DI–313 or DI–310, DI–317).

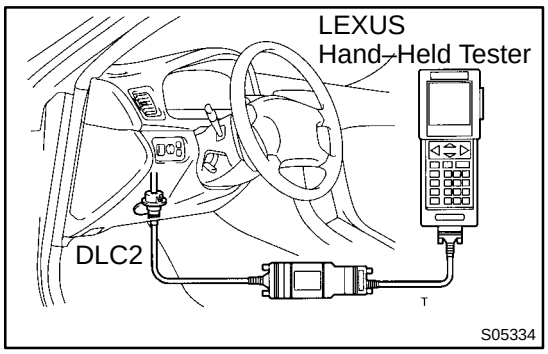
As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.

(4) Code are explained in the code table on page DI–277.

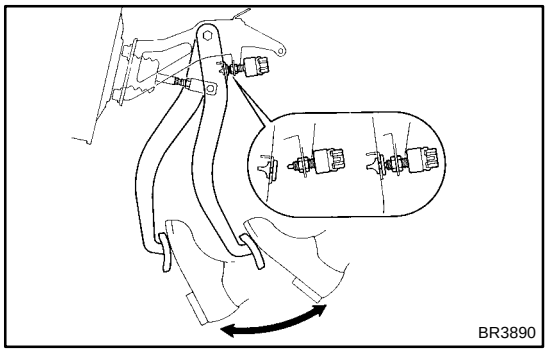
(5) After completing the check, disconnect terminals Tc and E_1, and turn off the display.

If 2 or more malfunctions are indicated at the same time the lowest numbered DTC will be displayed 1st.

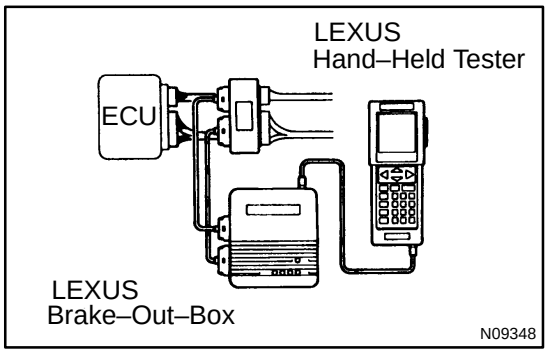




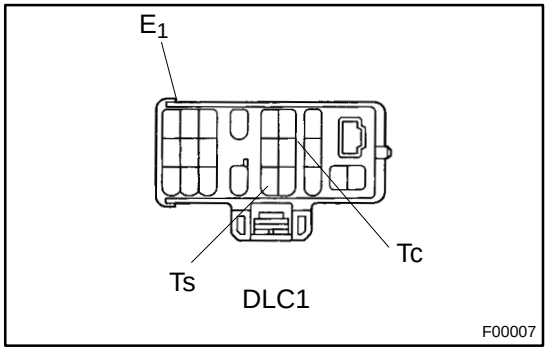
(c) DTC CHECK USING LEXUS HAND–HELD TESTER
(1) Hook up the LEXUS hand–held tester to the DLC2.
(2) Read the DTC by following the prompts on the tester screen.
Please refer to the LEXUS hand–held tester operator's manual for further details.



(d) DTC CLEARANCE
(1) Using SST, connect terminals Tc and E_1 of DLC2 or DLC1.
SST 09843 – 18020
(2) IG switch ON.
(3) Clear the DTC stored in ECU by depressing the brake pedal 8 or more times within 5 seconds.
(4) Check that the warning light shows the normal code.
(5) Remove the SST from the terminals of DLC2 or DLC1.
SST 09843 – 18020

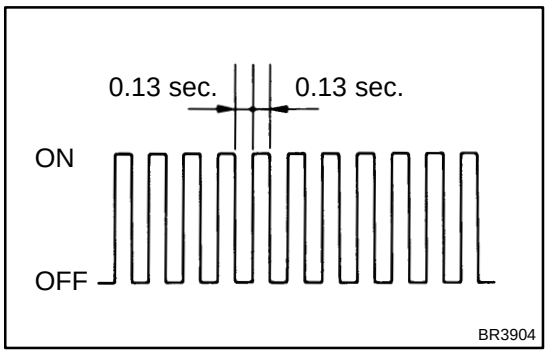


(e) ECU TERMINAL VALUES MEASUREMENT USING LEXUS BREAK –OUT–BOX AND LEXUS HAND–HELD TESTER
(1) Hook up the LEXUS hand–held tester and LEXUS break–out–box to the vehicle.
(2) Read the ECU input/output values by following the prompts on the tester screen.
HINT:LEXUS hand–held tester has a "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems.
Please refer to the LEXUS hand–held tester/LEXUS break–out–box operator's manual for further details.



2. SPEED SENSOR SIGNAL

(a) SPEED SENSOR SIGNAL CHECK
(1) Turn the ignition switch OFF.
(2) Using SST, connect terminals Ts and E_1 of DLC1.
SST 09843 – 18020
(3) Start the engine.



(4) Check that the ABS warning light blinks.

HINT:If the ABS warning light does not blink, inspect the ABS warning light circuit (See page DI–310).

(5) Drive vehicle straight forward.

HINT:Drive vehicle faster than 45 km/h (28 mph) for several seconds.

(6) Stop the vehicle.

(7) Using SST, connect terminals Tc and E_1 of DLC1.

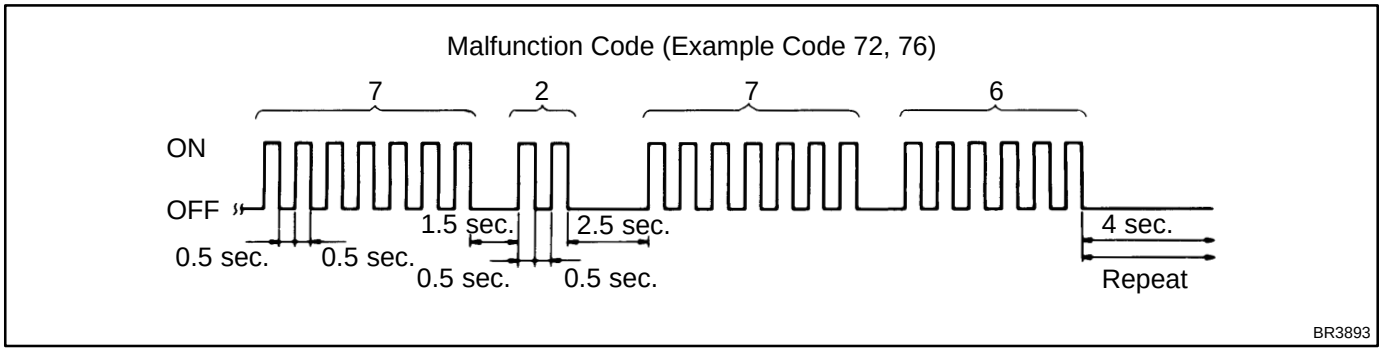
SST 09843 – 18020

(8) Read the number of blinks of the ABS warning light.

HINT:See the list of DTC shown on the next page.

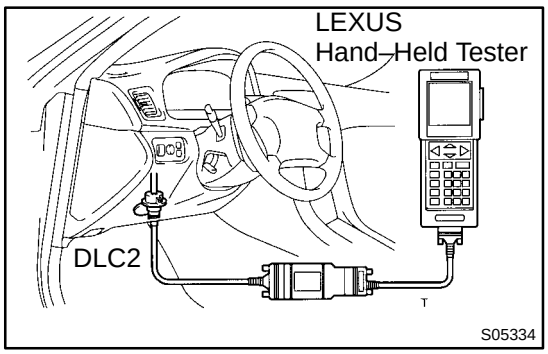
If every sensor is normal, a normal code is output (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated).

If 2 or more malfunction are indicated at the same time, the lowest numbered code will be displayed 1st.



(9) After doing the check, disconnect the SST from terminals Ts and E_1, Tc and E_1 of DLC1, and turn ignition switch OFF.

SST 09843 – 18020



(b) DTC CHECK USING LEXUS HAND–HELD TESTER

(1) Do step 1. ~ 6. on the previous page.

(2) Hook up the LEXUS hand–held tester to the DLC2.

(3) Read the DTC by following the prompts on the tester screen.

Please refer to the LEXUS hand–held tester operator's manual for further details.

(c) DTC OF SPEED SENSOR CHECK FUNCTION

Code No.	Diagnosis	Trouble Area
71	Low output voltage of right front speed sensor	●Right front speed sensor ●Sensor installation ●Right front speed sensor rotor
72	Low output voltage of left front speed sensor	●Left front speed sensor ●Sensor installation ●Left front speed sensor rotor
73	Low output voltage of right rear speed sensor	●Right rear speed sensor ●Sensor installation ●Right rear speed sensor rotor
74	Low output voltage of left rear speed sensor	●Left rear speed sensor ●Sensor installation ●Left rear speed sensor rotor
75	Abnormal change in output voltage of right front speed sensor	●Right front speed sensor rotor
76	Abnormal change in output voltage of left front speed sensor	●Left front speed sensor rotor
77	Abnormal change in output voltage of right rear speed sensor	●Right rear speed sensor rotor
78	Abnormal change in output voltage of left rear speed sensor	●Left rear speed sensor rotor

DI0BY–01

DIAGNOSTIC TROUBLE CODE CHART

HINT:Using SST 09843 –18020, connect the terminals Tc and E_1.

If a malfunction code is displayed during the DTC check, check the circuit listed that the code. For details of each code, turn to the page referred to under the ”See page” for respective ”DTC No.” in the DTC chart.

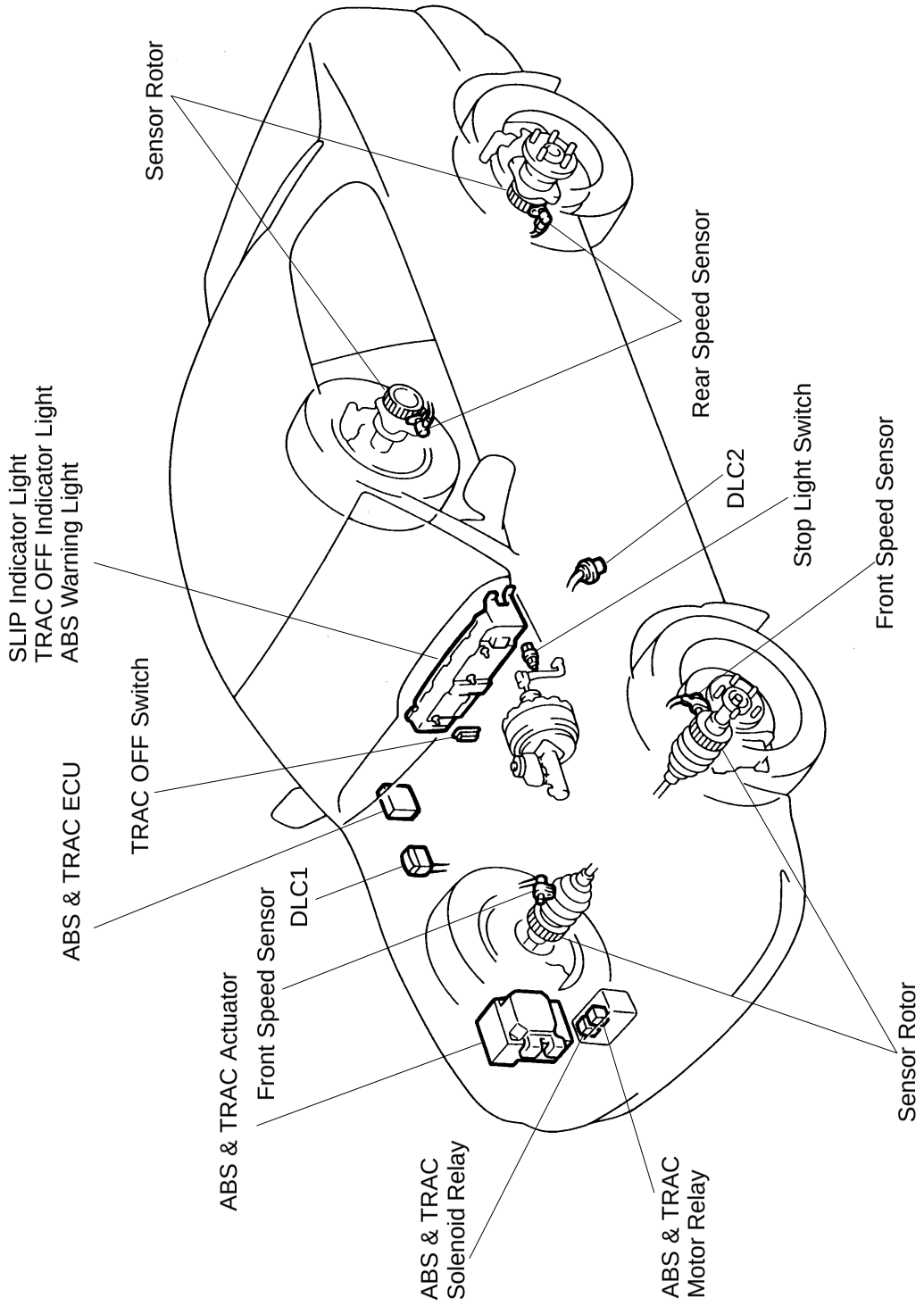
DTC No. (See Page)	Detection Item	Trouble Area
11 (DI–240)	Open circuit in ABS & TRAC solenoid relay circuit	●ABS & TRAC solenoid relay ●ABS & TRAC solenoid relay circuit ●ECU
12 (DI–240)	Short circuit in ABS & TRAC solenoid relay circuit	
13 (DI–286)	Open circuit in ABS & TRAC motor relay circuit	●ABS & TRAC motor relay ●ABS & TRAC motor relay circuit ●ECU
14 (DI–286)	Short circuit in ABS & TRAC motor relay circuit	
21 (DI–289)	Open or short circuit in right front solenoid circuit	●ABS & TRAC actuator ●SFRR or SFRH circuit ●ECU
22 (DI–289)	Open or short circuit in left front solenoid circuit	●ABS & TRAC actuator ●SFLR or SFLH circuit ●ECU
23 (DI–289)	Open or short circuit in right rear solenoid circuit	●ABS & TRAC actuator ●SRRR or SRRH circuit ●ECU
24 (DI–289)	Open or short circuit in left rear solenoid circuit	●ABS & TRAC actuator ●SRLR or SRLH circuit ●ECU
25 (DI–289)	Open or short circuit in SMC1 circuit	●ABS & TRAC actuator ●SMC1 circuit ●ECU
26 (DI–289)	Open or short circuit in SMC2 circuit	●ABS & TRAC actuator ●SMC2 circuit ●ECU
27 (DI–289)	Open or short circuit in SRC1 circuit	●ABS & TRAC actuator ●SRC1 circuit ●ECU
28 (DI–289)	Open or short circuit in SRC2 circuit	●ABS & TRAC actuator ●SRC2 circuit ●ECU
31 (DI–292)	Right front wheel speed sensor signal malfunction	●Right front, left front, right rear and left rear speed sensor ●Each speed sensor circuit ●Speed sensor rotor ●ECU
32 (DI–292)	Left front wheel speed sensor signal malfunction	
33 (DI–292)	Right rear wheel speed sensor signal malfunction	
34 (DI–292)	Left rear wheel speed sensor signal malfunction	
41 (DI–297)	Low battery positive voltage or abnormally high battery positive voltage	●Battery ●IC regulator ●Power source circuit ●ECU
43* (DI–300)	Malfunction in ABS control system	●ABS control system

44* (DI–301)	Open or short circuit in NE signal circuit	●NEO circuit ●ECM ●ECU
49 (DI–303)	Open circuit in stop light switch circuit	●Stop light switch ●Stop light switch circuit ●ECU
51 (DI–305)	Pump motor is locked	●ABS pump motor
53* (DI–306)	Malfunction in ECM communication circuit	●TRC+ or TRC – circuit ●EFI+ or EFI– circuit ●ECM ●ECU
61* (DI–307)	Malfunction in engine control system	●Engine control system
Always ON (DI–308)	Malfunction in ECU	●ECU

***: TRAC OFF indicator light blinking**

DI0BZ–01

PARTS LOCATION



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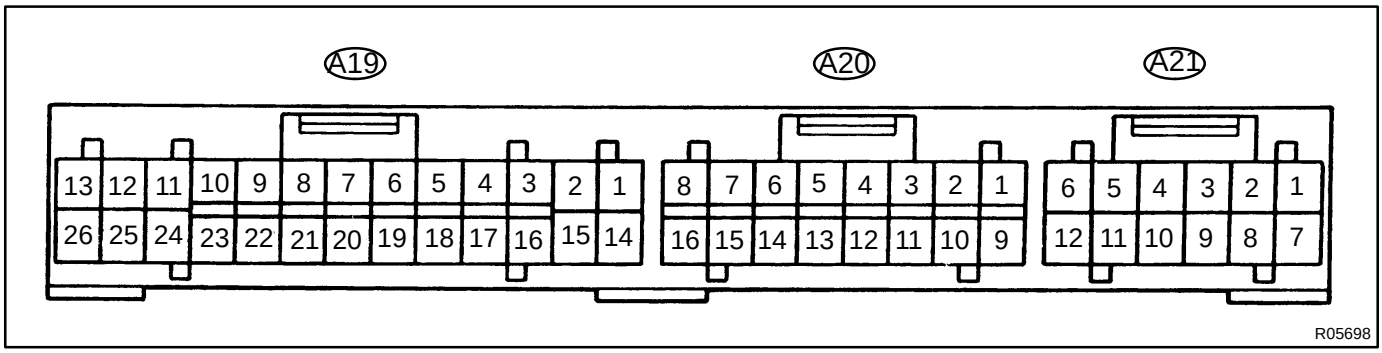
DI0C0–01

TERMINALS OF ECM



Symbols (Terminals No.)	STD Voltage (V)	Condition
IG1(A20 – 8) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON
R+ (A19 – 1) – SR (A19 – 11)	9 – 14	IG switch ON, ABS warning light OFF
R+ (A19 – 1) – MR (A19 – 24)	Below 1.0	IG switch ON
SFRR (A19 – 26) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, ABS warning light OFF
SFRH (A19 – 13) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, ABS warning light OFF
SFLR (A21 – 1) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, ABS warning light OFF
SFLH (A21 – 2) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, ABS warning light OFF
SRRR (A21 – 7) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, ABS warning light OFF
SRRH (A21 – 8) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, ABS warning light OFF
SRLR (A19 – 12) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, ABS warning light OFF
SRLH (A19 – 25) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, ABS warning light OFF
AST (A19 – 10) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, ABS warning light OFF
WA (A20 – 4) – GND (A19 – 15, A21 – 9, 10)	Below 2.0	IG switch ON, ABS warning light ON
	10 – 14	IG switch ON, ABS warning light OFF
STP (A20 – 16) – GND (A19 – 15, A21 – 9, 10)	Below 1.5	Stop light switch OFF
	8 – 14	Stop light switch ON
D/G (A19 – 22) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, ABS warning light ON
Tc (A19 – 9) – GND (A19 – 15, A21 – 9, 10)	8 – 14	IG switch ON
Ts (A19 – 23) – GND (A19 – 15, A21 – 9, 10)	8 – 14	IG switch ON
FR+ (A19 – 17) – FR– (A19 – 18)	AC generation	IG switch ON Slowly turn right front wheel
FL+ (A19 – 5) – FL– (A19 – 4)	AC generation	IG switch ON Slowly turn left front wheel
RR+ (A20 – 9) – RR– (A20 – 10)	AC generation	IG switch ON Slowly turn right rear wheel
RL+ (A20 – 2) – RL– (A20 – 1)	AC generation	IG switch ON Slowly turn left rear wheel
MT (A19 – 14) – GND (A19 – 15, A21 – 9, 10)	Below 1.5	IG switch ON
SRC1 (A21 – 5) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, TRAC OFF indicator light OFF
SRC2 (A21 – 6) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, TRAC OFF indicator light OFF
SMC1 (A21 – 12) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, TRAC OFF indicator light OFF
SMC2 (A21 – 6) – GND (A19 – 15, A21 – 9, 10)	10 – 14	IG switch ON, TRAC OFF indicator light OFF
NEO (A20 – 15) – GND (A19 – 15, A21 – 9, 10)	Pulse generation	Idling
EFI+ (A20 – 6) – GND (A19 – 15, A21 – 9, 10)	Pulse generation	IG switch ON
EFI– (A20 – 14) – GND (A19 – 15, A21 – 9, 10)	Pulse generation	IG switch ON

TRC+ (A20 – 13) – GND (A19 – 15, A21 – 9, 10)	Pulse generation	TRAC control active
TRC– (A20 – 5) – GND (A19 – 15, A21 – 9, 10)	Pulse generation	TRAC control active
IND (A20 – 3) – GND (A19 – 15, A21 – 9, 10)	Below 2.0	IG switch ON, SLIP indicator light ON
	10 – 14	IG switch ON, SLIP indicator light OFF
WT (A20 – 12) – GND (A19 – 15, A21 – 9, 10)	Below 2.0	IG switch ON, TRAC OFF indicator light ON
	10 – 14	IG switch ON, TRAC OFF indicator light OFF
CSW (A20 – 11) – GND (A19 – 15, A21 – 9, 10)	Below 2.0	IG switch ON, TRAC cut switch pushed in
	8 – 14	IG switch ON, TRAC cut switch released

DI0C1–01

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

Symptoms	Inspection Circuit	See page
ABS does not operate.	Only when 1. ~ 4. are all normal and the problem is still occurring, replace the ABS ECU. 1. Check the DTC reconfirming that the normal code is output. 2. IG power source circuit. 3. Speed sensor circuit. 4. Check the ABS & TRAC actuator with a checker. If abnormal, check the hydraulic circuit for leakage (See page DI–321).	 DI–273 DI–297 DI–292 BR–52
ABS does not operate efficiently.	Only when 1. ~ 4. are all normal and the problem is still occurring, replace the ABS ECU. 1. Check the DTC reconfirming that the normal code is output. 2. Speed sensor circuit. 3. Stop light switch circuit. 4. Check the ABS & TRAC actuator with a checker. If abnormal, check the hydraulic circuit for leakage (See page DI–321).	 DI–273 DI–292 DI–303 BR–52
ABS warning light abnormal.	1. ABS warning light circuit. 2. ABS & TRAC ECU.	DI–310 DI–308
DTC check cannot be done.	Only when 1. and 2. are all normal and the problem is still occurring, replace the ABS & TRAC ECU. 1. ABS warning light circuit. 2. TRAC OFF indicator light circuit. 3. Tc terminal circuit.	 DI–310 DI–317 DI–313
Speed sensor signal check cannot be done.	1. Ts terminal circuit. 2. ABS & TRAC ECU.	DI–315 DI–308
TRAC does not operate.	Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the ABS & TRAC ECU. 1. Check the DTC, reconfirming that the normal code is output. 2. IG power source circuit. 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit.	 DI–273 DI–297 DI–321 DI–292
SLIP indicator light abnormal.	SLIP indicator light circuit.	DI–320
TRAC OFF indicator light abnormal.	Only when inspection circuits for each problem symptom are all normal and the problem is still occurring, replace the ABS & TRAC ECU. 1. TRAC OFF indicator light circuit. 2. TRAC cut switch circuit.	 DI–317 DI–317

DI0C2–01

CIRCUIT INSPECTION

DTC	11, 12	ABS & TRAC Solenoid Relay Circuit

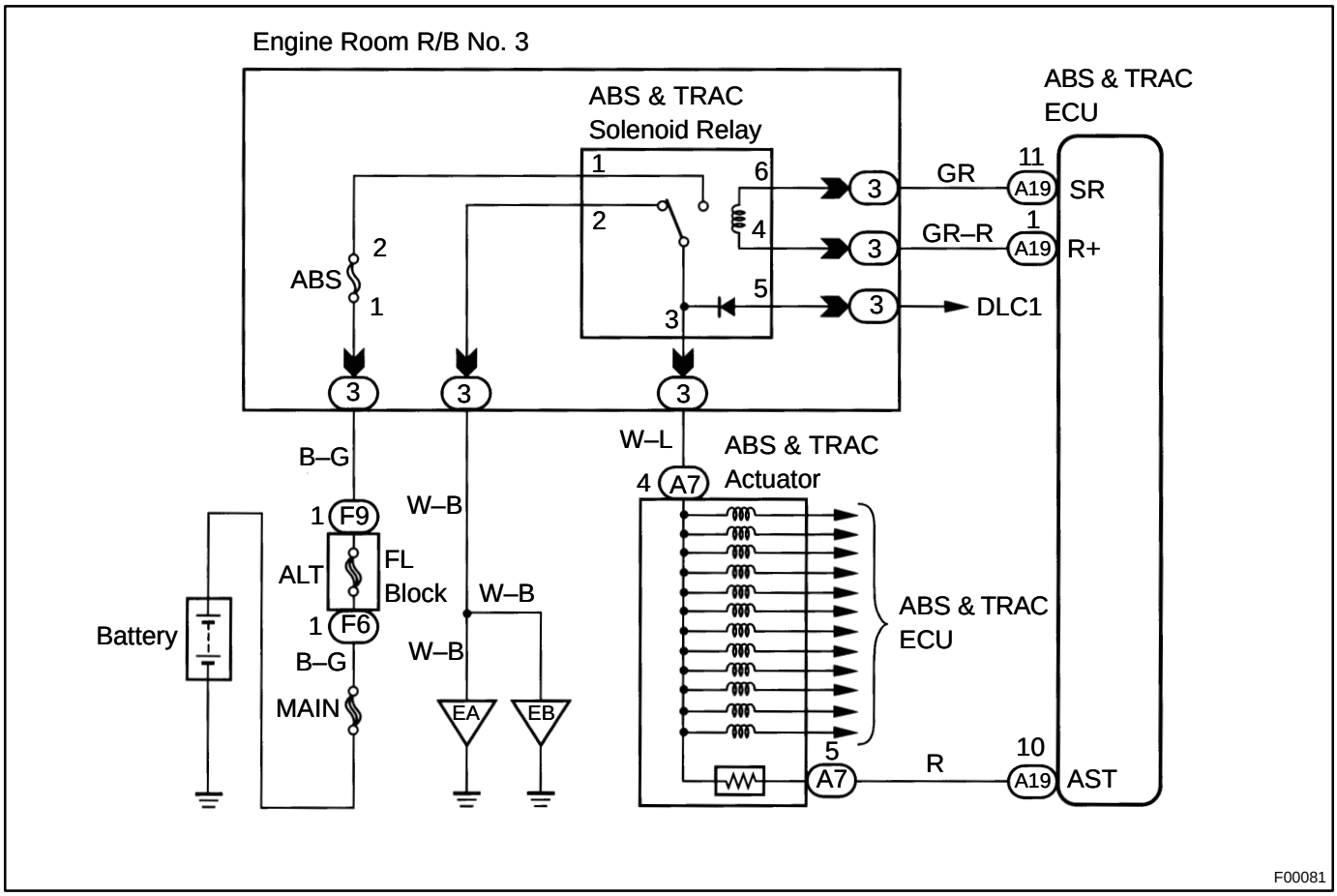
CIRCUIT DESCRIPTION

This relay supplies power to each ABS & TRAC solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
11	Condition (1) to (3) are detected: (1) Malfunction of solenoid relay monitor. (2) Battery voltage will not exceed more than 17.0 V within 2.16 sec. (3) Battery voltage will not become less than 9.5 V within 2.16 sec., or after the solenoid relay is ON and AST voltage of ECU terminal does not become 8.0 V or more.	●ABS & TRAC solenoid relay ●ABS & TRAC solenoid relay circuit ●ECU
12	Solenoid relay is OFF in the midst of premain routine, and AST voltage of ECU terminal is 8.0 V or more continues for 2.04 sec. or more.	

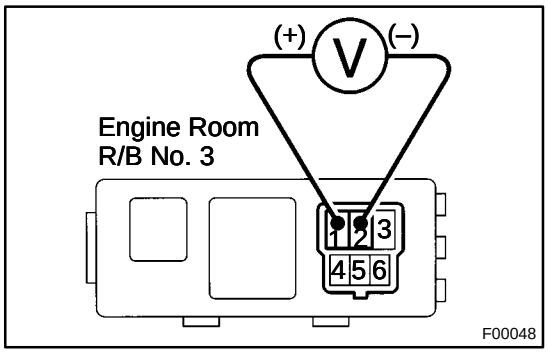
Fail safe function: If trouble in the ABS & TRAC solenoid relay circuit, the ECU cuts off current to the ABS & TRAC solenoid relay and prohibits ABS control and TRAC control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals 1 and 2 of Engine Room R/B No. 3 (for ABS & TRAC solenoid relay).**



PREPARATION:
Remove ABS & TRAC solenoid relay from Engine Room R/B No. 3.

CHECK:
Measure the voltage between terminals 1 and 2 of Engine Room R/B No. 3 (for ABS & TRAC solenoid relay).

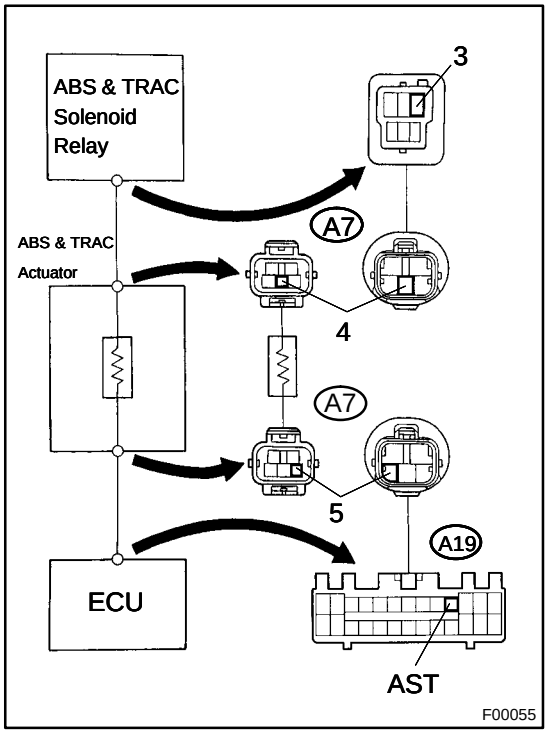
OK:

Voltage: 10 – 14 V

NG	**Check and repair harness or connector.**

OK

2	**Check continuity between terminal 3 of ABS & TRAC solenoid relay and terminal AST of ABS & TRAC ECU.**



CHECK:
Check continuity between terminal 3 of ABS solenoid relay and terminal AST of ABS & TRAC ECU.

OK:

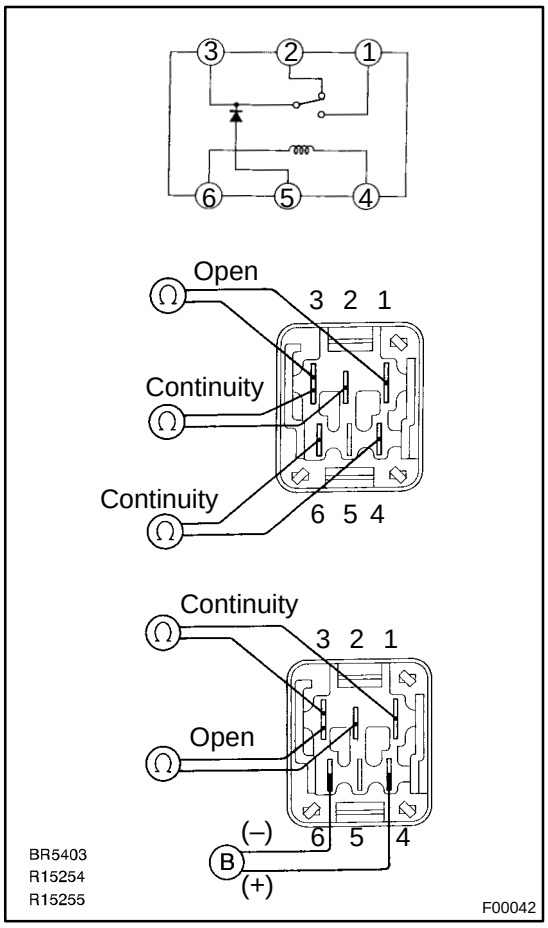
Continuity

HINT:There is a resistance of 33 Ω between terminals A7 – 4 and A7 – 5 of ABS actuator.

NG	**Repair or replace harness or ABS & TRAC actuator.**

OK

3	Check ABS & TRAC solenoid relay.



PREPARATION:

Remove ABS & TRAC solenoid relay from Engine Room R/B No. 3.

CHECK:

Check continuity between each terminal of ABS & TRAC solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

(a) Apply battery positive voltage between terminals 4 and 6.
(b) Check continuity between each terminal of ABS & TRAC solenoid relay.

OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

NG → **Replace ABS & TRAC solenoid relay.**

OK

4	Check for open and short in harness and connector between ABS & TRAC solenoid relay and ABS & TRAC ECU (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection.
If the connector are normal, the ECU may be defective.

DI0C3–01

DTC	13, 14	ABS & TRAC Motor Relay Circuit

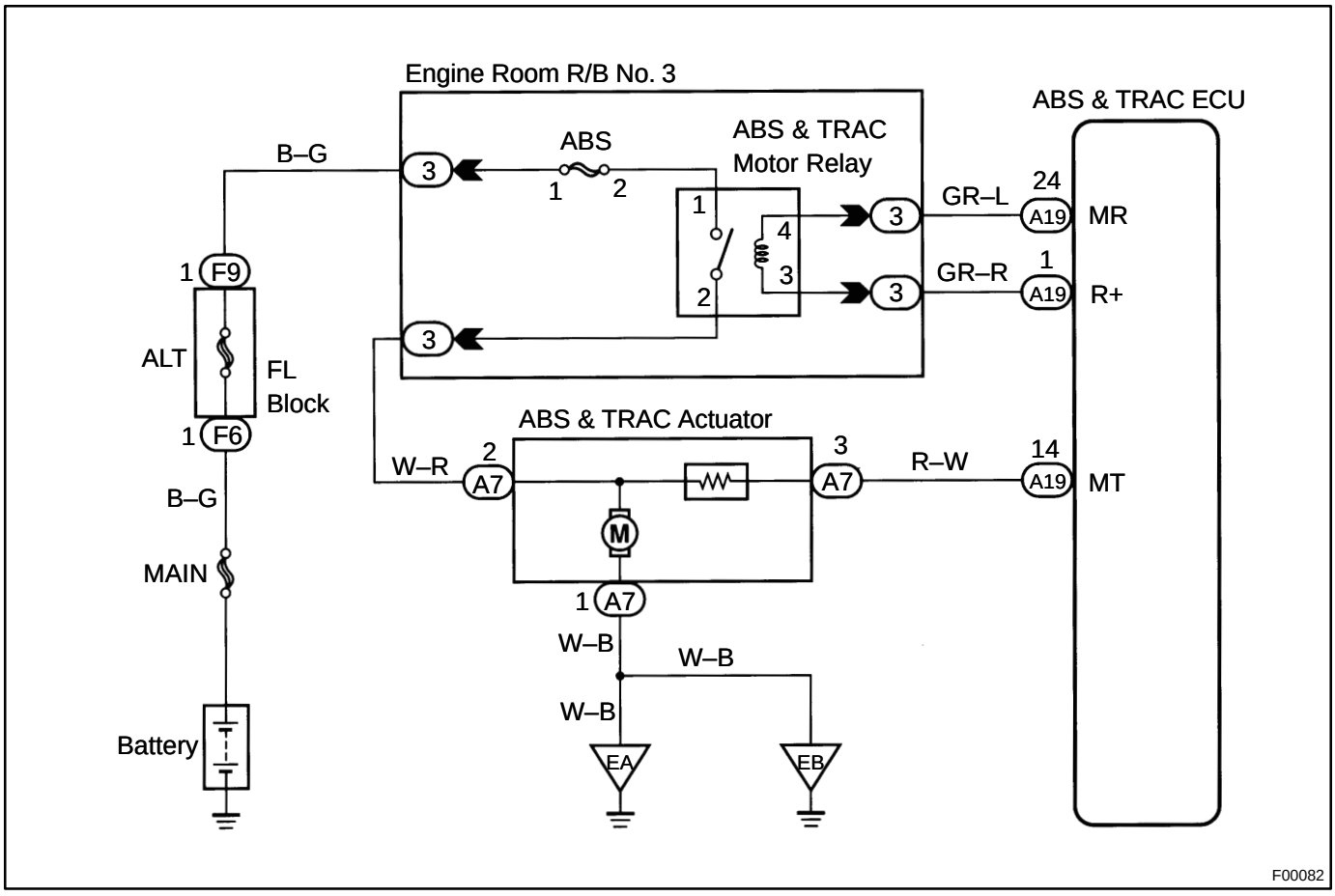
CIRCUIT DESCRIPTION

The ABS & TRAC motor relay supplies power to the ABS & TRAC pump motor. While the ABS is activated, the ECU switches the ABS & TRAC motor relay ON and operates the ABS & TRAC pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
13	Conditions (1) to (3) are detected: (1) Malfunction of motor relay monitor. (2) Battery voltage will not exceed more than 17.0 V within 2.16 sec. (3) Battery voltage will not become less than 9.5 V within 2.16 sec., or after the motor relay is ON and motor relay monitor does not ON.	●ABS & TRAC motor relay ●ABS & TRAC motor relay circuit ●ECU
14	Motor relay is OFF, and motor relay monitor is ON continues for 20.16 sec. or more.	

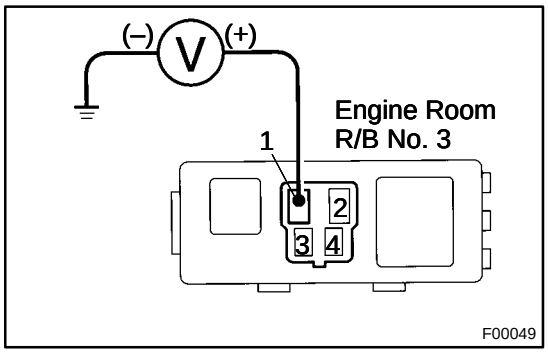
Fail safe function: If trouble occurs in the ABS & TRAC motor relay circuit, the ECU cuts off current to the ABS & TRAC solenoid relay and prohibits ABS control and TRAC control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal 1 of Engine Room R/B No. 3 (for ABS & TRAC motor relay) and body ground.**



PREPARATION:
Remove ABS & TRAC motor relay from Engine Room R/B No. 3.

CHECK:
Measure voltage between terminal 1 of Engine Room R/B No. 3 (for ABS & TRAC motor relay) and body ground.

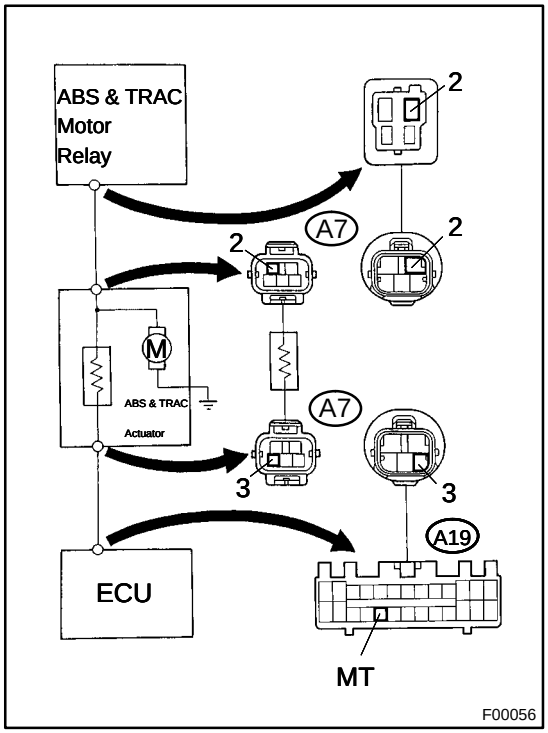
OK:

Voltage: 10 – 14 V

NG	**Check and repair harness or connector.**

OK

2	**Check continuity between terminal 2 of ABS & TRAC motor relay and terminal MT of ABS & TRAC ECU.**



CHECK:
Check continuity between terminal 2 of ABS & TRAC motor relay and terminal MT of ABS & TRAC ECU.

OK:

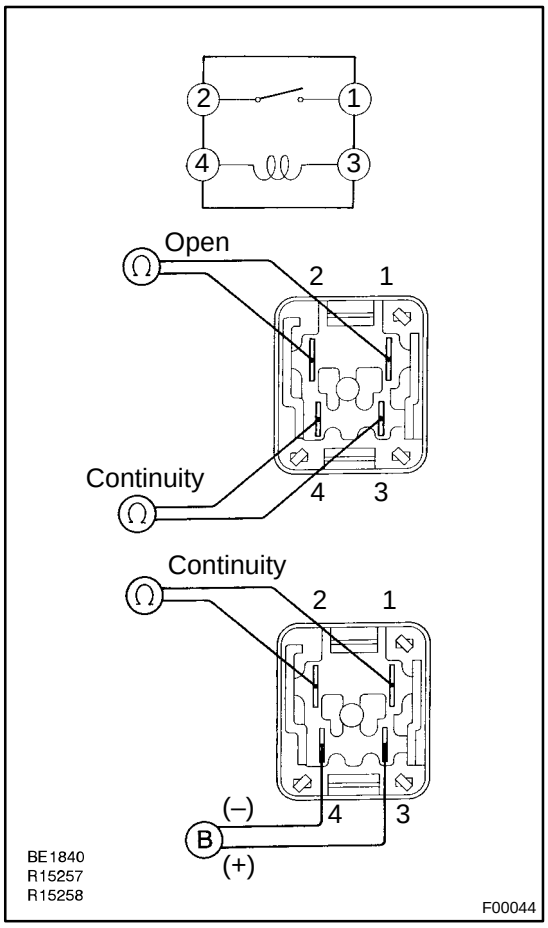
Continuity

HINT:There is a resistance of 33 Ω between terminals A7 – 2 and A7 – 3 of ABS & TRAC actuator.

NG	**Repair or replace harness or ABS & TRAC actuator.**

OK

3	Check ABS & TRAC motor relay.



PREPARATION:

Remove ABS & TRAC motor relay from Engine Room R/B No. 3.

CHECK:

Check continuity between each terminal of ABS & TRAC motor relay.

OK:

Terminals 3 and 4	Continuity (Reference value 62 Ω)
Terminals 1 and 2	Open

CHECK:

(a) Apply battery positive voltage between terminals 3 and 4.

(b) Check continuity between terminals of ABS & TRAC motor relay.

OK:

Terminals 1 and 2	Continuity

NG → **Replace ABS & TRAC motor relay.**

OK

4	Check for open and short in harness and connector between ABS & TRAC motor relay and ABS & TRAC ECU (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection.
If the connections are normal, the ECU may be defective.

DI0C4–01

DTC	21 to 28	ABS & TRAC Actuator Solenoid Circuit

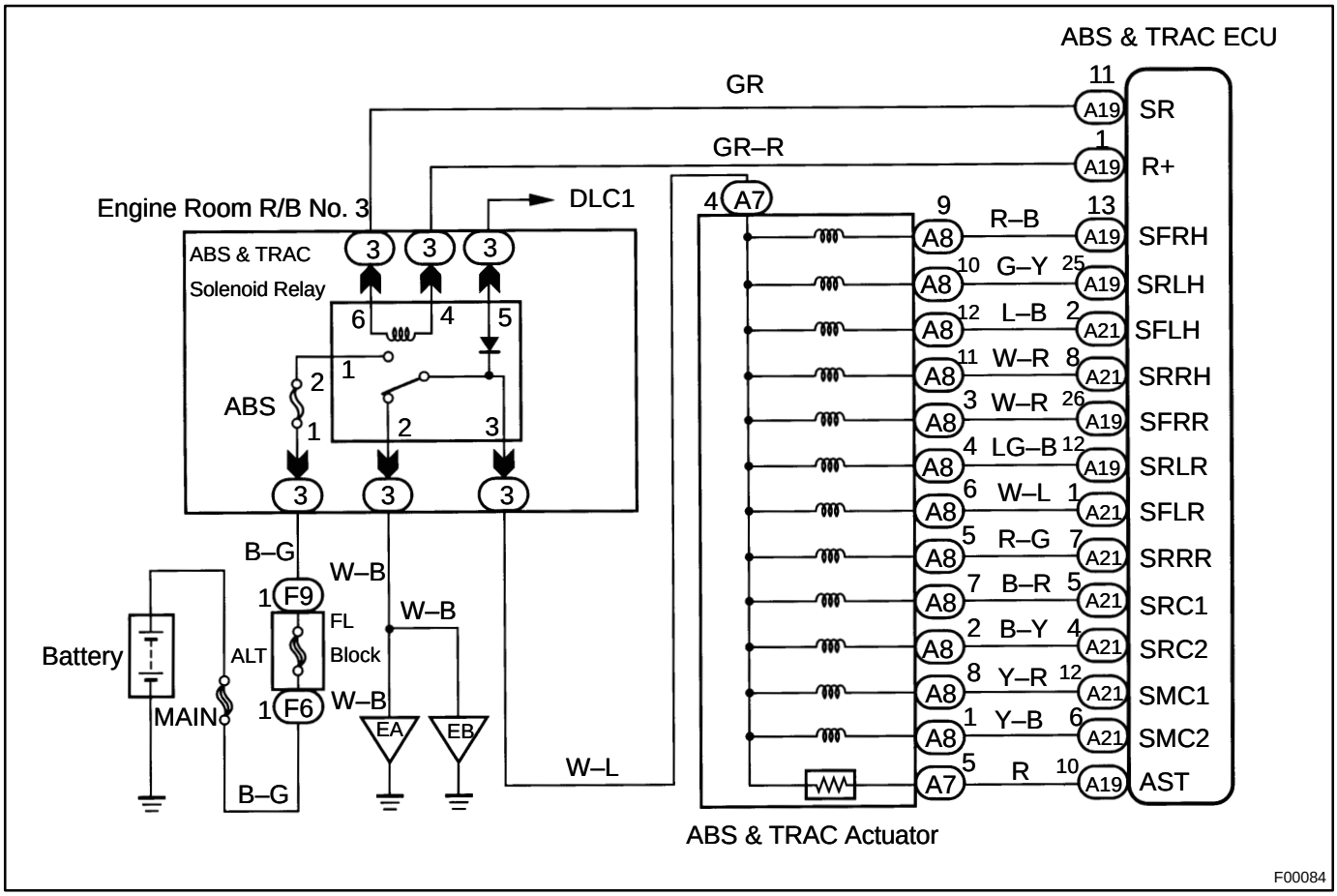
CIRCUIT DESCRIPTION

This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders thus controlling the braking force.

DTC No.	DTC Detecting Condition	Trouble Area
21	Conditions (1) and (2) or (3) continued for 0.48 sec. or more: (1) Recovery prohibit run pulse is not output, solenoid relay is ON, AST voltage of ECU terminal is 8.0 V or more, and solenoid output has no change between the last time and this time. (2) Solenoid output is ON, pressure holding solenoid monitor voltage is more than 1.0 V or pressure reduction solenoid monitor voltage is more than 1.5 V. (3) Solenoid output is OFF, solenoid monitor voltage is more than –1.0 V AST voltage of ECU.	●ABS actuator ●SFRR or SFRH circuit ●ECU
22		●ABS actuator ●SFLR or SFLH circuit ●ECU
23		●ABS actuator ●SRRR or SRRH circuit ●ECU
24		●ABS actuator ●SRLR or SRLH circuit ●ECU
25		●ABS actuator ●SMC1 circuit ●ECU
26		●ABS actuator ●SMC2 circuit ●ECU
27		●ABS actuator ●SRC1 circuit ●ECU
28		●ABS actuator ●SRC2 circuit ●ECU

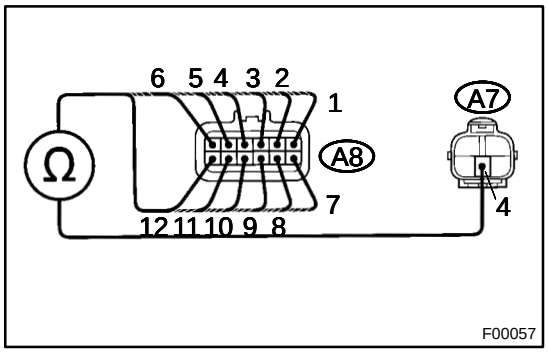
Fail safe function: If trouble occurs in the actuator solenoid circuit, the ECU cuts off current to the ABS & TRAC solenoid relay and prohibits ABS control and TRAC control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ABS & TRAC actuator solenoid.**



PREPARATION:

Disconnect the 2 connectors from ABS & TRAC actuator.

CHECK:

Check continuity between terminals A7 – 4 and A8 – 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 of ABS & TRAC actuator connector.

OK:

Continuity

HINT:Resistance of each solenoid coil is 1.2 Ω.

NG	**Replace ABS & TRAC actuator.**

OK

2	**Check for open and short in harness and connector between ABS & TRAC ECU and actuator (See page IN–27).**

NG → **Repair or replace harness or connector.**

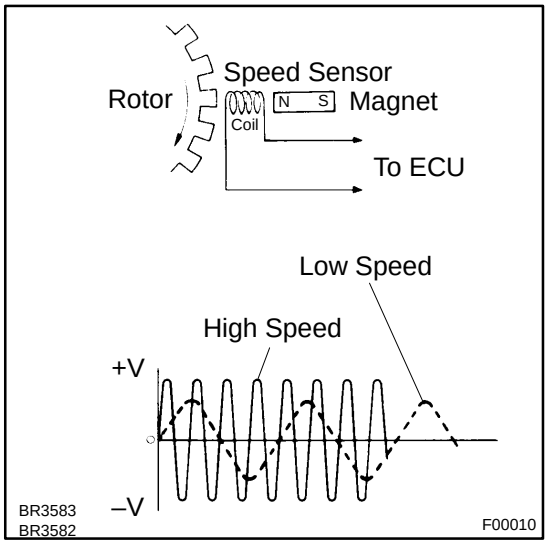
OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection.
If the connections are normal, the ECU may be defective.

DI0C5–01

DTC	31, 32, 33, 34	Speed Sensor Circuit

CIRCUIT DESCRIPTION

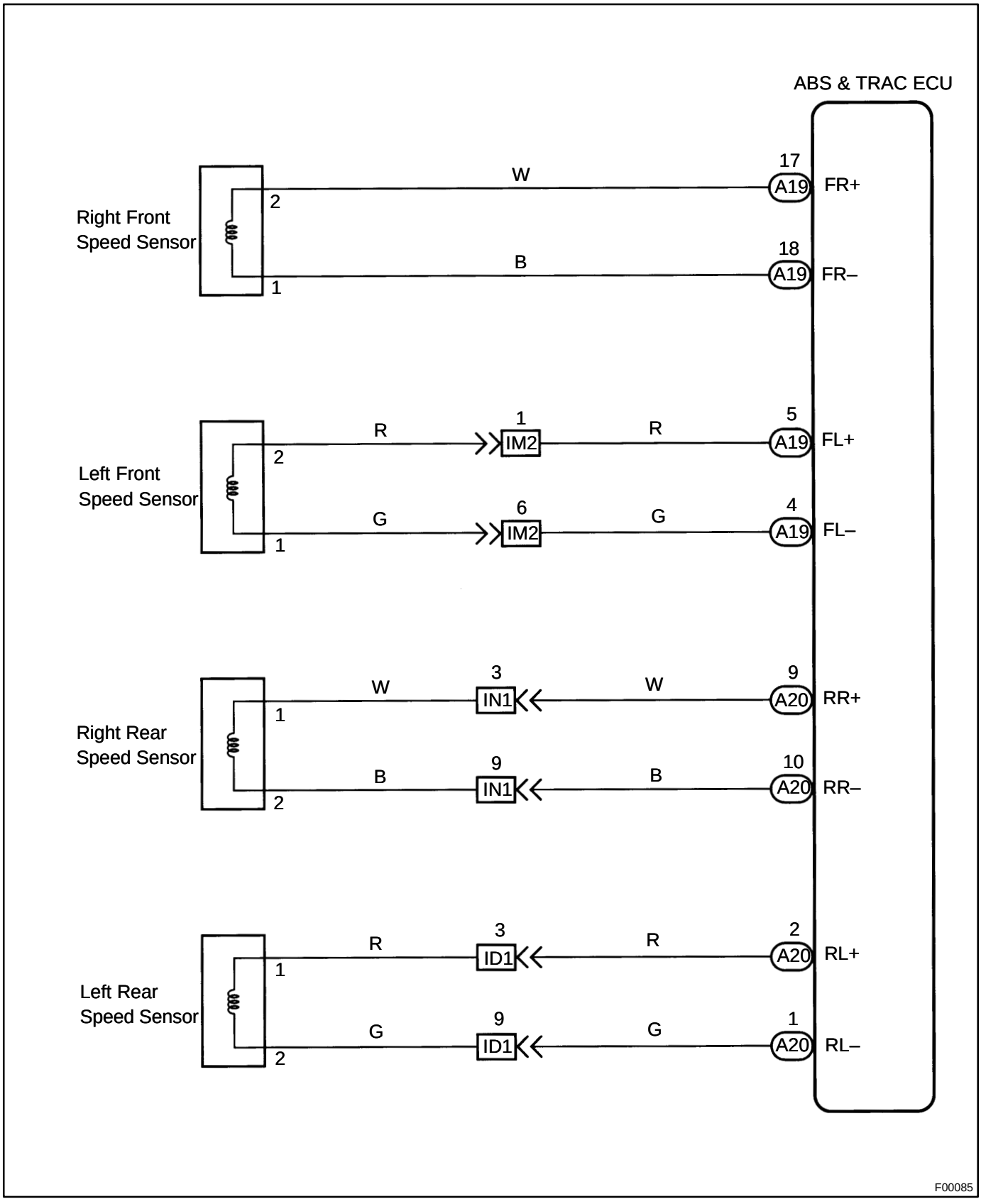


The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control of the ABS and TRAC system. The front and rear rotors each have 48 serrations.
When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
31, 32, 33, 34	Detection of any of conditions from (1) through (3): (1) ABS non–operation, wheel speed is 10 km/h or more, one eighth of maximum wheel speed is greater than the minimum wheel speed, one eighth of maximum wheel speed is smaller than the rear maximum wheel speed or momentary interruption of both the rear wheels are shown in the 15 sec. or more continuously. (2) ABS non–operation, momentary interruption of speed sensor occurs 7 times or more in the mean time of switching the ignition switch ON and OFF or vehicle speed is 20 km/h (12 mph) or more and the condition of noise interference or non–noise interference occurs 75 times or more within 5 sec. (3) Vehicle is at a stop, malfunction signal of vehicle speed sensor hardware open circuit is ON for 1.02 sec. continuously since starting the checking of a certain vehicle.	●Right front, left front, right rear, left rear speed sensor ●Each speed sensor circuit ●Speed sensor rotor ●ECU

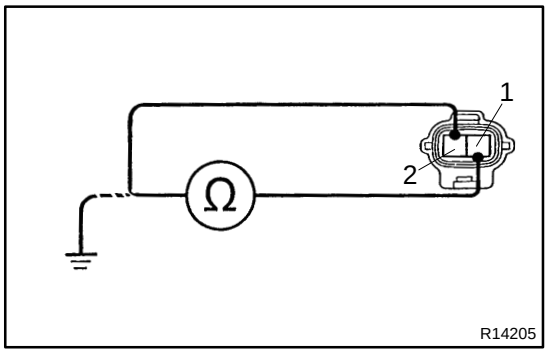
HINT:
DTC No. 31 is for the right front speed sensor.
DTC No. 32 is for the left front speed sensor.
DTC No. 33 is for the right rear speed sensor.
DTC No. 34 is for the left rear speed sensor.
Fail safe function: If trouble occurs in the speed sensor circuit, the ECU cuts off current to the ABS & TRAC solenoid relay and prohibits ABS control and TRAC control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check speed sensor.**



Front

PREPARATION:

(a) Remove front fender liner.

(b) Disconnect speed sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of speed sensor connector.

OK:

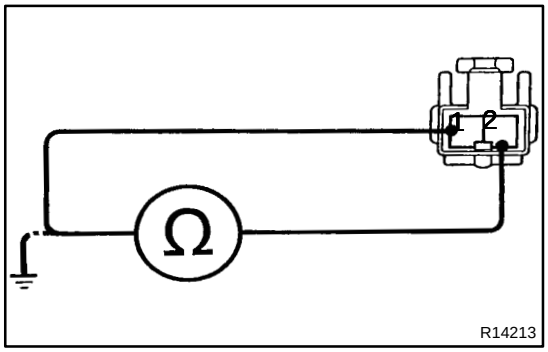
Resistance: 0.6 – 2.5 kΩ

CHECK:

Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher



Rear

PREPARATION:

(a) Remove the seat cushion and seat back.

(b) Disconnect speed sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of speed sensor connector.

OK:

Resistance: 1.2 – 2.3 kΩ

CHECK:

Measure resistance between terminals 1 and 2 of speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher

NG → **Replace speed sensor.**

NOTICE:Check the speed sensor signal last (See page DI–273).

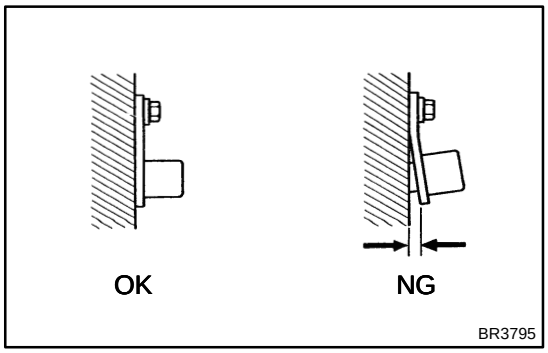
OK

2	**Check for open and short in harness and connector between each speed sensor and ECU (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

3	**Check sensor installation.**



CHECK:
Check the speed sensor installation.
OK:

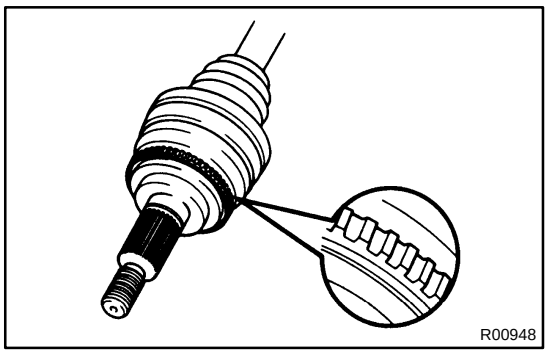
The installation bolt is tightened properly and there is no clearance between the sensor and rear axle carrier.

NG → **Replace speed sensor.**

NOTICE:Check the speed sensor signal last (See page DI–273).

OK

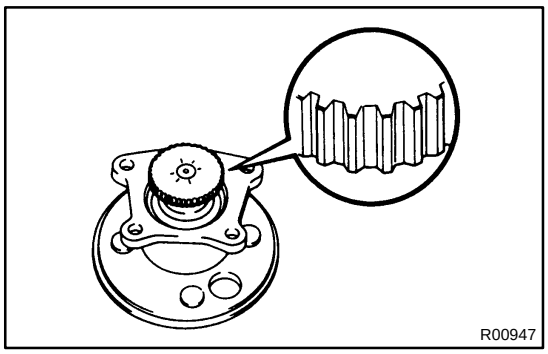
4	**Check sensor rotor and sensor tip.**



Front
PREPARATION:
Remove front drive shaft (See page SA–16).
CHECK:
Check sensor rotor serrations.
OK:

No scratches or missing teeth or foreign objects.
PREPARATION:
Remove the front speed sensor (See page BR–59).
CHECK:
Check the sensor tip.
OK:

No scratches or foreign objects on the sensor tip.



Rear

PREPARATION:

Remove the axle hub (See page SA–46).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches or missing teeth or foreign objects.

PREPARATION:

Remove the rear speed sensor (See page BR–59).

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

NG → **Replace speed sensor or rotor.**

NOTICE:Check the speed sensor signal last (See page DI–273).

OK

Check and replace ABS & TRAC ECU.

DI0C6–01

DTC	41	IG Power Source Circuit

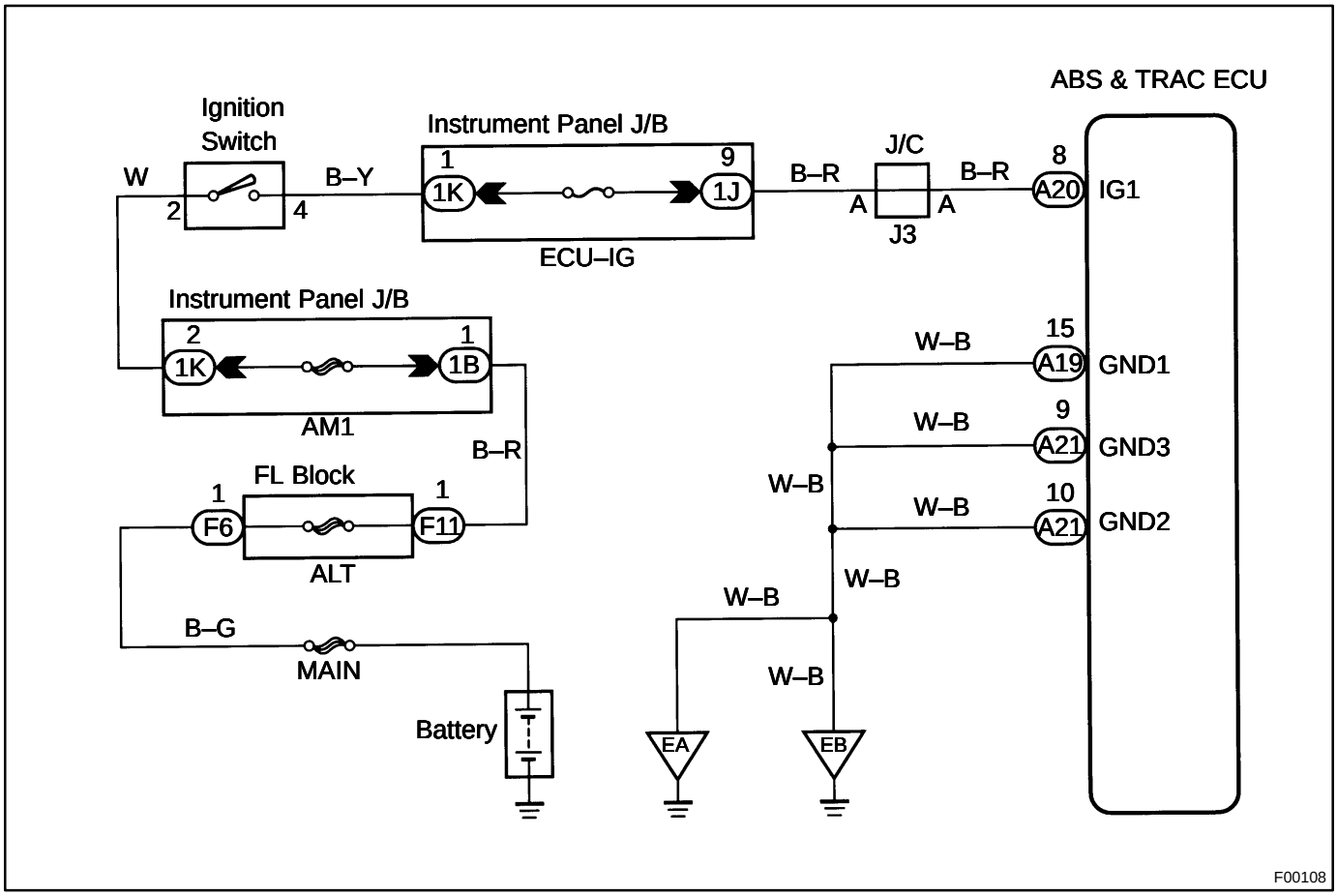
CIRCUIT DESCRIPTION

This is the power source for the ECU, hence the actuators.

DTC No.	DTC Detecting Condition	Trouble Area
41	Detection of any conditions from (1) through (3): (1) Vehicle speed is 3 km/h (1.9 mph) or more and battery voltage is less than 9.5 V continues for 10 sec. or more. (2) Battery voltage has never exceeded more than 17.0 V and has become less than 9.5 V within 2.16 sec., under malfunction of solenoid relay monitor after the solenoid relay is ON, at ECU AST terminal voltage of ECU has become 8.0 V or more or under malfunction of motor relay monitor and after the motor relay is ON, motor relay monitor has become ON. (3) Battery voltage is more than 17.0 V continues for 1.2 sec. or more or battery voltage has become more than 17.0 V within 2.16 sec. and solenoid or motor relay monitor is under malfunction condition.	●Battery ●IC regulator ●Power source circuit ●ECU

Fail safe function: If trouble occurs in the power source circuit, the ECU cuts off current to the ABS & TRAC solenoid relay and prohibits ABS control and TRAC control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check battery positive voltage.**

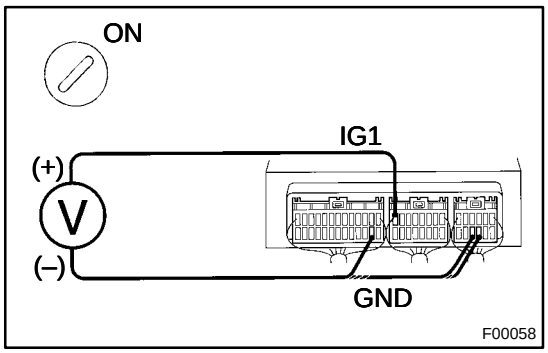
OK:

Voltage: 10 – 14 V

NG → **Check and repair the charging system.**

OK

2	**Check voltage between terminals IG1 and GND of ABS & TRAC ECU connector.**



PREPARATION:

Remove ABS & TRAC ECU with connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals IG1 and GND of ABS & TRAC ECU connector.

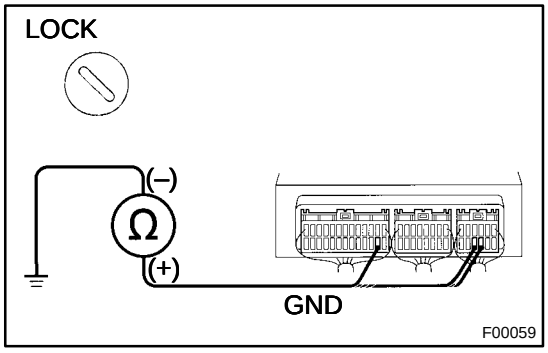
OK:

Voltage: 10 – 14 V

NG → **Check and replace ABS & TRAC ECU.**

OK

3	**Check continuity between terminals GND of ABS & TRAC ECU connector and body ground.**



CHECK:

Measure resistance between terminal GND of ABS & TRAC ECU connector and body ground.

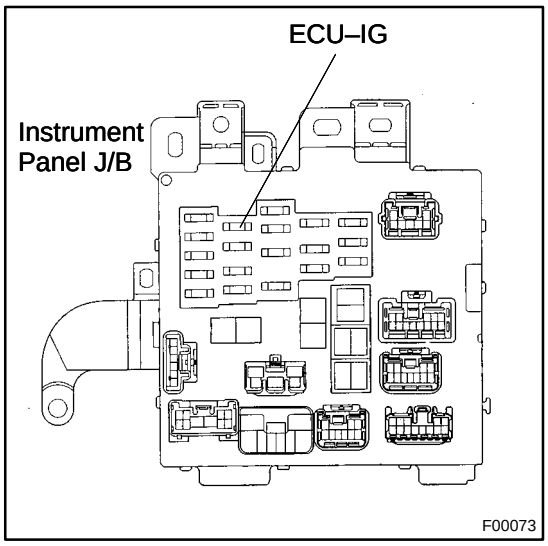
OK:

Resistance: 1 Ω or less

NG → **Repair or replace harness or connector.**

OK

4	Check ECU–IG fuse.



PREPARATION:
Remove ECU–IG fuse from Instrument Panel J/B.
CHECK:
Check continuity of ECU–IG fuse.
OK:

Continuity

NG → **Check for short in all the harness and components connected to ECU–IG fuse (See attached wiring diagram).**

OK

Check for open in harness and connector between ABS & TRAC ECU and battery (See page IN–27).

DI0C7–01

DTC	43	ABS Control System Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
43	Detection of any conditions from (1) through (8): (1) During TRAC is in non–operation and ABS is output DTC, but TRAC is not during initial lamp checking, terminal WA of ECU is ON and engine speed is 500 rpm or more continues for 1 sec. or more. (2) Solenoid relay circuit is open or short. (3) Motor relay circuit is open or short. (4) ABS solenoid circuit is open or short. (5) TRAC solenoid circuit is open or short. (6) Speed sensor is under malfunction condition. (7) IG power source is down or raise. (8) Pump motor is lock.	●ABS control system

INSPECTION PROCEDURE

1	**Check the DTC for the ABS (See page DI–273).**

***1** → **Repair ABS control system according to the code output.**

***2**

Check for ECU connected to malfunction indicator lamp.

*1: Output NG code
*2: Malfunction indicator lamp remains ON.

DI0C8–01

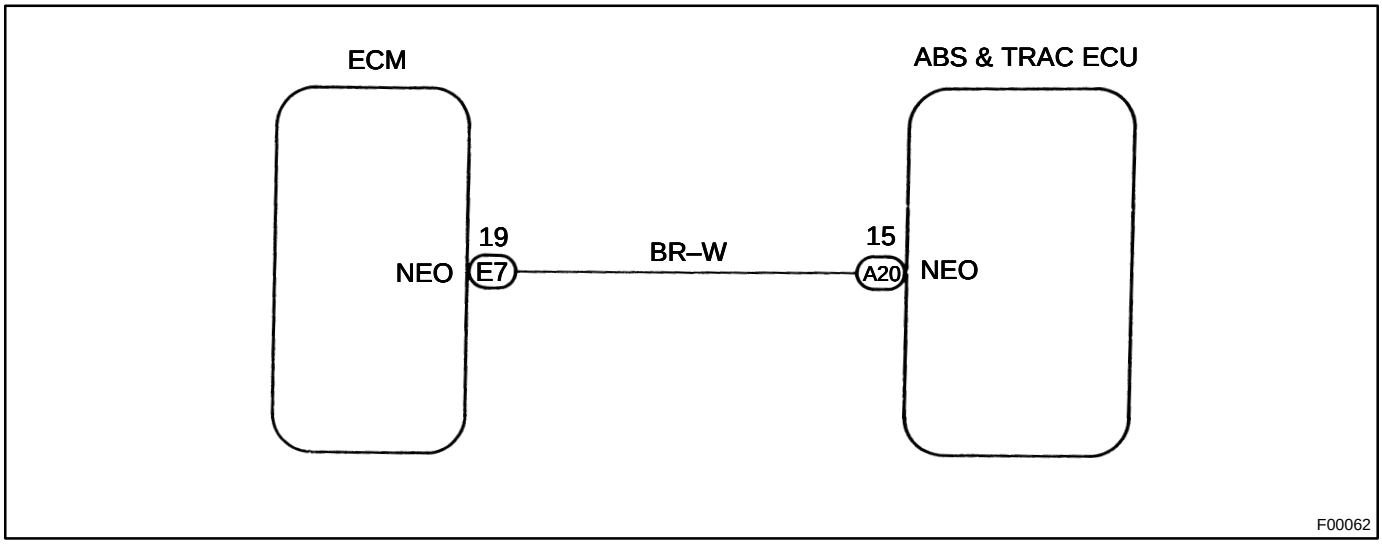
DTC	44	NE Signal Circuit

CIRCUIT DESCRIPTION

The ABS & TRAC ECU receives engine speed signals (NE signals) from the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
44	Condition (1) or (2) is detected: (1) TRAC is in operation and engine speed is 0 rpm continues for 2.4 sec. or more. (2) TRAC is in non–operation, sift lever is not in P or N position, both the front right and left wheels' speed is 30 km/h (19 mph) or more, engine speed is 0 rpm and does not have communication malfunction, and malfunction information of engine system is OFF.	●NEO circuit ●ECM ●ABS & TRAC ECU

WIRING DIAGRAM



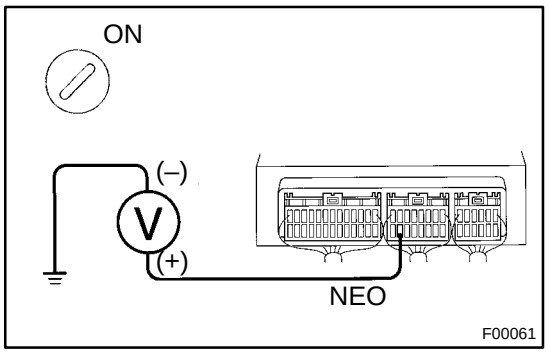
INSPECTION PROCEDURE

1	**Check for open and short in harness and connector between terminal NEO of ABS & TRAC ECU and terminal NEO of ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

2	Check voltage between terminal NEO of ABS & TRAC ECU and body ground.



PREPARATION:

(a) Remove ABS & TRAC ECU with connectors still connected.

(b) Turn ignition switch ON.

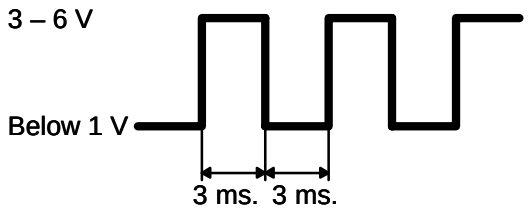
CHECK:

Measure voltage between terminal NEO of ABS & TRAC ECU and body ground for the engine conditions below.

OK:

Engine condition	Voltage
OFF (IG ON)	3 – 6 V or below 1 V
ON (Idling)	2 – 3 V (Pulse)

(Reference)



NG → **Check and replace ABS & TRAC ECU or ECM.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection.

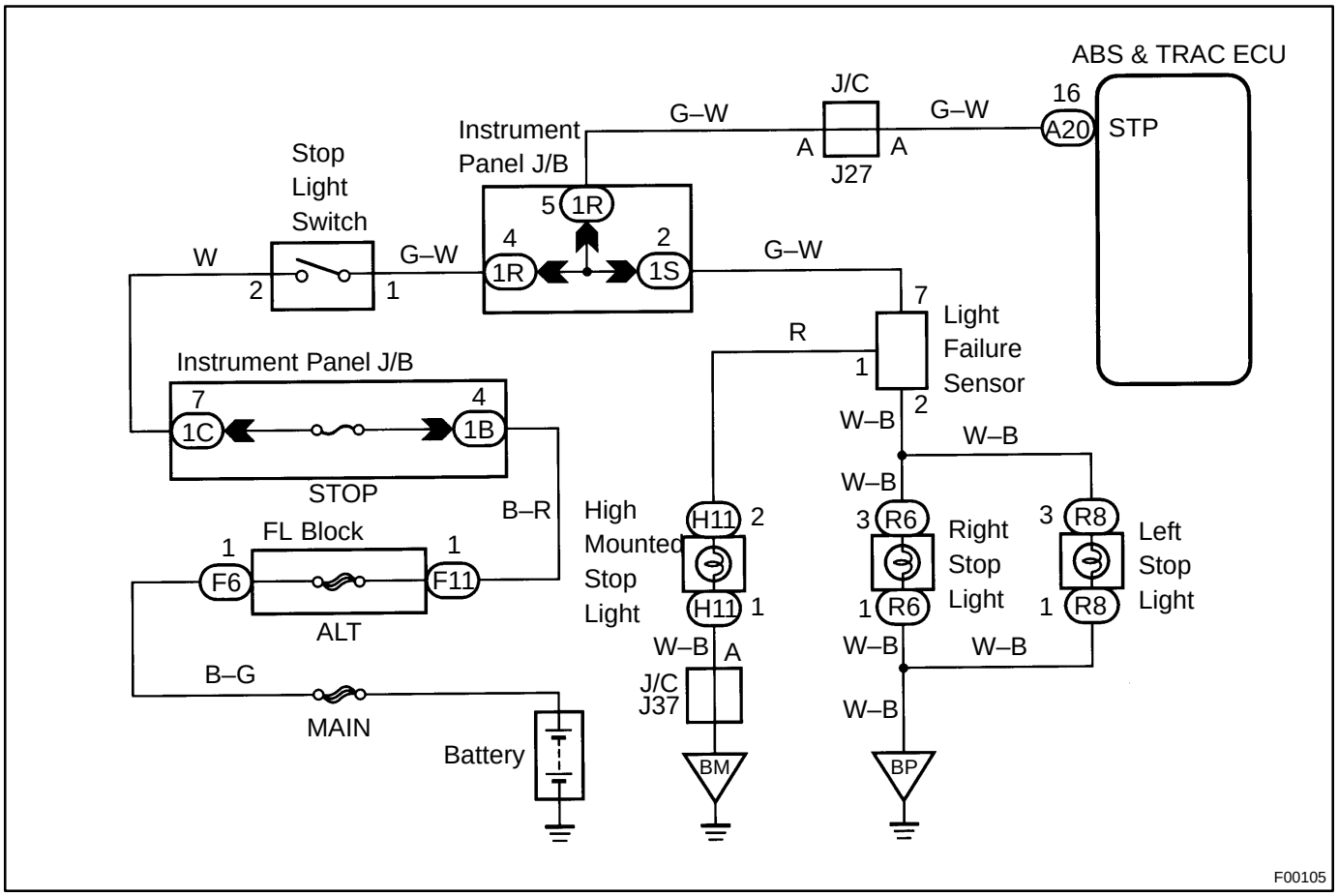
DI0CA–01

DTC	49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
49	Battery voltage has never exceed more than 17.0 V and become less than 9.5 V within 2.16 sec. and the STP terminal voltage of ECU is under open circuit detecting limits continues for 3 sec. or more.	●Stop light switch ●Stop light switch circuit ●ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check operation of stop light.

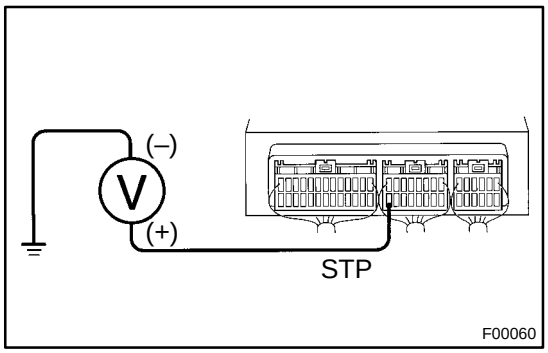
CHECK:

Check that stop light lights up when brake pedal is depressed and turns off when brake pedal is released.

NG	Repair stop light circuit (See page BE–50).

OK

2	**Check voltage between terminal STP of ABS & TRAC ECU and body ground.**



PREPARATION:
Remove ABS & TRAC ECU with connectors still connected.
CHECK:
Measure voltage between terminal STP of ABS & TRAC ECU and body ground when brake pedal is depressed.
OK:
Voltage: 8 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI–282).**

NG

3	**Check for open in harness and connector between ABS & TRAC ECU and stop light Switch (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ABS & TRAC ECU.

DI0CC–01

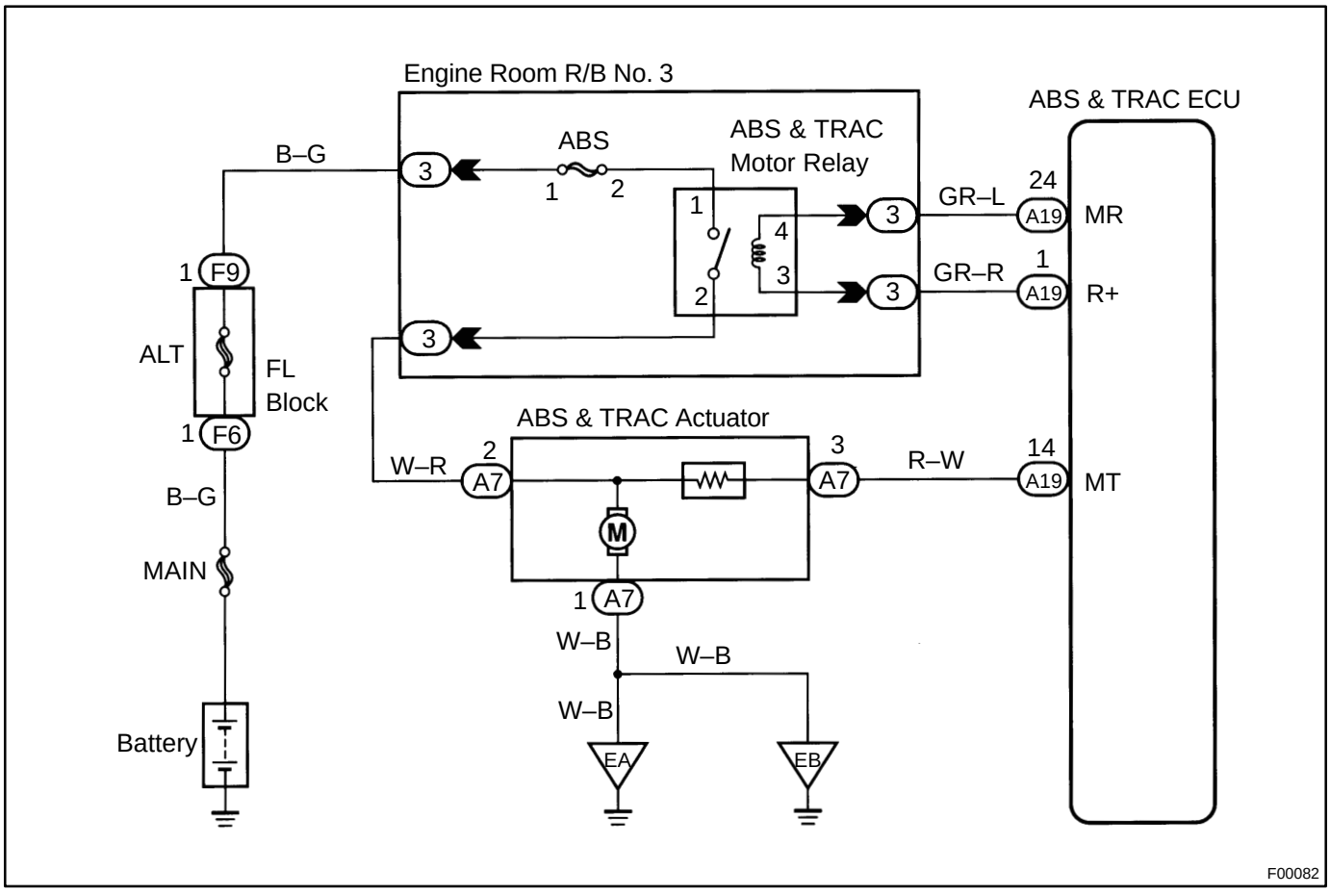
DTC	51	ABS Pump Motor Lock

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
51	In the midst of initial check, after the current flows to the motor for 3 sec. and motor relay is turned OFF, then within 0.66 sec., the condition that the motor relay monitor is OFF continues for 0.24 sec. or more.	●ABS pump motor

Fail safe function: If trouble occurs in the ABS & TRAC pump motor, the ECU cuts off current to the ABS & TRAC solenoid relay and prohibits ABS control and TRAC control.

WIRING DIAGRAM



DI0CD–01

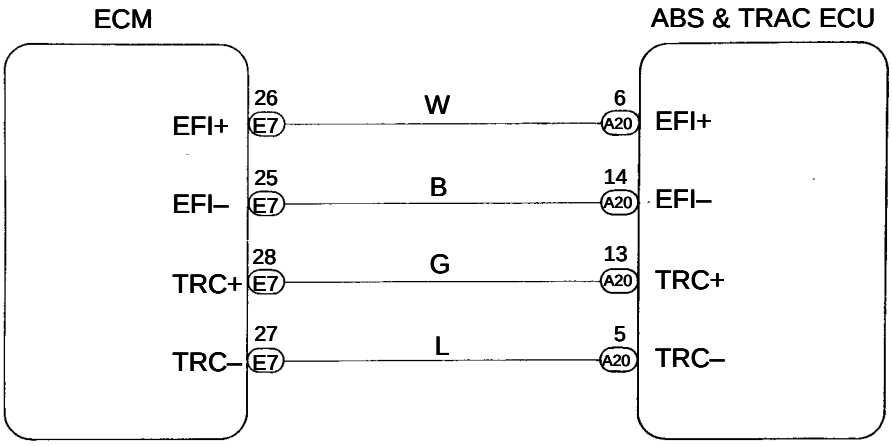
DTC	53	ECM Communication Circuit Malfunction

CIRCUIT DESCRIPTION

This circuit is used to send TRAC control information from the ABS & TRAC ECU to the ECM (TRC+, TRC–), and engine control information from the ECM to the ABS & TRAC ECU (EFI+, EFI–).

DTC No.	DTC Detecting Condition	Trouble Area
53	ECM communication data malfunction is detected.	●TRC+ or TRC– circuit ●EFI+ or EFI– circuit ●ECM ●ABS & TRAC ECU

WIRING DIAGRAM



F00063

INSPECTION PROCEDURE

1	**Check for open and short in harness and connector between terminals EFI+, EFI–, TRC+, TRC– of ABS & TRAC ECU and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM or ABS & TRAC ECU.

DI0CE–01

DTC	61	Engine Control System Malfunction

CIRCUIT DESCRIPTION

If trouble occurs in the engine control system, the ECU prohibits TRAC control.

DTC No.	DTC Detection Condition	Trouble Area
61	Conditions (1) and (2) is detected: (1) ECM communication is normal, malfunction information of engine system ON, and engine speed is 500 rpm or more continues for 0.48 sec. or more, and TRAC operation start condition is concluded. (2) ECM communication is normal, malfunction information of engine system is ON, engine speed is 500 rpm and more continues for 1 sec. or more, and the engine system memorizes DTC.	Engine control system

INSPECTION PROCEDURE

1	**Check the DTC for the engine (See page DI–3).**

***1** → **Repair engine control system according to the code output.**

***2**

Check for ECU connected to malfunction indicator light.

*1: Output NG code
*2: Malfunction indicator light remains ON.

DI0CG–01

DTC	Always ON	ABS & TRAC ECU Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	ABS & TRAC ECU internal malfunction is detected.	●ECU

Fail safe function: If trouble occurs in the power source circuit, the ECU cuts off current to the ABS & TRAC solenoid relay and prohibits ABS control and TRAC control.

INSPECTION PROCEDURE

1	**Is DTC output?**

Check DTC on page DI–273.

YES → **Repair circuit indicated by the code output.**

NO

2	**Is normal code displayed?**

YES → **Check ABS & TRAC solenoid relay. Check for short in harness and connector between solenoid relay and DLC1 (See page IN–27).**

NO

3	**Is ABS warning light go off?**

YES → **Check for open or short in harness and connector between ECU–IG fuse and ABS & TRAC ECU (See page IN–27).**

NO

4	**Check battery positive voltage.**

PREPARATION:
Start the engine.
CHECK:
Check the battery positive voltage.
OK:
10 – 14 V

NG → **Check and repair the charging system.**

OK

5	**Check ABS warning light.**

PREPARATION:
(a) Turn the ignition switch OFF.
(b) Disconnect the connector from the ABS & TRAC ECU.
(c) Turn the ignition switch ON.
CHECK:
Check the ABS warning light goes off.

OK → **Check and replace ABS & TRAC ECU.**

NG

Check for short in harness and connector between ABS warning light, DLC1, DLC2, and ABS & TRAC ECU (See page IN–27).

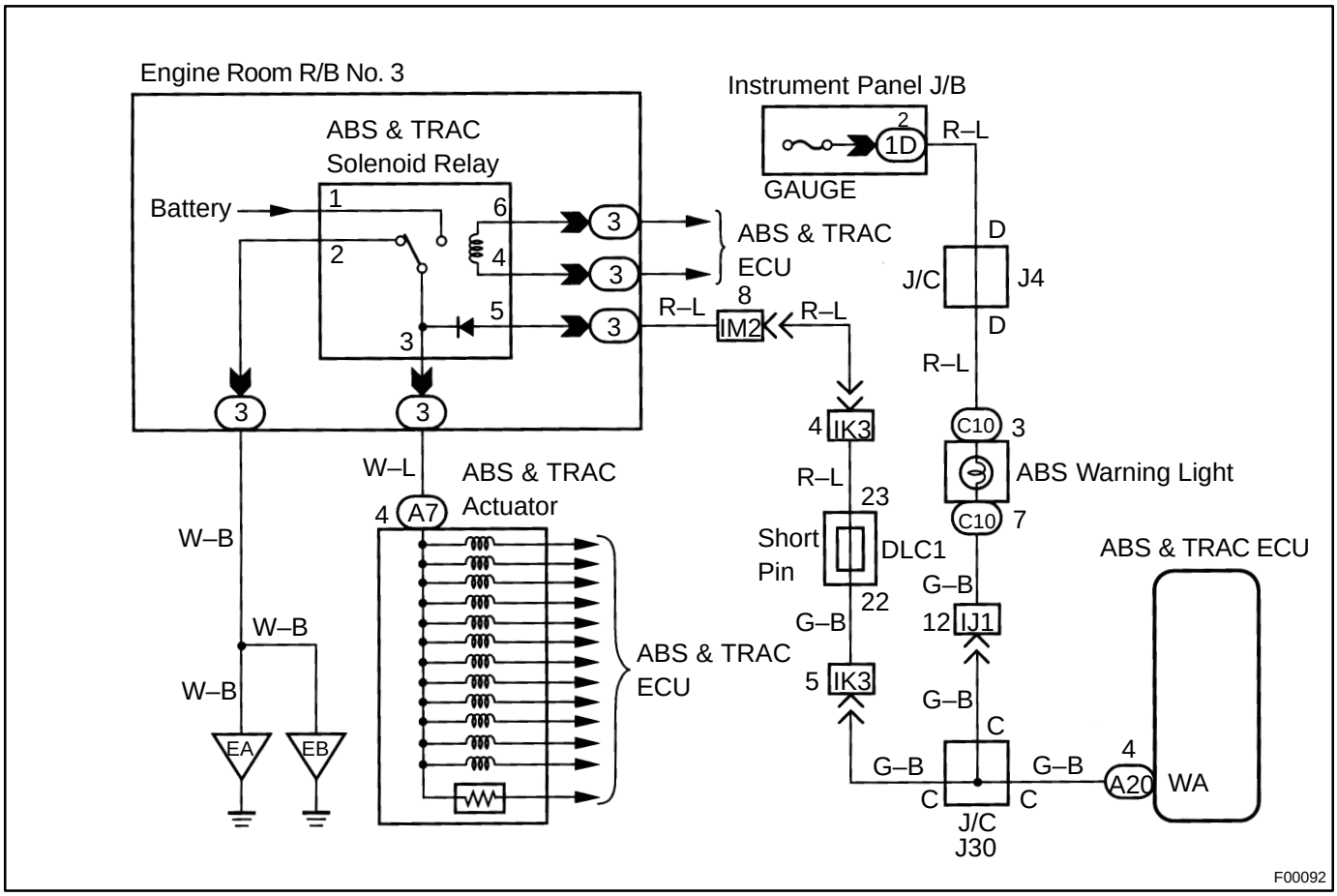
DI0CI–01

ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU detects trouble, it lights the ABS warning light while at the same time prohibiting ABS control. At this time, the ECU records a DTC in memory.
Connect terminals Tc and E_1 of the DLC1 or DLC2 make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

Troubleshooting in accordance with the chart below for each trouble symptom.

ABS warning light does not light up	Go to step 1
ABS warning light remains on	Go to step 3

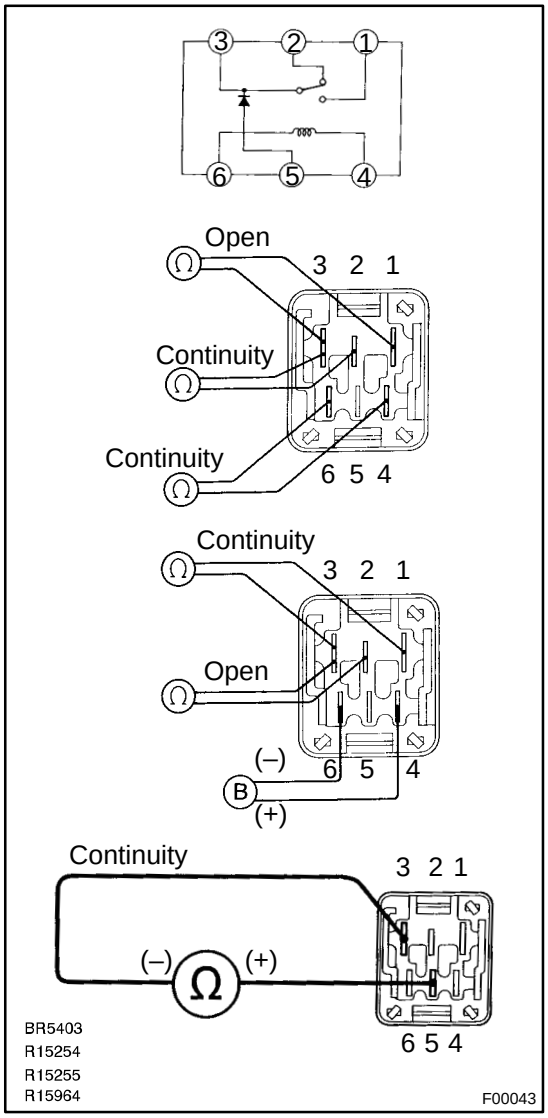
1	**Check ABS warning light.**

See Combination Meter Troubleshooting on page BE–58.

NG → **Repair bulb or combination meter assembly.**

OK

2	Check ABS & TRAC solenoid relay.



PREPARATION:

Remove ABS & TRAC solenoid relay from Engine Room R/B No. 3.

CHECK:

Check continuity between each terminal of ABS & TRAC solenoid relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

(a) Apply battery positive voltage between terminals 4 and 6.

(b) Check continuity between each terminal of ABS & TRAC solenoid relay.

OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

CHECK:

Connect the ~ test lead to terminal 5 and the ⊖ lead to terminal 3. Check continuity between the terminals.

OK:

Continuity

If there is no continuity, connect the ⊖ test lead to terminal 5 and the ~ lead to terminal 3. Recheck continuity between terminals.

NG → **Replace ABS & TRAC solenoid relay.**

OK

Check for open in harness and connector between DLC1, ABS & TRAC solenoid relay and body ground (See page IN–27).

3	**Is DTC output?**

Check DTC on page DI–273.

YES → **Repair circuit indicated by the code output.**

NO

4	**Does ABS warning light go off?**

NO → **Check for short in harness and connector between ABS warning light, DLC1 and ABS & TRAC ECU (See page IN–27).**

YES

5	**Check ABS & TRAC solenoid relay (See step 2).**

NG → **Replace ABS & TRAC solenoid relay.**

OK

Check for short in harness and connector between DLC1 and ABS & TRAC solenoid relay (See page IN–27).

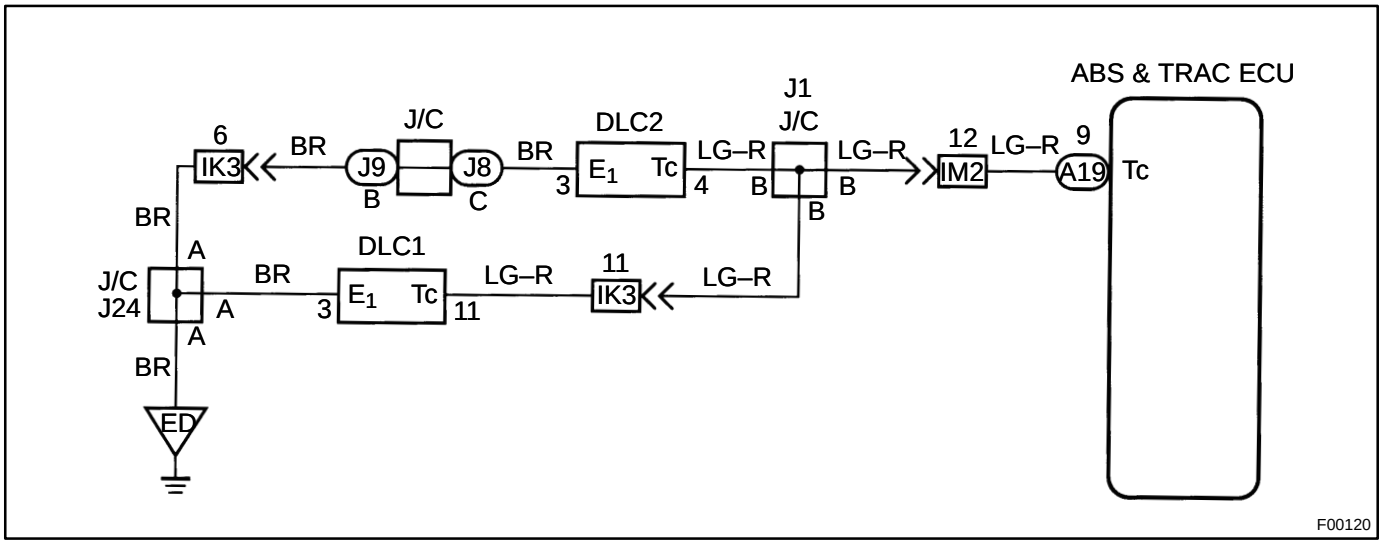
DI0CK–01

Tc Terminal Circuit

CIRCUIT DESCRIPTION

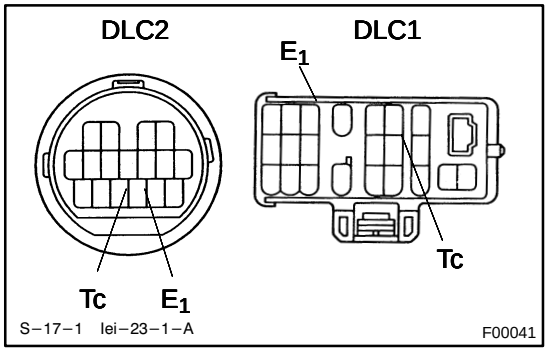
Connecting between terminals Tc and E_1 of the DLC1 or the DLC2 causes the ECU to display the DTC by blinking the ABS warning light and TRAC OFF indicator light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals Tc and E_1 of DLC2 or DLC1.**



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Tc and E_1 of DLC2 or DLC1.

OK:

Voltage: 10 – 14 V

OK	**If ABS warning light does not blink even after Tc and E_1 are connected, the ECU may be defective.**

NG

2	**Check for open and short in harness and connector between ABS & TRAC ECU and DLC2 or DLC1, DLC2 or DLC1 and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ABS & TRAC ECU.

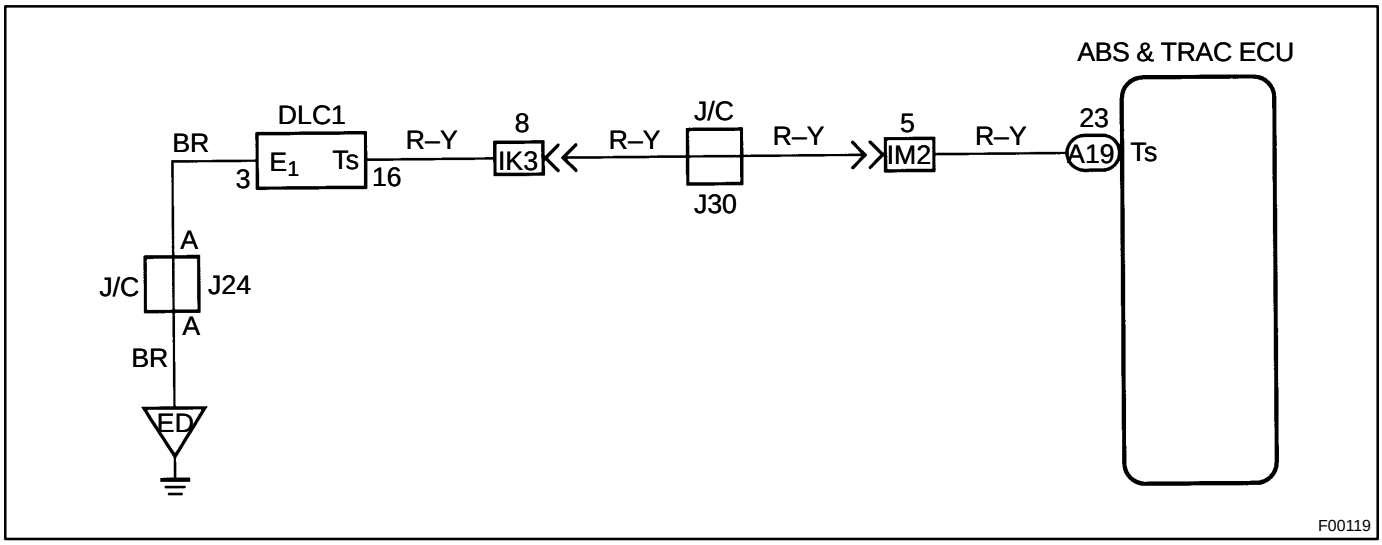
DI0CM–01

Ts Terminal Circuit

CIRCUIT DESCRIPTION

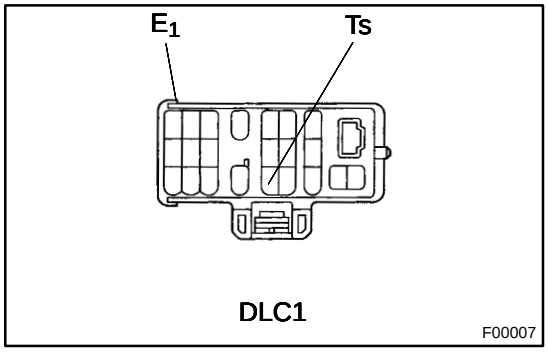
The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected with the DTC check.
Connecting terminals Ts and E_1 of the DLC1 in the engine compartment starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals Ts and E_1 of DLC1.**



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Ts and E_1 of DLC1.

OK:

Voltage: 10 – 14 V

OK	**If ABS warning light does not blink even after Ts and E_1 are connected, the ECU may be defective.**

NG

2	**Check for open and short in harness and connector between ABS & TRAC ECU and DLC1, DLC1 and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ABS & TRAC ECU.

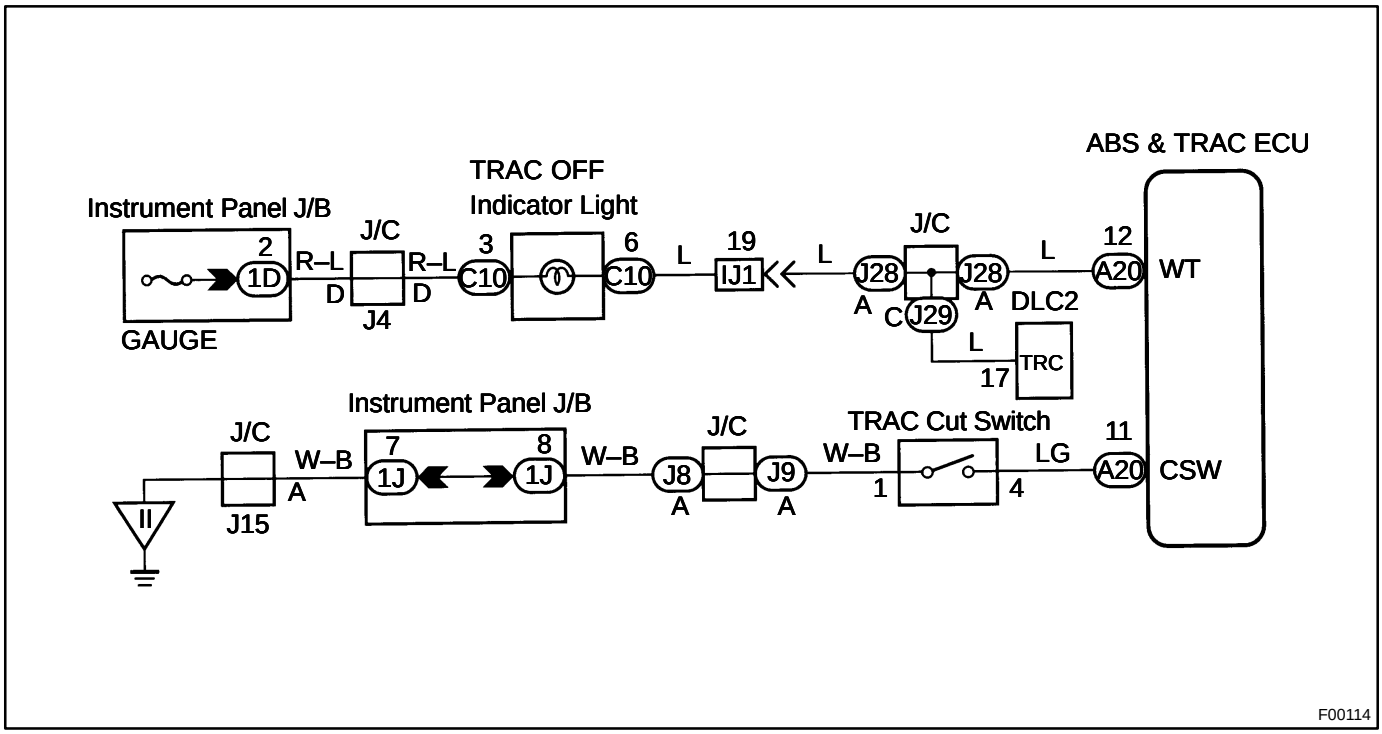
DI0CN–01

TRAC OFF Indicator, TRAC Cut Switch Circuit

CIRCUIT DESCRIPTION

This is the TRAC control main switch. When the TRAC cut switch is pushed on, TRAC control goes off and the TRAC OFF indicator lights up. This indicator blinks for warnings when the trouble occurs and for displaying DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

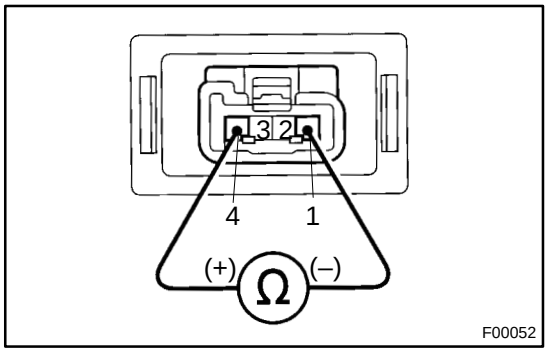
1	**Check DTC.**

Check DTC on page DI–273.

YES → **Repair circuit indicated by the code output.**

NO

2	**Check TRAC cut switch.**



PREPARATION:

(a) Remove TRAC cut switch.

(b) Disconnect TRAC cut switch connector.

CHECK:

Measure resistance between terminals 1 and 4 of TRAC cut switch when TRAC cut switch is on and off.

OK:

TRAC cut switch	Resistance
Pushed in	Continuity
Released	1 MΩ or higher

NG → **Replace TRAC cut switch.**

OK

3	**Check for open and short in harness and connector between terminal CSW of ABS & TRAC ECU and TRAC cut switch and body ground (See page IN–27).**

NG → **Repair or replace combination meter.**

OK

4	**Check TRAC OFF indicator light.**

See combination meter troubleshooting on page BE–58.

NG → **Repair or replace combination meter.**

OK

5	**Check for open and short in harness and connector between terminal WT of ABS & TRAC ECU and TRAC OFF indicator light (See page IN–27).**

NG → **Repair or replace harness connector.**

OK

Check and replace ABS & TRAC ECU.

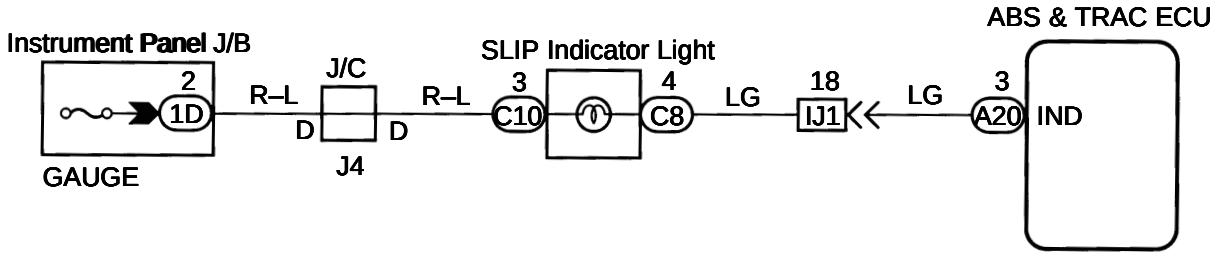
DI0CP–01

SLIP Indicator Light Circuit

CIRCUIT DESCRIPTION

The SLIP indicator blinks during TRAC operation.

WIRING DIAGRAM



F00097

INSPECTION PROCEDURE

1	**Check SLIP indicator light.**

See combination meter troubleshooting on page BE–58.

NG → **Repair or replace combination meter.**

OK

2	**Check for short in harness and connector between ABS & TRAC ECU and SLIP indicator light (See page IN–27).**

NG → **Repair or replace harness or connector.**

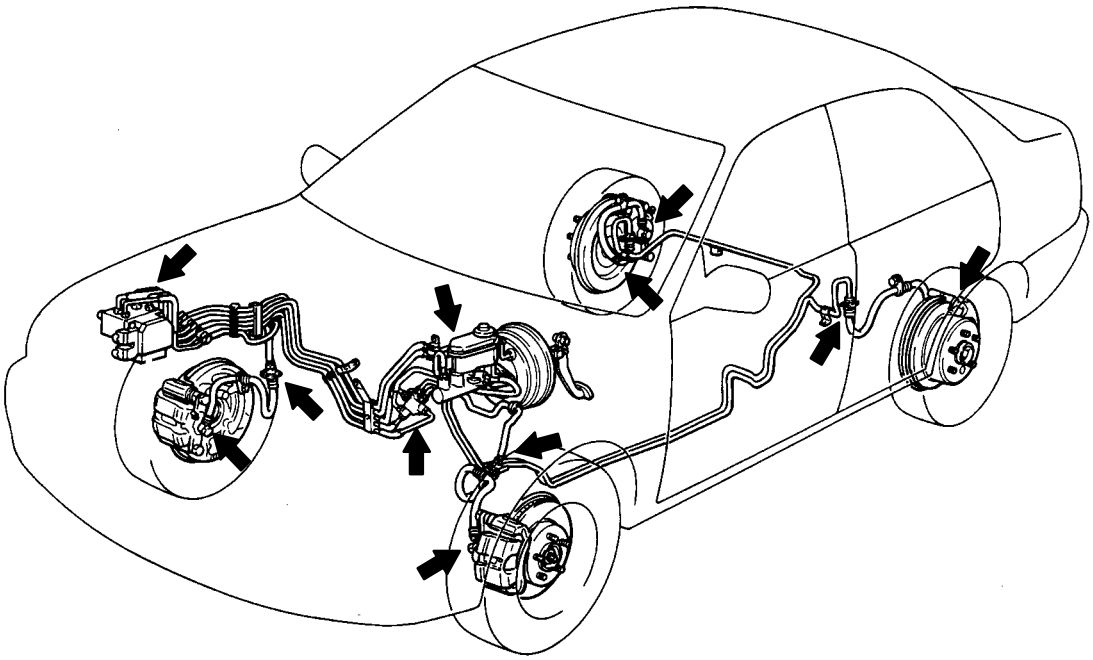
OK

Check and replace ABS & TRAC ECU.

DI0CR–01

Check for Fluid Leakage

Check for fluid leakage from actuator or hydraulic lines.

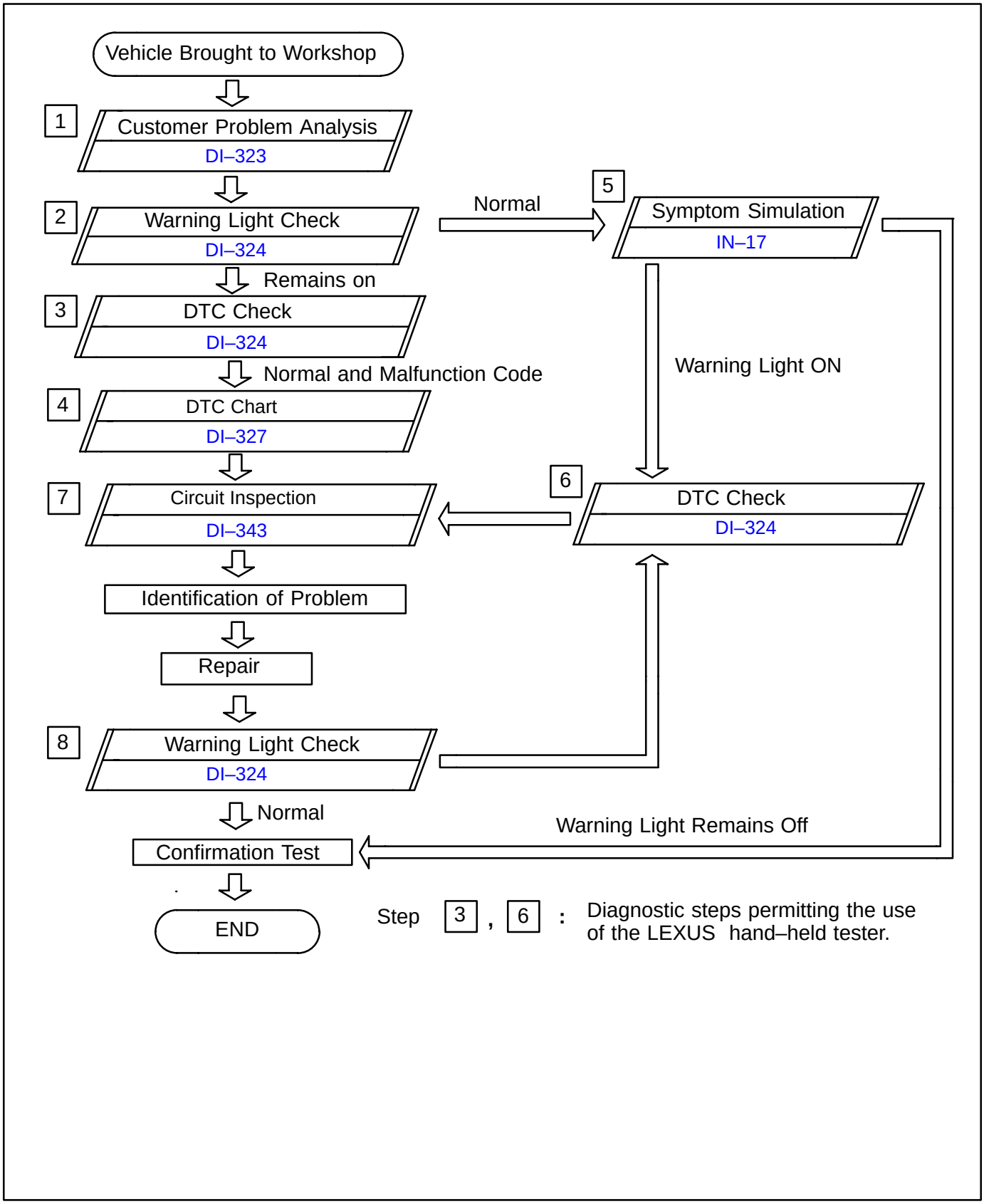


F00070

SUPPLEMENTAL RESTRAINT SYSTEM

DI0AT–01

HOW TO PROCEED WITH TROUBLESHOOTING



DI0AU–01

CUSTOMER PROBLEM ANALYSIS CHECK

Supplemental Restraint System Check Sheet

Inspector's Name _____

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km Miles

Date Problem Dist Occurred	/ /
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Other
Temperature	Approx.

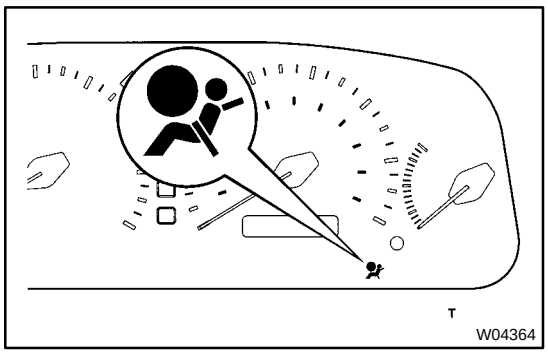
Vehicle Operation	☐ Starting ☐ Idling ☐ Driving [☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other]
Road Conditions	
Details Of Problem	

Vehicle Inspection, Repair History Prior to Occurrence of Malfunction(Including Supplemental Restraint System)	

Diagnosis System Inspection

SRS Warning Light Inspection	**1st Time**	☐ Remains ON ☐ Sometimes Light Up ☐ Does Not Light Up
	2nd Time	☐ Remains ON ☐ Sometimes Light Up ☐ Does Not Light Up
DTC Inspection	**1st Time**	☐ Normal Code ☐ Malfunction Code [Code.]
	2nd Time	☐ Normal Code ☐ Malfunction Code [Code.]

DI0AV–01



PRE–CHECK

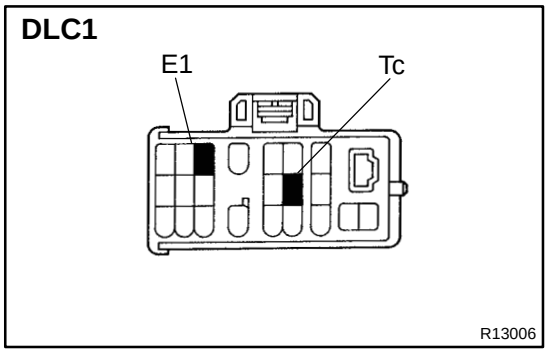
1. SRS WARNING LIGHT CHECK

(a) Turn the ignition switch to ACC or ON and check that the SRS warning light lights up.

(b) Check that the SRS warning light goes out after approx. 6 seconds.

HINT:

- When the ignition switch is at ACC or ON and the SRS warning light remains on or flashes, the airbag sensor assembly has detected a malfunction code.
- If, after approx. 6 seconds have elapsed, the SRS warning light sometimes lights up or the SRS warning light lights up even when the ignition switch is OFF, a short in the SRS warning light circuit can be considered likely. Proceed to "SRS warning light circuit malfunction" on page DI–362, DI–364.



2. DTC CHECK (Using diagnosis check wire)

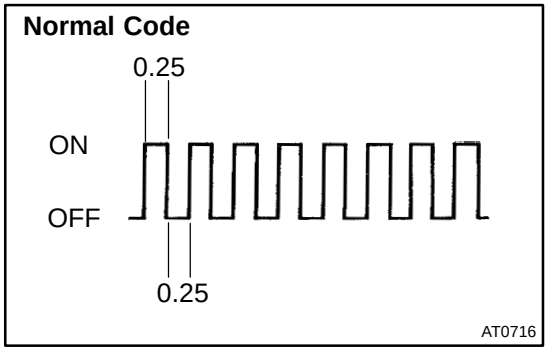
(a) OUTPUT DTC

(1) Turn the ignition switch to the ACC or ON position and wait approx. 20 seconds.

(2) Using SST, connect terminals Tc and E1 of the DLC1.
SST 09843–18020

NOTICE:Never make a mistake with the terminal connecting position as this will cause a malfunction.

HINT:DTC check and troubleshooting of each DTC can also be done using DLC2.



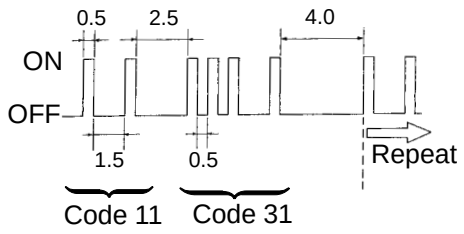
(b) READ DTC

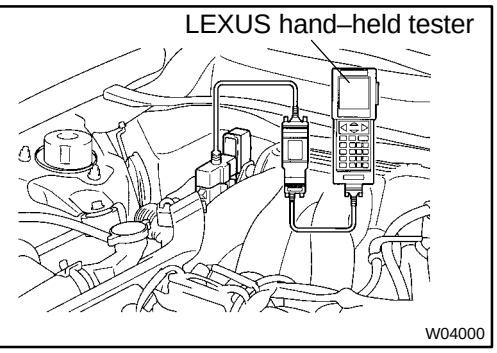
Read the 2–digit DTC as indicated by the number of times the SRS warning light blinks. As an example, the blinking patterns, normal, 11 and 31 are as shown on the illustration.

- Normal code indication
  The light will blink 2 times per second.
- Malfunction code indication
  The first blinking output indicates the first digit of a 2–digit

DTC. After a 1.5 second pause, the second blinking output will indicate the second digit.

Code 11 and 31





If there are 2 or more codes, there will be a 2.5 second pause between each code. After all the codes have been output, there will be a 4.0 second pause and they will all be repeated.

HINT:

- In the event of a number of trouble codes, indication will start from the smallest numbered code.
- If it does not output a DTC or outputs a DTC without terminal connection, proceed to the Tc terminal circuit inspection on page DI–367.

3. DTC CHECK (Using LEXUS hand–held tester)

(a) Hook up the LEXUS hand–held tester to the DLC1 or DLC2.

(b) Read the DTCs by following the prompts on the tester screen.

HINT:Please refer to the LEXUS hand–held tester operator's manual, for further details.

4. DTC CLEARANCE

When the ignition switch is turned off, the diagnostic trouble code is cleared.

5. RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

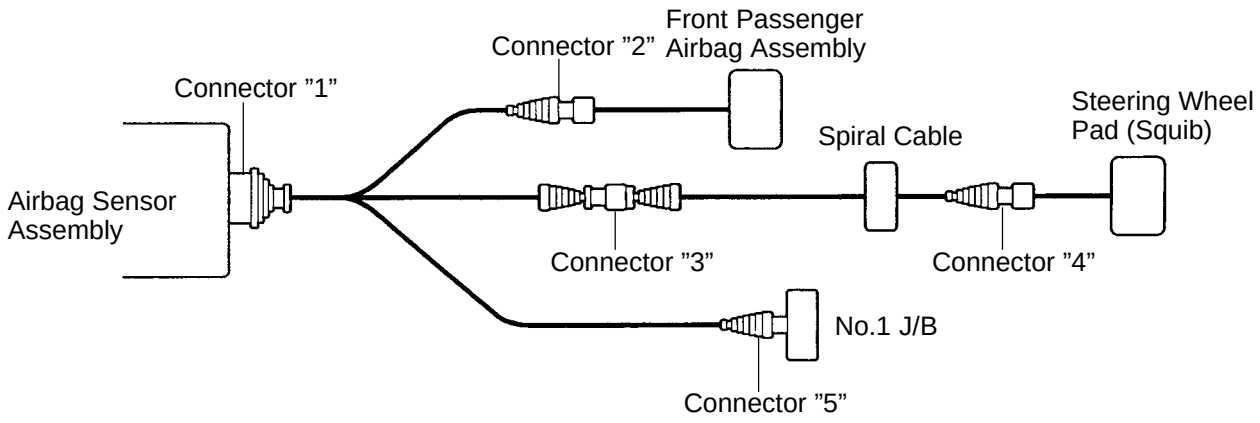
An airbag activation prevention mechanism is built into the connector for the squib circuit of the SRS.

When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure, as shown in the illustration of the connectors "1" and "3" below, insert paper which is the same thickness as the male terminal, between the terminal and the short spring.

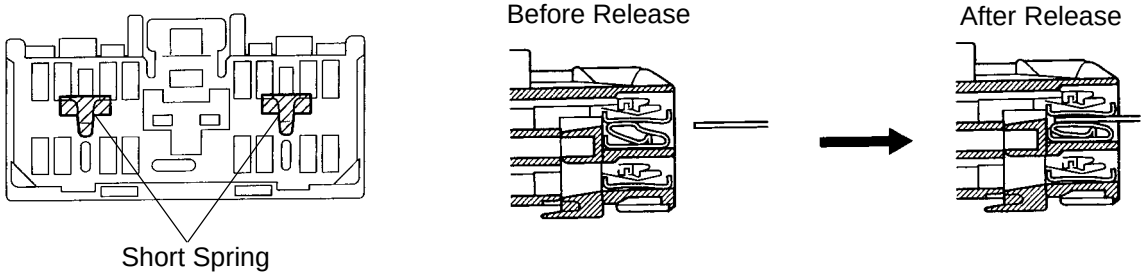
CAUTION:NEVER RELEASE the airbag activation prevention mechanism on the steering wheel pad connector.

NOTICE:

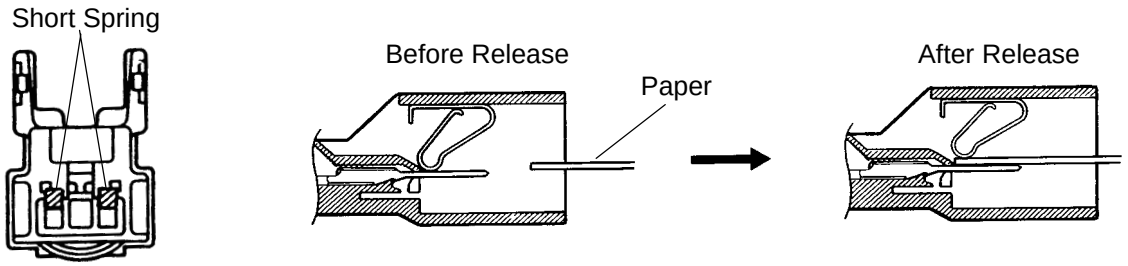
- **Do not release the airbag activation prevention mechanism unless specifically directed by the troubleshooting procedure.**
- **If the paper inserted is too thick the terminal and short spring may be damaged, so always use paper the same thickness as the male terminal.**



Airbag Sensor Assembly Connector (Connector ”1”)



Spiral Cable Connector (Connector ”3”)



W01805
W03146 W03147
AB0130 AB0045 AB0046

H00067

DI0AW–01

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below (Proceed to the page given for that circuit.).

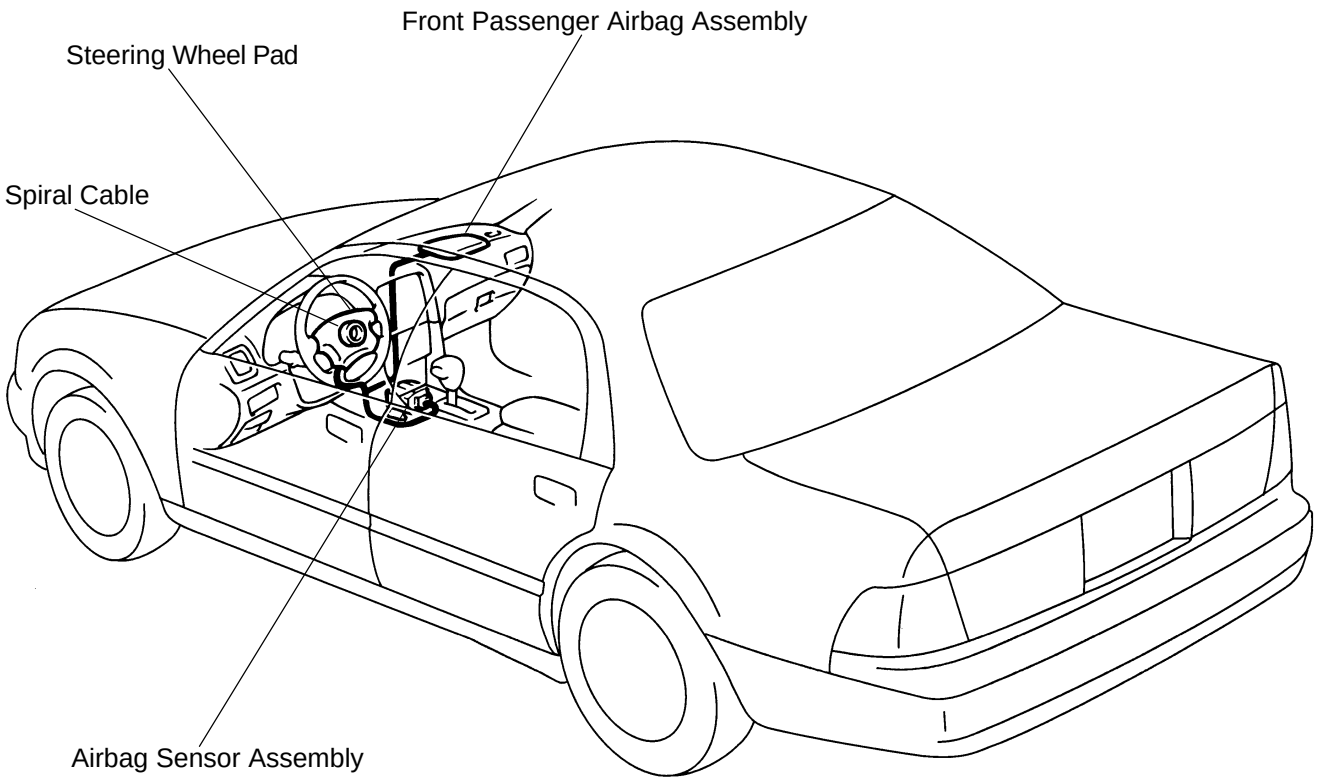
DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
Normal (DI–359)	●System normal	–	OFF
	●Voltage source drop	●Battery ●Airbag sensor assembly	ON
11 (DI–331)	●Short in squib circuit (to ground)	●Squib (driver airbag and front passenger airbag) ●Spiral cable ●Airbag sensor assembly ●Wire harness	ON
12 (DI–337)	●Short in squib circuit (to B+)	●Squib (driver airbag and front passenger airbag) ●Spiral cable ●Airbag sensor assembly ●Wire harness	ON
13 (DI–343)	●Short in D squib circuit	●Steering wheel pad (squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness	ON
14 (DI–347)	●Open in D squib circuit	●Steering wheel pad (squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness	ON
31 (DI–351)	●Airbag sensor assembly malfunction	●Airbag sensor assembly	ON
53 (DI–353)	●Short in P squib circuit	●Front passenger airbag assembly (squib) ●Airbag sensor assembly ●Wire harness	ON
54 (DI–356)	●Open in P squib circuit	●Front passenger airbag assembly (squib) ●Airbag sensor assembly ●Wire harness	ON

HINT:

- When the SRS warning light remains lit up and the DTC is the normal code, this means a voltage source drops.
  This malfunction is not stored in memory by the airbag sensor assembly and if the power source voltage returns to normal, the SRS warning light will automatically go out.
- When 2 or more codes are indicated, the codes will be displayed in numeral order starting from the lowest numbered code.
- If a code not listed on the chart is displayed, the airbag sensor assembly is faulty.

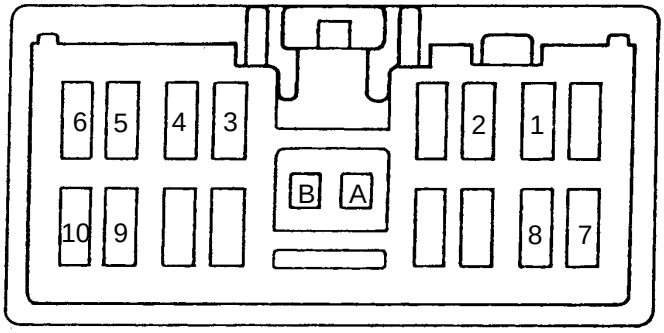
DI0AX–01

PARTS LOCATION



DI0AY–01

TERMINALS OF ECM



W02759

No.	Symbol	Terminal Name
A	–	Electrical Connection Check Mechanism
B	–	Electrical Connection Check Mechanism
1	P–	Squib (Passenger)
2	P+	Squib (Passenger)
3	LA	SRS Warning Light
4	D–	Squib (Driver)
5	D+	Squib (Driver)
6	Tc	Diagnosis
7	E2	Ground
8	E1	Ground
9	IG2	Power Source (IGN Fuse)
10	ACC	Power Source (CIG Fuse)

DI0AZ–01

PROBLEM SYMPTOMS TABLE

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspect Area	See page
●With the ignition switch at ACC or ON, the SRS warning light sometimes lights up after approx. 6 seconds have elapsed. ●SRS warning light is always lit up even when ignition switch is in the LOCK position.	●SRS warning light circuit (Always lights up when ignition switch is in LOCK position.)	DI–362
●With the ignition switch at ACC or ON, the SRS warning lights does not light up.	●SRS warning light circuit (Does not light up when ignition switch is turned to ACC or ON.)	DI–364
●DTC not displayed. ●SRS warning light is always lit up a DTC check procedure. ●DTC displayed without Tc and E1 terminal connection.	●Tc terminal circuit	DI–367

DI0B0–01

CIRCUIT INSPECTION

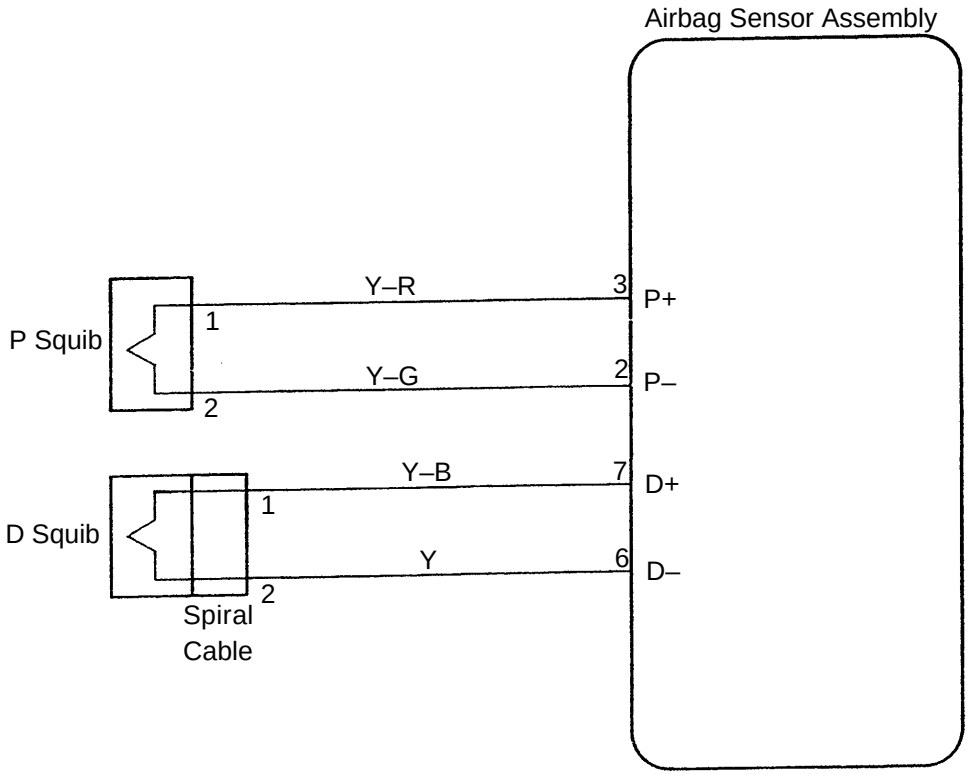
DTC	11	Short in Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The squib circuit consists of the airbag sensor assembly, spiral cable, steering wheel pad and front passenger airbag assembly. If causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS–2.
DTC 11 is recorded when ground short is detected in the squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
11	●Short circuit in squib wire harness (to ground) ●Squib malfunction ●Spiral cable malfunction ●Airbag sensor assembly malfunction	●Steering wheel pad (D squib) ●Front passenger airbag assembly (P squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

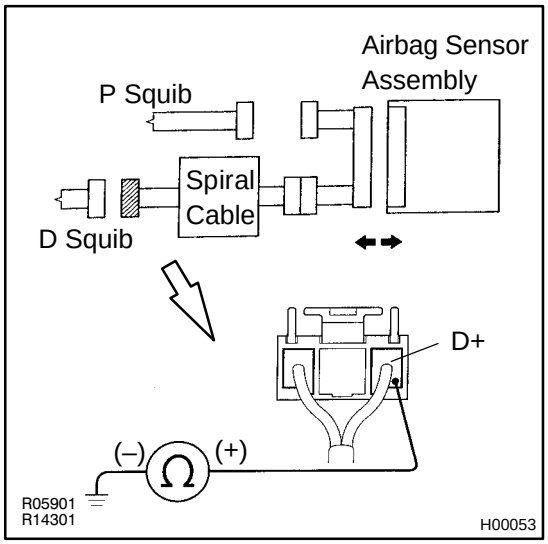


R16017

INSPECTION PROCEDURE

1	**Preparation. (See step ” 1 ” on page DI–359)**

2	**Check D squib circuit.**

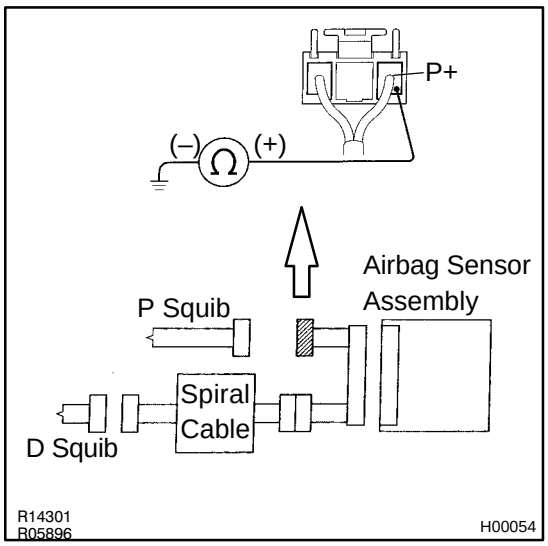


CHECK:
For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the resistance between D+ and body ground.
OK:
Resistance: 1MΩ or Higher

NG	**Go to step ” 7 ”.**

OK

3	**Check P squib circuit.**

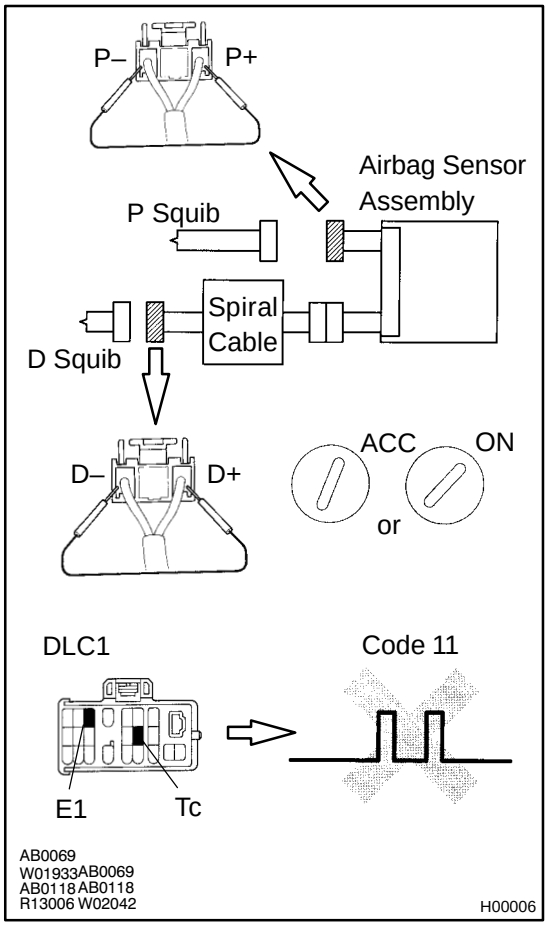


CHECK:
For the connector (on the airbag sensor assembly side) between the airbag sensor assembly and front passenger airbag assembly, measure the resistance between P+ and body ground.
OK:
Resistance: 1MΩ or Higher

NG → **Repair or replace harness or connector between the airbag sensor assembly and front passenger airbag assembly.**

OK

4	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect connector to airbag sensor assembly.
(b) Using a service wire connect D+ and D– on spiral cable side of connector between spiral cable and steering wheel pad.
(c) Using a service wire, connect P+ and P– on airbag sensor assembly side of connector between airbag sensor assembly and front passenger airbag assembly.
(d) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least 20 seconds.
(b) Clear malfunction code stored in memory
(See page DI–324).
(c) Turn ignition switch to LOCK, and wait at least 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(e) Using SST, connect terminals Tc and E1 of DLC 1.
SST 09843–18020
(f) Check DTC

OK:

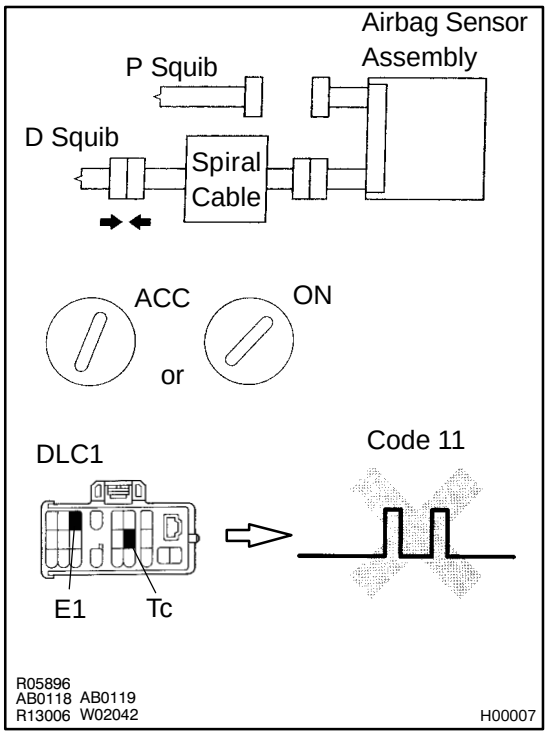
DTC 11 is not output.

HINT:
Codes other than code 11 may be output at this time, but they are not relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

5	Check D squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.
(c) Connect steering wheel pad connector.
(d) Connect negative (–) terminal cable to the battery, and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(b) Clear malfunction code stored in memory (See page DI–324).
(c) Turn ignition switch to LOCK, and wait at least 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(e) Using SST, connect terminals Tc and E1 of DLC 1.
SST 09843–18020
(f) Check DTC.

OK:

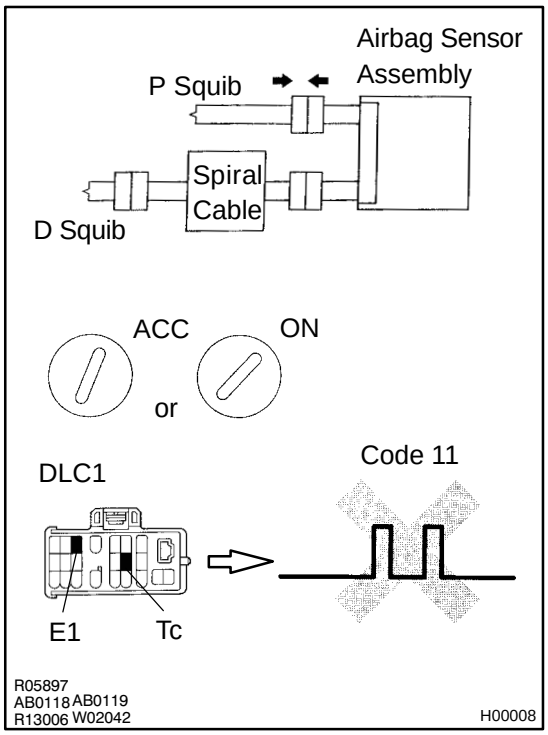
DTC 11 is not output.

HINT:
Codes other than code 11 may be output at this time, but they are not relevant to this check.

NG → **Replace steering wheel pad.**

OK

6	Check P squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.
(c) Connect front passenger airbag assembly connector.
(d) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(b) Clear malfunction code stored in memory (See page DI–324).
(c) Turn ignition switch to LOCK, and wait at least 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(e) Using SST, connect terminals Tc and E1 of DLC 1.
SST 09843–18020
(f) Check DTC.

OK:

DTC 11 is not output.

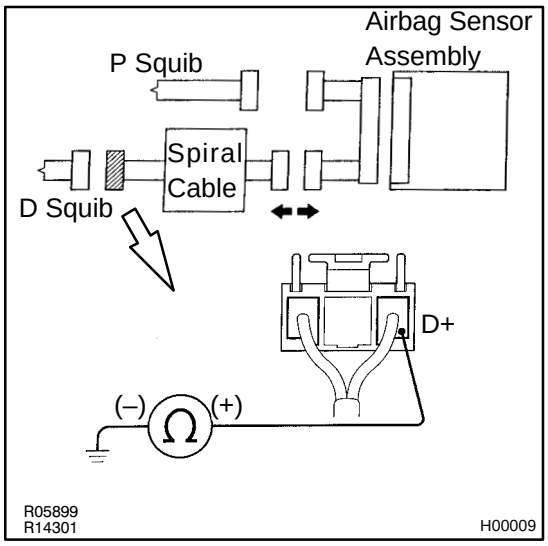
HINT:
Codes other than code 11 may be output at this time, but they are not relevant to this check.

NG → **Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

7	Check spiral cable.



PREPARATION:

Disconnect connector between airbag sensor assembly and spiral cable.

CHECK:

Measure resistance between D+ on spiral cable side of connector between spiral cable and steering wheel pad and body ground.

OK:

Resistance: 1MΩ or Higher

NG → **Repair or replace spiral cable.**

OK

Repair or replace harness or connector between airbag sensor assembly and spiral cable.

DI0B1–01

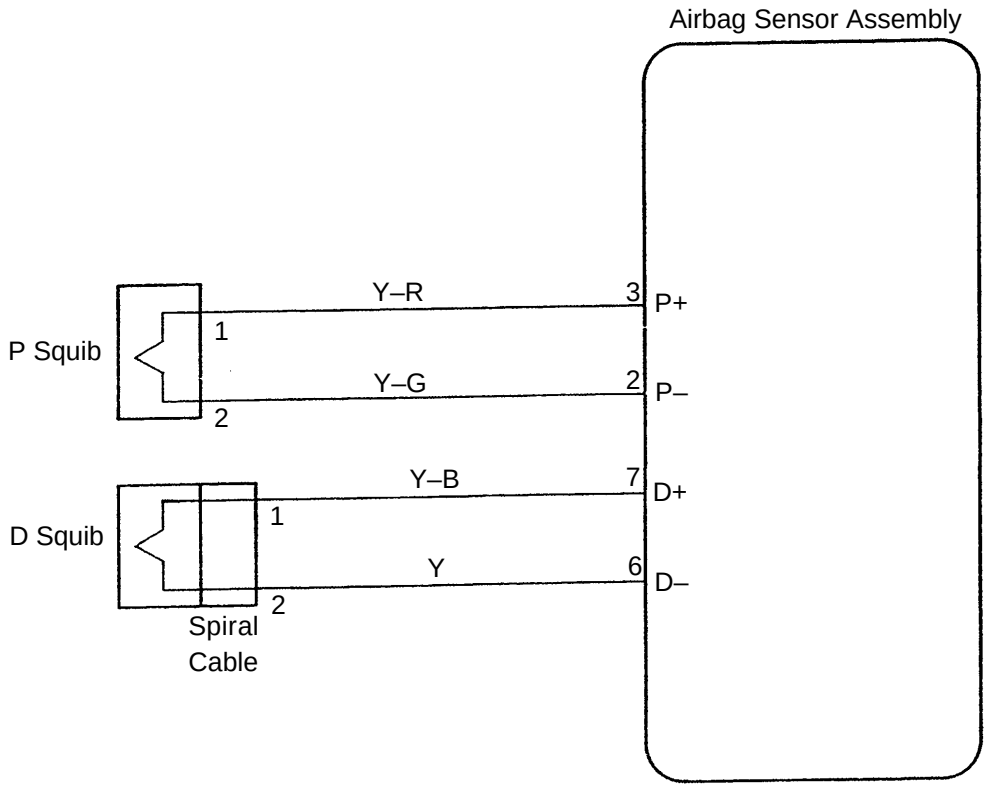
DTC	12	Short in Squib Circuit (to B+)

CIRCUIT DESCRIPTION

The squib circuit consists of the airbag sensor assembly, spiral cable, steering wheel pad and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each components, see page OPERATION on page RS–2.
DTC 12 is recorded when a B+ short is detected in the squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
12	●Short circuit in squib wire harness (to B+) ●Squib malfunction ●Spiral cable malfunction ●Airbag sensor assembly malfunction	●Steering wheel pad (D squib) ●Front passenger airbag assembly (P squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness

WIRING DIAGRAM

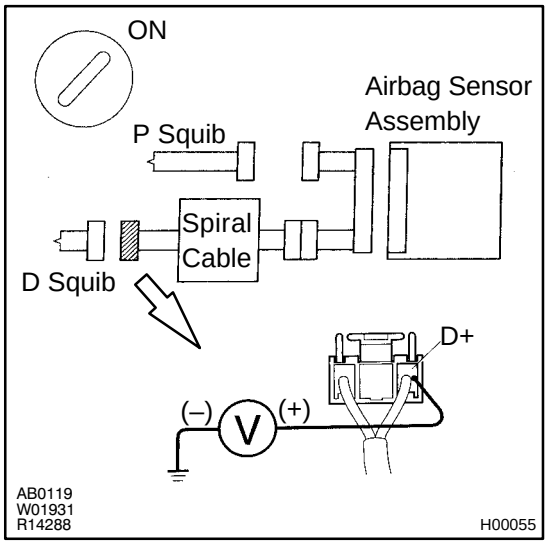


R16017

INSPECTION PROCEDURE

1	**Preparation. (See step " 1 " on page DI–359)**

2	**Check D squib circuit.**

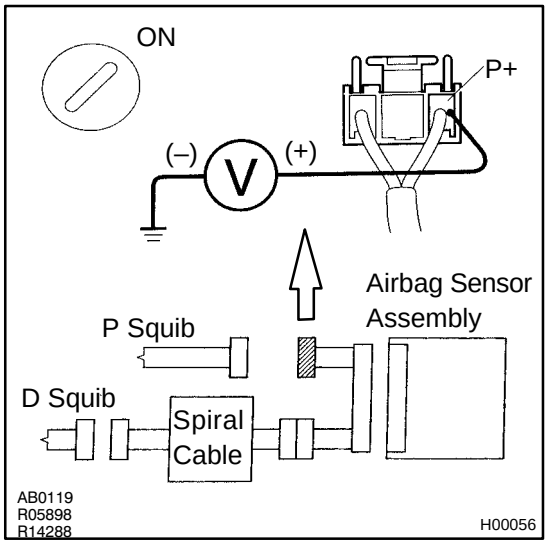


CHECK:
For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the voltage between D+ and body ground.
OK:
Voltage: 0 V

NG → **Go to step " 7 ".**

OK

3	**Check P squib circuit.**

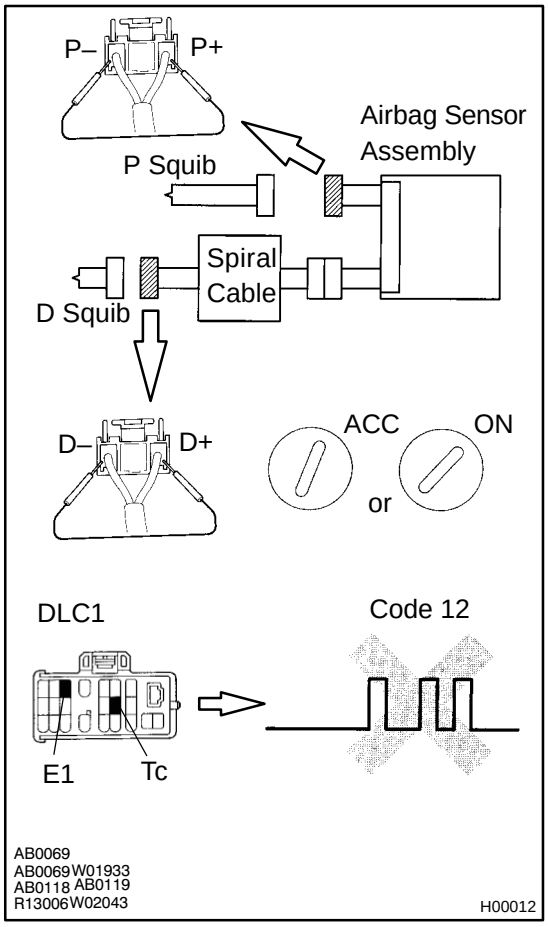


CHECK:
For the connector (on the airbag sensor assembly side) between airbag sensor assembly and front passenger airbag assembly, measure the voltage between P+ and body ground.
OK:
Voltage: 0V

NG → **Repair or replace harness or connector between the airbag sensor assembly and front passenger airbag assembly.**

OK

4	**Check airbag sensor assembly.**



PREPARATION:

(a) Connect connector to airbag sensor assembly.
(b) Using a service wire, connect D+ and D– on spiral cable side of connector between spiral cable and steering wheel pad.
(c) Using a service wire, connect P+ and P– on airbag sensor assembly side of connector between airbag sensor assembly and front passenger airbag assembly.
(d) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least 20 seconds.
(b) Clear malfunction code stored in memory
(See page DI–324).
(c) Turn ignition switch to LOCK, and wait at least 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(e) Using SST, connect terminals Tc and E1 of DLC1.
SST 09843–18020
(f) Check DTC.

OK:

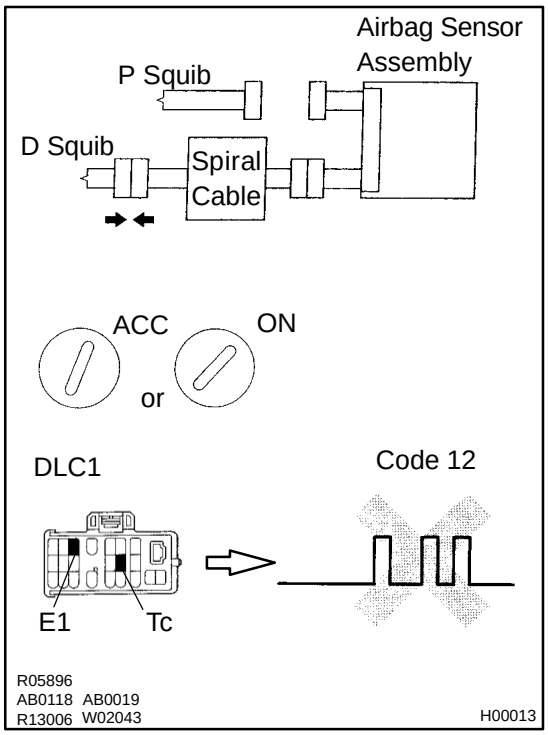
DTC 12 is not output.

HINT: Codes other than code 12 may be output at this time, but they are not relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

5	Check D squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.
(c) Connect steering wheel pad connector.
(d) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(b) Clear malfunction code stored in memory (See page DI–324).
(c) Turn ignition switch to LOCK, and wait at least 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(e) Using SST, connect terminals Tc and E1 of DLC1.
SST 09843–18020
(f) Check DTC.

OK:

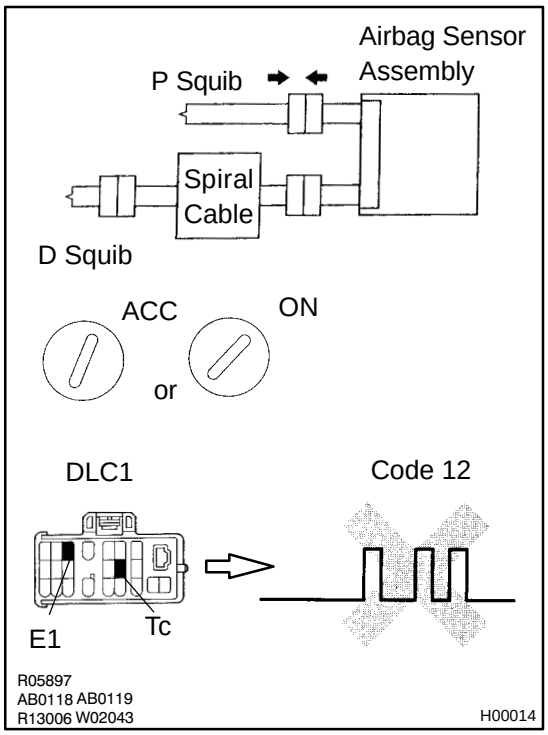
DTC 12 is not output.

HINT: Codes other than code 12 may be output at this time, but they are not relevant to this check.

NG → **Replace steering wheel pad.**

OK

6	Check P squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.
(c) Connect front passenger airbag assembly connector.
(d) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(b) Clear malfunction code stored in memory
(See page DI–324).
(c) Turn ignition switch to LOCK, and wait at least 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(e) Using SST, connect terminals Tc and E1 of DLC1.
SST 09843–18020
(f) Check DTC.

OK:

DTC 12 is not output.

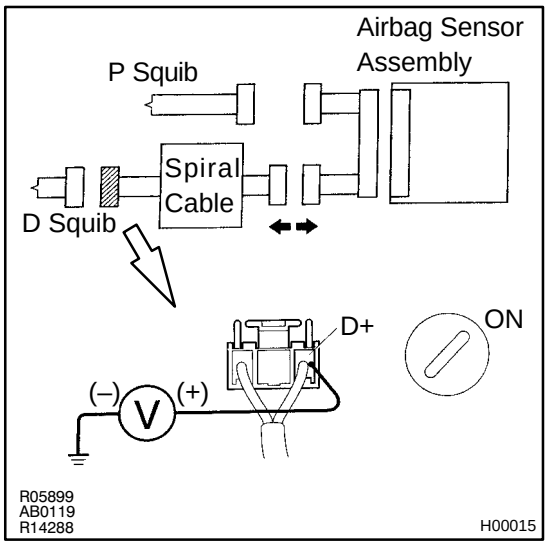
HINT:Codes other than code 12 may be output at this time, but they are not relevant to this check.

NG → **Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

7	Check spiral cable.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect connector between airbag sensor assembly and spiral cable.
(c) Turn ignition switch ON.

CHECK:

Measure voltage at D+ on spiral cable side of connector between spiral cable and steering wheel pad and body ground.

OK:

Voltage: 0 V

NG → **Repair or replace spiral cable.**

OK

Repair or replace harness or connector between airbag sensor assembly and spiral cable.

DI0B2–01

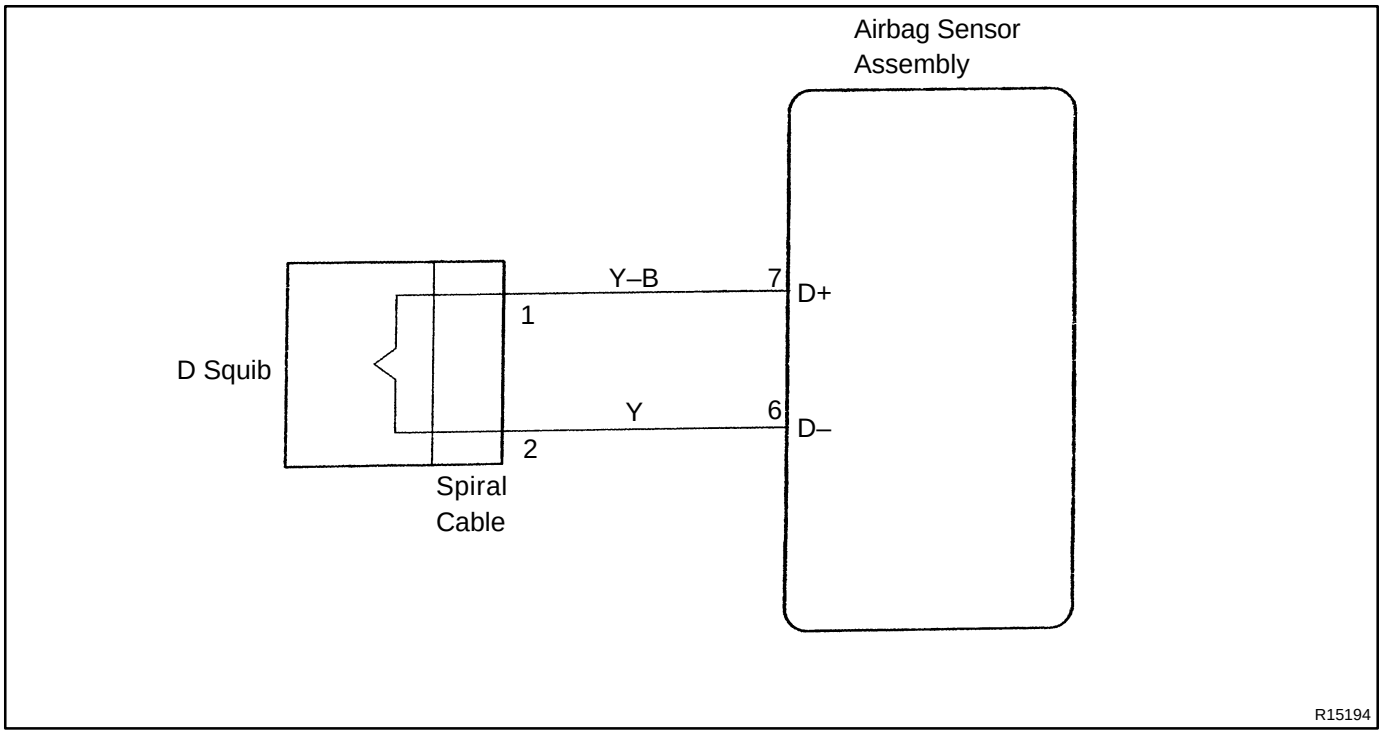
DTC	13	Short in D Squib Circuit

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad.
It causes the airbag to deploy when the airbag deployment conditions are satisfied.
For details of the function of each components, see OPERATION on page RS–2.
DTC 13 is recorded when a short is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
13	●Short circuit between D+ wire harness and D– wire harness of squib ●D squib malfunction ●Spiral cable malfunction ●Airbag sensor assembly malfunction	●Steering wheel pad (D squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness

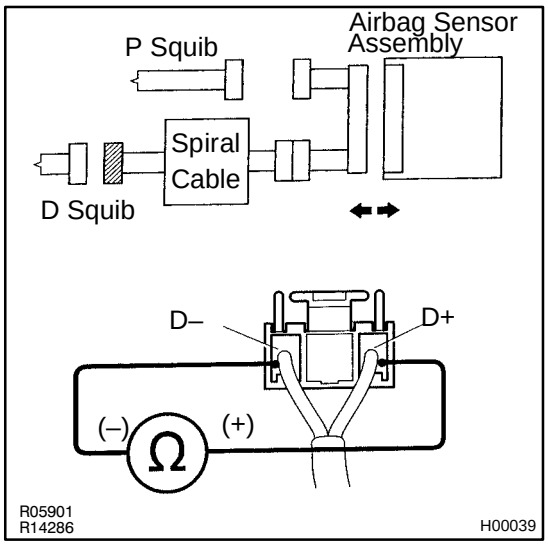
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Preparation. (See step ” 1 ” on page DI–359)**

2	Check D squib circuit.



PREPARATION:

Release airbag activation prevention mechanism on airbag sensor assembly side of airbag squib connector (See page DI–324).

CHECK:

For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the resistance between D+ and D–.

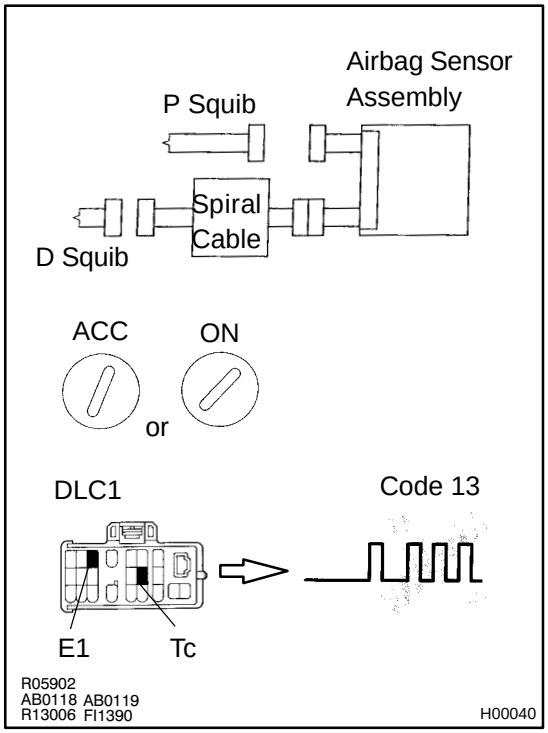
OK:

Resistance: 1 MΩ or Higher

NG → **Go to step ” 5 ”.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect connector to the airbag sensor assembly.
(b) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least 20 seconds.
(b) Clear malfunction code stored in memory (See page DI–324).
(c) Turn ignition switch to LOCK, and wait at least 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(e) Using SST, connect terminals Tc and E1 of DLC 1.
SST 09843–18020
(f) Check DTC.

OK:

DTC 13 is not output.

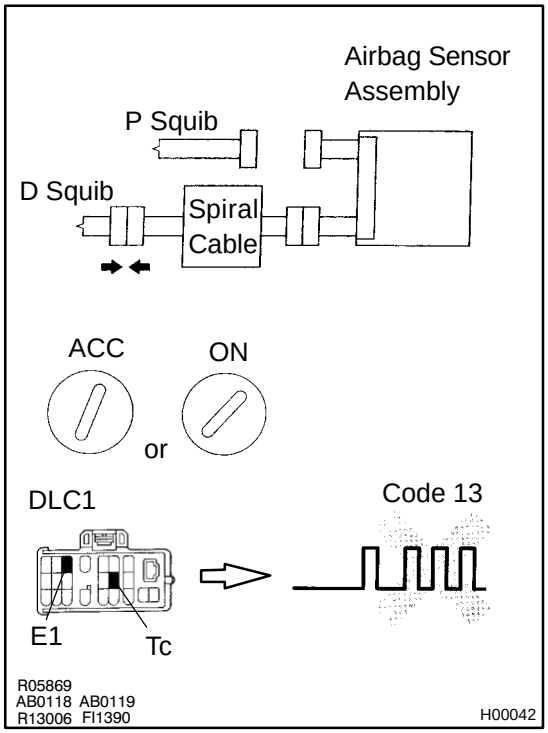
HINT:

Codes other than code 13 may be output at this time, but they are relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

4	**Check D squib.**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.
(c) Connect steering wheel pad connector.
(d) Connect negative (–) terminal cable to battery,and wait at least 2 seconds.

CHECK:

(a) Turn ignition swiitch to LOCK, and wait at least 20 seconds.
(b) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(c) Clear malfunction code stored in memory (See page DI–324).
(d) Turn ignition switch to LOCK, and wait at least 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(f) Using SST, connect terminals Tc and E1 of DLC 1.
SST 09843–18020
(g) Check DTC.

OK:

DTC 13 is not output.

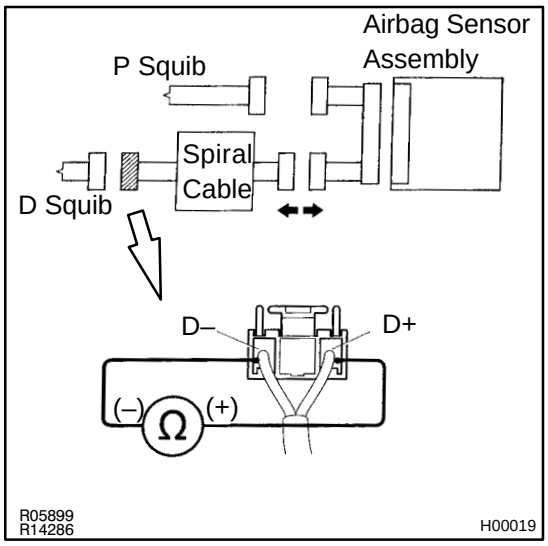
HINT:
Codes other than code 13 may be output at this time, but they are not relevant to this check.

NG → **Replace steering wheel pad.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

5	Check spiral cable.



PREPARATION:

(a) Disconnect connector between airbag sensor assembly and spiral cable.

(b) Release airbag activation prevention mechanism on airbag sensor assembly side of airbag squib connector (See page DI–324).

CHECK:

For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the resistance between D+ and D–.

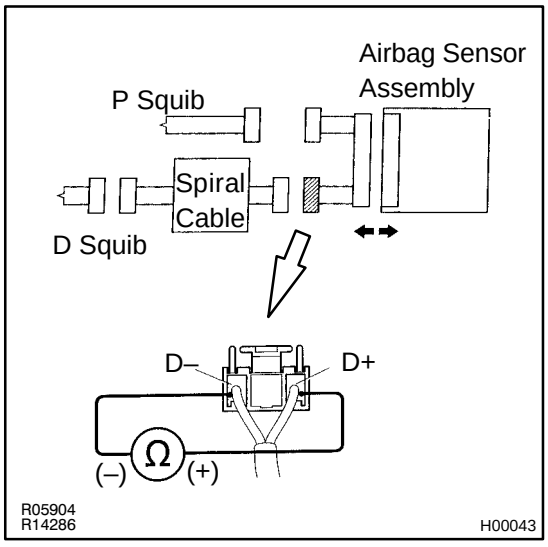
OK:OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace spiral cable.**

OK

6	Check harness between airbag sensor assembly and spiral cable.



PREPARATION:

Release airbag activation prevention mechanism on airbag sensor assembly side of airbag squib connector (See page DI–324).

CHECK:

For the connector (on the airbag sensor assembly side) between the airbag sensor assembly and spiral cable, measure the resistance between D+ and D–.

OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between airbag sensor assembly and spiral cable.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI0B3–01

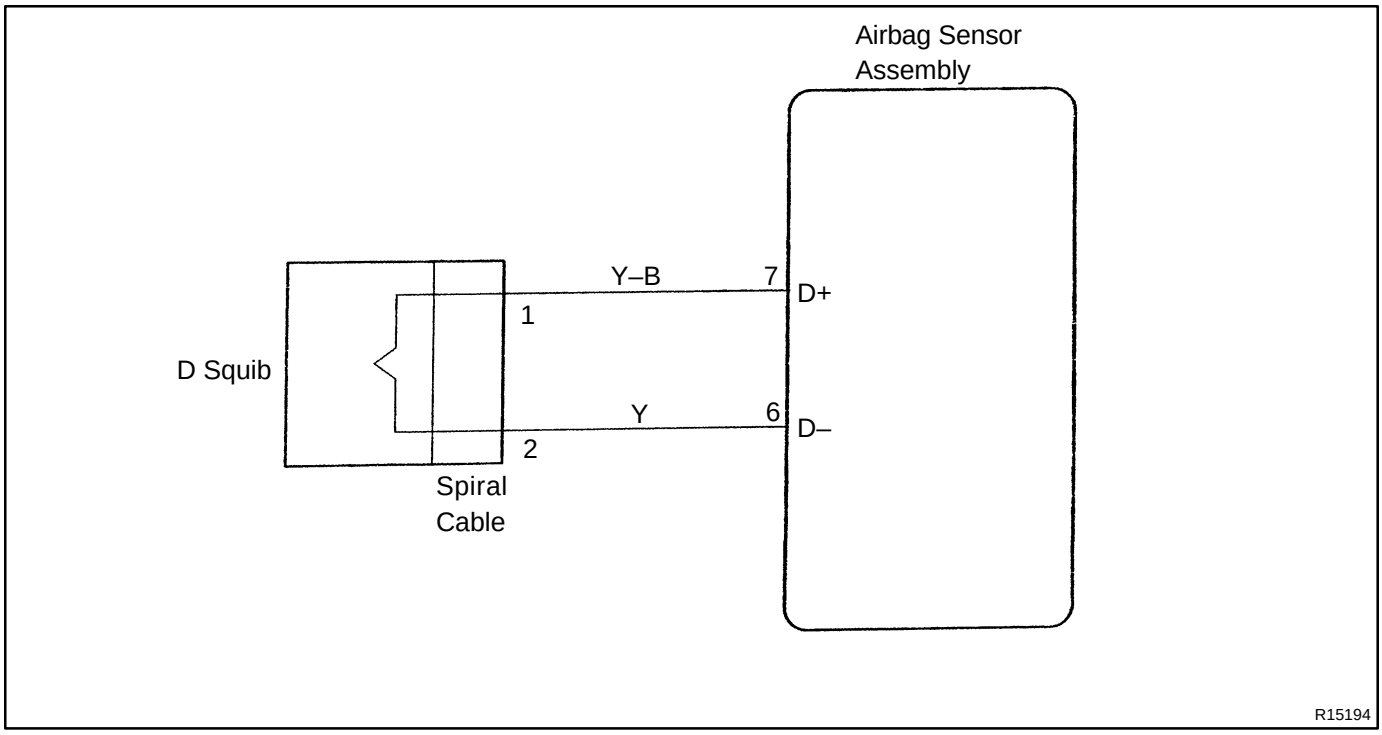
DTC	14	Open in D Squib Circuit

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad.
It causes the airbag to deploy when the airbag deployment conditions are satisfied.
For details of the function of each components, see OPERATION on page RS–2.
DTC 14 is recorded when an open is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
14	●Open circuit in D+ wire harness or D– wire harness of squib ●D squib malfunction ●Spiral cable malfunction ●Airbag sensor assembly malfunction	●Steering wheel pad (D squib) ●Spiral cable ●Airbag sensor assembly ●Wire harness

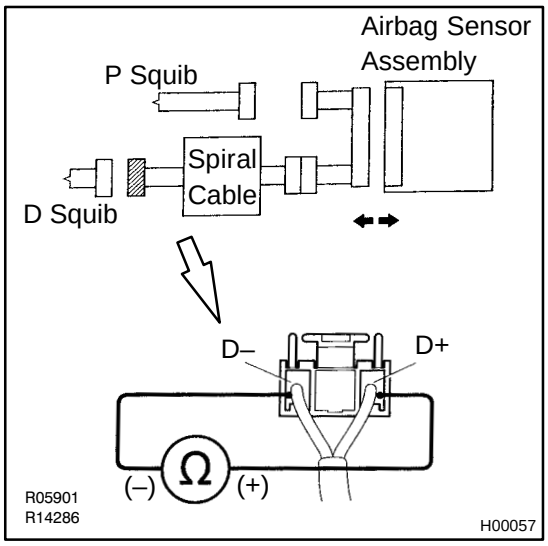
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Preparation. (See step ” 1 ” on page DI–359)**

2	Check D squib circuit.



CHECK:

For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the resistance between D+ and D–.

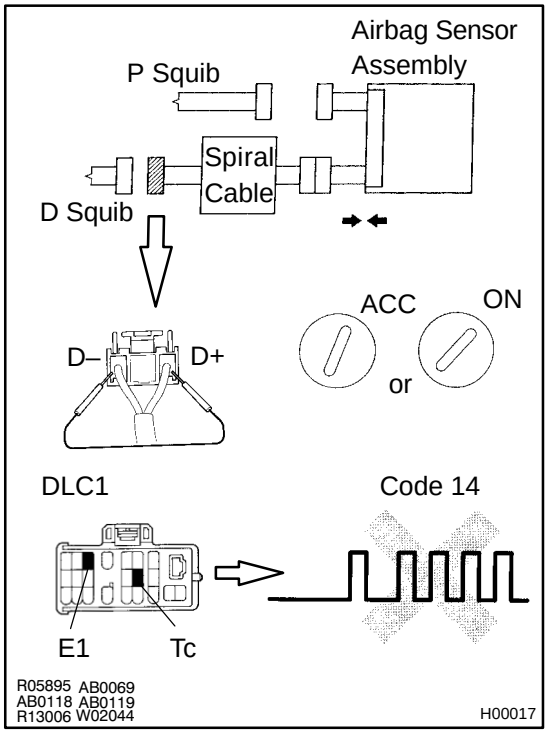
OK:

Resistance: Below 1 Ω

NG	Go to step " 5 ".

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect connector to airbag sensor assembly.
(b) Using a service wire, connect D+ and D– on spiral cable side of connector between spiral cable and steering wheel pad.
(c) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least 20 seconds.
(b) Clear malfunction code stored in memory (See page DI–324).
(c) Turn ignition switch to LOCK, and wait at least 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(e) Using SST, connect terminals Tc and E1 of DLC 1.
SST 09843–18020
(f) Check DTC.

OK:

DTC 14 is not output.

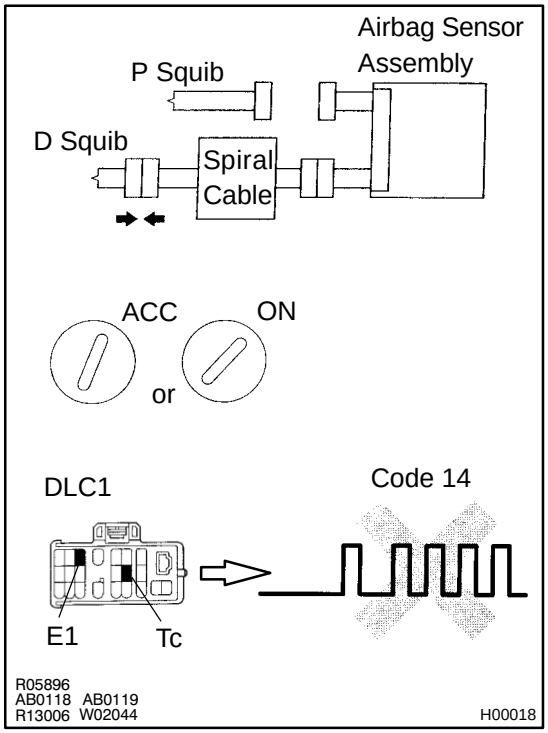
HINT:

Codes other than code 14 may be output at this time, but they are relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

4	**Check D squib.**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.
(c) Connect steering wheel pad connector.
(d) Connect negative (–) terminal cable to battery,and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(b) Clear malfunction code stored in memory (See page DI–324).
(c) Turn ignition switch to LOCK, and wait at least 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(e) Using SST, connect terminals Tc and E1 of DLC 1.
SST 09843–18020
(f) Check DTC.

OK:

DTC 14 is not output.

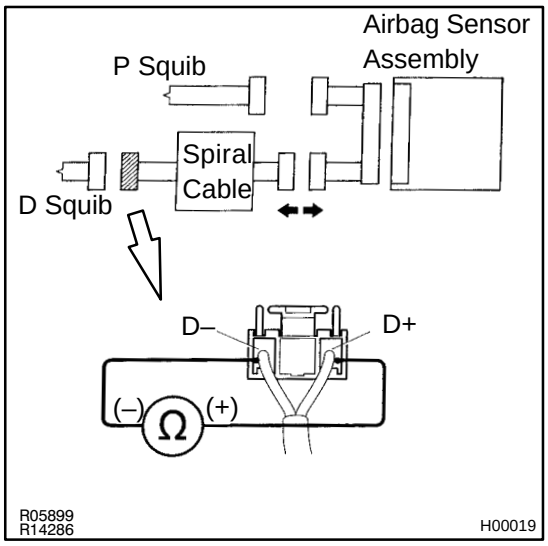
HINT:
Codes other than code 14 may be output at this time, but they are not relevant to this check.

NG → **Replace steering wheel pad.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

5	Check spiral cable.



PREPARATION:
Disconnect connector between airbag sensor assembly and spiral cable.

CHECK:
For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the resistance between D+ and D–.

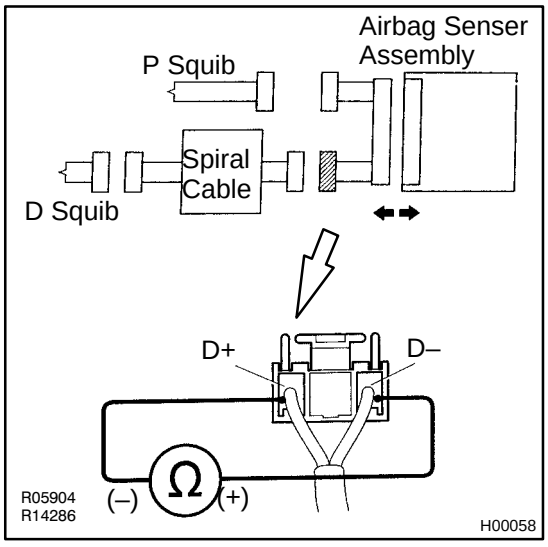
OK:

Resistance: Below 1 Ω

NG → **Repair or replace spiral cable.**

OK

6	Check harness between airbag sensor assembly and spiral cable.



CHECK:
For the connector (on the airbag sensor assembly side) between the airbag sensor assembly and spiral cable, measure the resistance between D+ and D–.

OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between airbag sensor assembly and spiral cable.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI0B4–01

DTC	31	Airbag Sensor Assembly Malfunction

CIRCUIT DESCRIPTION

The airbag sensor assembly consists of a airbag sensor, safing sensor, drive circuit, diagnosis circuit and ignition control, etc.
It receives signals from the airbag sensor, judges whether or not the SRS must be activated, and diagnosis system malfunction.
DTC 31 is recorded when occurrence of a malfunction in the airbag sensor assembly is detected.

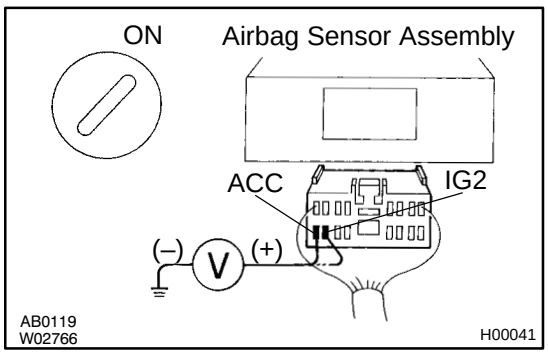
DTC No.	DTC Detecting Condition	Trouble Area
31	●Airbag sensor assembly malfunction	●Airbag sensor assembly

INSPECTION PROCEDURE

HINT:When a malfunction code other than code 31 is displayed at the same time, first repair the malfunction indicated by the malfunction code other than code 31.

1	**Preparation. (See step ” 1 ” on page DI–359)**

2	**Check voltage at IG2 and ACC of airbag sensor assembly**

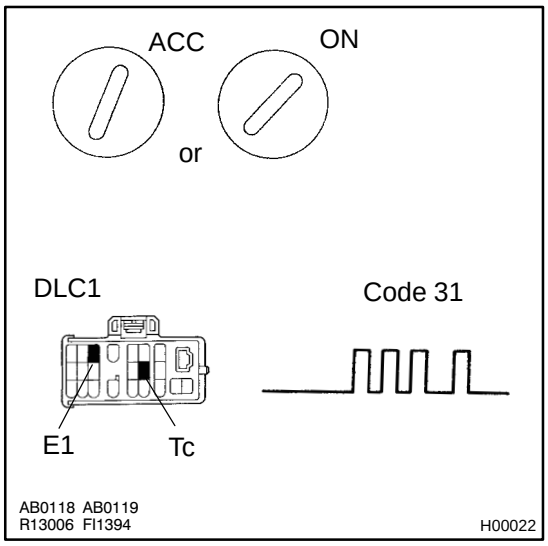


PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals IG2 and ACC of airbag sensor assembly and body ground.
OK:
Voltage: Below 16 V

NG → **Check battery and charging system. (See charging system section)**

OK

3	Is DTC 31 output again?



PREPARATION:

Clear malfunction code.

CHECK:

(a) Turn ignition switch to LOCK, and wait at least 20 seconds.
(b) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(c) Repeat operation in step (a) and (b) at least 5 times.
(d) Using SST, connect terminals Tc and E1 of DLC 1.
SST 09843–18020
(e) Check DTC.

NO → **Using simulation method, reproduce malfunction symptoms (See page IN–17).**

YES

Replace airbag sensor assembly.

DI0B5–01

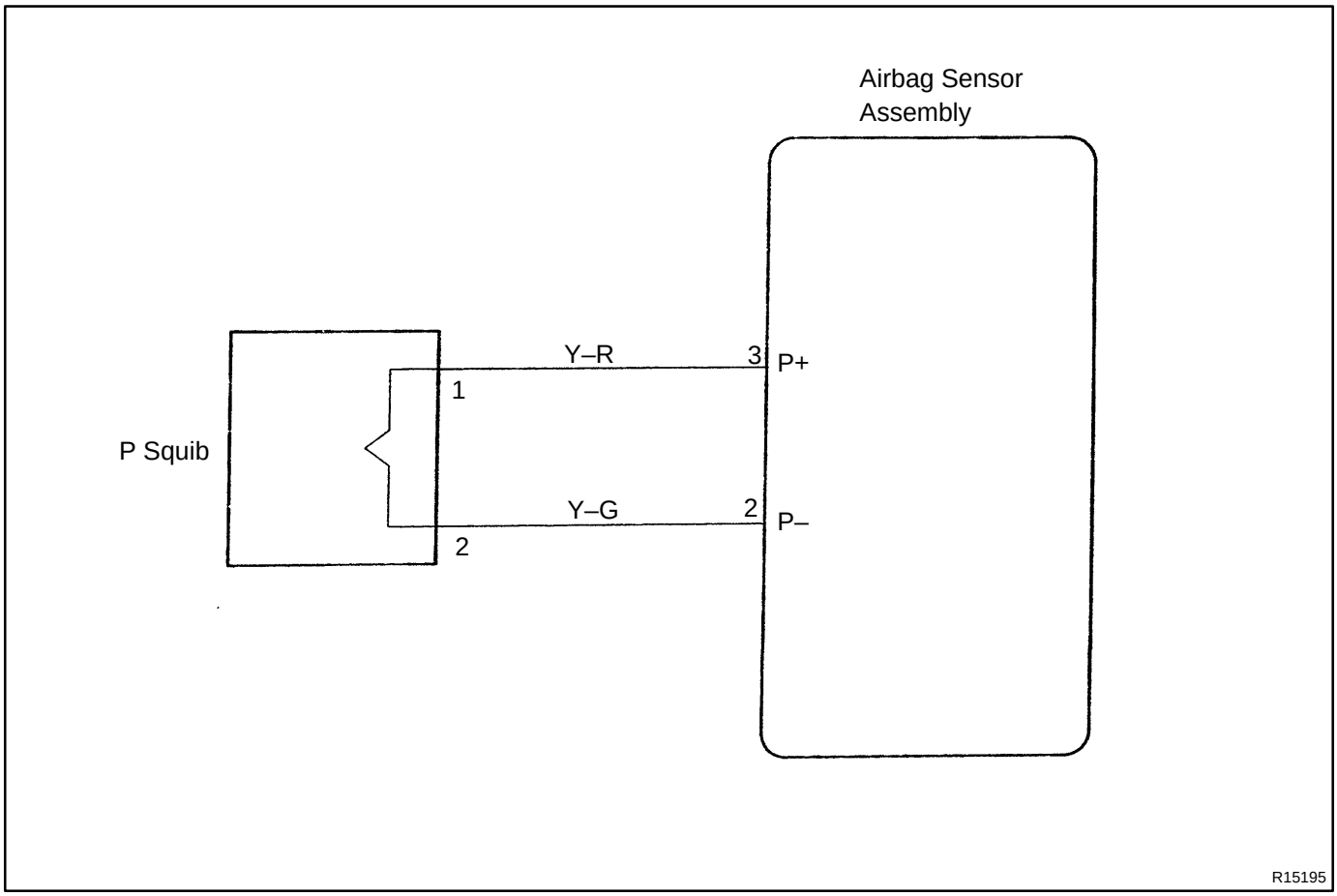
DTC	53	Short in P Squib Circuit

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly.
It causes the airbag to deploy when the airbag deployment conditions are satisfied.
For details of the function of each components, see OPERATION on page RS–2.
DTC 53 is recorded when a short is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
53	●Short circuit between P+ wire harness or P– wire harness of squib ●P squib malfunction ●Airbag sensor assembly malfunction	●Front passenger airbag assembly (P squib) ●Airbag sensor assembly ●Wire harness

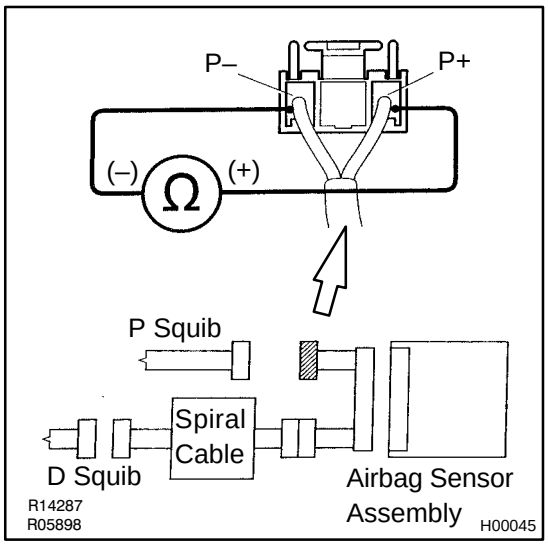
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Preparation. (See step ” 1 ” on page DI–359)**

2	Check P squib circuit.



PREPARATION:

Release airbag activation prevention mechanism on airbag sensor assembly side of airbag squib connector (See page DI–324).

CHECK:

For the connector (on the airbag sensor assembly side) between the airbag sensor assembly and front passenger airbag assembly, measure the resistance between P+ and P–.

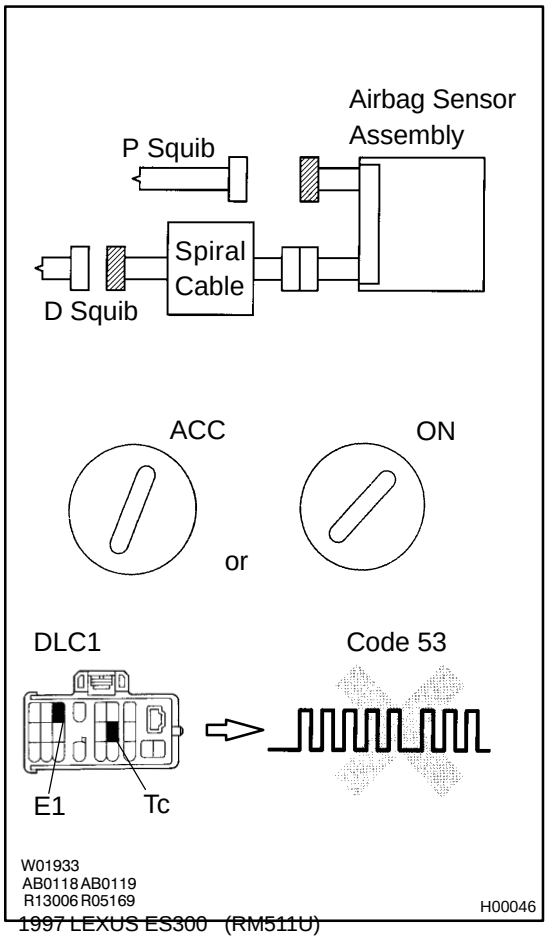
OK:

Resistance: 1MΩ or Higher

NG → **Repair or replace harness or connector between airbag sensor assembly and front passenger airbag assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect connector to airbag sensor assembly.
(b) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least 20 seconds.
(b) Clear malfunction code stored in memory (See page DI–324).
(c) Turn ignition switch to LOCK, and wait at least 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(e) Using SST, connect terminal Tc and E1 of DLC1.
SST 09843–18020
(f) Check DTC.

OK:

DTC 53 is not output.

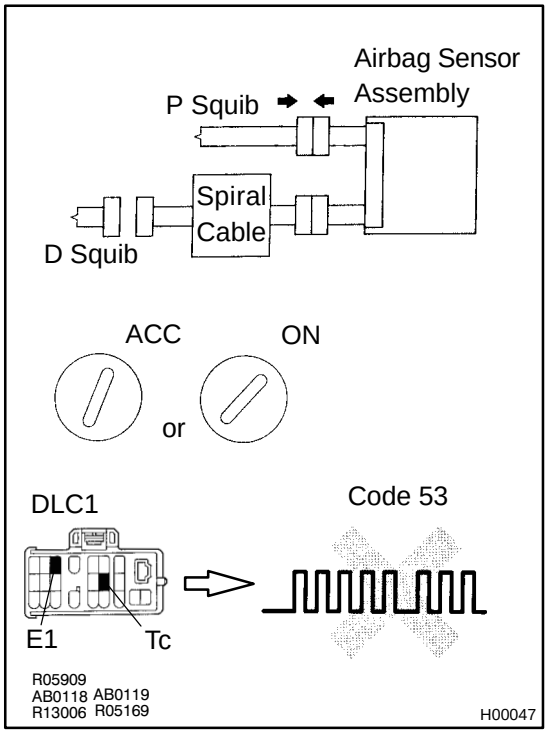
HINT:

Codes other than code 53 may be output at this time, but they are not relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

4	**Check P squib.**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.
(c) Connect front passenger airbag assembly connector.
(d) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

CHECK:

(a) Turn igniton switch to LOCK, and wait at least 20 seconds.
(b) Turn ignition switch to ACC or ON and wait at least 20 seconds.
(c) Clear malfunction code stored in memory
(See page DI–324).
(d) Turn ignition switch to LOCK, and wait at least 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(f) Using SST, connect terminal Tc and E1 of DLC1.
SST 09843–18020
(g) Check DTC.

OK:

DTC 53 is not output.

HINT:
Codes other than code 53 may be output at this time, but they are not relevant to this check.

NG → **Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI0B6–01

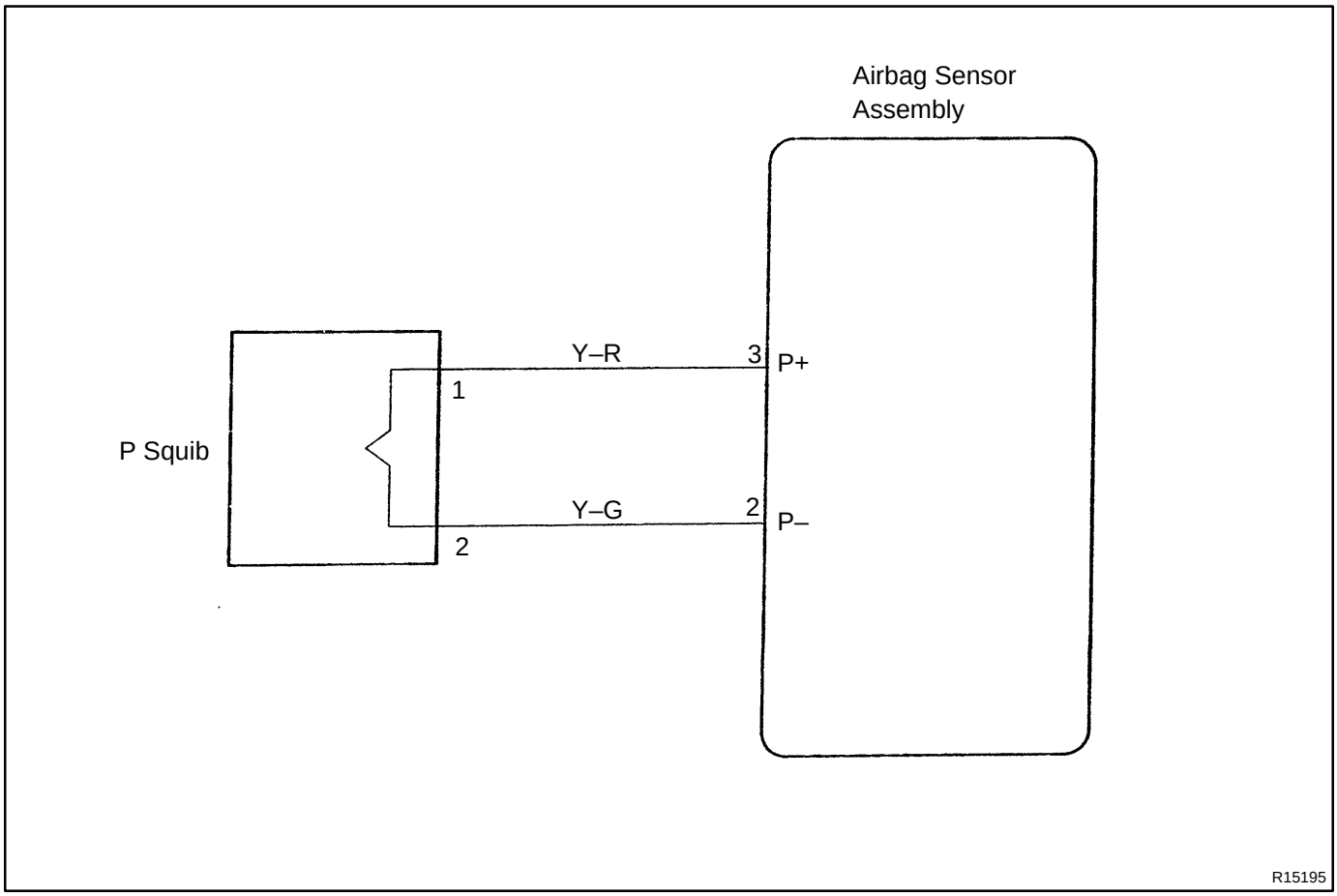
DTC	54	Open in P Squib Circuit

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly.
It causes the airbag to deploy when the airbag deployment conditions are satisfied.
For details of the function of each components, see OPERATION on page RS–2.
DTC 54 is recorded when an open is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
54	●Open circuit in P+ wire harness or P– wire harness of squib ●P squib malfunction ●Airbag sensor assembly malfunction	●Front passenger airbag assembly (P squib) ●Airbag sensor assembly ●Wire harness

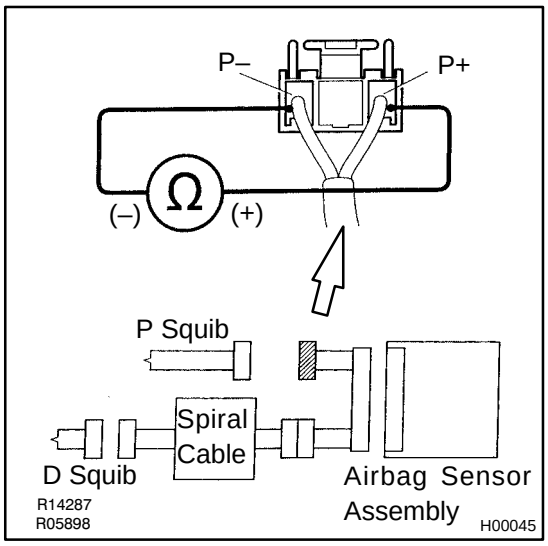
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Preparation. (See step ” 1 ” on page DI–359)**

2	Check P squib circuit.



CHECK:

For the connector (on the airbag sensor assembly side) between the airbag sensor assembly and front passenger airbag assembly measure the resistance between P+ and P–.

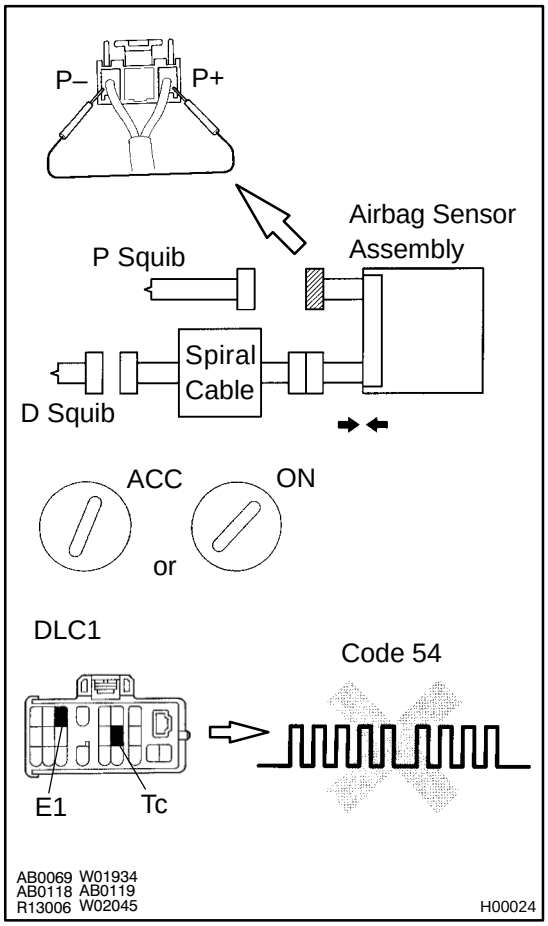
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between airbag sensor assembly and front passenger airbag assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect connector to airbag sensor assembly.
(b) Using a service wire, connect P+ and P– on airbag sensor assembly side of connector between airbag sensor assembly and front passenger airbag assembly.
(c) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least 20 seconds.
(b) Clear malfunction code stored in memory
(See page DI–324).
(c) Turn ignition switch to LOCK, and wait at least 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(e) Using SST, connect terminal Tc and E1 of DLC1.
SST 09843–18020
(f) Check DTC.

OK:

DTC 54 is not output.

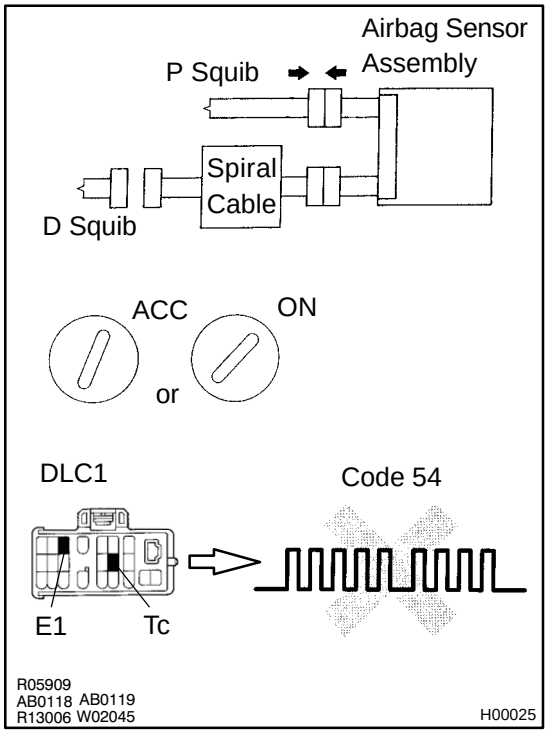
HINT:

Codes other than code 54 may be output at this time, but they are not relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

4	**Check P squib.**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.
(c) Connect front passenger airbag assembly connector.
(d) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least 20 seconds.
(b) Clear malfunction code stored in memory (See page DI–324).
(c) Turn ignition switch to LOCK, and wait at least 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.
(e) Using SST, connect terminal Tc and E1 of DLC1.
SST 09843–18020
(f) Check DTC.

OK:

DTC 54 is not output.

HINT:
Codes other than code 54 may be output at this time, but they are not relevant to this check.

NG → **Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI0B7–01

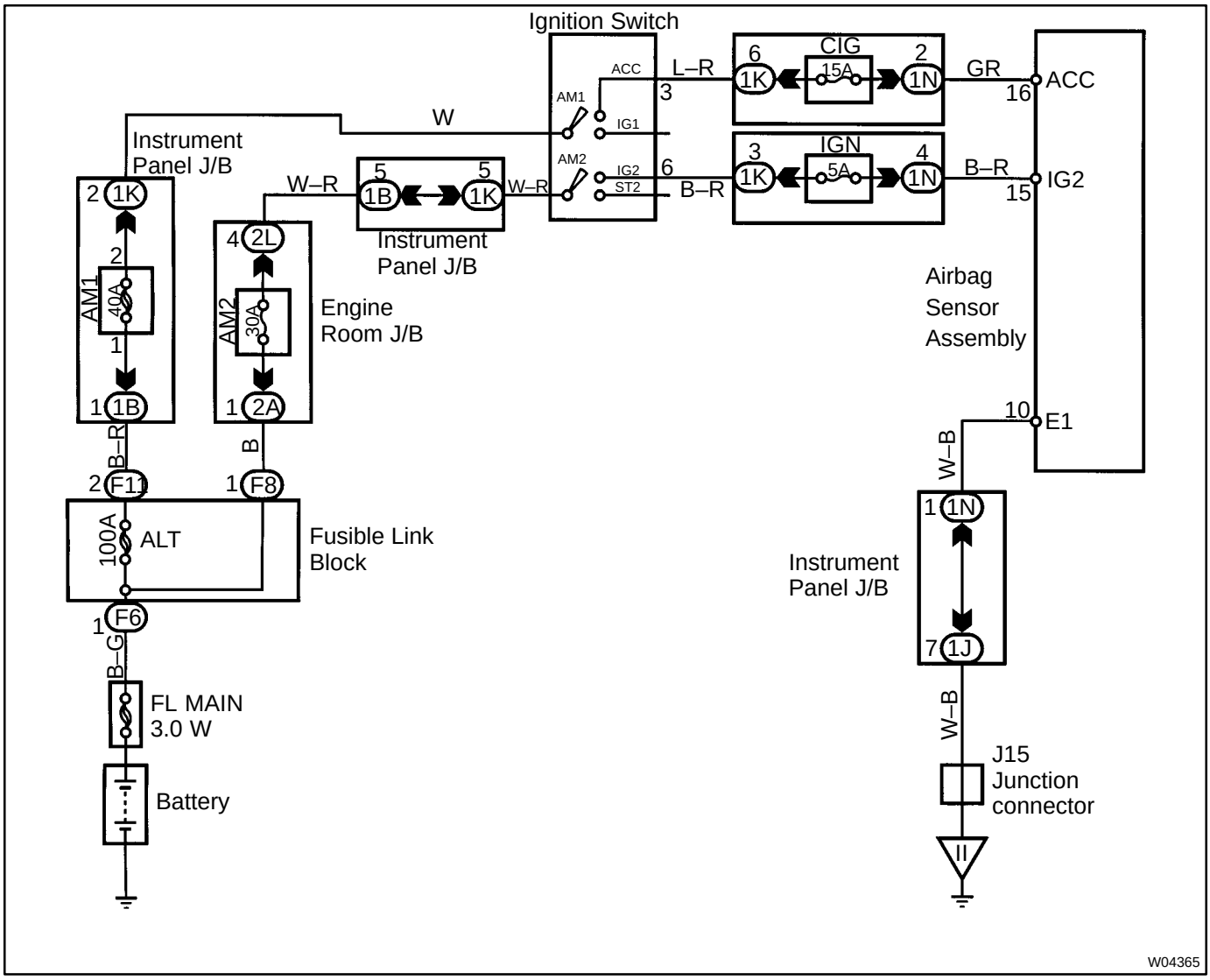
DTC	Normal	Source Voltage Drop

CIRCUIT DESCRIPTION

The SRS is equipped with a voltage–increase circuit (DC–DC converter) in the airbag sensor assembly in case the source voltage drops.
When the battery voltage drops, the voltage–increase circuit (DC–DC converter) functions to increase the voltage of the SRS to normal voltage.
The diagnosis system malfunction display for this circuit is different to other circuits–when the SRS warning light remains lit up and the DTC is a normal code, source voltage drop is indicated.
Malfunction in this circuit is not recorded in the airbag sensor assembly, and the source voltage returns to normal, the SRS warning light automatically goes off.

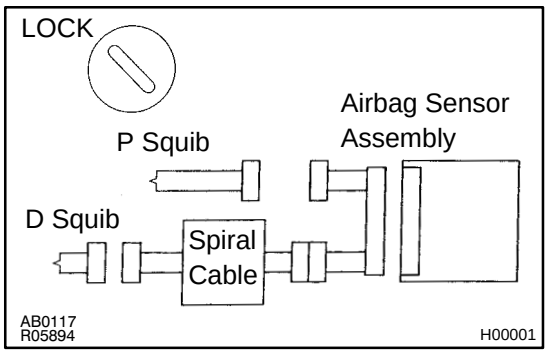
DTC No.	Diagnosis
(Normal)	Source voltage drop.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Preparation.

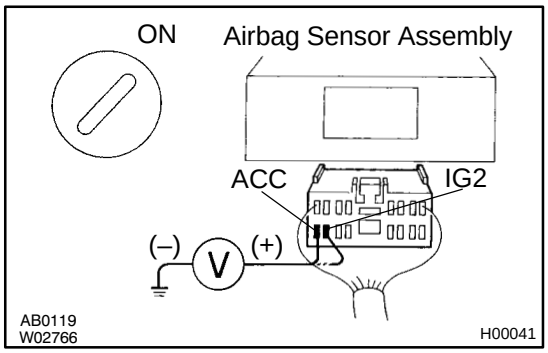


PREPARATION:

(a) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.
(b) Remove steering wheel pad (See page SR–11).
(c) Disconnect connector of front passenger airbag assembly (See page RS–21).
(d) Disconnect connector of airbag sensor assembly (See page RS–35).

CAUTION:
Store the steering wheel pad with the front surface facing upward.

2	Check source voltage.



PREPARATION:

(a) Connect negative (–) terminal cable to battery.
(b) Turn ignition switch ON.

CHECK:

Measure voltage at IG2 or ACC on sensor and operate electric system. (defogger, wiper, headlight, heater blower, etc.)

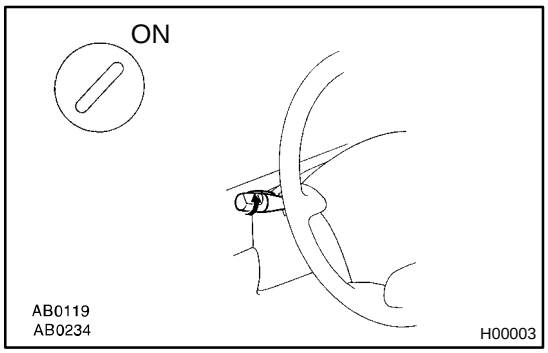
OK:

Voltage: 10 – 14 V

NG → **Check the harness between battery and airbag sensor assembly, and check the battery and charging system.**

OK

3	Does SRS warning light turn off?



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Connect steering wheel pad connector.
(c) Connect front passenger airbag assembly connector.
(d) Connect airbag sensor assembly connector.
(e) Turn ignition switch ON.

CHECK:

Operate electric system (defogger, wiper, headlight, heater blower, etc.) and check that SRS warning light goes off.

NO → **Check for DTCs. If a DTC is output, perform troubleshooting for the DTC. If a normal code is output, replace airbag sensor assembly.**

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

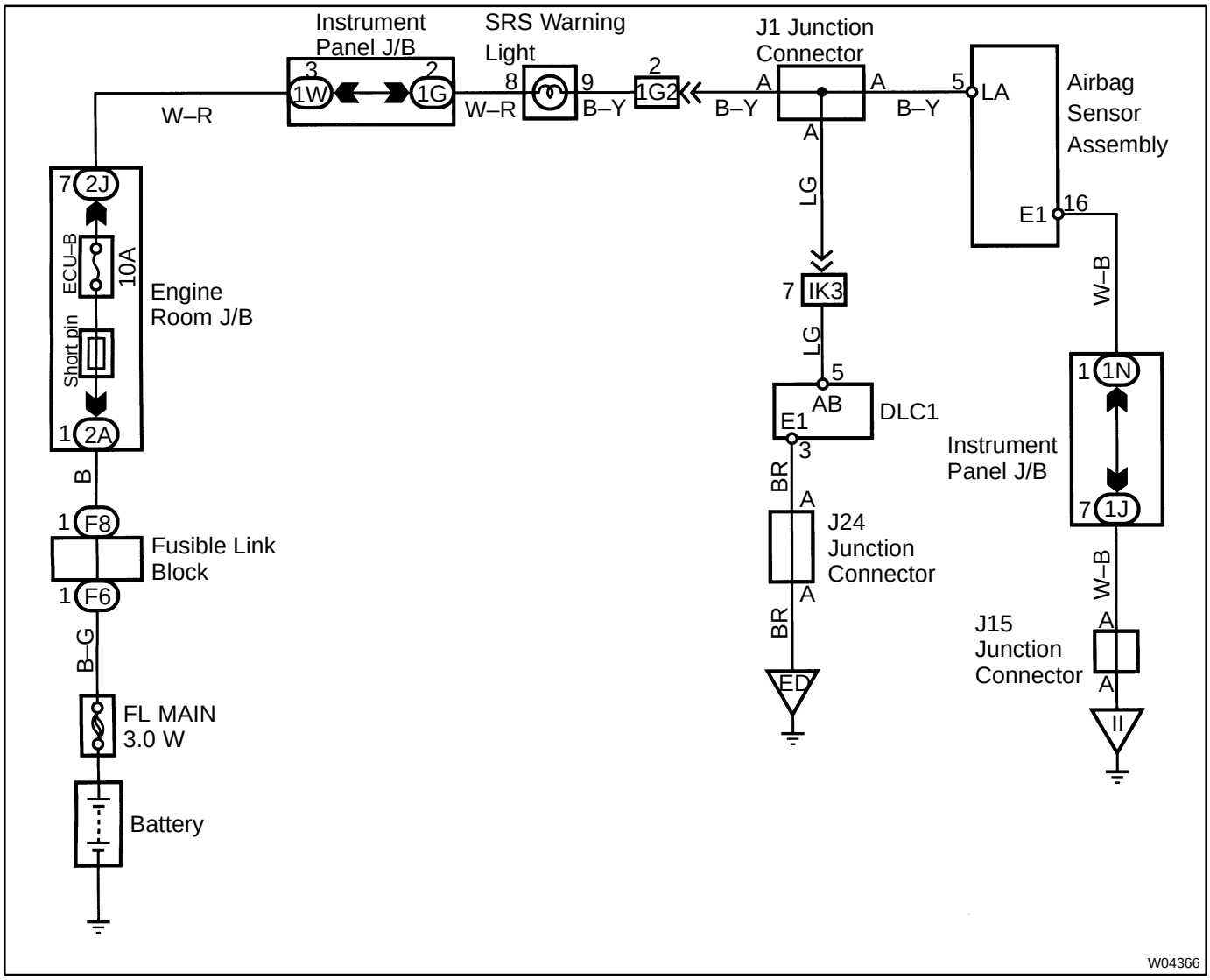
DI0B8–01

SRS Warning Light Circuit Malfunction (Always lights up, when ignition switch is in LOCK position.)

CIRCUIT DESCRIPTION

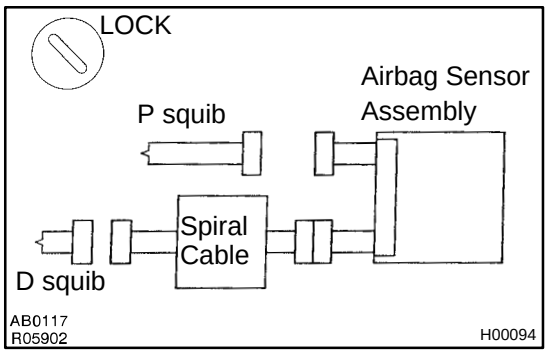
The SRS warning light is located on the combination meter.
When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from the LOCK position to ACC or ON position, and then turns off automatically.
If there is a malfunction in the SRS, the SRS warning light lights up to inform the driver of the abnormality. When terminals Tc and E1 of the DLC1 are connected, the DTC is displayed by the blinking of the SRS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Preparation.



PREPARATION:

(a) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.

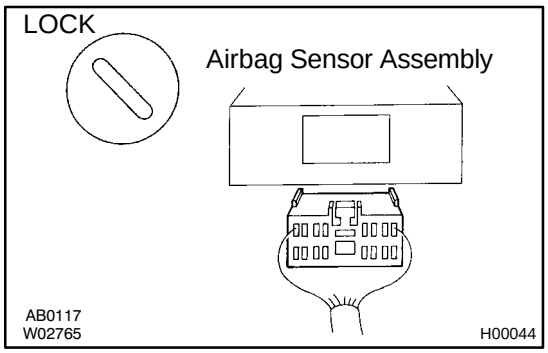
(b) Remove steering wheel pad (See page SR–11).

(c) Disconnet connector of front passenger airbag assembly (See page RS–22).

CAUTION:

Store the steering wheel pad with the front surface facing upward.

2	Does SRS warning light turn off?



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.

(c) Disconnect airbag sensor assembly connector.

(d) Connect negative (–) terminal cable to battery.

CHECK:

Check operation of SRS warning light.

NO → **Check SRS warning light circuit or terminal AB circuit of DLC1.**

YES

Replace airbag sensor assembly.

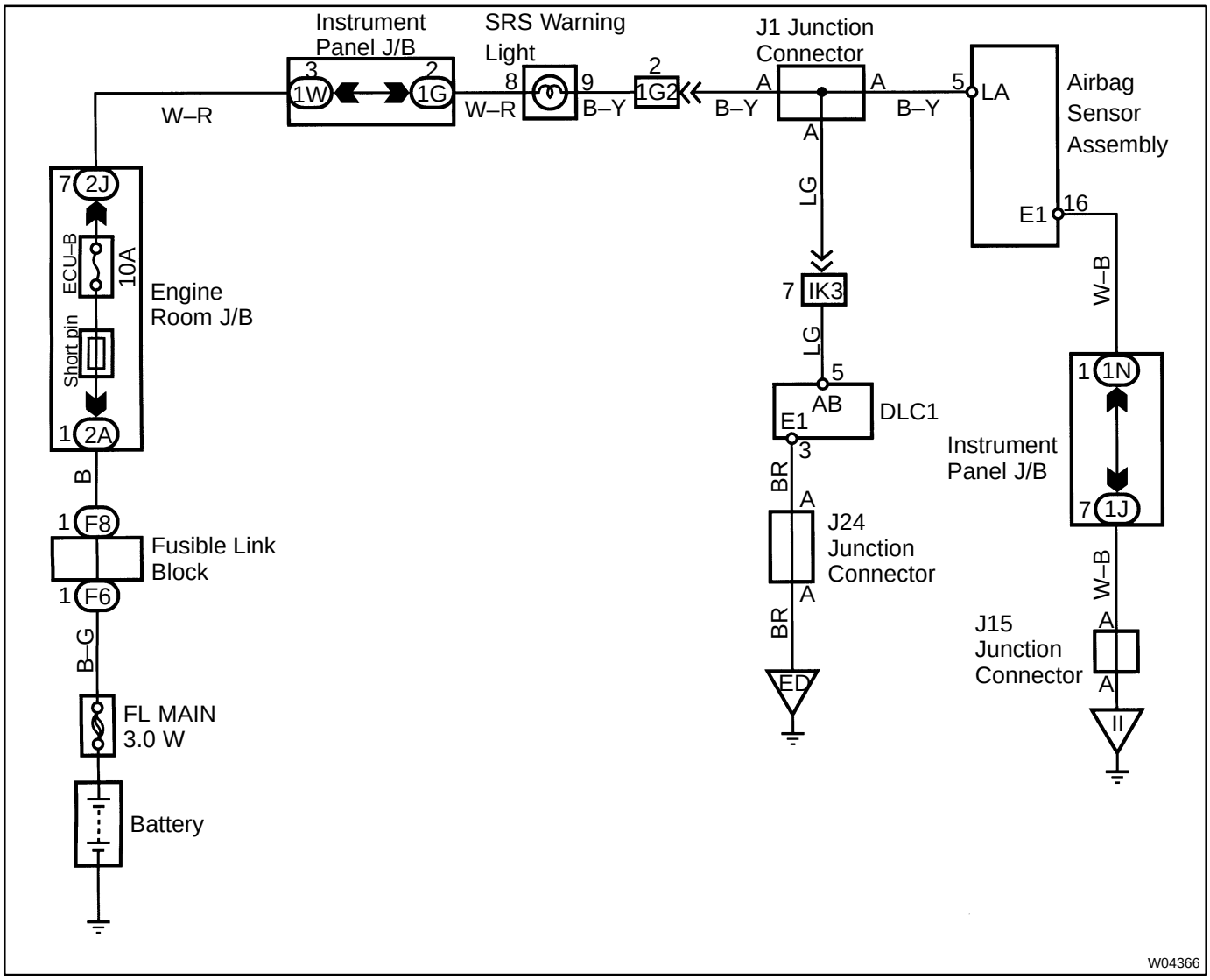
DI0B9–01

SRS Warning Light Circuit Malfunction (Does not light up, when ignition switch is turned to ACC or ON.)

CIRCUIT DESCRIPTION

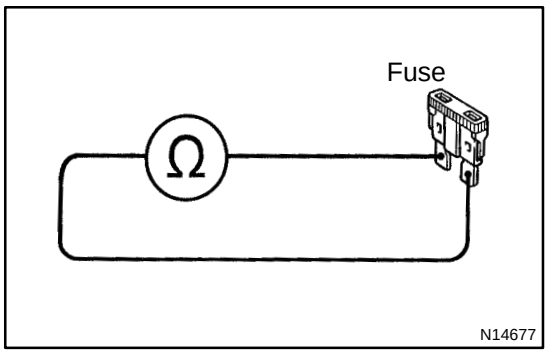
The SRS warning light is located on the combination meter.
When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from LOCK position to ACC or ON position, and then turns off automatically.
If there is a malfunction in the SRS, the SRS warning light lights up to inform the driver of the abnormality When terminals Tc and E1 of the DLC1 are connected, the DTC is displayed by the blinking of the SRS warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ECU–B Fuse.**



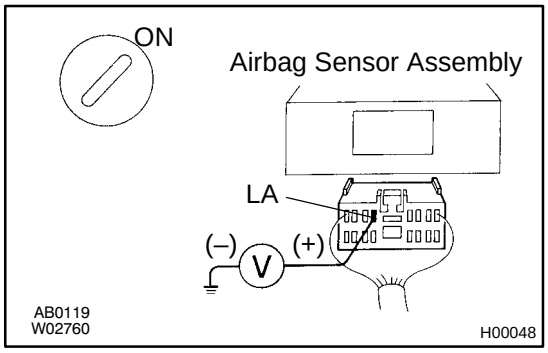
PREPARATION:
Remove ECU–B fuse.
CHECK:
Check continuity of ECU–B fuse.
OK:
Continuity
HINT:
- Fuse may be burnt out even if it appears to be OK during visual inspection.
- If fuse is OK, install it.

NG → **Go to step ” 5 ”.**

OK

2	**Preparation. (See step ” 1 ” on page DI–359)**

3	**Check SRS warning light circuit.**

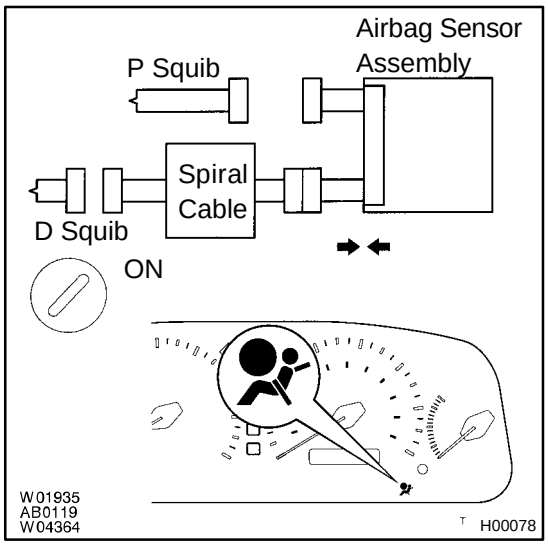


PREPARATION:
(a) Connect negative (–) terminal cable to battery.
(b) Turn ignition switch to ACC or ON.
CHECK:
Measure voltage LA terminal of harness side connector of airbag sensor assembly.
OK:
Voltage: 10 – 14 V

NG → **Check SRS warning light bulb / repair SRS warning light circuit.**

OK

4	Does SRS warning light come on?



PREPARATION:

(a) Disconnect negative (–) terminal cable from the battery.
(b) Connect airbag sensor assembly connector.
(c) Connect negative (–) terminal cable to battery, and wait at least 2 seconds.
(d) Turn ignition switch to ACC or ON.

CHECK:

Check operation of SRS warning light.

NO → **Check terminal LA of airbag sensor assembly. If normal, replace airbag sensor assembly.**

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use simulation method to check.

5	Is new ECU–B fuse burnt out again?

NO → **Using simulation method, reproduce malfunction symptoms (See page IN–17).**

YES

Check harness between ECU–B fuse and SRS warning light.

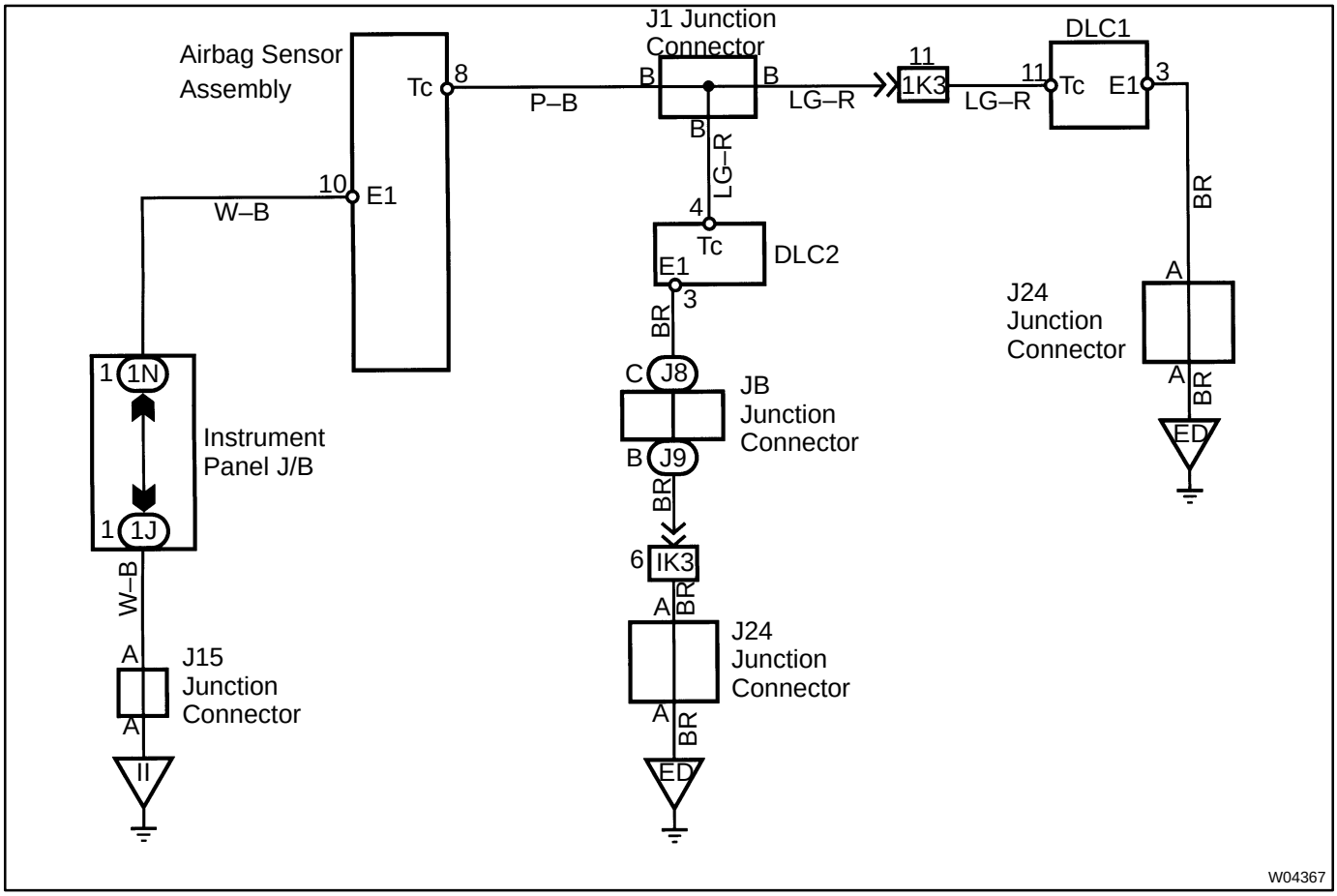
DI0BA–01

Tc Terminal Circuit

CIRCUIT DESCRIPTION

By connecting terminals Tc and E1 of the DLC1 the airbag sensor assembly is set in the DTC output mode. The DTCs are displayed by the blinking of the SRS warning light.

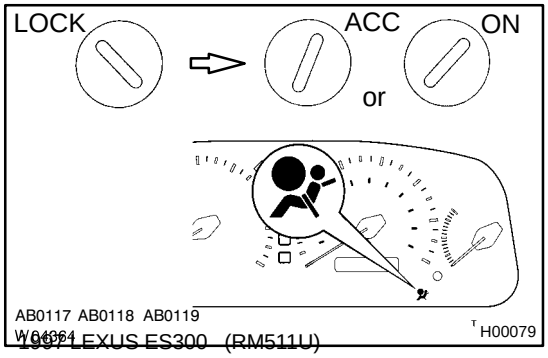
WIRING DIAGRAM



INSPECTION PROCEDURE

If the DTC is not displayed, do the following troubleshooting.

1	**Does SRS warning light up for approx. 6 seconds?**



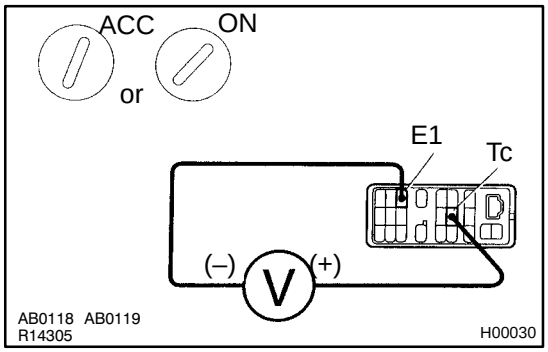
PREPARATION:

Check operation of SRS warning light after ignition switch is turned from LOCK position to ACC or ON position.

NO → **Check SRS warning light system (See page DI–324).**

YES

2	**Check voltage between terminals Tc and E1 of DLC1.**

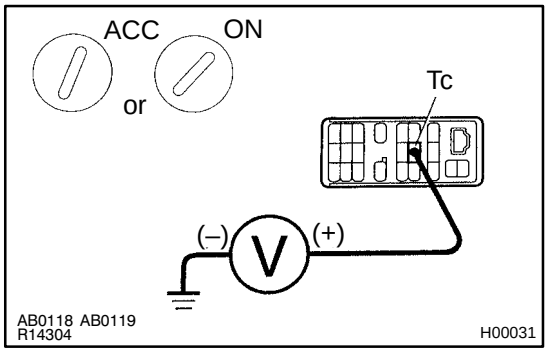


PREPARATION:
Turn ignition switch to ACC or ON.
CHECK:
Measure voltage between terminals Tc and E1 of DLC1.
OK:
Voltage; 10 – 14 V

OK → **Go to step ” 4 ”.**

NG

3	**Check voltage between terminals Tc of DLC1 and body ground**

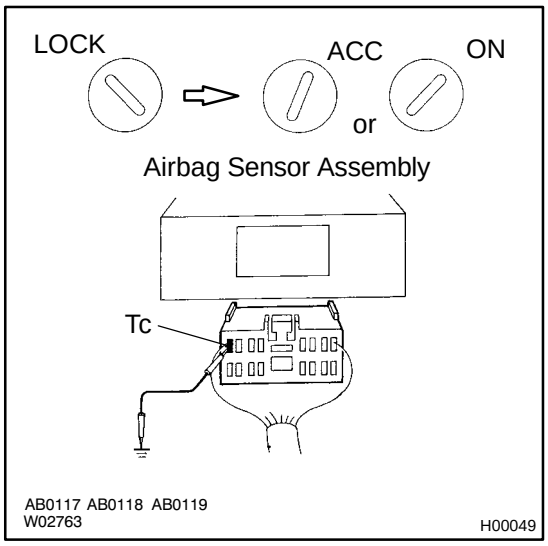


CHECK:
Measure voltage between terminal Tc of DLC1 and body ground.
OK:
Voltage: 10 – 14 V

OK → **Check harness between terminal E1 of DLC1 and body ground.**

NG

4	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.
(c) Disconnect airbag sensor assembly connector.
(d) Insert service wire into terminal Tc from back side as shown.
(e) Connect airbag sensor assembly connector with service wire.
(f) Connect negative (–) terminal cable to battery.
(g) Turn ignition switch to ACC or ON and wait at least 20 seconds.
(h) Connect service wire of terminal Tc to body ground.

CHECK:

Check operation of SRS warning light.

OK:

SRS waning light comes on.

NOTICE:

Never make a mistake with the terminal connection position as this cause a malfunction.

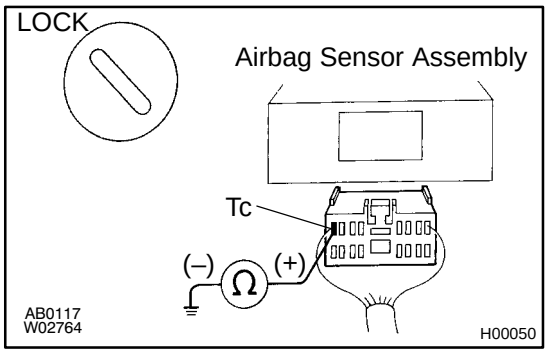
OK → **Check harness between airbag sensor assembly and DLC1.**

NG

Replace airbag sensor assembly.

If the DTC is displayed without a DTC check procedure, perform the following troubleshooting.

1	**Check resistance between terminal Tc of airbag sensor assembly and body ground.**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (–) terminal cable from the battery, and wait at least 90 seconds.
(c) Disconnect airbag sensor assembly connector.

CHECK:

Check resistance between terminal Tc of airbag sensor assembly connector.

OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector.**

OK

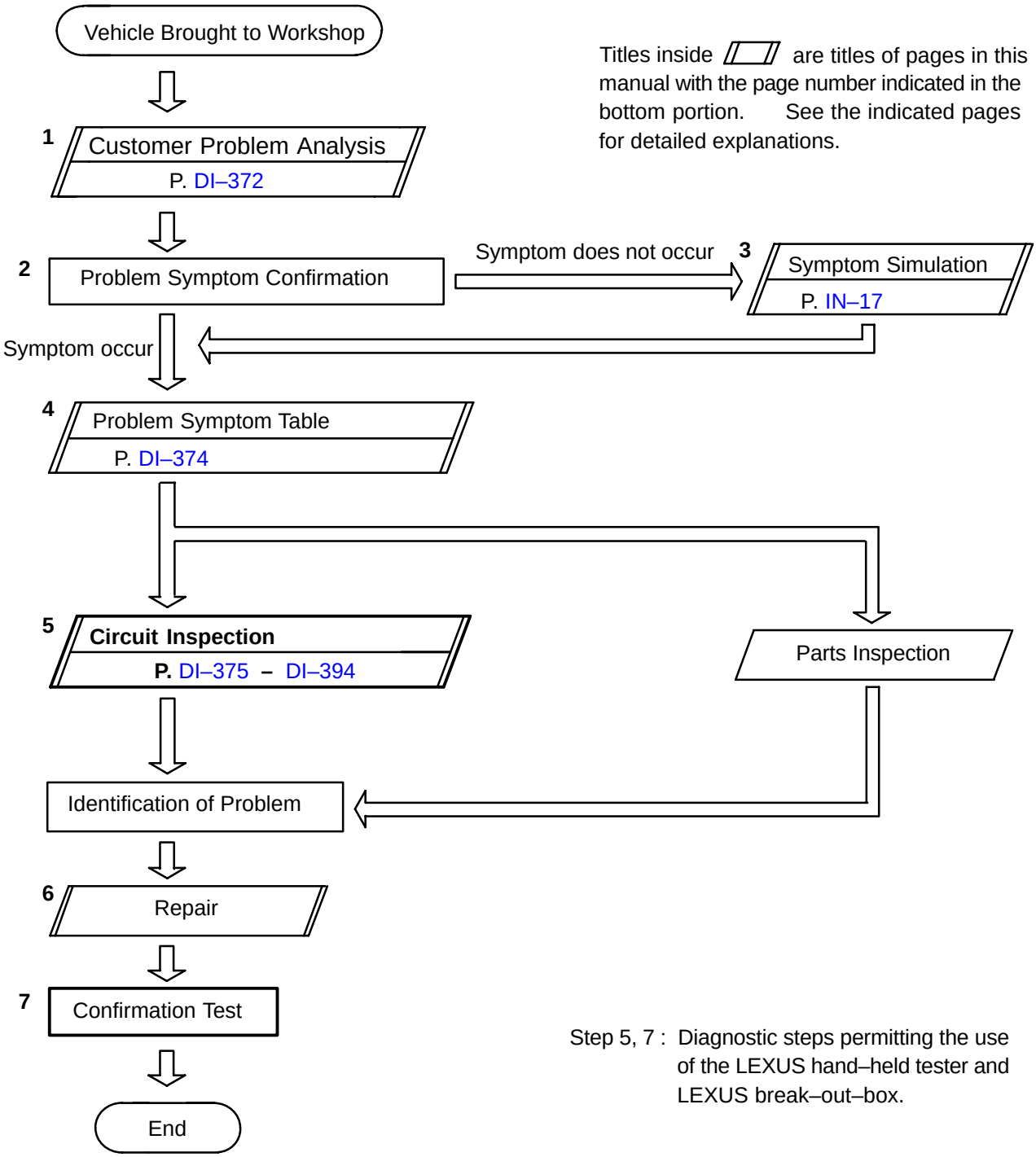
Replace airbag sensor assembly.

POWER SEAT CONTROL SYSTEM

DI0FP–01

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.



Titles inside ▱ are titles of pages in this manual with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.

Step 5, 7 : Diagnostic steps permitting the use of the LEXUS hand–held tester and LEXUS break–out–box.

DI0FR–01

CUSTOMER PROBLEM ANALYSIS CHECK

POWER SEAT CONTROL SYSTEM Check Sheet

Inspector's name: _____

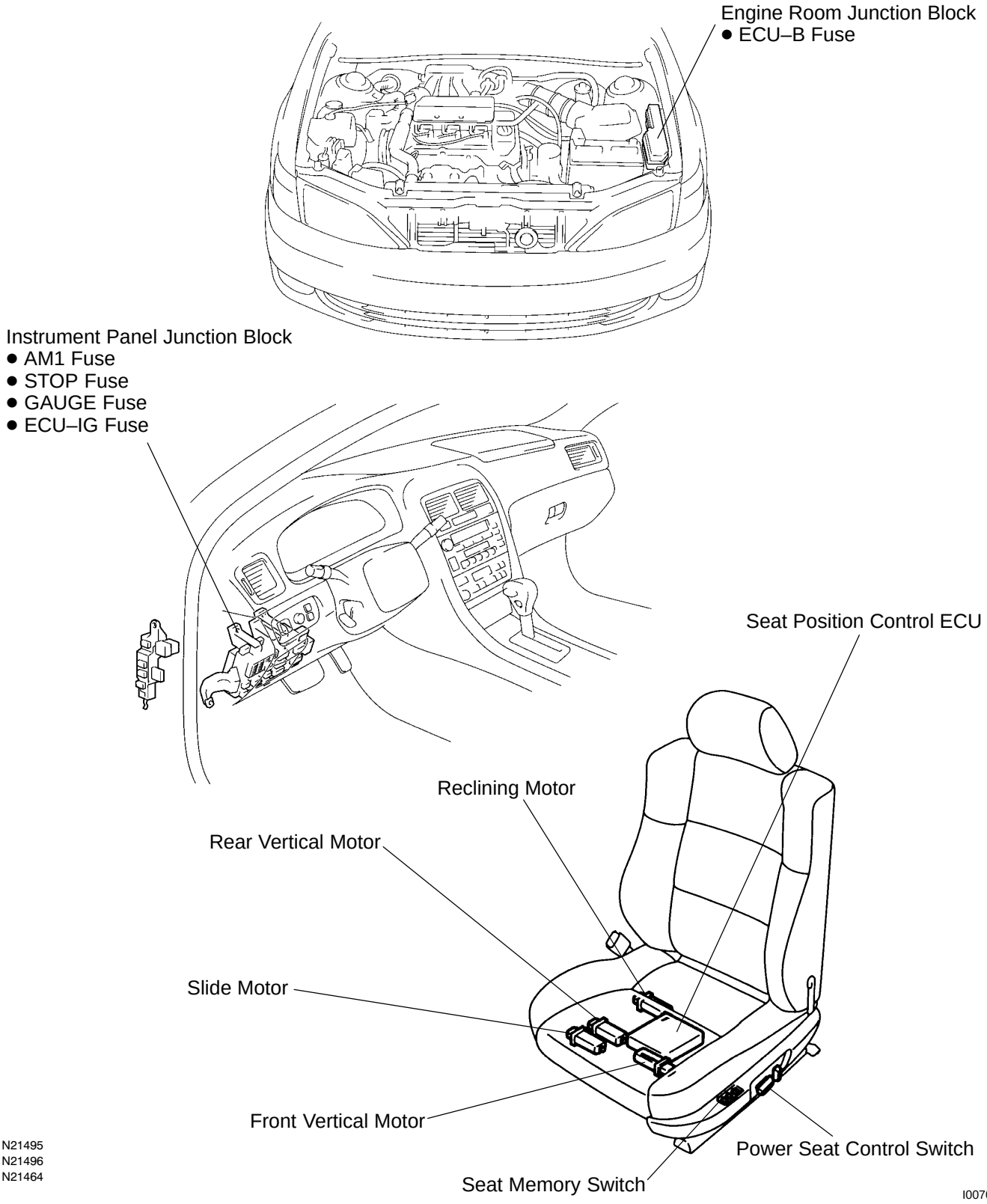
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Date Problem First Occurred	/ /
How Often does Problem Occurs	● Continuous ● Intermittent (Times a day)

Problem Symptom	● Manual Function does not operate.	● Slide ● Front Vertical ● Rear Vertical ● Reclining
	● Return Function does not operate.	● Slide ● Front Vertical ● Rear Vertical ● Does not operate in any conditions ● Only with key inserted ● Only with key not inserted ● Only with memory & return switch 1 or 2
	● Memory function does not operate.	
	● Position return function does not stop when brake pedal is depressed.	

DI0FT–01

PARTS LOCATION



DI0FV–01

PROBLEM SYMPTOMS TABLE

Perform troubleshooting of the circuits for the applicable problem symptom in the order given in the chart below. Proceed to the page located for each circuit.

HINT:

- If the instruction ”Proceed to next circuit inspection shown on matrix chart” is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- If the trouble still reappears even though there are no abnormalities in any of the other circuits, then check and replace the Seat Position Control ECU as the last step.

Symptom	Suspect Area	See page
Both manual & return functions do not operate(All functions).	1. +B power source circuit 2. Power seat control switch circuit 3. Motor circuit 4. Power seat control ECU	DI–375 DI–392 DI–379 IN–27
Both manual & return functions do not operate(One function only).	1. Motor circuit 2. Power seat control ECU	DI–379 IN–27
One or all functions do not operate for manual operation only.	1. Power seat control switch circuit 2. Power seat control ECU	DI–392 IN–27
Memory function does not operate.	1. Power seat memory switch circuit 2. Ignition switch circuit 3. Park/neutral position switch circuit 4. Power seat control ECU	DI–394 DI–390 DI–388 IN–27
Return operation does not stop when brake pedal is depressed.	1. Stop light switch circuit 2. Power seat control ECU	DI–386 IN–27
Only return function does not operate or operates a little, then stops (All return functions).	1. Power seat memory switch circuit 2.ECU power source circuit 3.Position sensor power source circuit 4.Power seat control ECU	DI–394 DI–377 DI–382 IN–27
Only return function does not operate or operates a little, then stops (Only one return function).	1. Position sensor circuit 2.Power seat control ECU	DI–384 IN–27

DI0FY–01

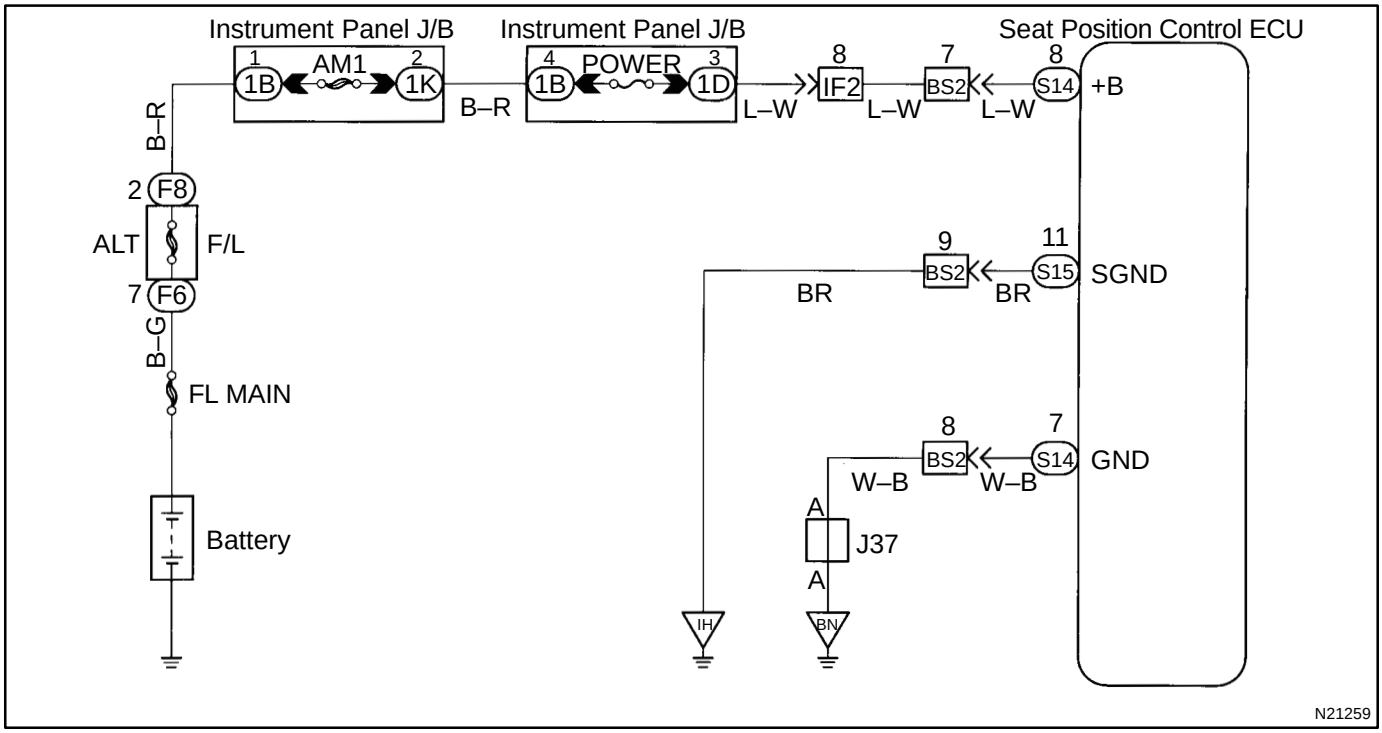
CIRCUIT INSPECTION

+B Power Source Circuit

CIRCUIT DESCRIPTION

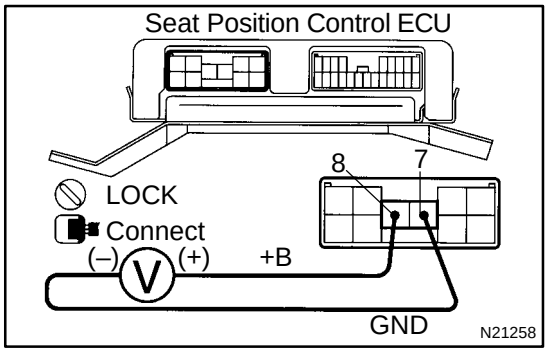
This is the power source for motors such as the slide motor, reclining motor, front vertical motor and rear vertical motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals +B and GND of Seat Position Control ECU connector.**



PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

Measure voltage between terminals +B and GND of Seat Position Control ECU connector.

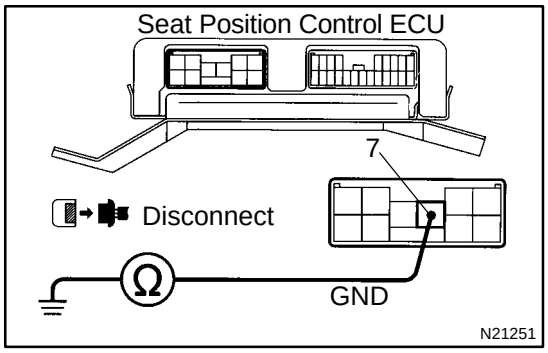
OK:

Voltage: 10 – 14 V

OK	**Proceed to next circuit inspection shown on matrix chart (See page DI–374).**

NG

2	Check continuity between terminals GND of Seat Position Control ECU connector and body ground.



CHECK:

Measure resistance between terminals GND of Seat Position Control ECU connector and body ground.

OK:

Resistance: Continuity (below 1 Ω)

NG → **Repair or replace harness or connector.**

OK

3	Check AM1 fuse and POWER fuse.

NG → **Check for short in all the harness and components connected to the AM1 and POWER fuse, and repair them (See attached wiring diagram).**

OK

Check and repair harness or connector between Seat Position Control ECU and battery.

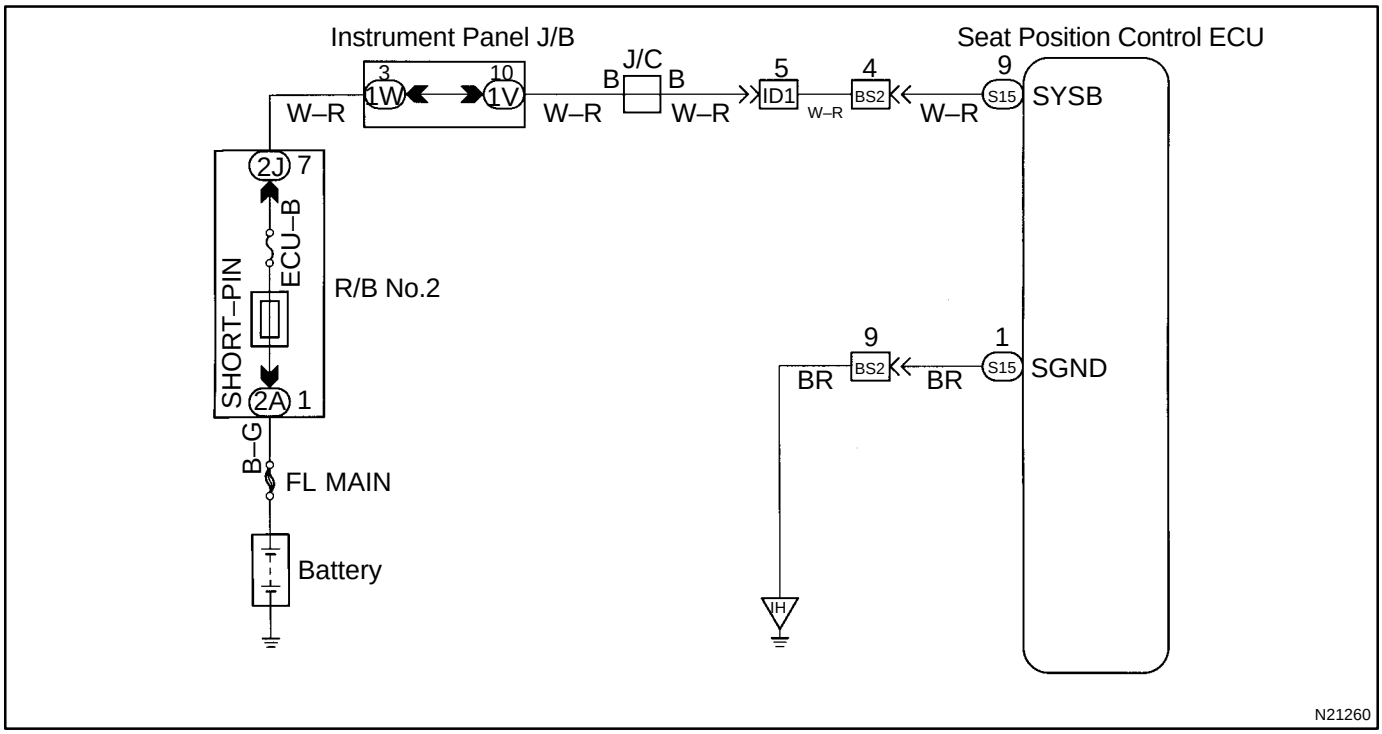
DI0G1–01

ECU Power Source Circuit

CIRCUIT DESCRIPTION

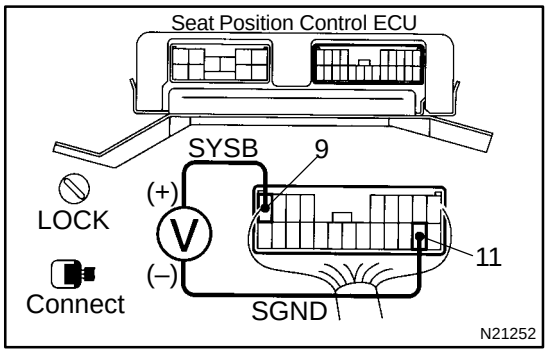
This circuit provides power for ECU operation and is also the power source for the sensor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals SYSB and SGND of Seat Position Control ECU connector.**



PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

Measure voltage between terminals SYSB and SGND of Seat Position Control ECU connector.

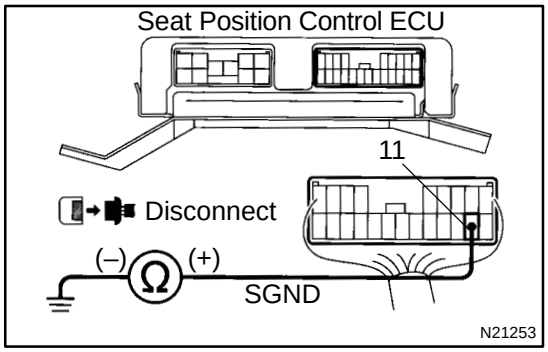
OK:

Voltage: 10 – 14 V

OK	**Proceed to next circuit inspection shown on matrix chart (See page DI–374).**

NG

2	Check continuity between terminals SGND of Seat Position Control ECU connector and body ground.



CHECK:

Measure resistance between terminal SGND of Seat Position Control ECU connector and body ground.

OK:

Resistance: Continuity (below 1 Ω)

NG → **Repair or replace harness or connector.**

OK ↓

3	Check ECU–B fuse.

NG → **Check for short in all the harness and components connected to ECU–B fuse and repair them (See attached wiring diagram).**

OK ↓

Check and repair harness or connector between Seat Position Control ECU and battery.

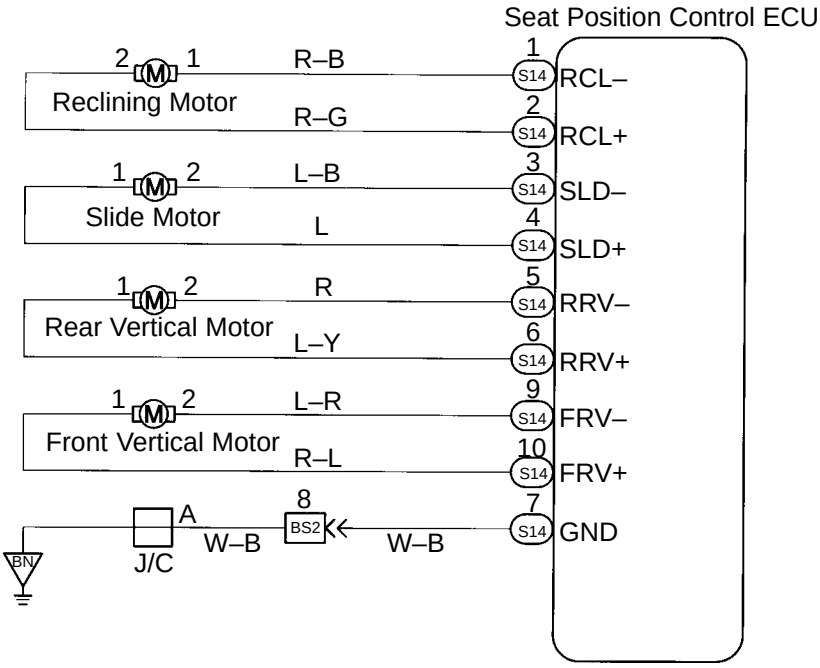
DI0G4–01

Motor Circuit

CIRCUIT DESCRIPTION

The Seat Position Control ECU controls the 4 motors for slide, front vertical, rear vertical and reclining.

WIRING DIAGRAM

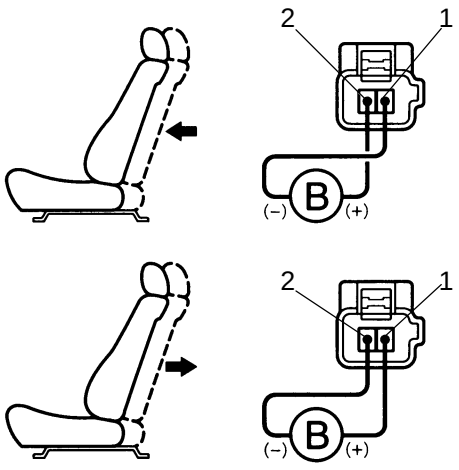


N21261

INSPECTION PROCEDURE

1	**Check motor.**

Slide Motor



1997 LEXUS ES300 (RM511U)

N21468

PREPARATION:

1. Remove seat.
2. Disconnect each motor connector.

CHECK:

Check seat movement when battery positive voltage is applied to each motor.

Slide motor

CHECK:

Connect battery ~ to terminal 2 and battery ⊖ to terminal 1 of the slide motor connector.

OK:

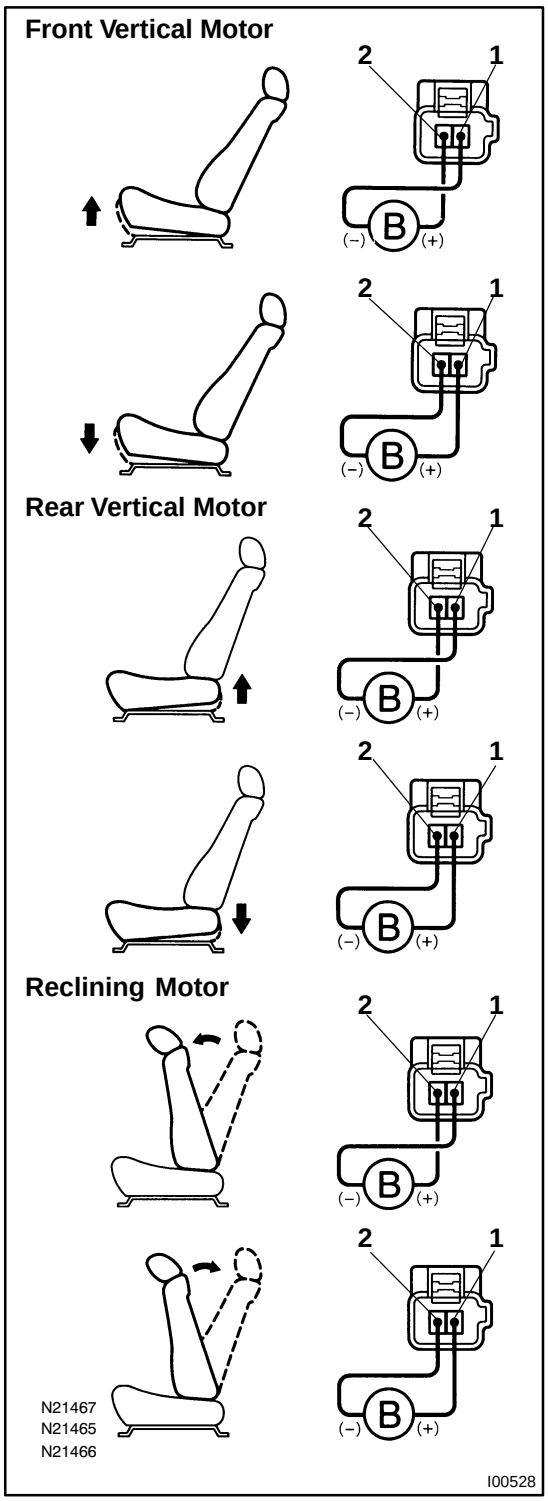
The seat moves forward.

CHECK:

Connect battery ⊖ to terminal 2 and battery ~ to terminal 1 of the slide motor connector.

OK:

The seat moves back.



Front vertical motor

CHECK:

Connect battery ~ to terminal 2 and battery ⊖ to terminal 1 of the front vertical motor connector.

OK:

The front of the seat cushion rises.

CHECK:

Connect battery ⊖ to terminal 2 and battery ~ to terminal 1 of the front vertical motor connector.

OK:

The front of the seat cushion lowers.

Rear vertical motor

CHECK:

Connect battery ~ to terminal 2 and battery ⊖ to terminal 1 of the rear vertical motor connector.

OK:

The front of the seat cushion rises.

CHECK:

Connect battery ⊖ to terminal 2 and battery ~ to terminal 1 of the rear vertical motor connector.

OK:

The front of the seat cushion lowers.

Reclining motor

CHECK:

Connect battery ~ to terminal 2 and battery ⊖ to terminal 1 of the reclining motor connector.

OK:

The seat back return to up right.

CHECK:

Connect battery ⊖ to terminal 2 and battery ~ to terminal 1 of the reclining motor connector.

OK:

The seat back reclining.

NG → **Replace motor.**

OK

2	**Check harness and connector between Seat Position Control ECU and motor (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Proceed to next circuit inspection shown on matrix chart (See page DI–374).

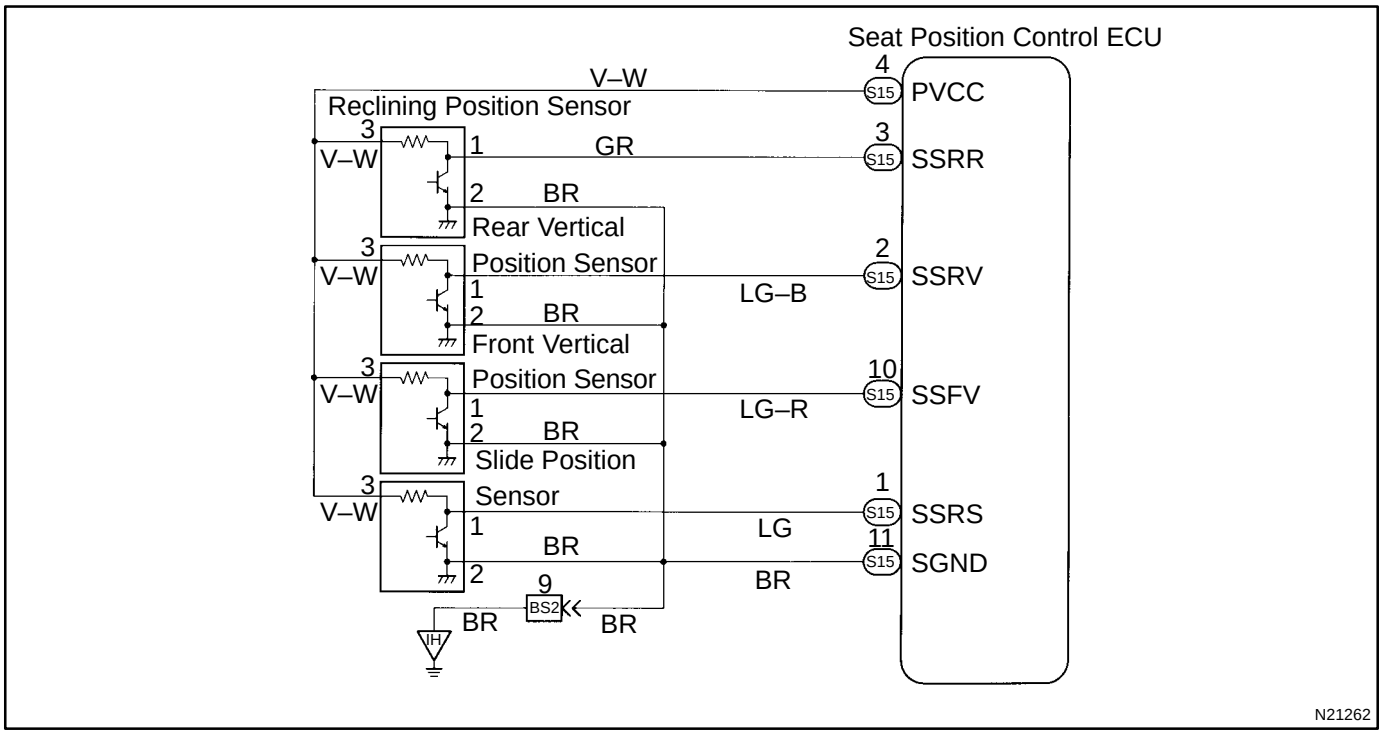
DI0G6–01

Position Sensor Power Source Circuit

CIRCUIT DESCRIPTION

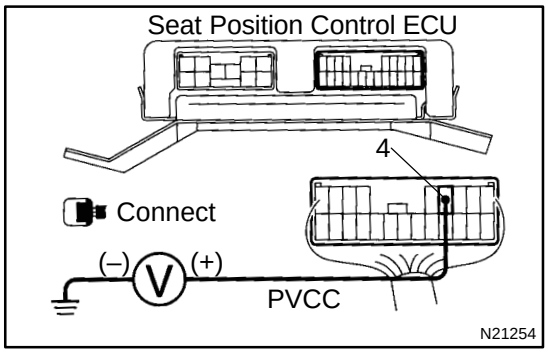
This circuit provides power to the slide, front vertical and reclining sensors.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal PVCC of Seat Position Control ECU connector and body ground.**



PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

While operating the Power Seat Control Switch and moving the seat, check voltage between terminal PVCC of Seat Position Control ECU connector and body ground.

OK:

Voltage: 7.2 – 8.8 V

OK	**Proceed to next circuit inspection shown on matrix chart (See page DI–374).**

NG

2	**Check harness and connector connected to terminal PVCC of Seat Position Control ECU (See page IN–27).**

CHECK:

Check for open or short in the harness and check connectors for the position sensor power source circuit outlined in the diagram with a thick line (–). (See page DI–382)

NG → **Repair or replace harness or connector.**

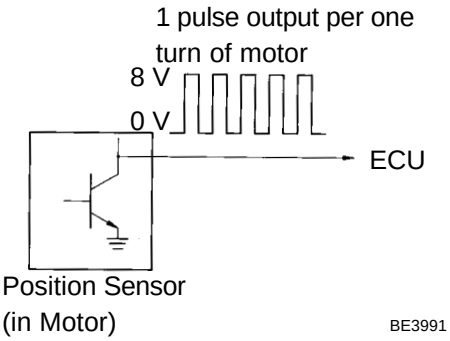
OK →

Check and replace Seat Position Control ECU.

DI0G9–01

Position Sensor Circuit

CIRCUIT DESCRIPTION



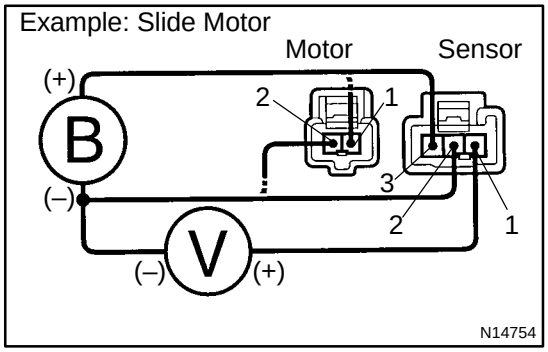
The position sensor senses movement of the seat and send pulse signals to the ECU. The position sensor sends pulse to the ECU in proportion to the amount of seat movement, as shown in the diagram on the left.
The ECU uses the number of pulses to constantly calculate the position relative to the memory position and returns the seat to the memorized position.
If a malfunction occurs in a position sensor and a sensor signal is not in put to the ECU even when the motor operates, the ECU prohibits return operation.

WIRING DIAGRAM

See page DI–382.

INSPECTION PROCEDURE

1	**Check position sensor.**



PREPARATION:
Disconnect the connector of the sensor and the connector of the motor leading to the sensor.
CHECK:
(a) Connect positive ~ lead to terminal 3 of sensor and negative ⊖ lead to terminal 2.
(b) Measure voltage between terminal 1 of sensor and body ground when battery positive voltage is applied between terminals 1 and 2 of motor connector.

HINT:
When the battery positive voltage is applied the motor connector terminals, ~ and ⊖ are interchangeable.

OK:

Condition	Voltage
Motor stopped (Check several times with the motor in a different position each time.)	0 V or battery positive voltage according to stop position.
with motor turning	half of battery positive voltage

NG → **Replace position sensor.**

OK

2	**Check harness and connectors between Seat Position Control ECU and position sensors (See page IN–27).**

NG → **Repair or replace harness or connectors.**

OK

Check and replace Seat Position Control ECU.

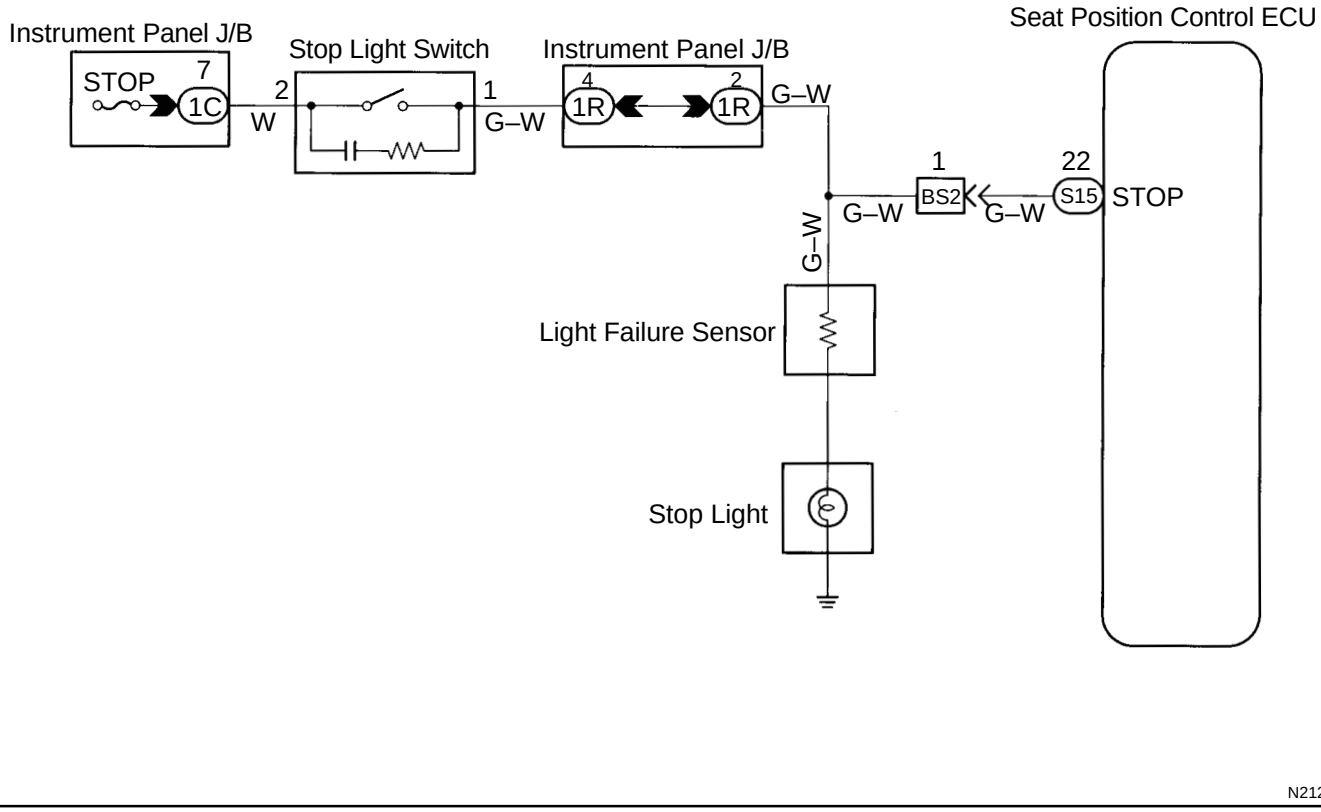
DI0GB–01

Stop Light Switch Circuit

CIRCUIT DESCRIPTION

The stop light switch sends a brake ON or OFF signal to the ECU. When the ECU receives a brake ON signal, it prohibits return operation of the seat.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check stop light operation.**

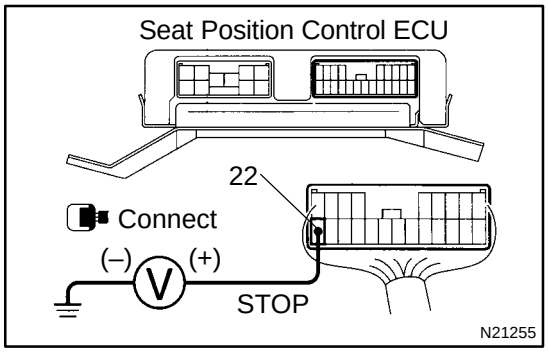
CHECK:

Check that the stop light comes on when the brake pedal is depressed, and turns off when the pedal is released.

NG → **Check stop light circuit (See page BE–2).**

OK

2	**Check voltage between terminal STOP of Seat Position Control ECU connector and body ground.**



PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

Measure voltage between terminal STOP of Seat Position Control ECU and body ground when the brake pedal is depressed and released.

OK:

Brake pedal	Voltage
Depressed	10 ~ 14 V
Released	0 V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–374).**

NG

Check and repair harness and connector between Seat Position Control ECU and stop light switch.

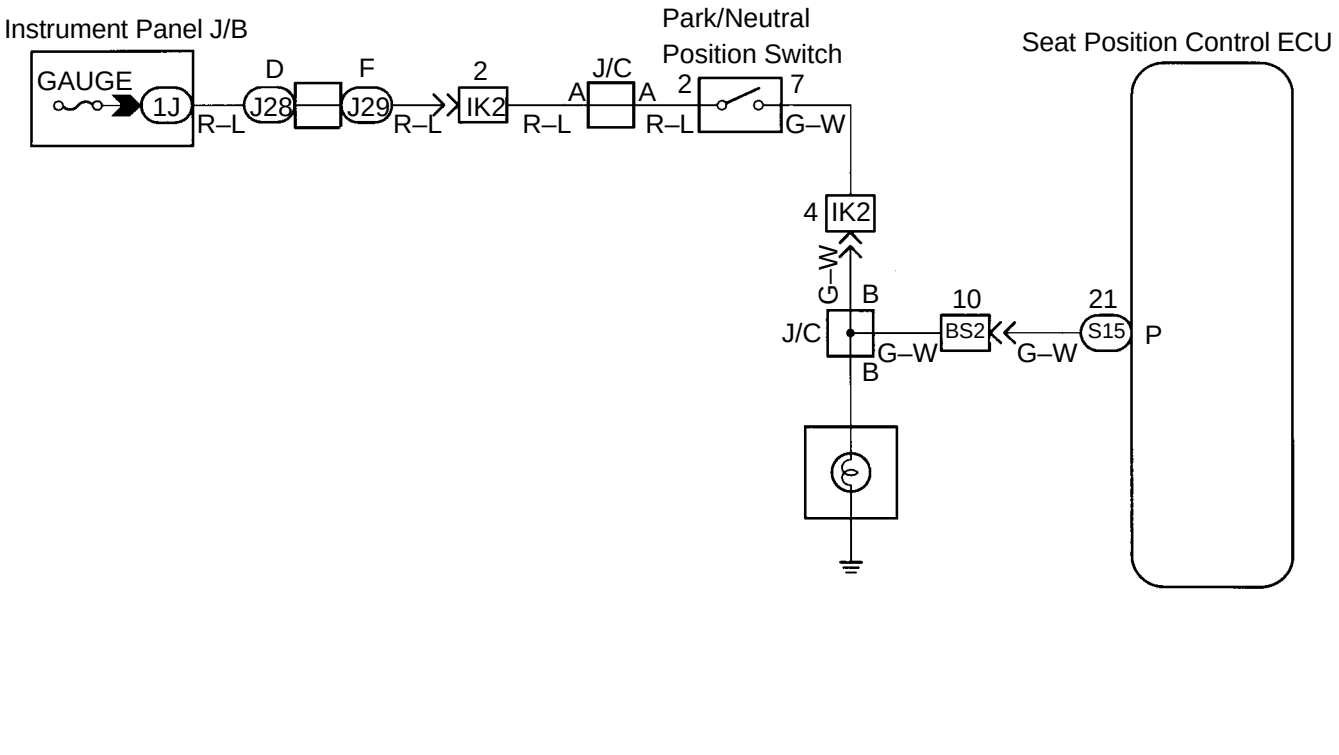
DI0GE–01

Park/Neutral Position Switch Circuit

CIRCUIT DESCRIPTION

The park/neutral position switch detects the P position when the lever is shifted into P and sends a signal to the ECU. When the return switch is turned ON with the IG SW ON and the shift in P position, the ECU performs return operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check shift position indicator.**

CHECK:

Check that P lights up on the shift indicator when P position is shifted into, and that P is OFF when shifting into another position.

NG	**Check shift position indicator circuit (See page BE–2).**

NG

2	**Check voltage between terminal P of Seat Position Control ECU connector and body ground.**

PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

(a) Turn ignition switch ON.

(b) Measure voltage between terminal P of Seat Position Control ECU connector and body ground when the shift lever is positioned to the following ranges.

OK:

Shift position	Voltage
P	10 ~ 14 V
Other than P	0 V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–374).**

NG → **Check and repair harness and connector between Seat Position Control ECU and park/neutral position switch.**

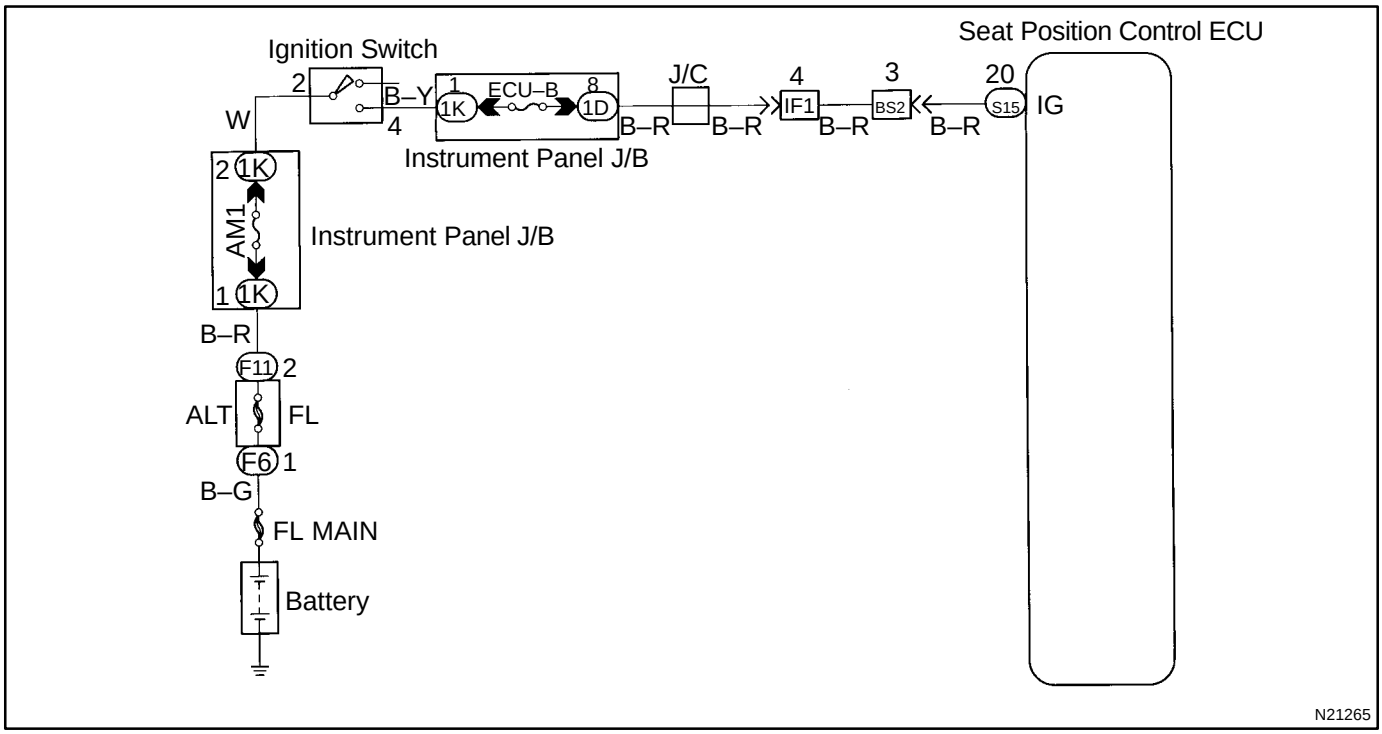
DI0GF–01

Ignition Switch Circuit

CIRCUIT DESCRIPTION

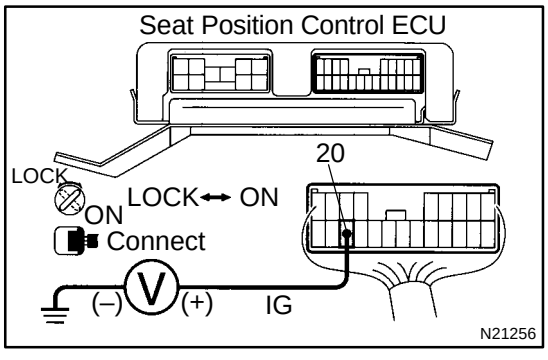
This circuit sends an ignition switch ON or OFF signal to the ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal IG of Seat Position Control ECU connector and body ground.**



PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

Measure voltage between terminal IG of Seat Position Control ECU connector and body ground when ignition switch is on and off.

OK:

Ignition switch	Voltage
ON	10 ~ 14 V
OFF	0 V

OK	**Proceed to next circuit inspection shown on matrix chart (See page DI–374).**

NG

2	Check ECU–IG fuse.

NG → Check for short in all the harness and components connected to ECU–IG fuse.

NG

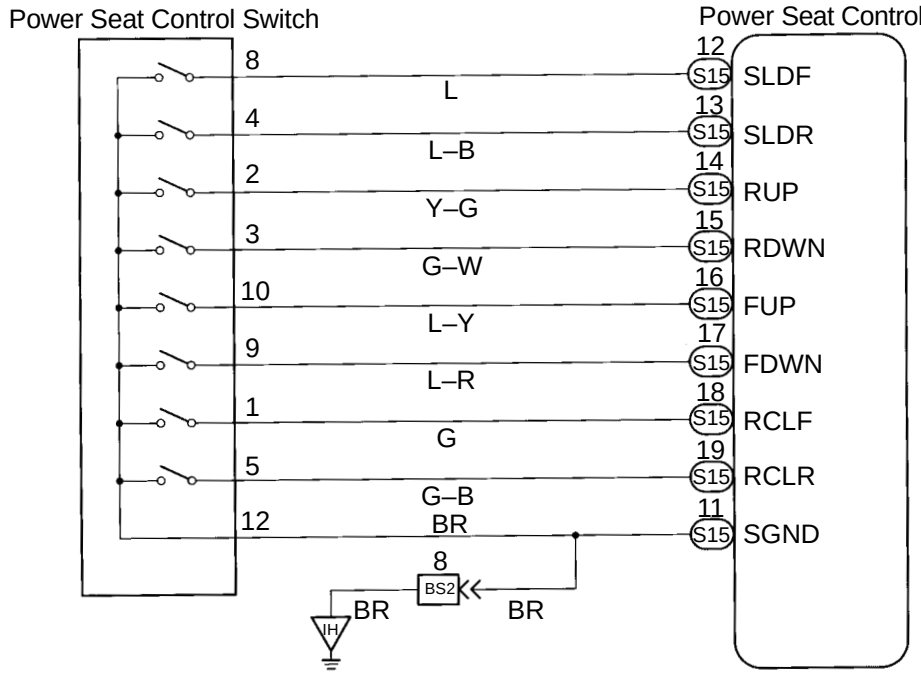
Check and repair harness or connector between Seat Position Control ECU and battery.

Power Seat Control Switch Circuit

CIRCUIT DESCRIPTION

When the power seat control switch is operated, a signal is sent from the power seat control switch to the ECU and the ECU sends a signal to the motor to make it operate.
Even if a malfunction should occur with the position sensor and return operation is prohibited, manual operation will occur as normal.

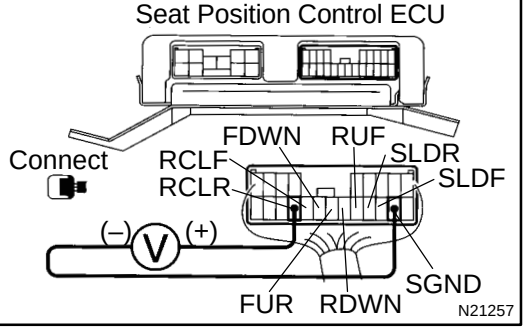
WIRING DIAGRAM



N21266

INSPECTION PROCEDURE

1	**Check voltage between each terminal of the Power Seat Control Switch and SGND of Seat Position Control ECU connector.**



N21257

PREPARATION:
Remove Seat Position Control ECU with connectors still connected.

CHECK:
Measure voltage between each terminal of the Power Seat Control Switch and SGND of Seat Position Control ECU connector. (The illustration shows inspection of the reclining as an example.)

OK:

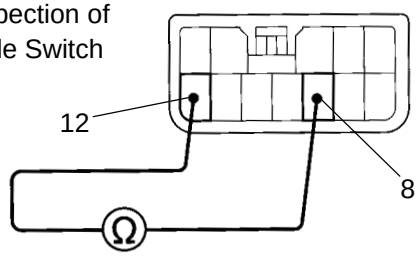
At each terminal with switch ON	0 V
At each terminal with switch OFF	10 ~ 14 V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–374).**

NG

2	**Check power seat control switch.**

(Example)
Inspection of
Slide Switch



PREPARATION:
Disconnect power seat control switch connector.
CHECK:
Check continuity of each terminal.
OK:

Switch position	Terminal
Neutral	–
Slide switch FRONT	8 – 12
Slide switch BACK	4 – 12
Front vertical switch UP	10 – 12
Front vertical switch DOWN	10 – 12
Rear vertical switch UP	2 – 12
Rear vertical switch DOWN	3 – 12
Reclining switch FORWARD	1 – 12
Reclining switch REARWARD	5 – 12

NG → **Replace power seat control switch.**

OK

3	**Check harness and connectors between Seat Position Control ECU and power seat control switch (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace Seat Position Control ECU.

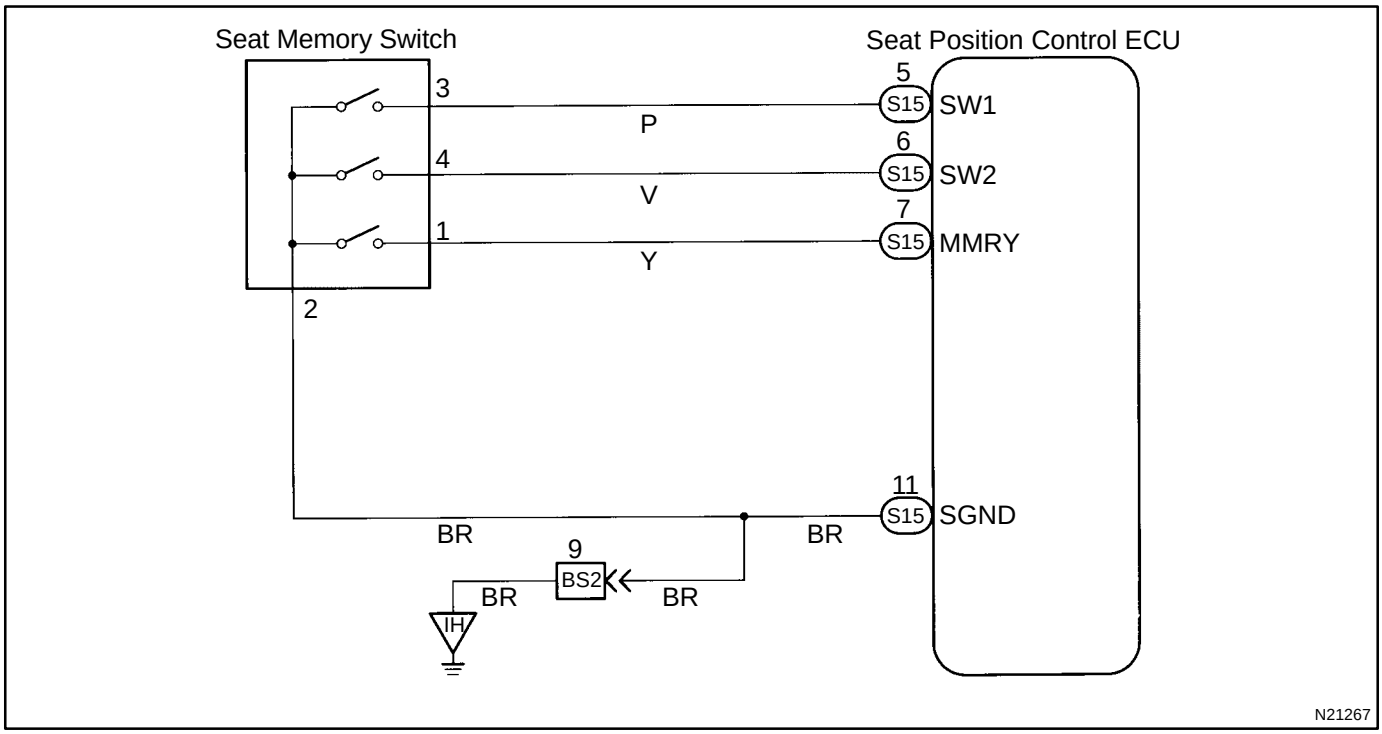
DI0GH–01

Seat Memory Switch

CIRCUIT DESCRIPTION

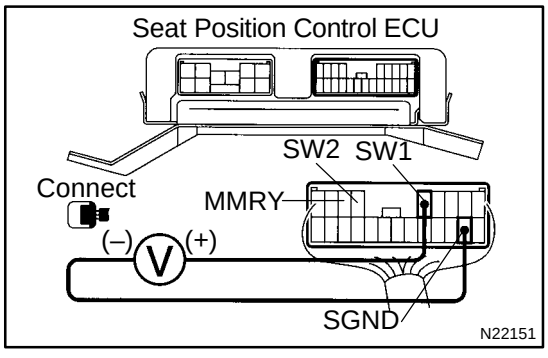
Seat memory switch send memory and return signals to the seat position control ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between each terminal of the seat memory switch and SGND of Seat Position Control ECU connector.**



PREPARATION:

Remove Seat Position Control ECU with connectors still connected.

CHECK:

Measure voltage between terminal of the seat memory switch and SGND of Seat Position Control ECU connector.

(The illustration shows inspection of the Memory 1 as an example.)

OK:

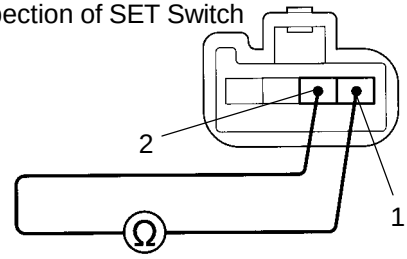
At each terminal with switch ON	0 V
At each terminal with switch OFF	10 ~ 14 V

OK	**Proceed to next circuit inspection shown on matrix chart (See page DI–374).**

NG

2	Check seat memory switch.

(Example)
Inspection of SET Switch



PREPARATION:
Disconnect seat memory switch connector.
CHECK:
Check continuity of each terminal.
OK:

Switch position	Terminal
SET switch ON	1 – 2
Memory switch 1	2 – 3
Memory switch 2	2 – 4

NG → Replace seat memory switch.

OK

3	Check harness and connectors between Seat Position Control ECU and seat memory switch (See page IN–27).

NG → Repair or replace harness or connector.

OK

Check and replace Seat Position Control ECU.

THEFT DETERRENT SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI01P–01

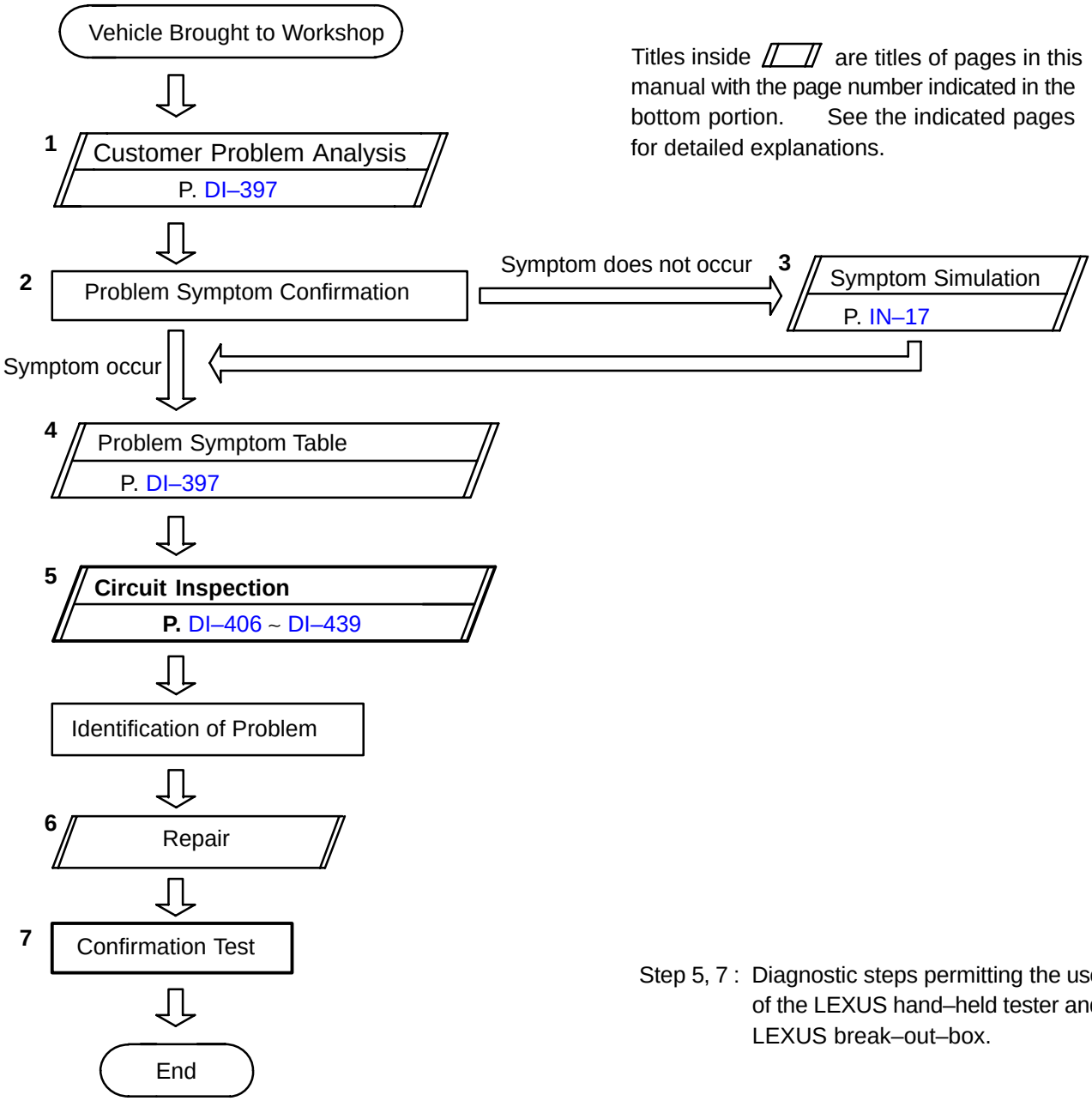
HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

For troubleshooting using a volt/ohm meter.

Be sure to use troubleshooting procedure appropriate to the diagnostic tool being used.

Perform troubleshooting in accordance with the procedure on the following page.



Titles inside ▱ are titles of pages in this manual with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.

Step 5, 7 : Diagnostic steps permitting the use of the LEXUS hand–held tester and LEXUS break–out–box.

DI01Q–01

CUSTOMER PROBLEM ANALYSIS CHECK

THEFT DETERRENT SYSTEM Check Sheet

Inspector's name: _____

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Date Problem First Occurred		/ /
Frequency Problem Occurs		● Constant ● Sometimes (Times per day, month) ● Once only
Weather Conditions When Problem Occurred	**Weather**	● Fine ● Cloudy ● Rainy ● Snowy ● Various/Others
	Outdoor temperature	● Hot ● Warm ● Cool ● Cold (Approx. °F (°C))

Problem Symptom	● Theft deterrent system cannot be set.		
	● Indicator light does not flash when the theft deterrent system is set. (It stays on or does not light at all.)		
	● Theft deterrent system does not operate.	● When unlocked using the door lock knob. ● When the engine hood is opened.	Malfunction ● Horns only ● Theft deterrent horn only ● Headlights only ● Taillights only ● Starter cut only ● Door lock operation only
	● System cannot be canceled once set.	● When door is unlocked using key or wireless door lock control system. ● When the key is inserted in the ignition key cylinder and turned to ACC or ON position. (However, only when the system has never operated) ● When the luggage compartment door is opened with the key.	
	● System cannot be canceled during warning operation.	● When door is unlocked using key or wireless door lock control system. ● When the key is inserted in the ignition key cylinder and turned to ACC or ON position.	
	● Warning operation starts when the system is set and the door or luggage compartment door is opened with the key.		
	● Others.		

DI01R–01

PRE–CHECK

1. SETTING THE THEFT DETERRENT MODE

The system will be automatically set to the theft deterrent mode about 30 seconds after the setting process listed below are performed.

Setting Processes: (do processes (a)~(c) in the order)

(a) Remove the ignition key from the key cylinder.

(b) Close all entry points (door, hood and luggage compartment door).

(c) Use any one of the following methods to lock all the doors depending on a given condition.

(1) Use the key to lock the driver–side door (as a result, all the doors will be locked), or

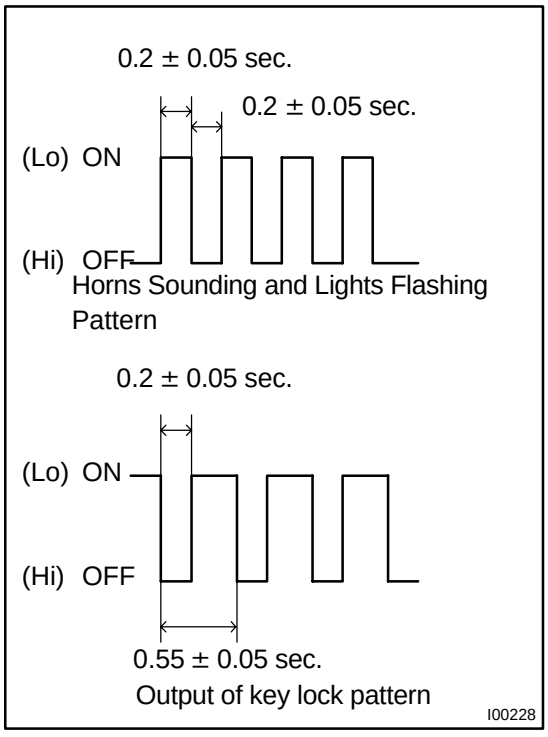
(2) Use the remoto control to lock any door (as a result, all the doors will be locked), or

(3) If the front right or left door is unlocked when both the rear doors are already locked, lock and close the remaining unlocked door by hand (as a result, all the doors will be locked).

(d) About 30 seconds after the above process (c), the theft deterrent mode will automatically start.

HINT:

The closing/locking of all the entry points (doors, hood and luggage) must remain unchanged for about 28 seconds after the above process (c) is completed and then in about another 2 seconds (which is called "DETECTION TIME"), the system will start the theft deterrent mode.



2. THEFT DETERRENT OPERATION

When the system is set to the theft deterrent mode and any of the following conditions are met, the system sounds the horns and flashes the headlights and the taillights for about 1 minute. At the same time, the system disconnects the starter motor circuit *1 and locks all doors (If all door are not locked at once, the system repeats door locking operation every 0.55 seconds during the one minute alarm time). The system continues to disconnect the starter motor circuit after the system is operated until the theft deterrent mode is cancelled.

Condition

(1) Any of the doors (Including the engine hood and luggage compartment door) is unlocked or opened without the key.

(2) The ignition switch is turned to the ACC or ON position without the ignition key.

(3) The battery terminal is disconnected and reconnected. *1

(4) The system receives panic signal from remote keyless entry. *2

*1: The theft deterrent mode is activated if the battery is reconnected after it is disconnected.

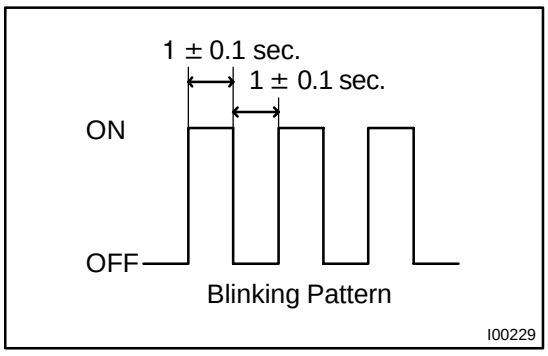
*2: When ignition key is not inserted in the key cylinder.

3. CANCELLATION OF THEFT DETERRENT OPERATION OR MODE

The theft deterrent operation of mode can be cancelled when any of the following conditions is met.

No.	Condition	Cancel of Operation	Cancel of Mode
1	Unlock front door with the key	Effective	Effective
2	Unlock doors with remote keyless entry	Effective	Effective
3	Insert key into ignition key cylinder and turn it to Acc or ON position	Effective *1	Effective *2
4	About 1 minute passes after theft deterrent operation begins	Automatic stop *3	–
5	Unlock the luggage compartment door with the key	Uneffective	Effective *4
6	If the system receives panic signal again when the system is activated by panic signal	Effective *3	Uneffective

*1: In this case, the starter cut is not cancelled.
*2: This applies only when the theft deterrent operation is never activated. If the theft deterrent operation is activated even once, the starter cut is not cancelled.
*3: The system is set to the theft deterrent mode again in about 2 seconds after the operation stops, if all doors are closed.
*4: The mode is cancelled only temporarily while the luggage compartment door is open. The system is set to the theft deterrent mode again in about 2 seconds after the luggage compartment door is closed.



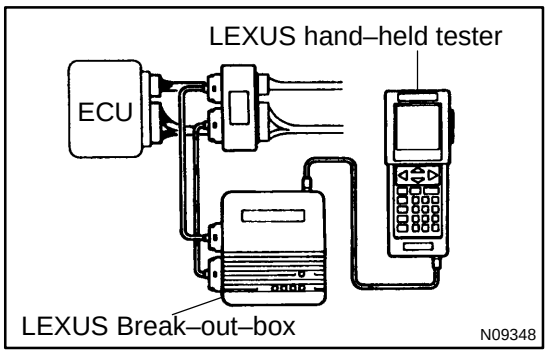
4. INDICATOR LIGHT (LED)

The indicator light functions as shown below according to the system condition in the theft deterrent mode. If remains off in the initial state.

System Condition	Indicator Light
During set preparation time	ON
When the mode is set	Blinks
When alarm is activated	ON
When is temporally cancelled	OFF

5. KEEPING POWER SUPPLY FUNCTION IN CASE OF DOME FUSE OPEN

Even if the dome fuse blows open on the theft deterrent mode, the system will keep warking on the theft deterrent mode.



6. ECU DATA MONITOR USING LEXUS HAND–HELD TESTER

(a) Hook up the LEXUS hand–held tester to the DLC2.

(b) Monitor the ECU data by following the prompts on the tester screen.

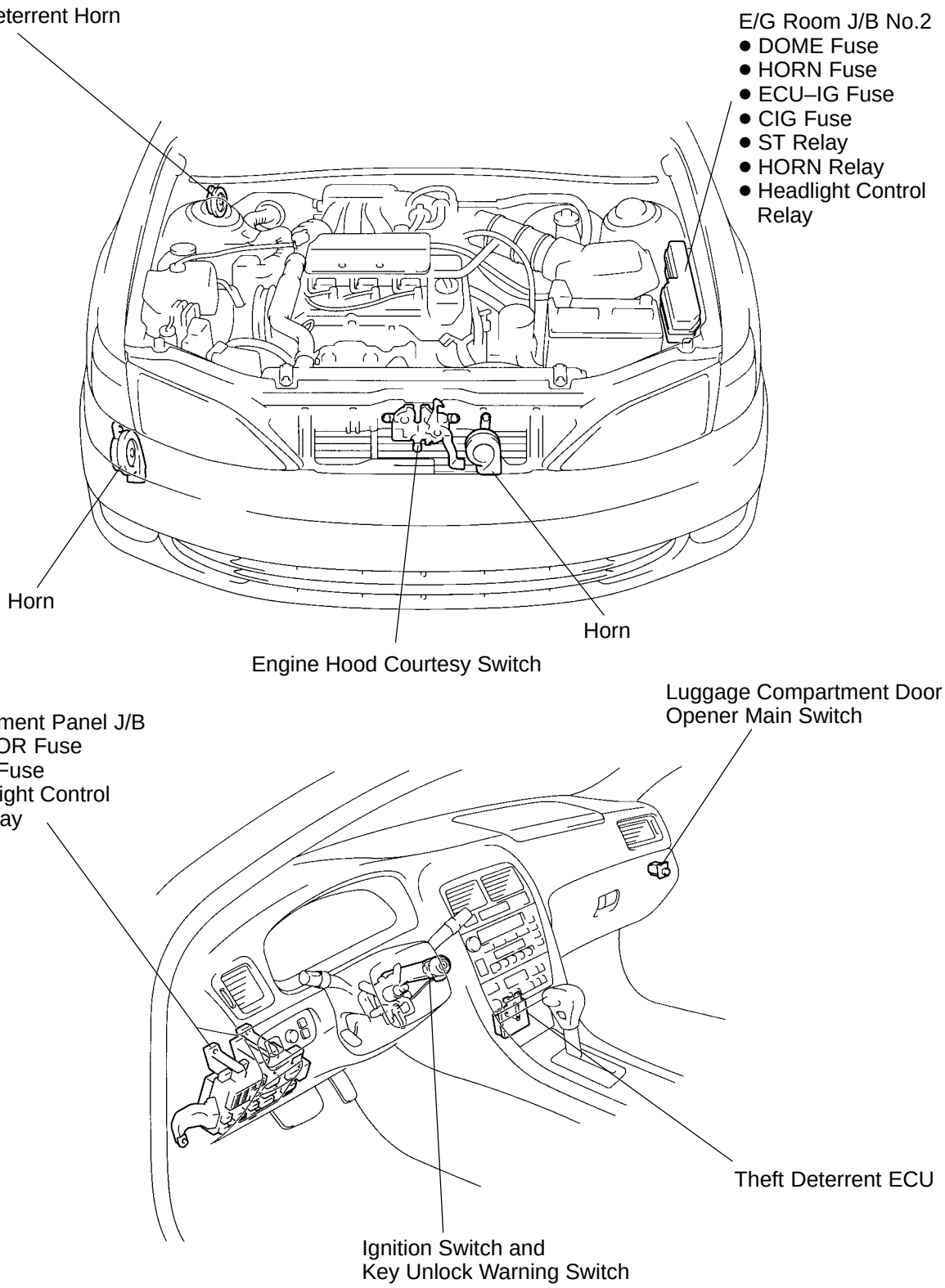
HINT:

LEXUS hand–held tester has a ”Snapshot” function which records the monitored data.

Please refer to the LEXUS hand–held tester operator’s manual for further datails.

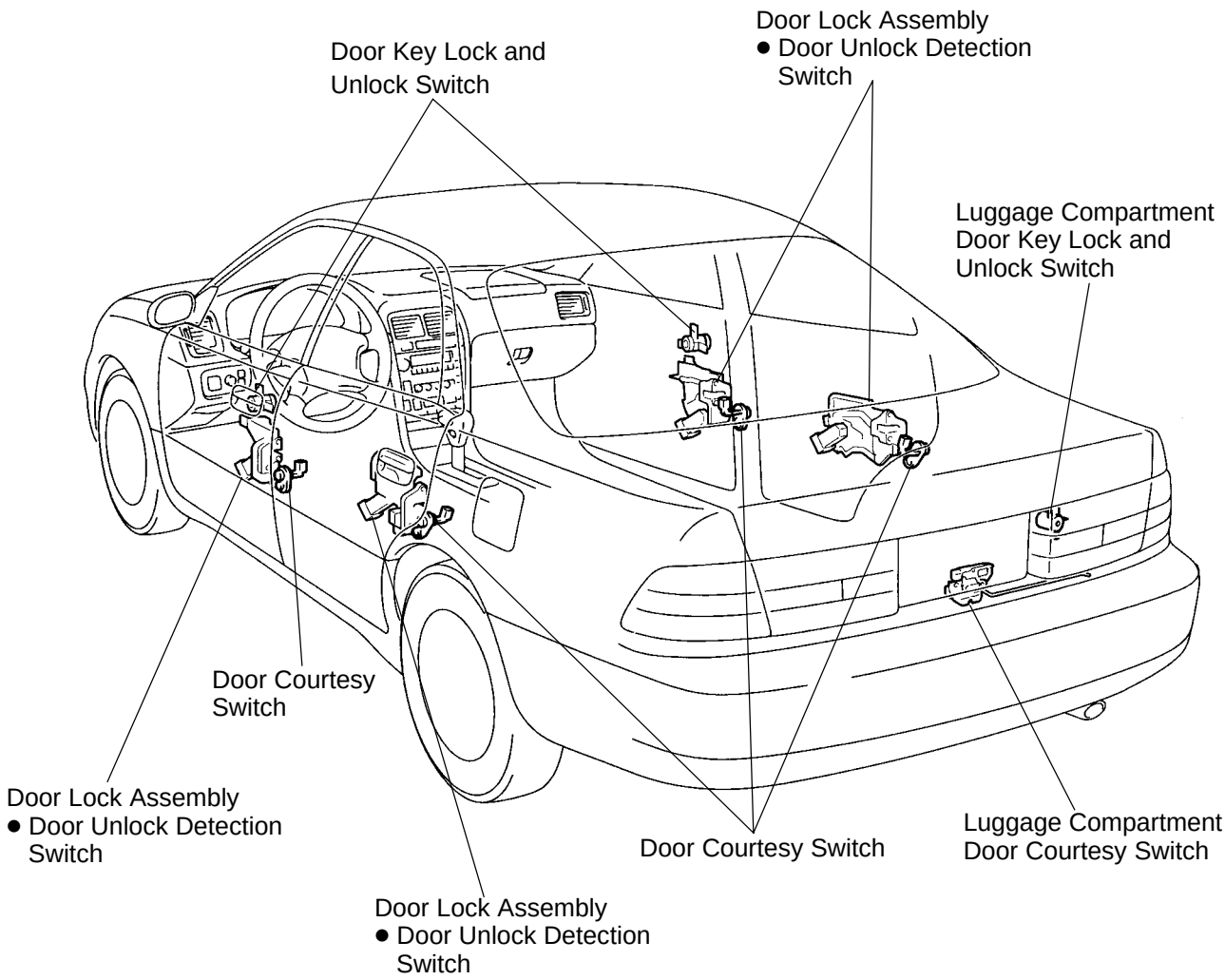
DI01S–01

PARTS LOCATION



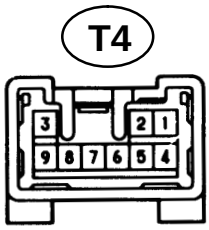
N22047
N22048

I00635

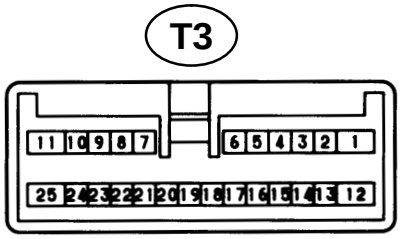

Door Key Lock and
Unlock Switch
Door Lock Assembly
● Door Unlock Detection
Switch
Luggage Compartment
Door Key Lock and
Unlock Switch
Door Courtesy
Switch
Door Lock Assembly
● Door Unlock Detection
Switch
Door Courtesy Switch
Luggage Compartment
Door Courtesy Switch
Door Lock Assembly
● Door Unlock Detection
Switch
N22049

DI01T–01

TERMINALS OF ECM



Connector ”B”



Connector ”A”

I00302 I00303 I00304

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
DSWP ↔ E (A1 ↔ B4)	R–G ↔ W–B	Door courtesy switch ”ON” (Passenger’s door opened)	Below 1 Ω
		Door courtesy switch ”OFF” (Passenger’s door closed)	1 MΩ or higher
DSWD ↔ E (A2 ↔ B4)	R–G ↔ W–B	Door courtesy switch ”ON” (Driver’s door opened)	Below 1 Ω
		Door courtesy switch ”OFF” (Driver’s door Closed)	1 MΩ or higher
CTY ↔ E (A3 ↔ B4)	R–W ↔ W–B	Door courtesy switch ”ON” (Rear door opened)	Below 1 Ω
		Door courtesy switch ”OFF” (Rear door closed)	1 MΩ or higher
DSWH ↔ E (A4 ↔ B4)	B ↔ W–B	Engine hood courtesy switch ”ON” (Engine hood opened)	Below 1 Ω
		Engine hood courtesy switch ”OFF” (Engine hood closed)	1 MΩ or higher
DSWL ↔ E (A5 ↔ B4)	R–Y ↔ W–B	Luggage compartment door courtesy switch ”ON” (Luggage compartment door opened)	Below 1 Ω
		Luggage compartment door courtesy switch ”OFF” (Luggage compartment door closed)	1 MΩ or higher
L2 ↔ E (A6 ↔ B4)	L–W ↔ W–B	Door key lock and unlock switch ”LOCK” (Driver’s and passenger’s door)	Below 1 Ω
		Door key lock and unlock switch ”UNLOCK” (Driver’s and passenger’s door)	1 MΩ or higher
UL3 ↔ E (A7 ↔ B4)	R–G ↔ W–B	Door key lock and unlock switch ”UNLOCK” (Driver’s door)	Below 1 Ω
		Door key lock and unlock switch ”LOCK” (Driver’s door)	1 MΩ or higher
UL2 ↔ E (A8 ↔ B4)	L ↔ W–B	Door key lock and unlock switch ”UNLOCK” (passenger’s door)	Below 1 Ω
		Door key lock and unlock switch ”LOCK” (passenger’s door)	1 MΩ or higher
LUG ↔ E (A9 ↔ B4)	G–W ↔ W–B	Luggage compartment door key lock and unlock switch ”ON”	Below 1 Ω
		Luggage compartment door key lock and unlock switch ”OFF”	1 MΩ or higher
IND ↔ E (A10 ↔ B4)	R–Y ↔ W–B	Always	Below 1 V
+B1 ↔ Body ground (A11 ↔ Body ground)	R ↔ W–B	Always	10 – 14 V

IG ↔ E (A12 ↔ B4)	B–R ↔ W–B	Ignition switch is turned to ”ON” position	10 – 14 V
ACC ↔ E (A13 ↔ B4)	P–L ↔ W–B	Ignition switch is turned to ”ACC” position	10 – 14 V
TSW ↔ E (A14 ↔ B4)	L–Y ↔ W–B	Luggage compartment door opener main switch ”ON” (Luggage compartment door opened)	Below 1 Ω
		Luggage compartment door opener main switch ”OFF” (Luggage compartment door closed)	1 MΩ or higher
KSW ↔ E (A15 ↔ B4)	L–B ↔ W–B	Key unlock warning switch ”ON” (Key inserted)	Below 1 Ω
		Key unlock warning switch ”OFF” (Key removed)	1 MΩ or higher
LSWD ↔ E (A16 ↔ B4)	L–R ↔ W–B	Door unlock detection switch ”ON” (Driver’s door)	Below 1 Ω
		Door unlock detection switch ”OFF” (Driver’s door)	1 MΩ or higher
LSWP ↔ E (A17 ↔ B4)	Y ↔ W–B	Door unlock detection switch ”ON” (Passenger’s door)	Below 1 Ω
		Door unlock detection switch ”OFF” (Passenger’s door)	1 MΩ or higher
LSWR ↔ E (A18 ↔ B4)	L–Y ↔ W–B	Door unlock detection switch ”ON” (Rear door)	Below 1 Ω
		Door unlock detection switch ”OFF” (Rear door)	1 MΩ or higher
PANI ↔ E (A24 ↔ B4)	LG ↔ W–B	It is receiving panic signal from remote keyless entry	Below 1 Ω
		Except above mention	1 MΩ or higher
+B2 ↔ Body ground (B1 ↔ Body ground)	L–W ↔ Body ground	Always	10 – 14 V
TO ↔ E (B2 ↔ B4)	L ↔ W–B	Always	10 – 14 V
SH ↔ E (B3 ↔ B4)	W–L ↔ W–B	Always	10 – 14 V
E ↔ Body ground (B4 ↔ Body ground)	W–B ↔ Body ground	Always	10 – 14 V
HORN ↔ E (B6 ↔ B4)	G–B ↔ W–B	Horn switch ”OFF”	10 – 14 V
TAIL ↔ E (B7 ↔ B4)	G–R ↔ W–B	Light control switch ”TAIL” or ”HEAD”	10 – 14 V
HEAD ↔ E (B8 ↔ B4)	R–B ↔ W–B	Light control switch ”HEAD”	10 – 14 V
SRLY ↔ E (B9 ↔ B4)	W–B ↔ W–B	Ignition switch ”ST” and PNP switch ON (Shift to N or P position)	10 – 14 V

DI01U–01

PROBLEM SYMPTOMS TABLE

Proceed to the reference page shown in the matrix chart below for each malfunction symptom and troubleshoot for each circuit.

HINT:

Troubleshooting of the theft deterrent system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the theft deterrent system, first make certain that the door lock control system is operating normally.

Details of Problem			Inspecting Circuit*1	See page
The theft deterrent system cannot be set			1. Indicator light circuit	DI–406
			2. ECU power source circuit	DI–408
			3. Key unlock warning switch circuit	DI–423
			4. Luggage compartment door key lock and unlock switch circuit	DI–425
			5. Luggage compartment door courtesy switch circuit	DI–427
			6. Door key lock and unlock switch circuit	DI–433
			7. Door courtesy switch circuit	DI–437
			8. Door unlock detection switch circuit	DI–435
			9. Luggage compartment door opener main switch and opener switch circuit	DI–431
			10. Engine hood courtesy switch circuit	DI–439
The indicator light does not blink when system is set			Indicator light circuit	DI–406
When the system is set	When the rear door is unlocked	The system does not operate	Door unlock detection switch circuit	DI–435
	When the luggage compartment door is opened by a method other than the key		1. Luggage compartment door opener main switch and opener switch circuit	DI–431
			2. Luggage compartment door opener motor circuit	DI–429
			3. Luggage compartment door courtesy switch circuit	DI–427
	When the engine hood is opened		Engine hood courtesy switch circuit	DI–439
While the system is in warning operation	Horns do not sound		Horn relay circuit	DI–415
	Theft deterrent horn does not sound		Theft deterrent horn circuit	DI–413
	Headlights do not flash		Headlight control relay circuit	DI–417
	Taillights do not flash		Taillight control relay circuit	DI–419
	The starter cut is not cut off		Starter relay circuit	DI–411
	The door lock is not locked in unlock condition		Door unlock detection switch circuit	DI–435
When the system is set	It is not canceled when the ignition key is turned to ACC or ON position		Ignition switch circuit	DI–421
	It still operates when the luggage compartment door is opened with the key		Luggage compartment door key lock and unlock switch circuit	DI–425
System is still set even when a rear door is open			Door courtesy switch circuit	DI–437
Even when the system is not set	Horns sound		Horn relay circuit	DI–415
	Theft deterrent horn sounds		Theft deterrent horn circuit	DI–413
	Headlights stay on		Headlight control relay circuit	DI–417
	Taillights stay on		Taillight control relay circuit	DI–419

*1: If numbers are given to the circuit proceed with troubleshooting in the order indicated by those numbers.

DI01V–01

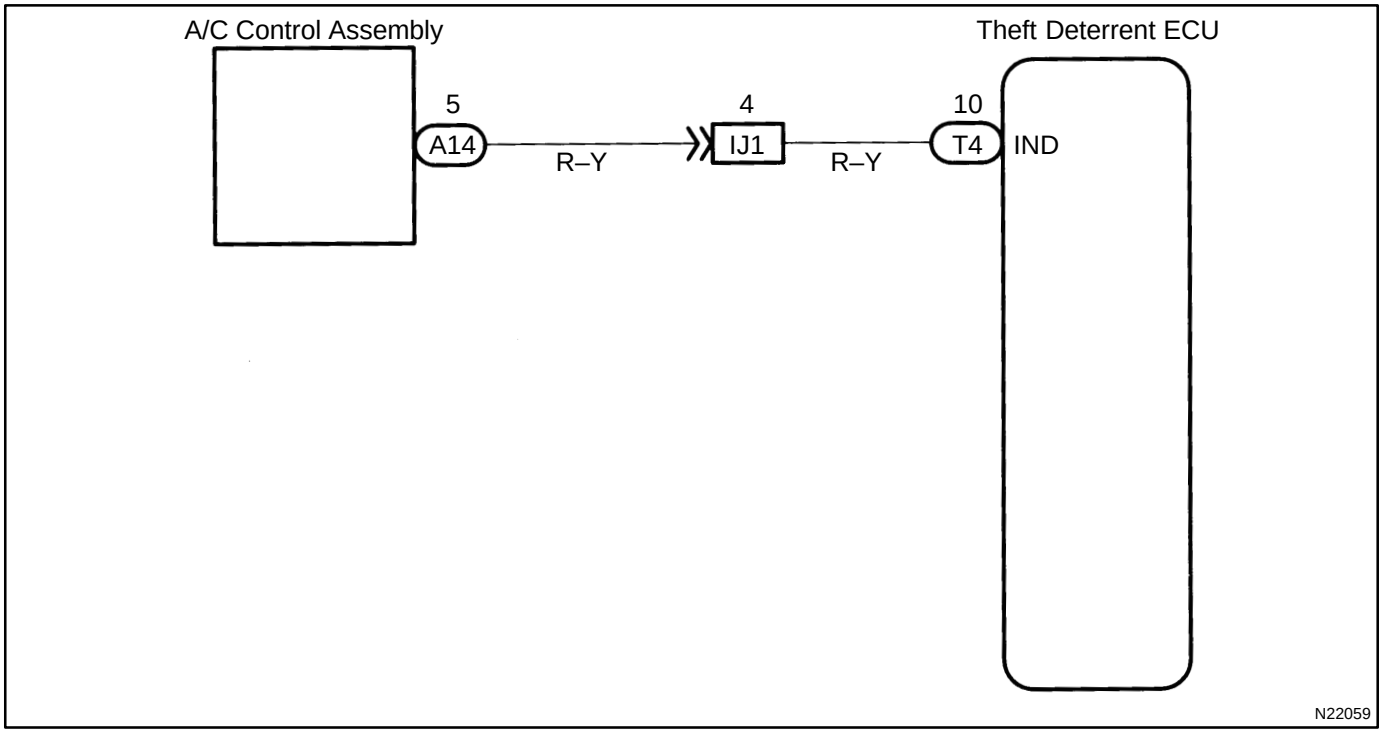
CIRCUIT INSPECTION

Indicator Light Circuit

CIRCUIT DESCRIPTION

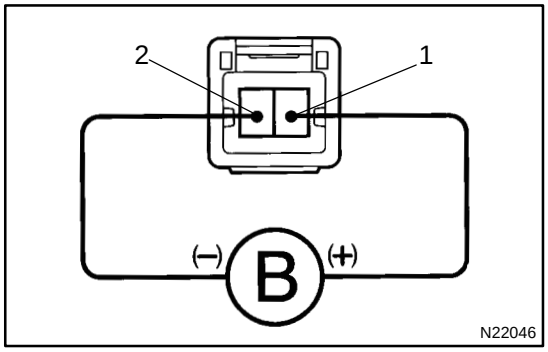
When the theft deterrent system is preparing to set, this circuit lights up the indicator light. When the system has been set, it continually turns the indicator light on for 1 second and turns it off for 1 second, thus blinking the indicator light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check indicator light.**



PREPARATION:

(a) Remove A/C control assembly.

(b) Disconnect indicator light connector.

CHECK:

Connect the positive (+) lead to terminal 1 and the negative (–) lead to terminal 2 of indicator light connector.

OK:

Indicator light comes on.

NG	**Replace indicator light.**

OK

2	**Check harness and connector between theft deterrent ECU and indicator light, indicator light and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown on matrix chart (See page DI–405).

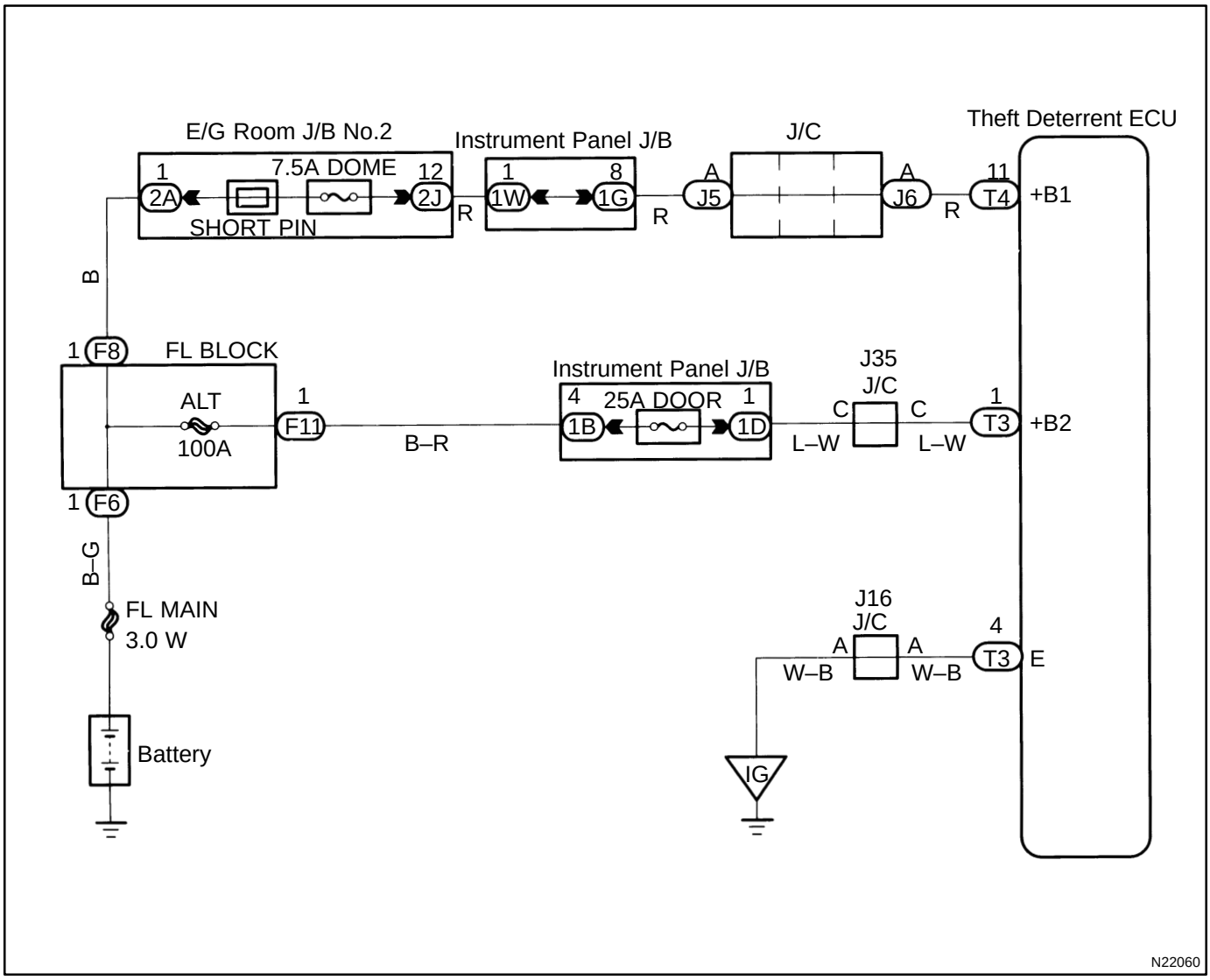
DI01W–01

ECU Power Source Circuit

CIRCUIT DESCRIPTION

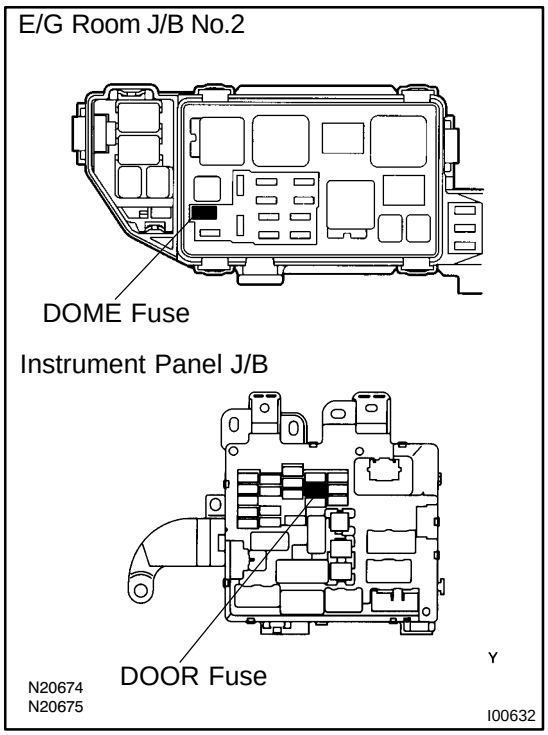
This circuit provides power to operate the theft deterrent ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check DOME and DOOR fuse.



PREPARATION:

(a) Remove DOME fuse from engine room junction block No.2.

(b) Remove DOOR fuse from instrument panel junction block No.1.

CHECK:

Check continuity of DOME and DOOR fuse.

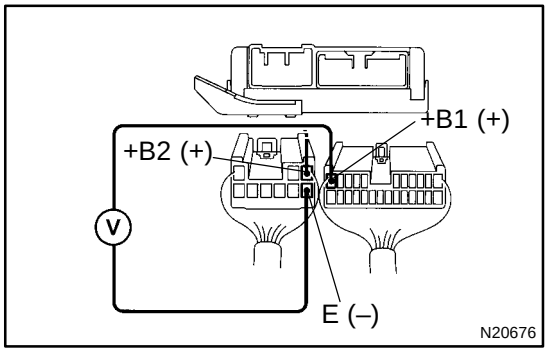
OK:

Continuity

NG → **Check for short in all the harness and components connected to the DOME and DOOR fuse (See attached wiring diagram).**

OK

2	Check voltage between terminals +B1, +B2 and E of theft deterrent ECU connector.



PREPARATION:

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminals +B1, +B2 and E of theft deterrent ECU connector.

OK:

Voltage: 10~14V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–405).**

NG

3	Check for open in harness and connector between ECU and body ground (See page IN–27).

NG → Repair or replace harness or connector.

OK

Check and repair harness and connector between ECU and battery.

DI01X–01

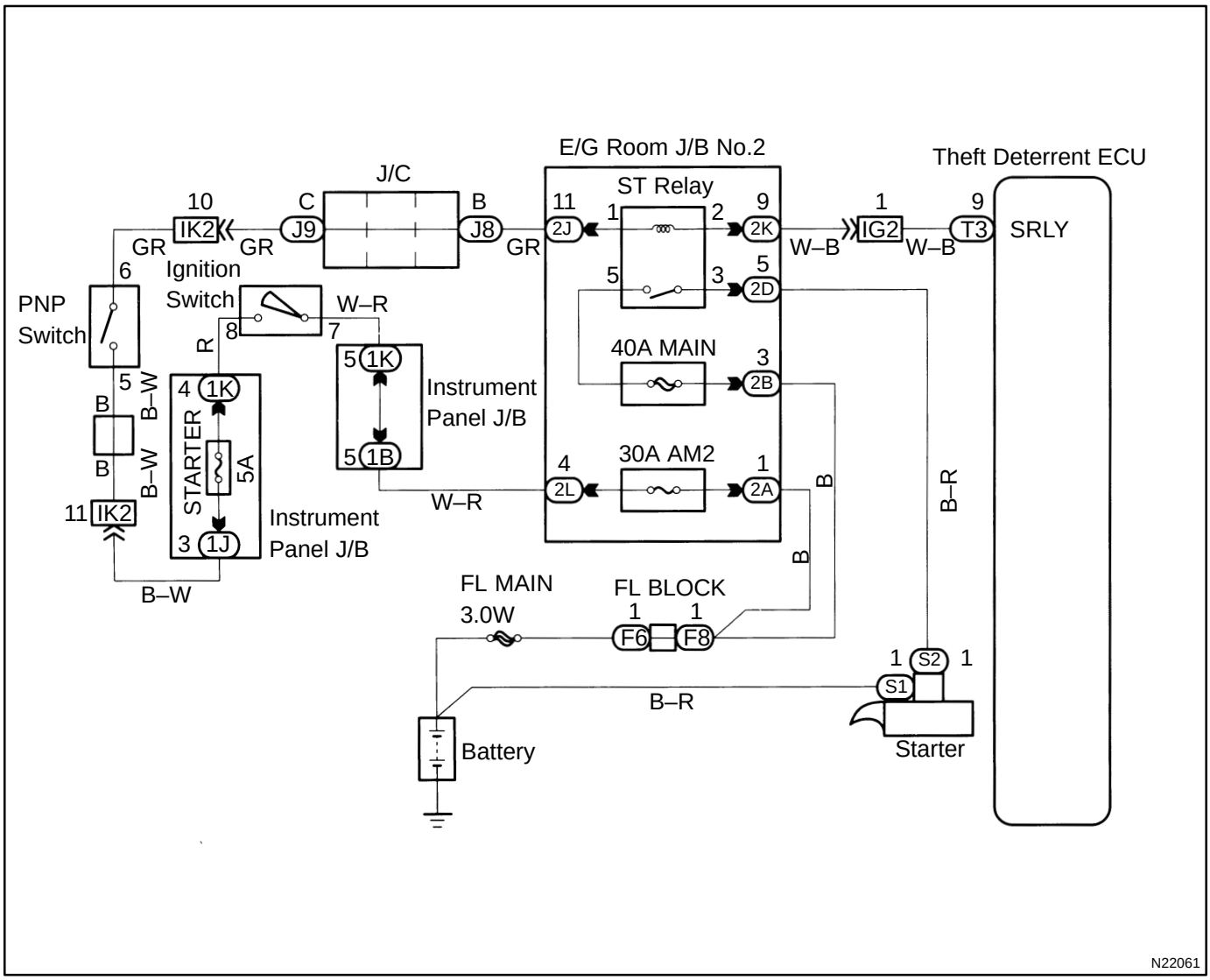
Starter Relay Circuit

CIRCUIT DESCRIPTION

When the theft deterrent system is activated, contact (a) in the ECU becomes open, creating an open circuit in terminal SRLY circuit and making the starter inoperative (starter cut).
In this condition, if one of the following operations is done, the contact (a) in the ECU is grounded, thus canceling the starter cut:

(1) Unlock the front LH or RH door with key.
(2) Unlock the doors with the wireless door lock control system.

WIRING DIAGRAM



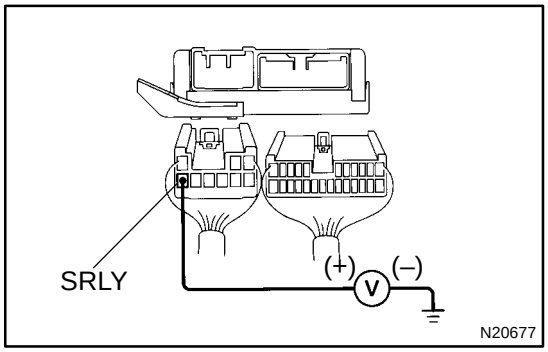
INSPECTION PROCEDURE

HINT:

This troubleshooting is based on the premise that engine cranking occurs.

If the engine does not crank, proceed to the engine troubleshooting on EG–Section.

1	**Check voltage between terminal SRLY of theft deterrent ECU connector and body ground.**



PREPARATION:

(a) Disconnect the theft deterrent ECU connector.

(b) PNP switch ON (Shift to N or P position).

CHECK:

Measure voltage between terminal SRLY of theft deterrent ECU connector and body ground, when ignition switch is turned to ST position.

OK:

Voltage: 10~14V

NG → **Check and repair harness and connector between starter and theft deterrent ECU (See page IN–17).**

OK

Check and repair theft deterrent ECU.

DI01Y–01

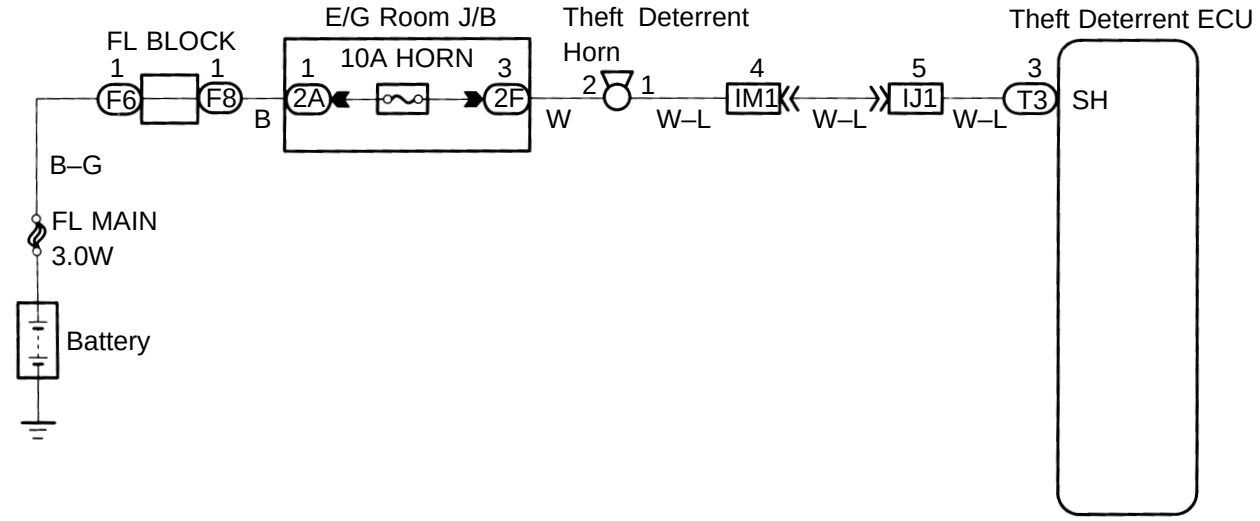
Theft Deterrent Horn Circuit

CIRCUIT DESCRIPTION

When the theft deterrent system is activated, contact (a) and contact (b) in the ECU close alternately in cycles of approximately 0.2 sec., causing the theft deterrent horn to blow (See the wiring diagram below).
In this condition, if any of the following operations is done, the contact (a) in the ECU opens, thus stopping the theft deterrent horn from blowing:

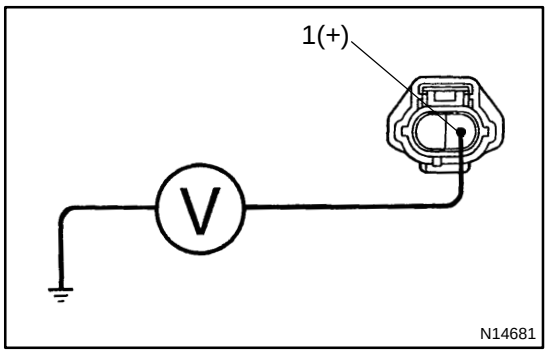
(1) Unlock the front LH or RH door with key.
(2) Turn the ignition switch to ACC or ON position.
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 60 seconds.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal 1 of theft deterrent horn connector and body ground.**

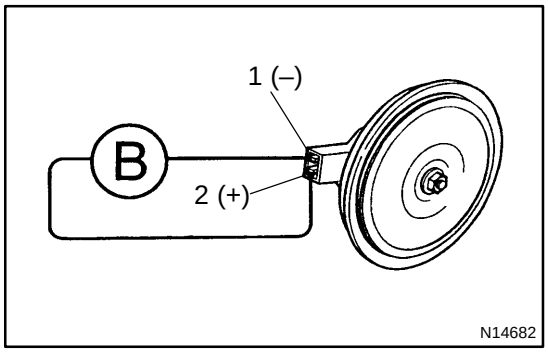


PREPARATION:
Remove the theft deterrent horn and disconnect the connector.
CHECK:
Measure voltage between terminal 1 of theft deterrent horn connector and body ground.
OK:
Voltage: 10~14V

NG → **Check and repair harness and connector between HORN fuse and theft deterrent horn.**

OK

2	**Check theft deterrent horn.**



CHECK:
Connect positive (+) lead to terminal 1 and negative (–) lead to terminal 2 to theft deterrent horn connector.

OK:

Theft deterrent horn blows.

NG → **Replace theft deterrent horn.**

OK

3	**Check harness and connector between theft deterrent ECU and theft deterrent horn (See page IN–27).**

NG → **Check and repair harness or connector.**

OK

Check and replace theft deterrent ECU.

DI01Z–01

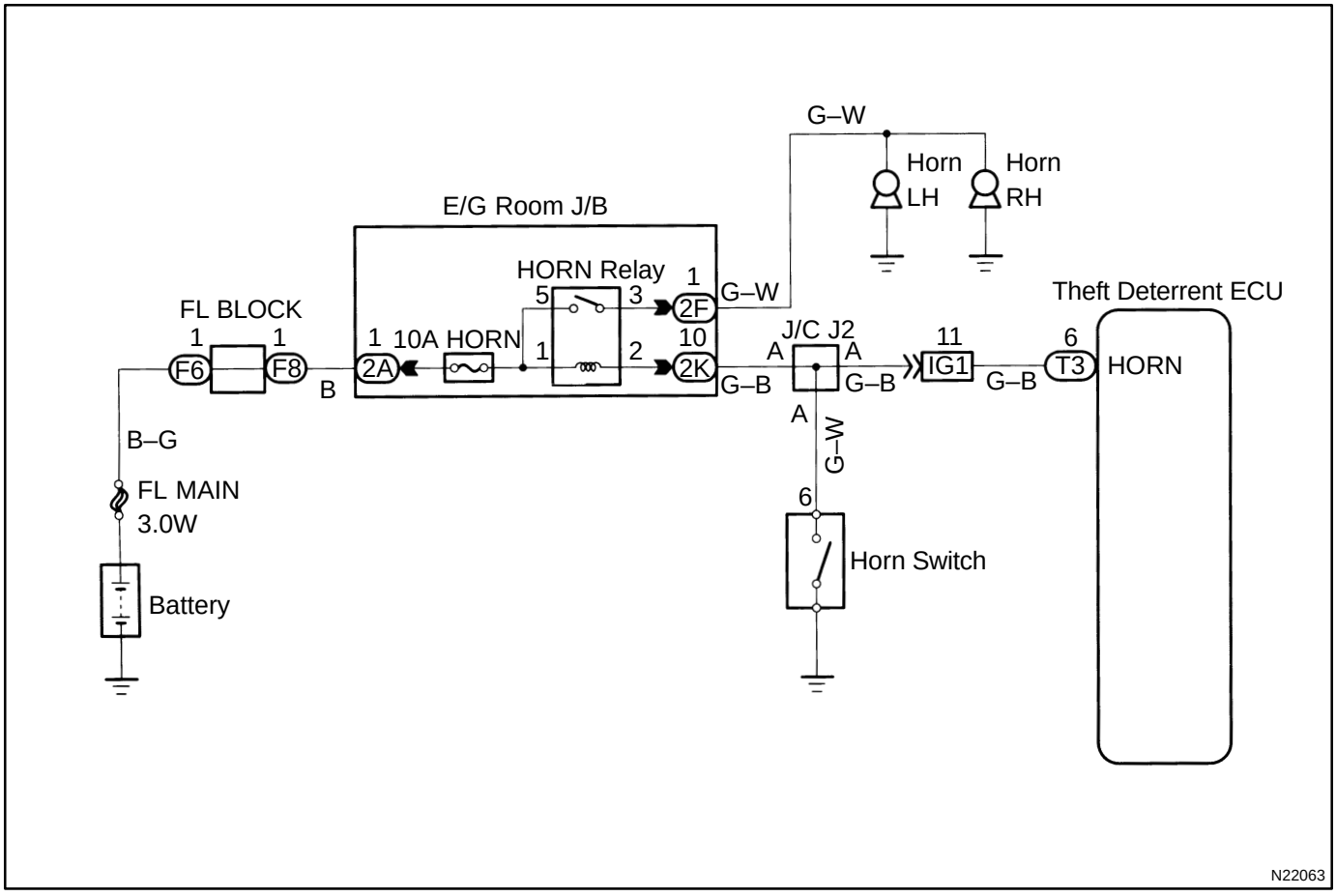
Horn Relay Circuit

CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the Tr in the ECU to switch on and off in approximately 0.4 sec. cycles. This switches the horn relay on and off, thus the horns blow (See the wiring diagram below). In this condition, if any of the following operations is done, the Tr in the ECU goes off and the horn relay switches off, thus stopping the horns from blowing:

(1) Unlock the front LH or RH door with key.
(2) Turn the ignition switch to ACC or ON position.
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 60 seconds.

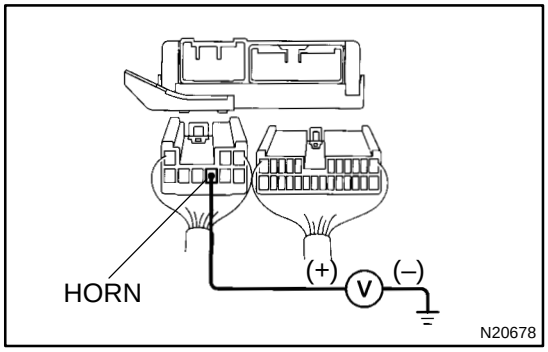
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
The flow chart below is based on the premise that the horns blow normally whenever the horn switch is operated. If horn operation is not normal when the horn switch is operated, check the horn switch.

1	**Check voltage between terminal HORN of theft deterrent ECU connector and body ground.**



PREPARATION:
Disconnect the theft deterrent ECU connectors.
CHECK:
Measure voltage between terminal HORN of theft deterrent ECU connector and body ground.
OK:
Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and horn relay.**

OK

Check and replace theft deterrent ECU.

DI020–01

Headlight Control Relay Circuit

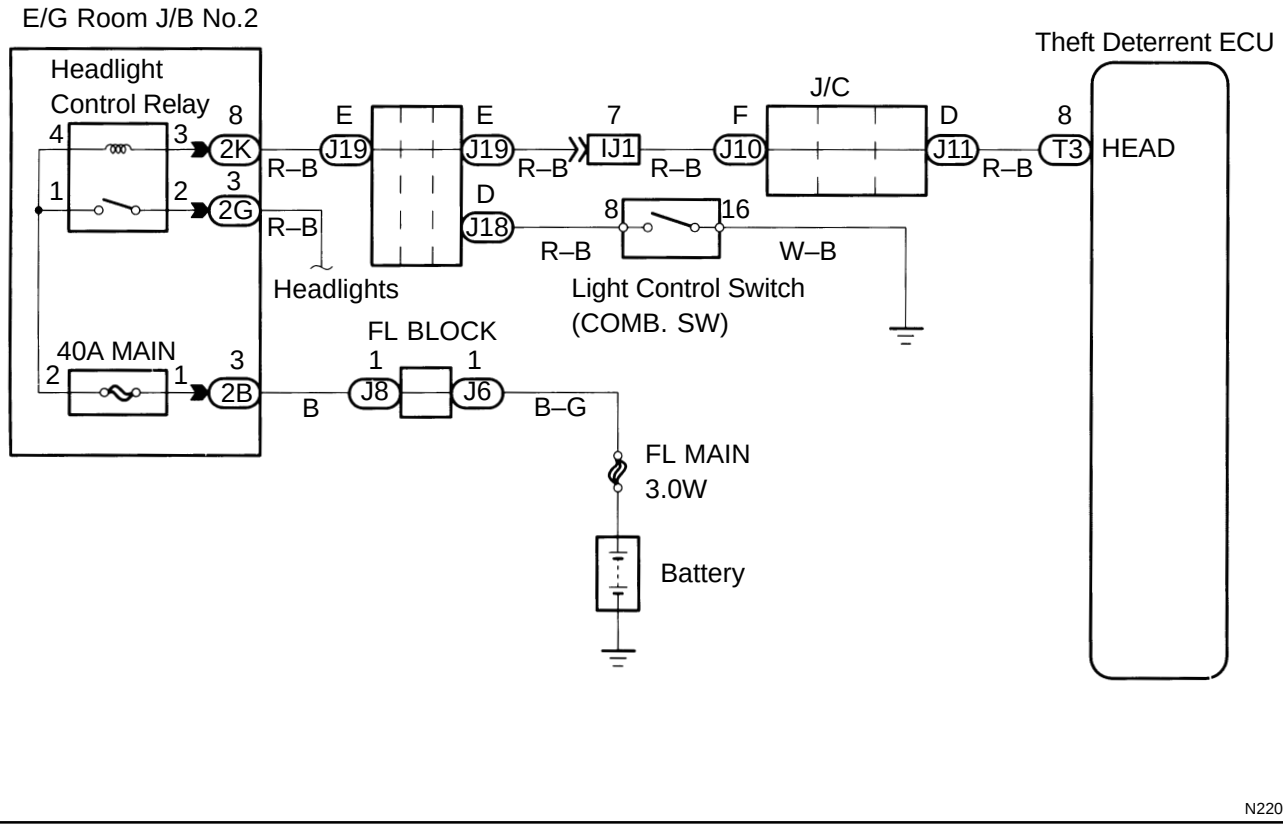
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the Tr in the ECU to switch on and off at approximately 0.4 sec. intervals. This switches the headlight control relay on and off, thus flashing the headlights (See the wiring diagram below).

In this condition, if any of the following operations is done, the Tr in the ECU goes off and the headlight control relay switches off, thus stopping the headlights flashing:

(1) Unlock the front LH or RH door with key.
(2) Turn the ignition switch to ACC or ON position.
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 60 seconds.

WIRING DIAGRAM

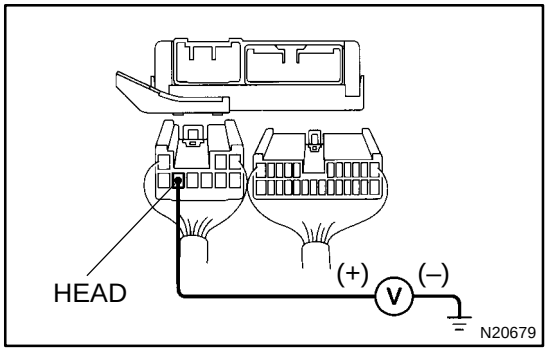


INSPECTION PROCEDURE

HINT:

The flow chart below is based on the premise that the headlights light up normally whenever the light control switch is operated. If headlight operation is not normal when the light control switch is operated, proceed to troubleshooting on page BE–2.

1	**Check voltage between terminal HEAD of theft deterrent ECU connector and body ground.**



PREPARATION:

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminal HEAD of theft deterrent ECU connector and body ground.

OK:

Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and headlight control relay (See page IN–27).**

OK →

Check and replace theft deterrent ECU.

DI021–01

Taillight Control Relay Circuit

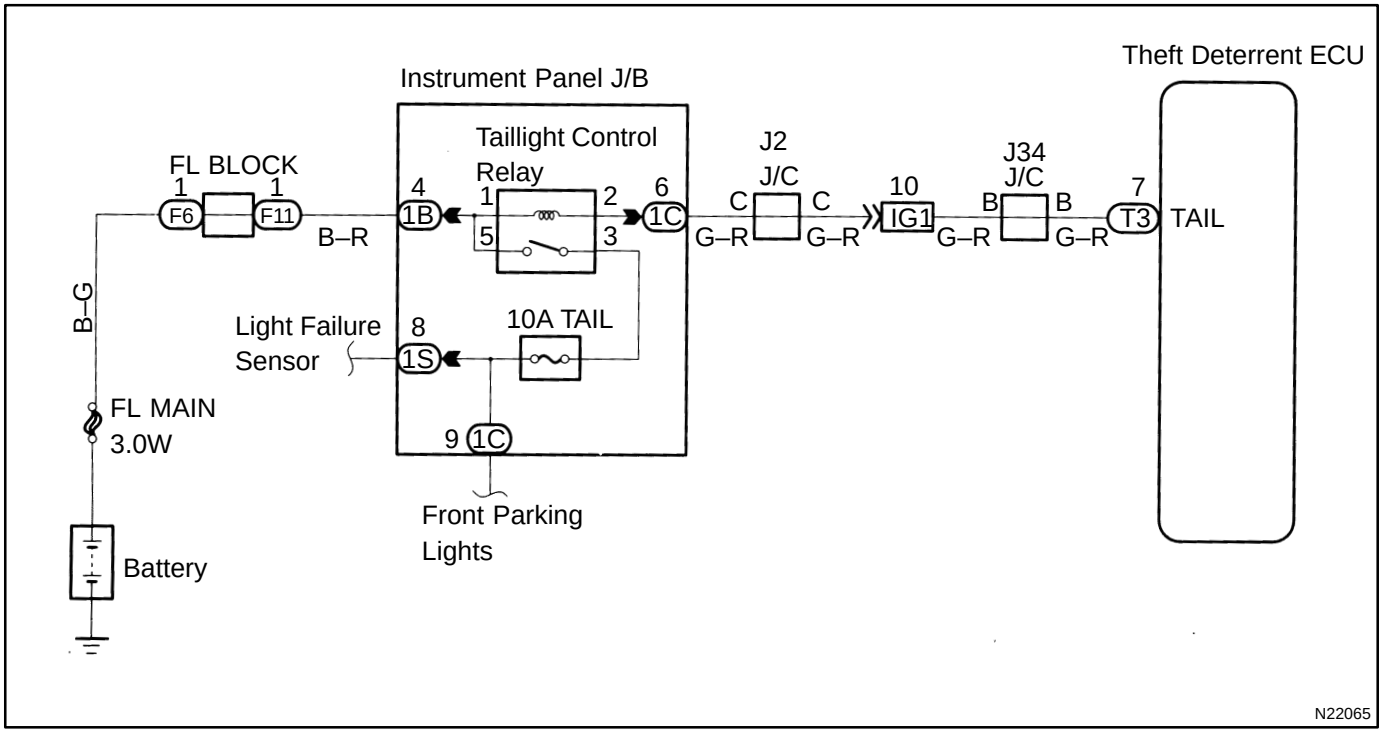
CIRCUIT DESCRIPTION

When the theft deterrent system is activated, it causes the Tr in the ECU to switch on and off at approximately 0.4 sec. intervals. This switches the taillight control relay on and off, thus flashing the taillights (See the wiring diagram below).

In this condition, if any of the following operations is done, the Tr in the ECU goes off and the taillight control relay switches off, thus stopping the taillights flashing:

(1) Unlock the front LH or RH door with key.
(2) Turn the ignition switch to ACC or ON position.
(3) Unlock the doors with the wireless door lock control system.
(4) Wait for approximately 60 seconds.

WIRING DIAGRAM

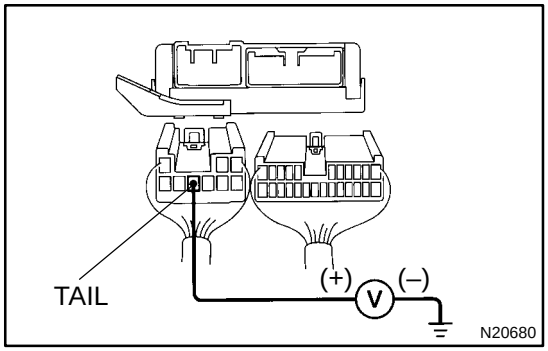


INSPECTION PROCEDURE

HINT:

The flow chart below is based on the premise that the taillights light up normally whenever the light control switch is operated. If taillight operation is not normal when the light control switch is operated, proceed to troubleshooting on page BE–2.

1	**Check voltage between terminal TAIL of theft deterrent ECU connector and body ground.**



PREPARATION:

Disconnect the theft deterrent ECU connector.

CHECK:

Measure voltage between terminal TAIL of theft deterrent ECU connector and body ground.

OK:

Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and taillight control relay (See page IN–27).**

OK

Check and replace theft deterrent ECU.

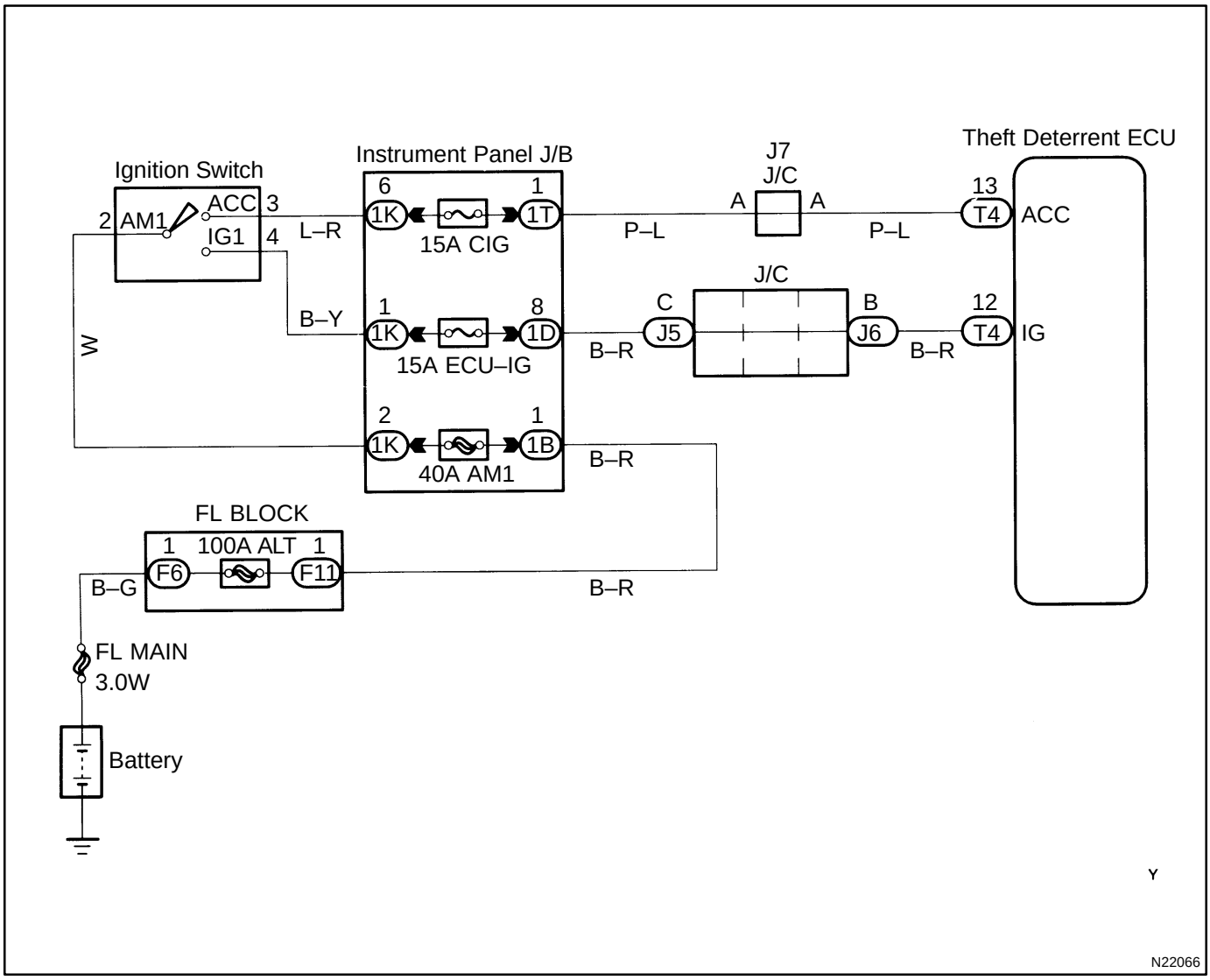
DI022–01

Ignition Switch Circuit

CIRCUIT DESCRIPTION

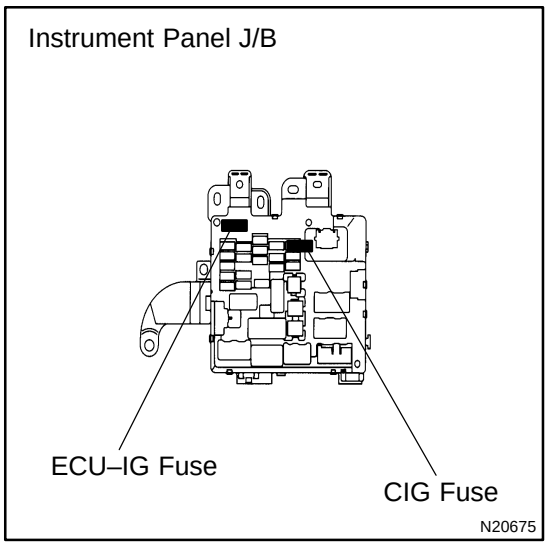
When the ignition switch is turned to the ACC position, battery positive voltage is applied to the terminal ACC of the ECU. Also, if the ignition switch is turned to the ON position, battery positive voltage is applied to the terminals ACC and IG of the ECU. When the battery positive voltage is applied to the terminal ACC of the ECU while the theft deterrent system is activated, the warning stops. Furthermore, power supplied from the terminals ACC and IG of the ECU is used as power for the door courtesy switch, and position switch, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check CIG and ECU–IG fuses.



PREPARATION:
(a) Remove the fuse box opening cover.
(b) Remove CIG and ECU–IG fuses from instrument panel junction block.

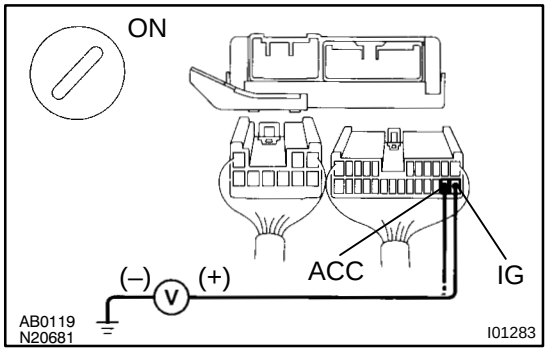
CHECK:
Check continuity of CIG and ECU–IG fuses.

OK:
Continuity

NG → **Check for short in all the harness and components connected to the CIG and ECU–IG fuses (See attached wiring diagram).**

OK →

2	Check voltage between terminals IG and ACC of theft deterrent ECU and body ground.



PREPARATION:
(a) Disconnect the theft deterrent ECU connectors.
(b) Turn ignition switch ON.

CHECK:
Measure voltage between terminals IG and ACC of theft deterrent ECU connector and body ground.

OK:
Voltage: 10~14V

NG → **Check and repair harness and connector between theft deterrent ECU and battery (See page IN–27).**

OK →

Check and replace theft deterrent ECU.

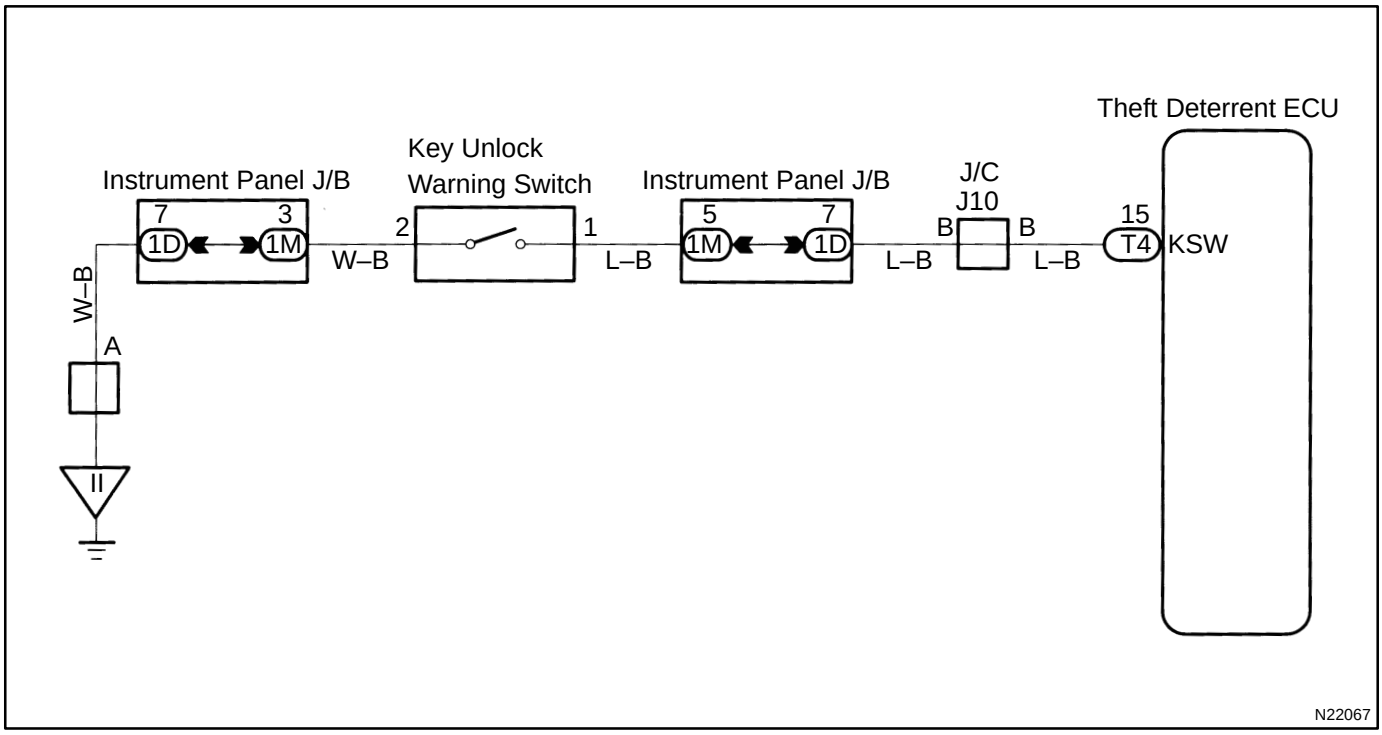
DI023–01

Key Unlock Warning Switch Circuit

CIRCUIT DESCRIPTION

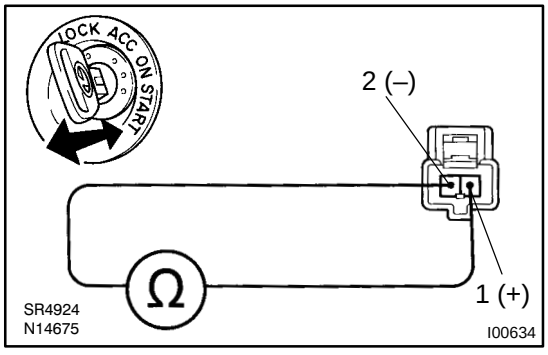
The key unlock warning switch goes on when the ignition key is inserted in the key cylinder and goes off when the ignition key is removed.
The ECU operates the key confinement prevention function while the key unlock warning switch is on.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check key unlock warning switch.**



PREPARATION:
Disconnect key unlock warning switch connector.
CHECK:
Check continuity between terminal 1 and 2 of key unlock warning switch connector, when the key is inserted to the key cylinder or removed.
OK:

Switch position	Tester connection	Specified condition
ON (Key inserted)	1 – 2	Continuity
OFF (Key removed)	–	No continuity

NG	**Replace key unlock warning switch.**

OK

2	**Check harness and connectors between ECU and key unlock warning switch, key unlock warning switch and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown on matrix chart (See page DI–405).

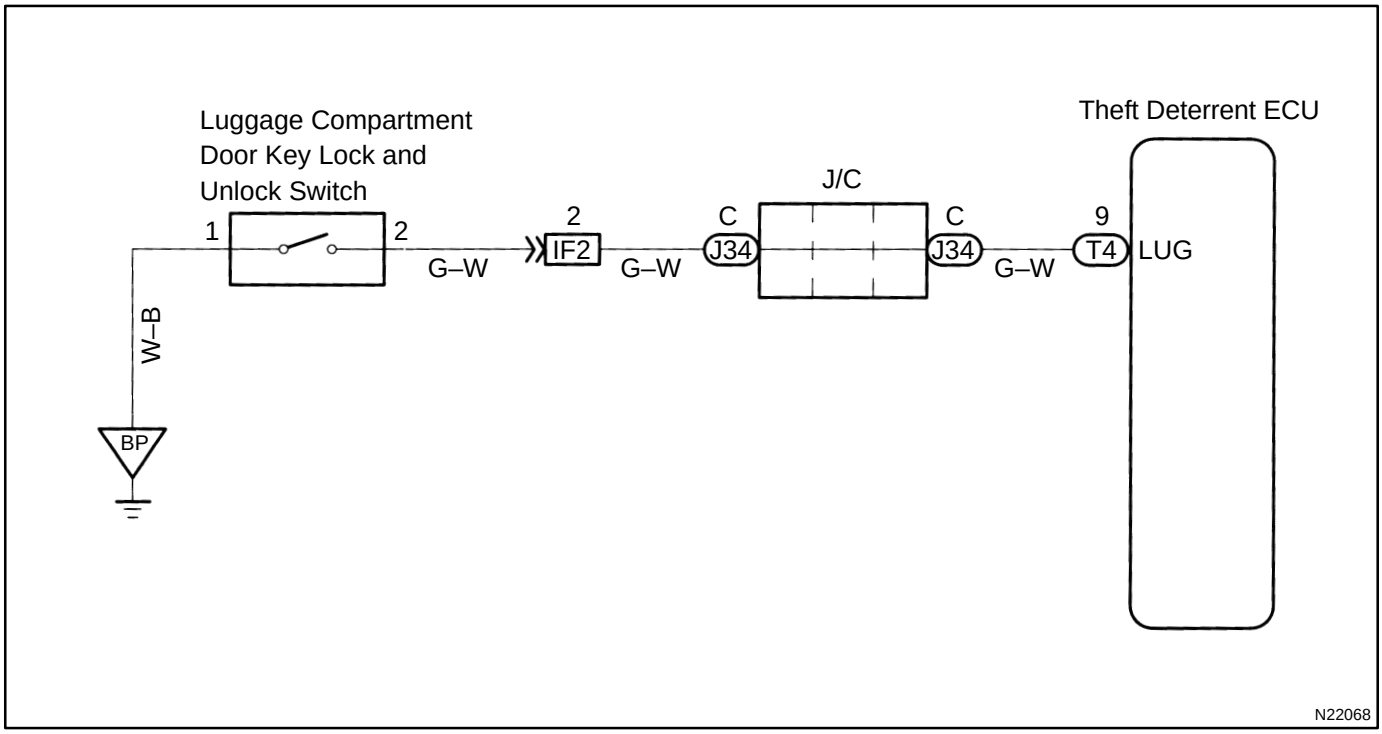
DI024–01

Luggage Compartment Door Key Lock and Unlock Switch Circuit

CIRCUIT DESCRIPTION

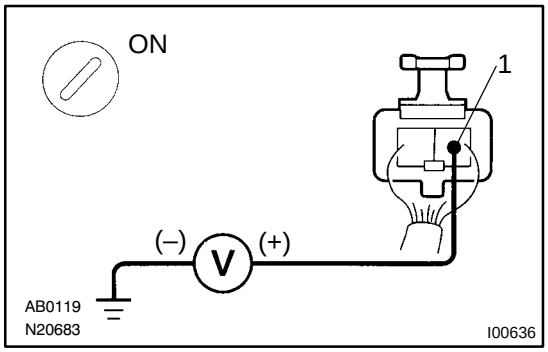
The luggage compartment door key lock and unlock switch goes on when the luggage compartment door key cylinder is turned to the unlock side with the key.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal 1 of luggage compartment door key lock and unlock switch connector and body ground.**



PREPARATION:

(a) Remove luggage compartment door trim.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal 1 of luggage compartment door key lock and unlock switch connector and body ground, when the key is turned to the unlock side and not turned.

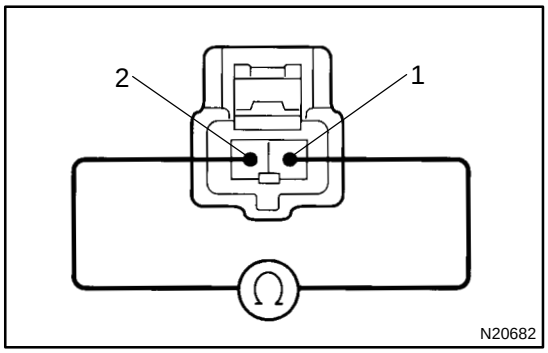
OK:

Key operation	Voltage
Turned to the unlock side	0 V
Not turned	Battery positive voltage

OK	**Check and replace theft deterrent ECU.*1**

NG

2	Check luggage compartment door key lock and unlock switch.



PREPARATION:
Disconnect luggage compartment door key lock and unlock switch connector.

CHECK:
Check continuity between terminals 1 and 2, when the key is turned to the unlock side and not turned.

OK:

Key operation	Tester connection	Specified condition
Turned to unlock	1 – 2	Continuity
Not turned	–	No continuity

NG → **Repair or replace luggage compartment door key lock and unlock switch.**

OK

3	Check harness and connector between theft deterrent ECU and key lock and unlock switch, key lock and unlock switch and body ground (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

Check and replace theft deterrent ECU.

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown on matrix chart (See page DI–405).

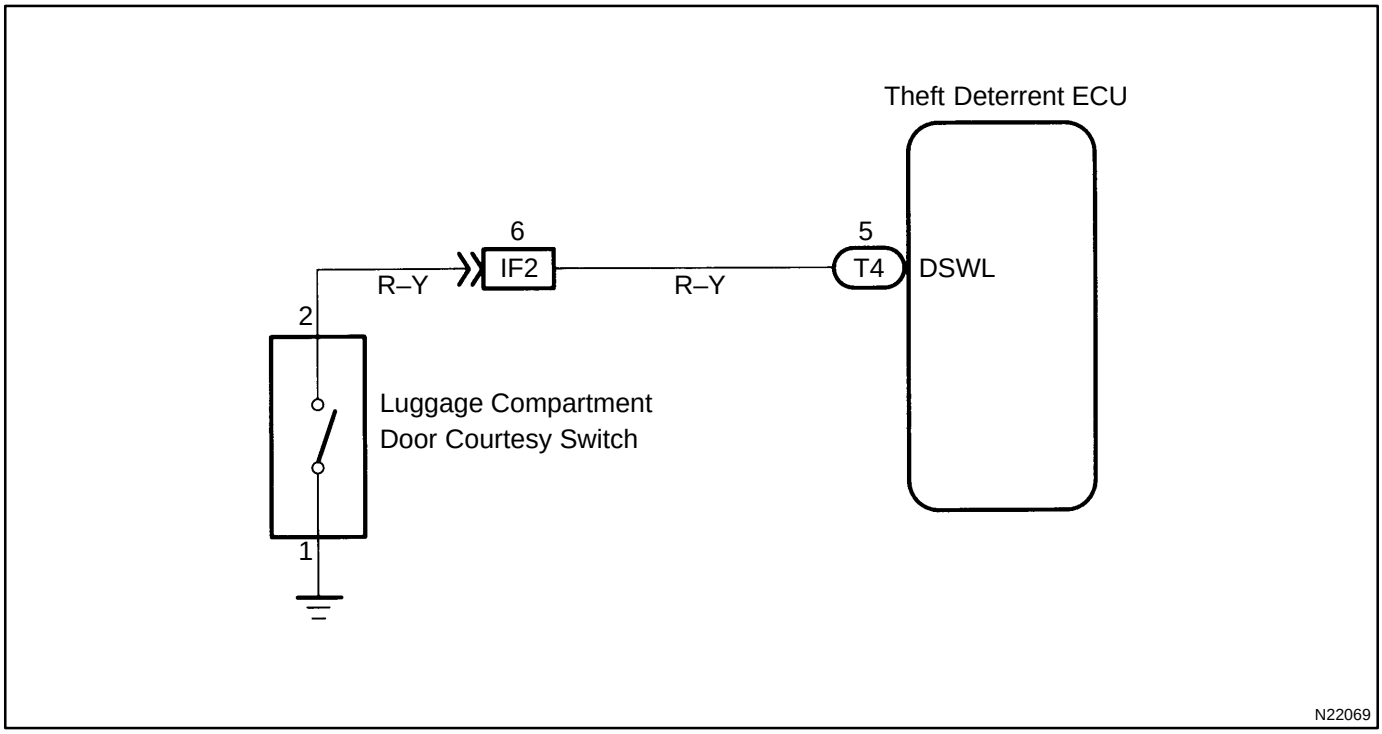
DI025–01

Luggage compartment Door Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The luggage compartment door courtesy switch goes on when luggage compartment door is opened and goes off when the luggage compartment door is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of luggage compartment door courtesy light.**

CHECK:

Check that luggage compartment door courtesy light goes off when luggage compartment door courtesy switch is pushed, and comes on when switch is not pushed.

NG → **Check and repair luggage compartment door courtesy light circuit (See page BE–46).**

OK

2	**Check for open in harness and connector between theft deterrent ECU and luggage compartment door courtesy switch (See page IN–27).**

NG → **Repair or replace harness or connectors.**

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown on matrix chart (See page DI–405).

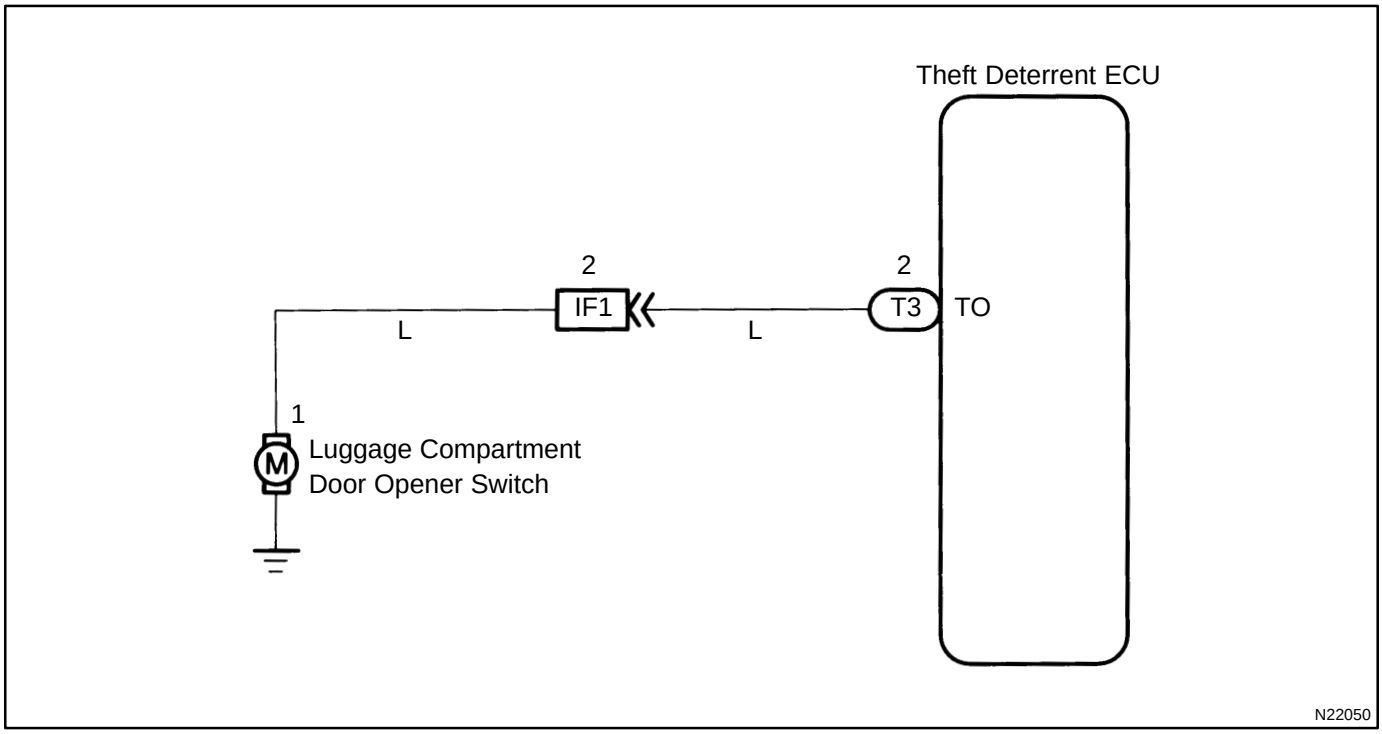
DI026–01

Luggage Compartment Door Opener Motor Circuit

CIRCUIT DESCRIPTION

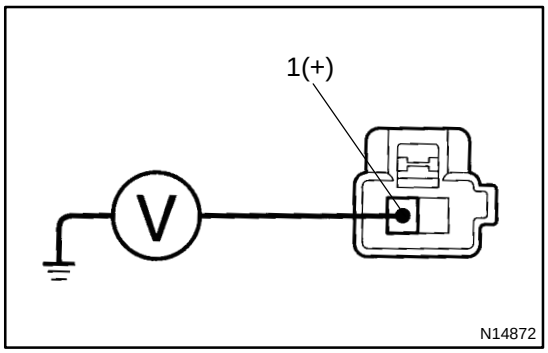
This circuit unlocks the luggage compartment door when the ECU sends signals to the luggage compartment door opener motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal 1 of luggage compartment door opener motor and body ground.**



PREPARATION:

Disconnect the courtesy switch and opener motor connector.

CHECK:

Measure voltage between terminal 1 of luggage compartment door opener motor and body ground, when opener switch is pulled and not pulled.

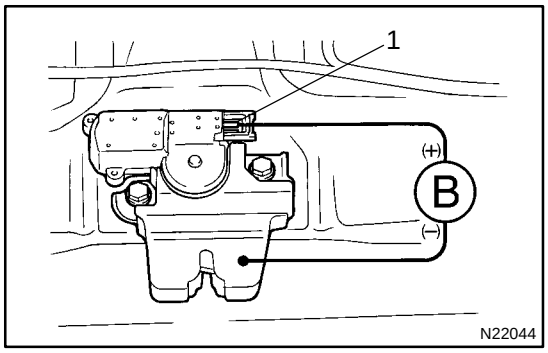
OK:

Opener switch	Voltage
Pulled	5 – 14 V
Not pulled	Below 1 V

NG	**Check harness and connectors between ECU and luggage compartment door opener motor (See page IN–27).**

OK

2	Check luggage compartment door opener motor.



PREPARATION:
Disconnect luggage compartment door courtesy switch and opener motor connector.
CHECK:
Connect positive (+) lead from the battery to terminal 1 and the negative (–) lead to the body ground.
OK:
Operated motor shaft and gear.
HINT:
Perform inspection in a short time (within 1 second).

NG → **Replace luggage compartment door opener motor.**

OK

Proceed to next circuit inspection shown on matrix chart (See page DI–405).

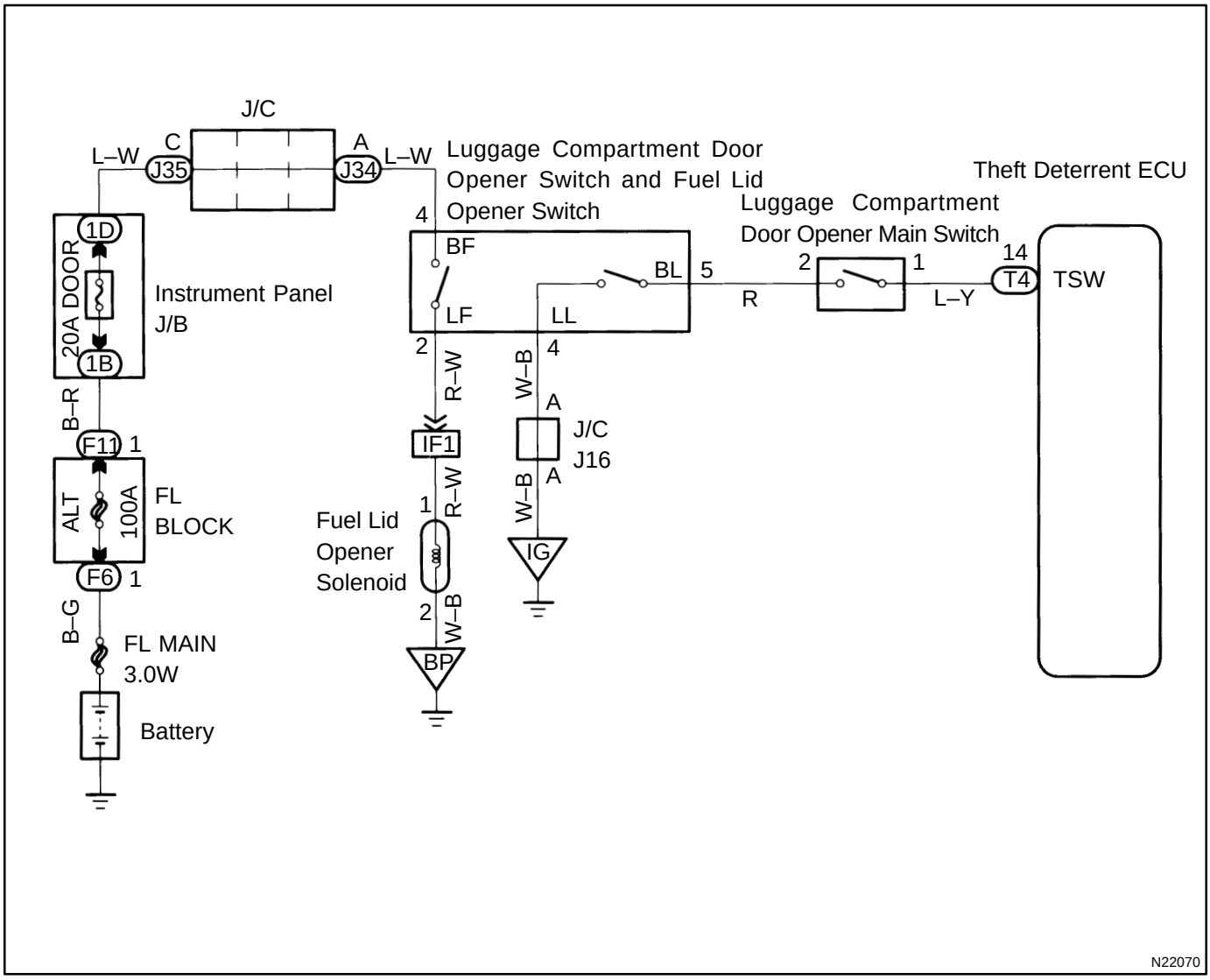
DI027–01

Luggage Compartment Door Opener Main Switch and Opener Switch Circuit

CIRCUIT DESCRIPTION

The luggage compartment door opener main switch is off when it is pushed in, and the luggage compartment door opener switch is on when it is pulled.
The ECU energizes the luggage compartment door opener solenoid only when the main switch and opener switch are together.

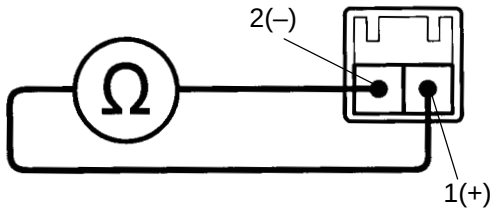
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check luggage compartment door opener main switch and opener switch.**

Luggage Compartment Door Opener Main Switch



PREPARATION:

Disconnect the luggage compartment door opener main switch and opener switch connector.

CHECK:

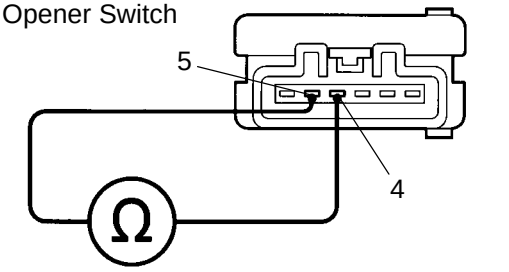
(a) Check luggage compartment door opener main switch.

(b) Check continuity between terminals of main switch connector.

OK:

Switch position	Tester connection	Specified condition
ON	1 – 2	Continuity
OFF	–	No continuity

Luggage Compartment Door Opener Switch



CHECK:

(a) Check luggage compartment door opener switch.

(b) Check continuity between terminals of main switch and opener switch connector.

OK:

Switch position	Tester connection	Specified condition
ON	4 – 5	Continuity
OFF	–	No continuity

NG → **Replace luggage compartment door opener main switch and/or opener switch.**

OK

2	**Check harness and connector between ECU and main switch, opener switch and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Proceed to next circuit inspection shown on matrix chart (See page DI–405).

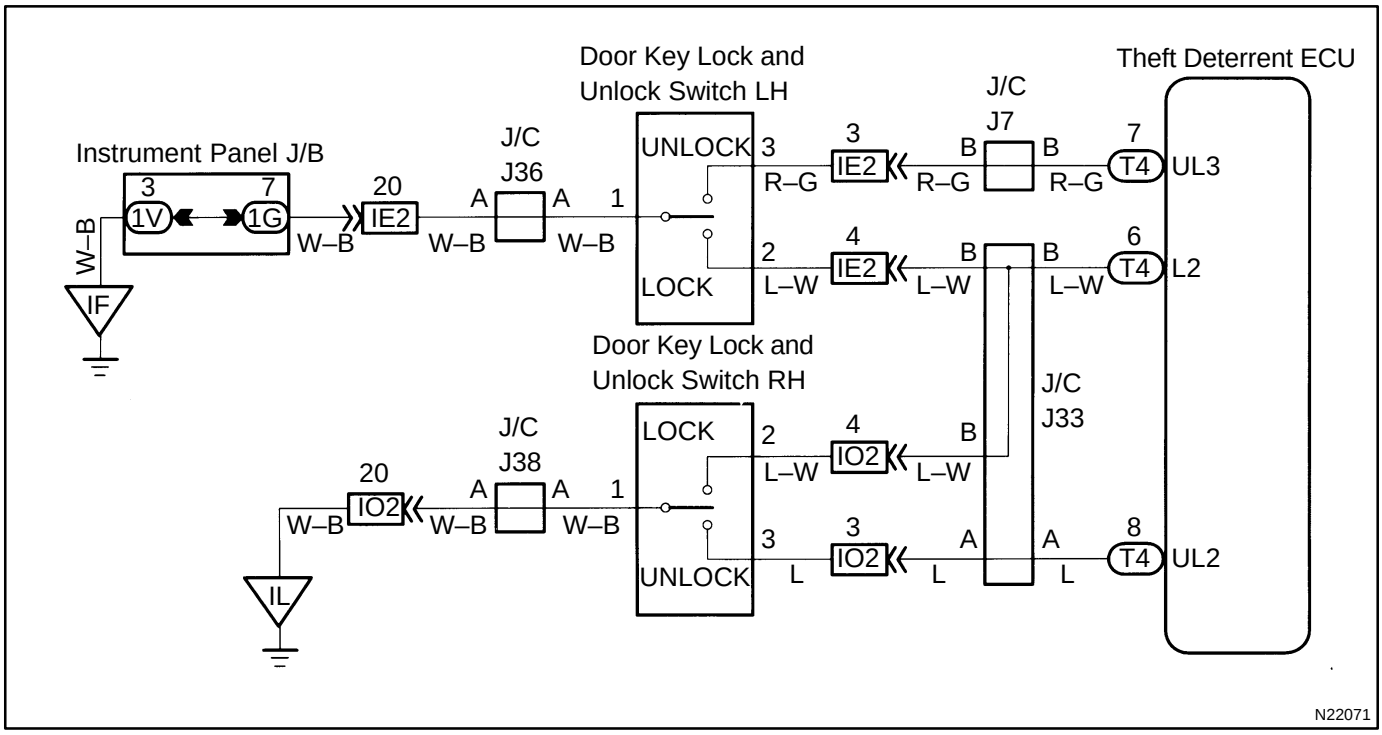
DI028–01

Door Key Lock and Unlock Switch Circuit

CIRCUIT DESCRIPTION

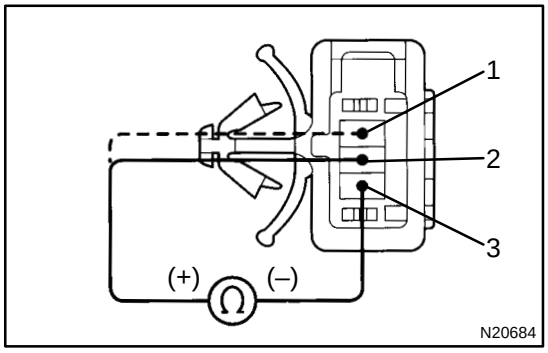
The door key lock and unlock switch is built in the door key cylinder. When the key is turned to the lock side, terminal 1 of the switch is grounded and when the key is turned to the unlock side, terminal 2 of the switch is grounded.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check door key lock and unlock switch.**



PREPARATION:

(a) Remove the door trim and service hole cover.

(b) Disconnect the door key lock and unlock switch connector.

CHECK:

Check continuity between terminals 1, 2 and 3 of door key lock and unlock switch connector, when door key lock and unlock switch is turned to the lock side, unlock side and not turned.

OK:

Switch position	Tester connection	Specified condition
Lock side	2 – 3	Continuity
Unlock side	1 – 3	Continuity
OFF	–	No continuity

NG → **Replace door key lock and unlock switch.**

OK

2	**Check harness and connectors between ECU and switch, switch and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown on matrix chart (See page DI–405).

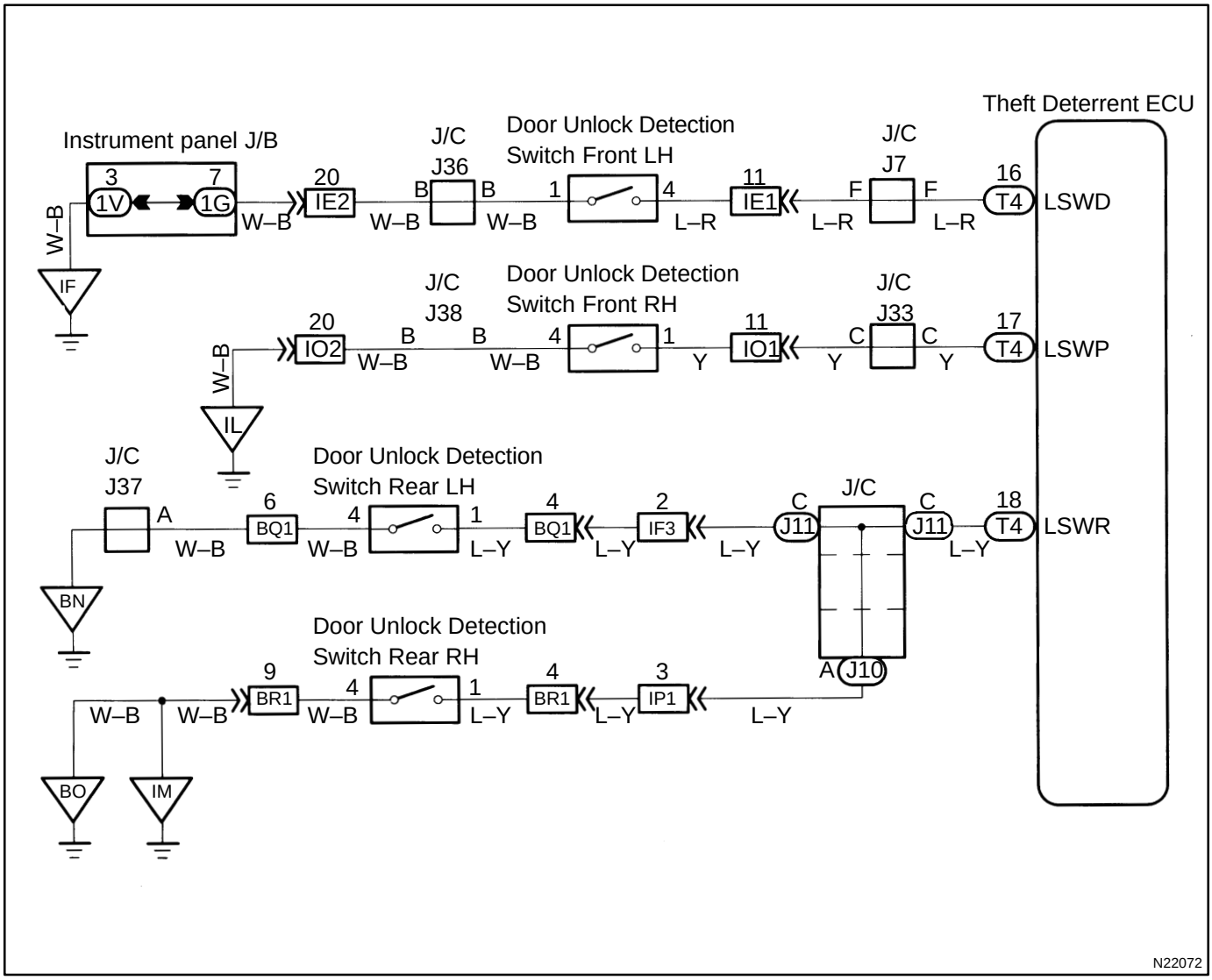
DI029–01

Door Unlock Detection Switch Circuit

CIRCUIT DESCRIPTION

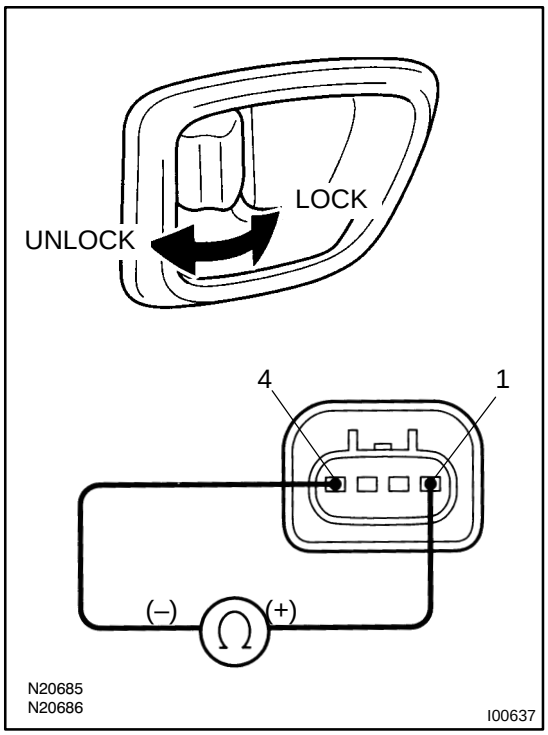
The door unlock detection switch is built in the door lock motor assembly. This switch is on when the door lock knob is in the unlock position and off when the lock knob is in the lock position. The ECU detects the door lock knob conditions is this circuit. It is used as one of the operating conditions for the key confinement prevention function.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check Door Unlock Detection Switch.



PREPARATION:

(a) Remove the door trim and service hole cover.

(b) Disconnect door unlock detection switch connector.

CHECK:

Check continuity between terminals 1 and 4 of door unlock detection switch connector, when the door lock knob is operated to the lock side and unlock side.

OK:

Switch Condition	Tester connection	Specified condition
Door unlock	1 – 4	Continuity
Door lock	–	No continuity

NG → **Replace door unlock detection switch.**

OK ↓

2	Check harness and connectors between ECU and door unlock detection switch, door unlock detection switch and body ground (See page IN–27).

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown on matrix chart (See page DI–405).

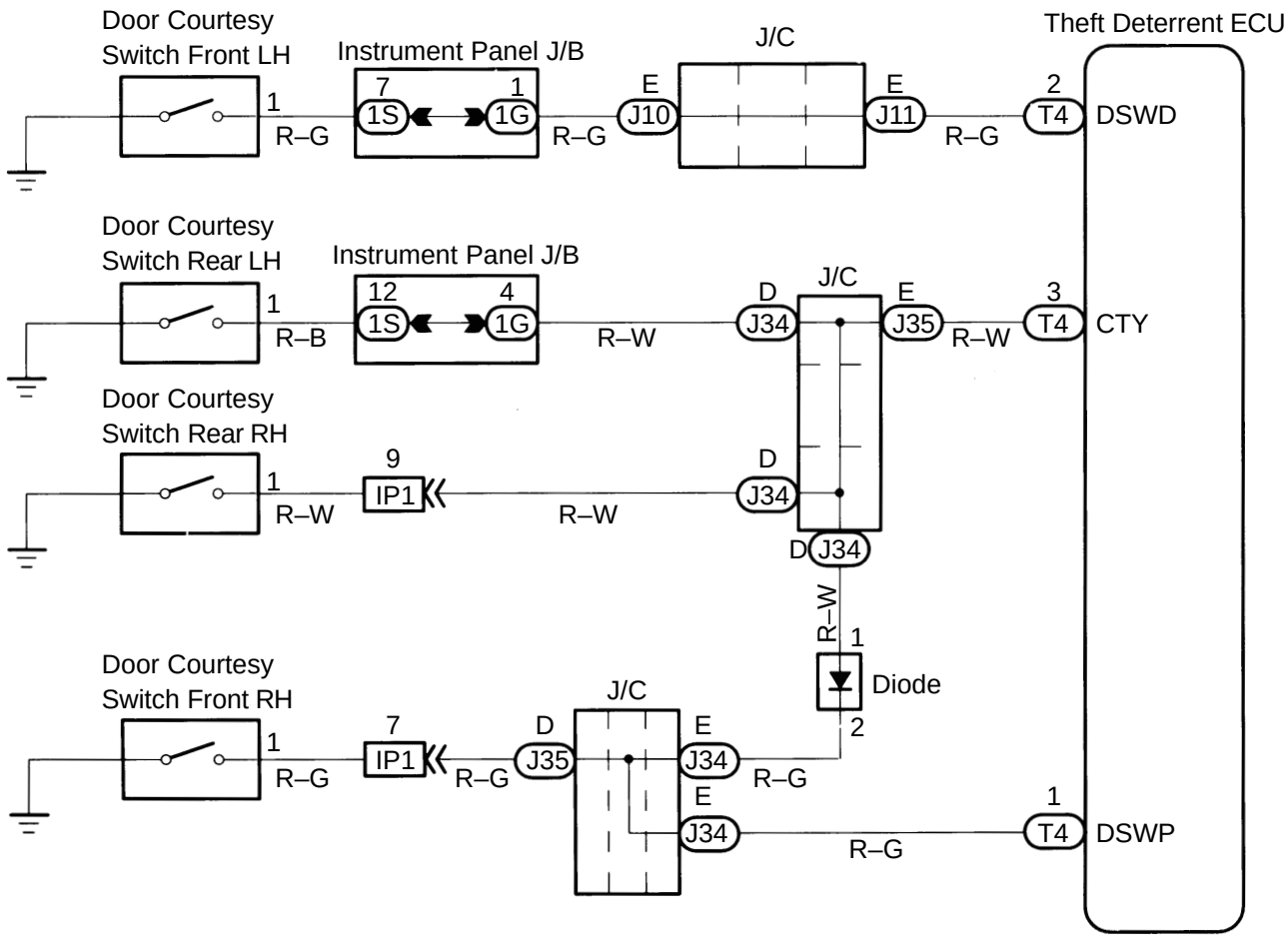
DI02A–01

Door Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The door courtesy switch goes on when the door is opened and goes off when the door is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of open door warning light.**

CHECK:

Check that open door warning light comes on when each door is opened, and goes off when all doors are closed.

NG	**Check and repair open door warning light circuit.**

OK

2	**Check for open in harness and connector between theft deterrent ECU and door courtesy switch (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace theft deterrent ECU.*1

*1: When there is a malfunction that the theft deterrent system cannot be set, proceed to the next numbered circuit inspection shown on matrix chart (See page DI–405).

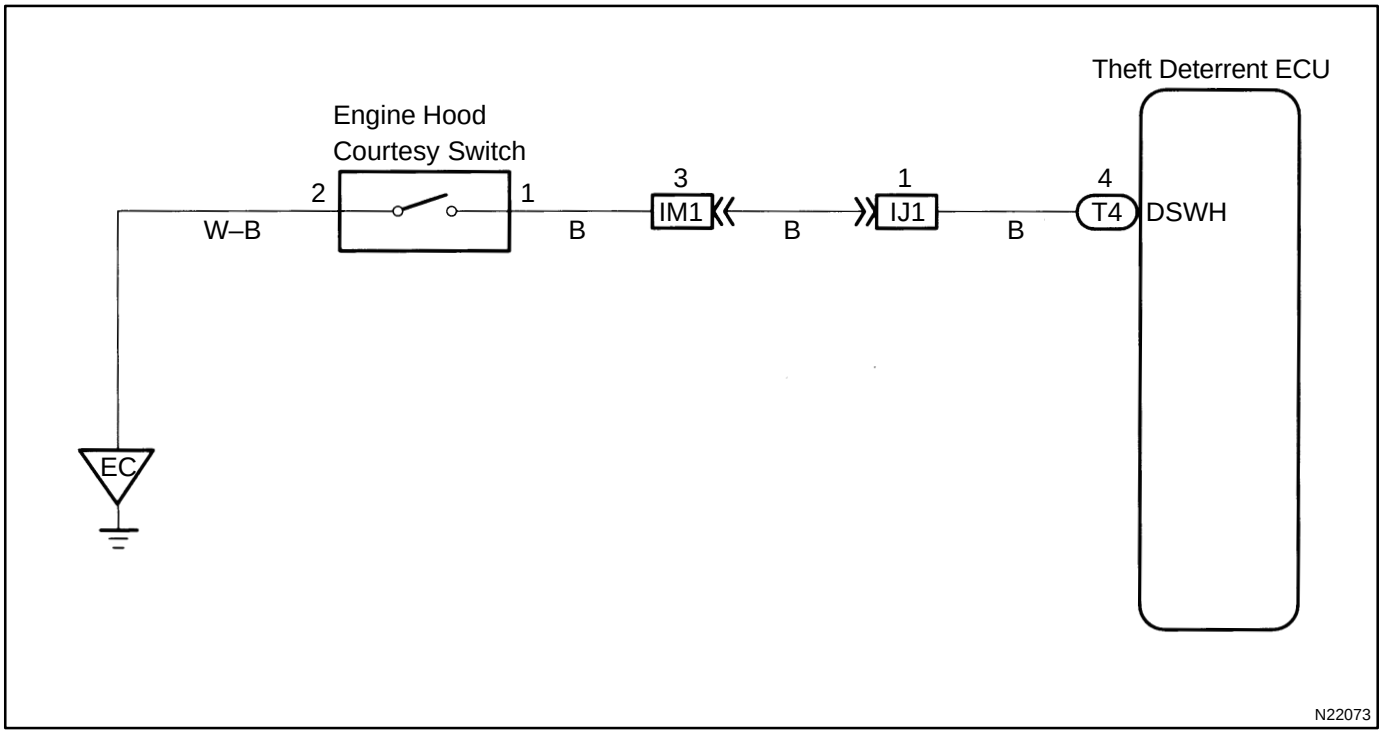
DI02B–01

Engine Hood Courtesy Switch Circuit

CIRCUIT DESCRIPTION

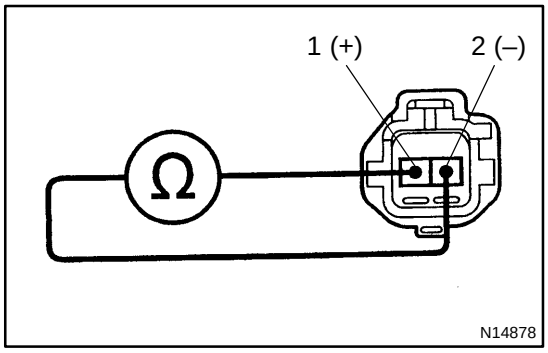
The engine hood courtesy switch is built into the engine hood lock assembly and goes on when the engine hood is opened and goes off when the engine hood is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check engine hood courtesy switch.**



PREPARATION:

(a) Remove engine hood lock assembly.

(b) Disconnect engine hood courtesy switch connector.

CHECK:

Check continuity between terminals 1 and 2 when engine hood lock is locked and unlocked.

OK:

Engine hood lock	Tester connection	Specified condition
LOCK	–	No continuity
UNLOCK	1 – 2	Continuity

NG → **Replace engine hood courtesy switch.**

OK

2	**Check harness and connector between theft deterrent ECU and switch, switch and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

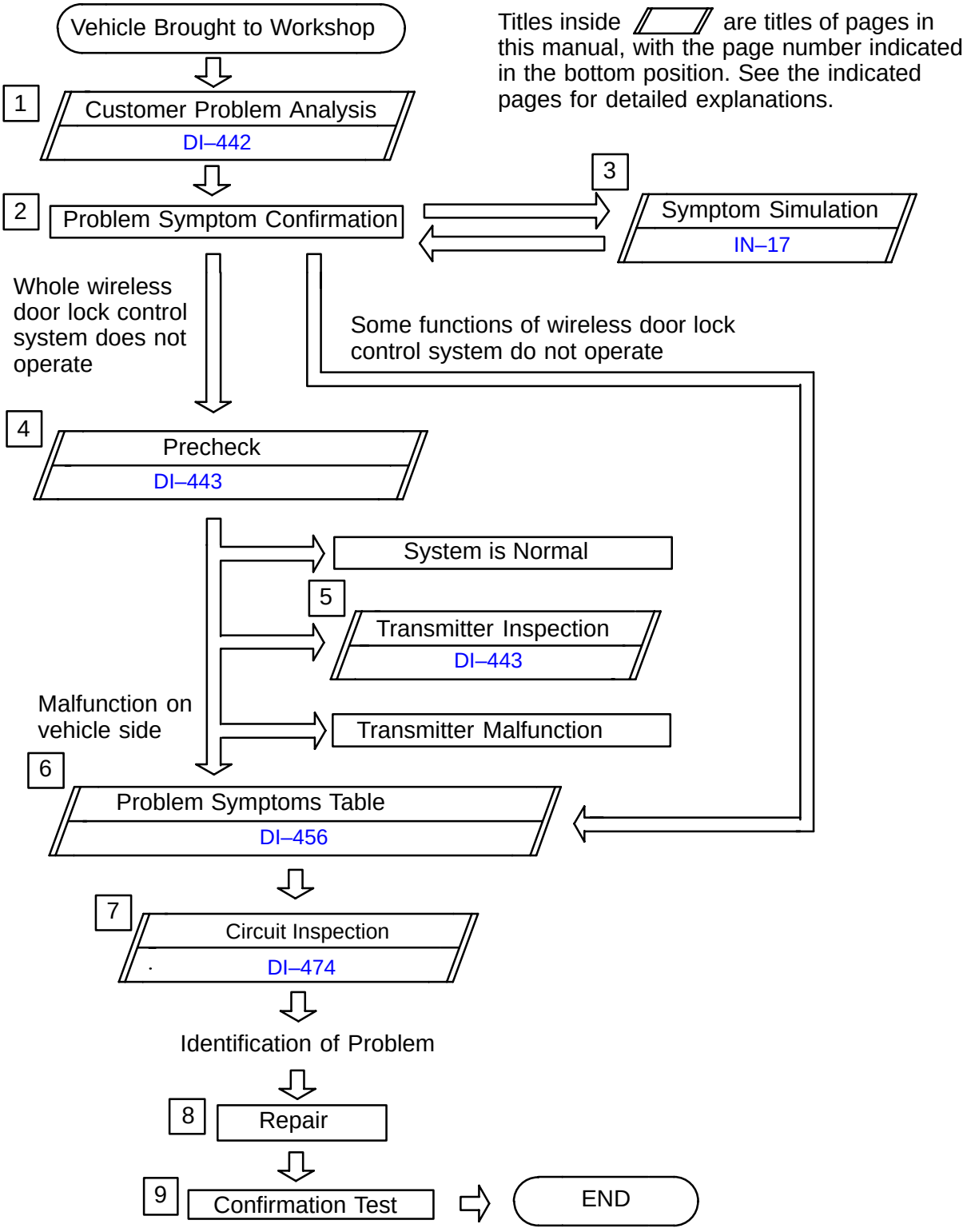
Check and replace theft deterrent ECU (See page IN–27).

WIRELESS DOOR LOCK CONTROL SYSTEM

DI0DQ–01

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:Troubleshooting of the wireless door lock control system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the wireless door lock control system, first make certain that the door lock control system is operating normally.
Perform troubleshooting in accodnce with procedure on the following page.



DI0DR–01

CUSTOMER PROBLEM ANALYSIS CHECK

WIRELESS DOOR LOCK CONTROL System Check Sheet

Inspector's Name _____

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	**km Miles**

Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (times/per day, month) ☐ Once only
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Others
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. ˚F (˚C))
	Place	☐ Everywhere ☐ Specific Locality( )
Date Transmitter Battery Last Replaced		/ /

Problem Symptom	☐ Whole wireless door lock control system does not operate.	
	☐ Only door unlock operation is not possible.	
	☐ Only door lock operation is not possible.	
	☐ Only key confinement prevention function is not possible.	
	☐ Wireless door lock function operates even each door is opened.	
	☐ Wireless door lock function incorrectly. (Although one door is unlocked, when the transmitter switch is pressed, all doors unlock.)	☐ When RH door is unlocked ☐ When LH door is unlocked
	☐ Others	

DI0DS–01

PRE–CHECK

Wireless function (Remote control) will not operate.

To make the vehicle be in the initialized condition.
Initialized condition is the condition when the following conditions are satisfied.
(1) Key plate has not been inserted in the ignition key cylinder.
(2) All the doors are closed. (Door warning light is off.)
(3) All the doors are locked.
(4) The buzzer volume is maximum.

↓

Basic function check
With a standard operation, when repeating the operations of UNLOCK switch and LOCK switch three times or more alternately, check the operation of UNLOCK – LOCK from 3rd time onward.
□Following procedures are standard operation.
(1) Depart about 1 M to the right direction from the outside handle of a driver's seat.
(2) Point the transmitter toward the vehicle and press either of transmitter switch for about 1 sec.
<Reference>
As of the security function, even the wireless function is normal, there may be the case that only UNLOCK operation will not work.

No ↓

Yes ↓

Normal
<Reference>
□Operative distance may differ depends on the operator, the way of holding or the position.
□Because of the use of weak electric wave, in case of strong wave or noise in the frequency used, there may be the case that operative distance gets shorter.

No

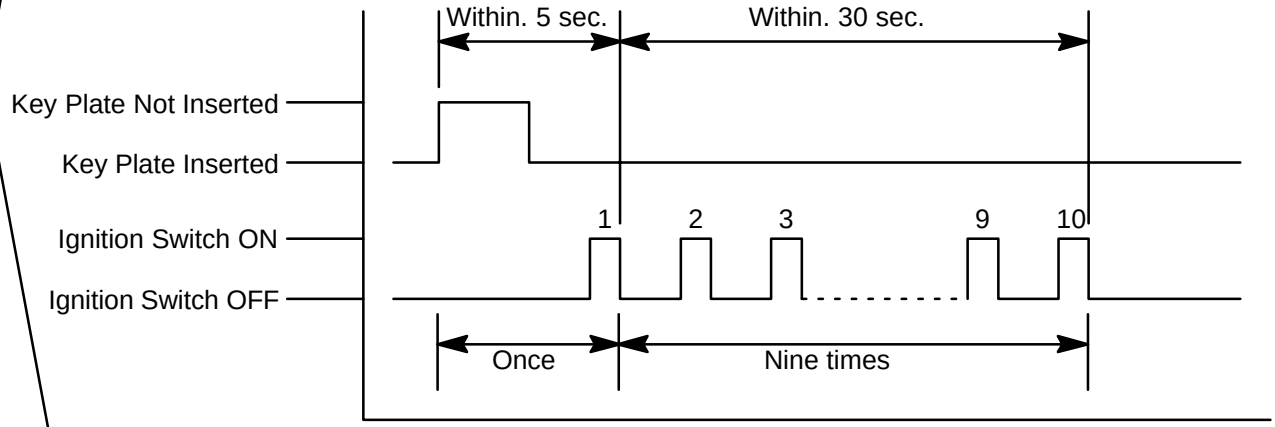
Transmitter battery check:
Charge the transmitter battery to a new or normal one, check UNLOCK operation of the transmitter with the standard operation.
<Reference>
☐New or normal battery is necessary.
☐Battery quality can be judged by checking the remnant volume of the battery.

Yes → Battery faulty.

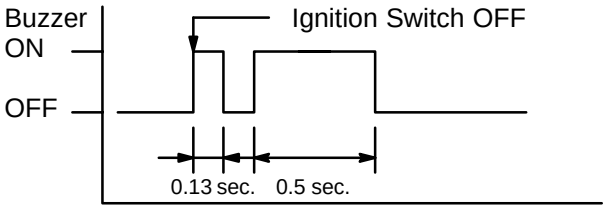
No

To make the vehicle be in the initialized condition.

Enter diagnostic mode:
If operation the wireless door lock ECU in the order of 1 through 2, the mode turns to diagnostic mode.
(1) Insert the key plate into the ignition key cylinder and pull out, then insert it again and turn the ignition switch OFF → ON → OFF 1 time.
(2) After completing the procedure (1) and within 30 seconds, turn the ignition switch OFF to ON to OFF nine times.
<Reference>
☐In the case that either one of (1) and (2) conditions is not satisfied, transfer to normal mode.



Diagnostic mode operation confirmation:
Check the buzzer output soon after the input operation of self diagnostic mode.



<Reference>
□Buzzer volume should be maximum despite the controller.

No

Is the method to input the diagnostic mode correct?

No

Not enter in diagnostic mode

Yes

Is the function of operation confirmation buzzer normal?

No

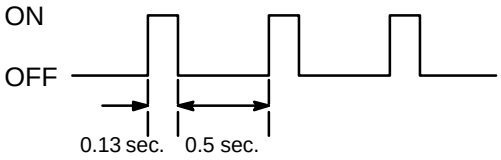
Buzzer faulty

Yes

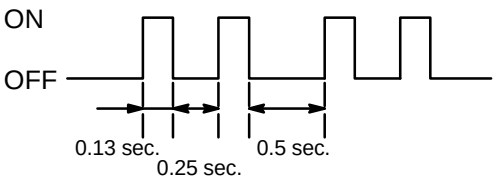
Yes

Confirmation of diagnostic mode:
Check buzzer output when pressing on each switch of transmitter.

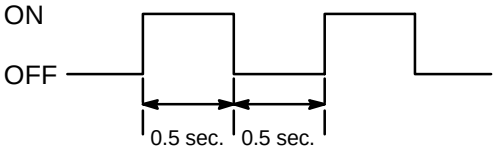
(1) Received normal wave of LOCK switch.



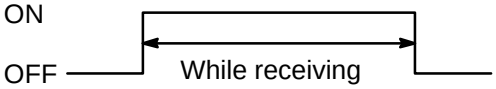
(2) Received normal wave of UNLOCK switch.



(3) Received normal wave of TRUNK switch.



(4) Compatibility of the recognition code or out from synchronization of rolling code.*.

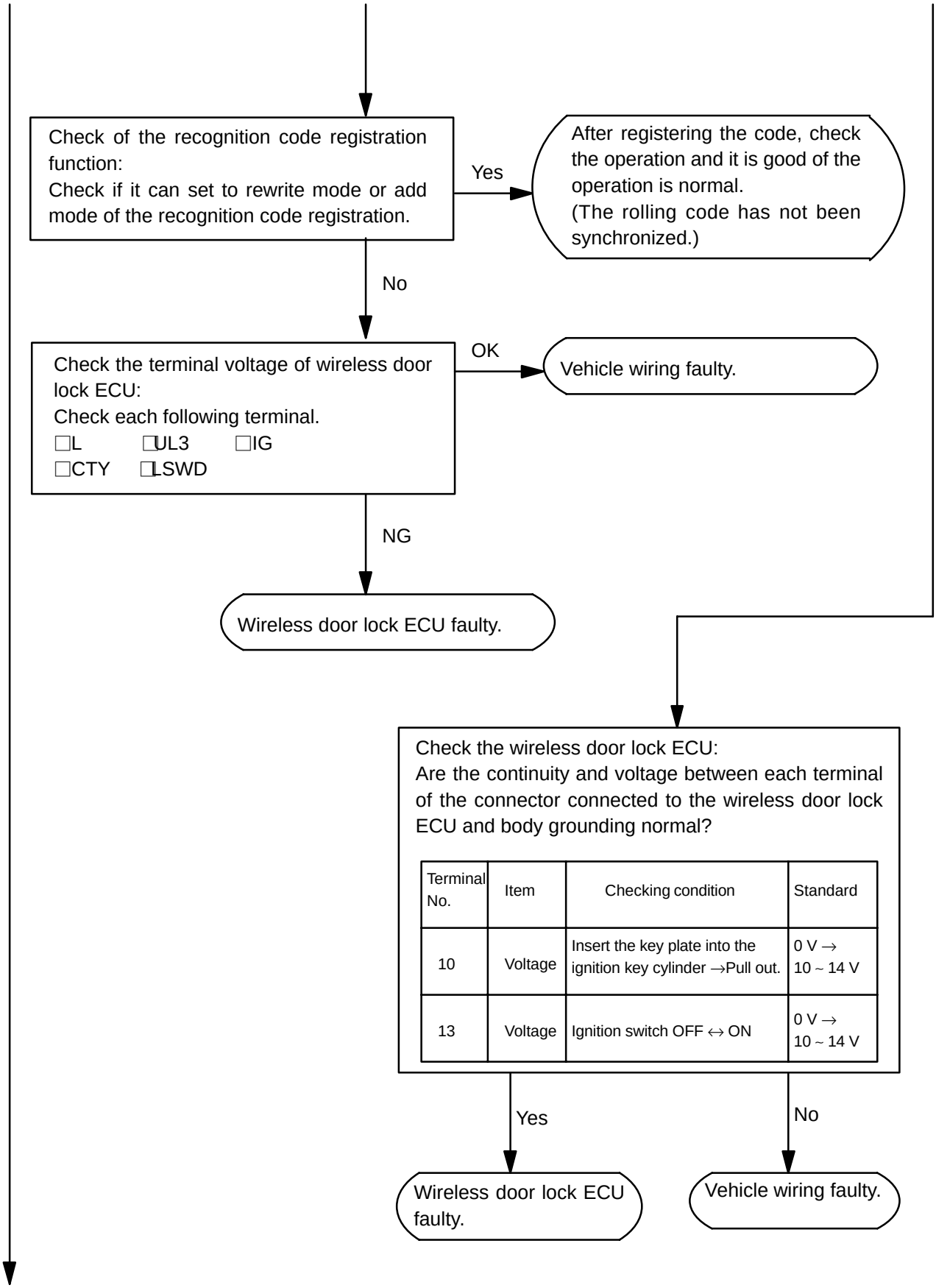


No response

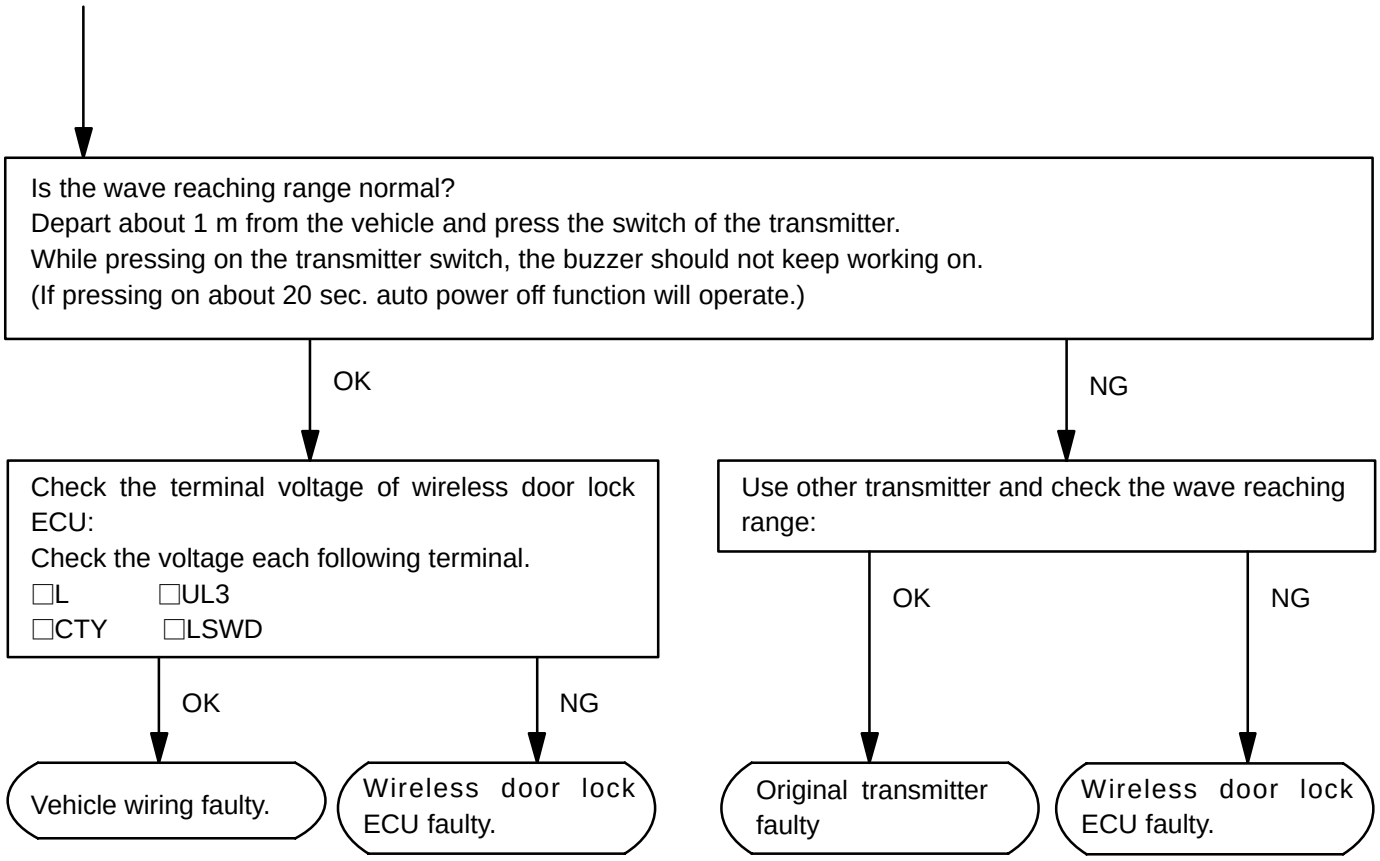
Transmitter faulty or wireless door lock ECU faulty.
<Reference>
□Use other (normal) transmitter and check with the diagnostic mode and in the case that the check result shows the transmitter faulty, it can be judged that wireless door lock ECU is normal.

In case of buzzer outputs from (1) ~ (3)

In case of buzzer outputs of (4)



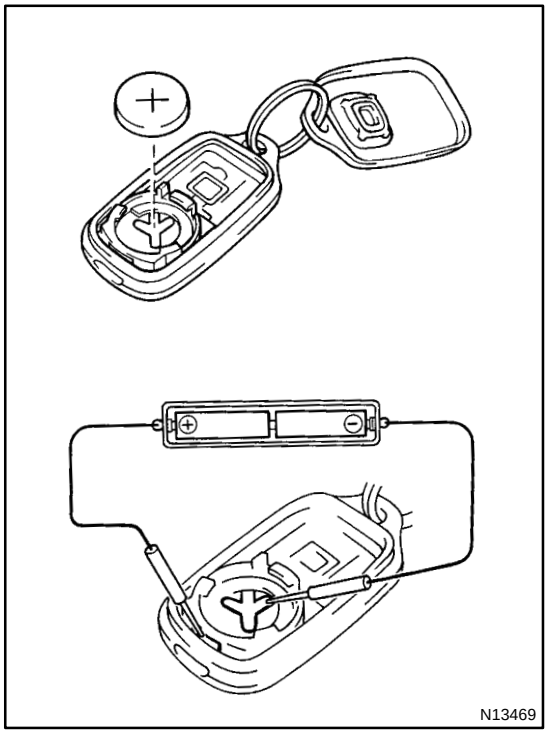
Terminal No.	Item	Checking condition	Standard
10	Voltage	Insert the key plate into the ignition key cylinder →Pull out.	0 V → 10 ~ 14 V
13	Voltage	Ignition switch OFF ↔ ON	0 V → 10 ~ 14 V



HINT: The rolling code is the code changing at each time when the wave is transmitted from the transmitter and is changing synchronized between transmitter side and ECU side.
When the rolling code is not synchronized between the transmitter and ECU, a symptom of ”Only LOCK operation is available.”appears.
In this case, it goes back to normal by synchronizing the rolling code.
(The method to synchronize it is the same as of the registration of the recognition code.)

1. TRANSMITTER INSPECTION

1	**Check the transmitter operation.**



HINT:
This inspection is not directly for the purpose of checking the capacity of the transmitter battery, but is performed when remote control operation becomes difficult or impossible, in order to ascertain if this is caused by low battery capacity.

PREPARATION:

(a) Using a screwdriver, pry outward the cover.
(b) Remove the battery.

CHECK:

(a) Connect 4 new 1.5 V dry–cell batteries in series. Connect the battery ~ terminal to the battery receptacle side terminal and the battery ⊖ terminal to the bottom terminal to provide 6 V to the transmitter.
(b) Push the wireless door lock remote control switch on the side of the transmitter body and operate the door lock by remote control.

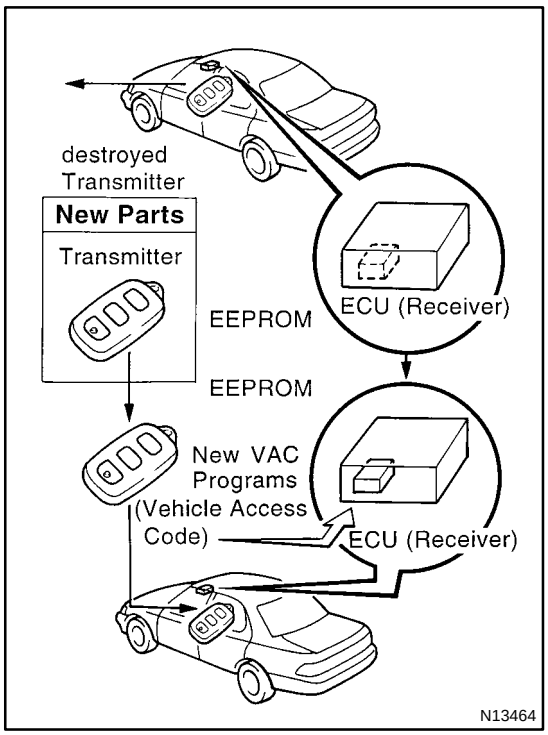
OK:

Remote control operation possible.

OK → **Replace the battery for transmitter (See page DI–443).**

NG

Replace transmitter and registration of recognition code (See page DI–443).



2. WIRELESS DOOR LOCK ECU AND TRANSMITTER REPLACEMENT

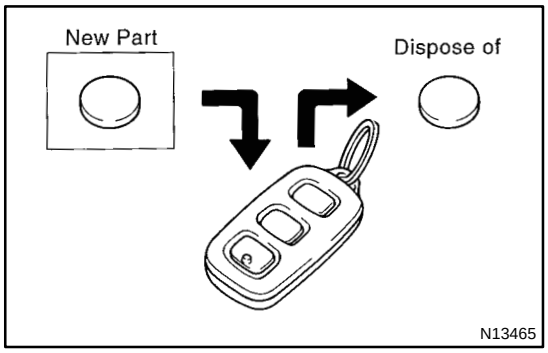
Disassembly and assembly of the transmitter includes details of spare parts and replacement procedure for detective parts found through troubleshooting.

Each part is a precision electronic component so handle with care.

(a) SPARE PARTS AND REPLACEMENT PROCEDURE FOR MALFUNCTIONING PARTS:

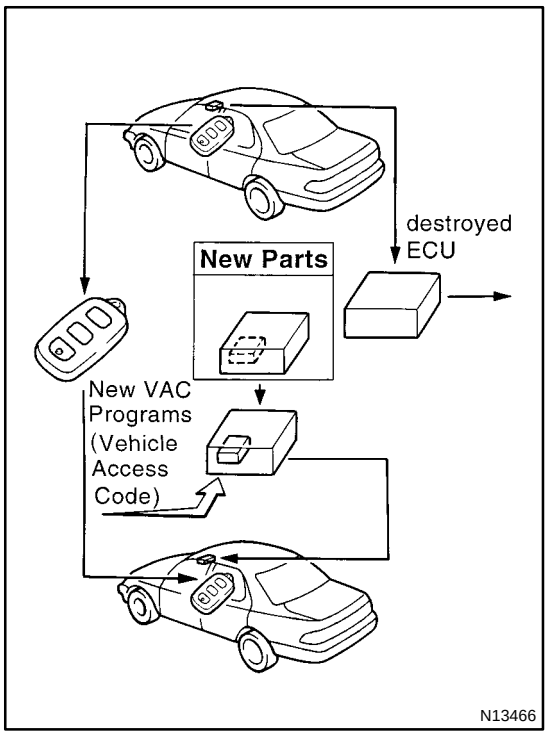
○ **For malfunctioning transmitter:**

(1) Prepare a new transmitter.
(2) Registration of recognition code.
(3) Check that door lock remote control operation works.



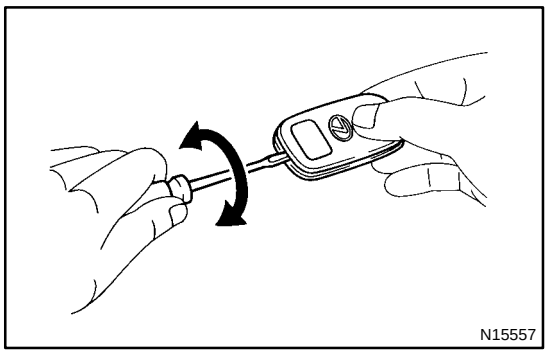
○ **For malfunctioning battery:**

(1) Prepare a new battery.
(2) Remove the battery from transmitter.
(3) Install a new battery into transmitter.

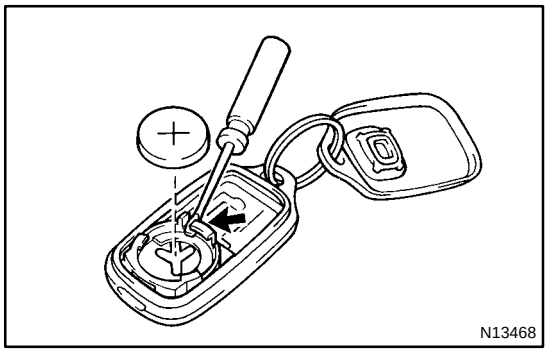


○ **For malfunctioning ECU:**

(1) Prepare a new ECU.
(2) Remove the ECU from the vehicle.
(3) Install a new ECU in the vehicle.
(4) Registration of recognition code.



(b) REPLACE BATTERY FOR TRANSMITTER
(1) Using a screwdriver, pry outward the cover.



(2) Remove the battery.
(3) Set a new battery into the transmitter.
(4) Install the cover to the transmitter.

3. REGISTRATION OF RECOGNITION CODE

Follow the flow chart on the following page to register the transmitter recognition code with the wireless door lock ECU.
HINT:

- If the prescribed conditions are not entered while registering the transmitter code, the wireless door lock ECU returns to normal operation.
- There are 4 modes: add mode, rewrite mode, confirmation mode and erase mode; the mode to use is decided after the recognition code is registered.
- If maximum of 4 recognition codes can be registered.

REFERENCE:

- The add mode is used to retain codes already registered while you register new recognition codes.
  However, if the number of registered codes exceeds 4 codes, previous registered codes are correspondingly erased in order, starting from the first registered code.
- The rewrite mode is used to erased all previous registered codes before registering new recognition codes. This mode before registering new transmitter or wireless door lock ECU.
- The confirmation mode is for confirming how many recognition codes are already registered before you register additioned recognition codes.
- The erase mode is used to erase all registered modes and cancels the wireless door lock operates. Use this mode when the transmitter is lost.

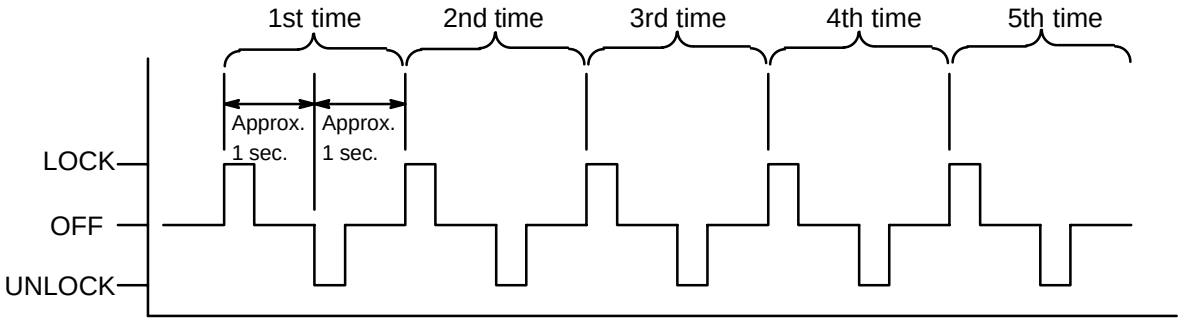
Start registration of recognition code

The vehicle should be as follows.
☐The key is not inserted in the ignition key cylinder.
☐Driver's door is OPEN. (Other doors are CLOSED)
☐Driver's door is UNLOCKED.

Insert the key into the ignition key cylinder, then remove it.

Within 40 secs.

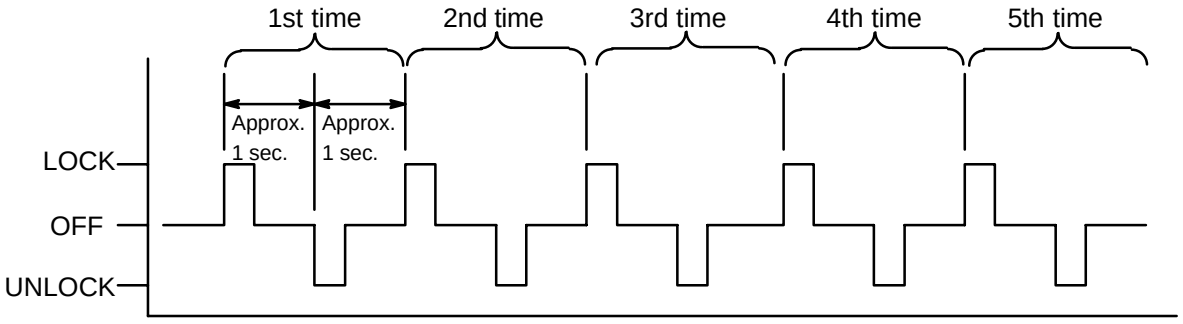
Using the door control switch (for manual operation) move the switch 5 times to LOCK/UNLOCK at approx. 1 sec. intervals.



Close the driver's door, then open it.

Within 40 secs.

Again using the door control switch (for manual operation), move the switch 5 times to LOCK/UNLOCK at approx. 1 sec. intervals.

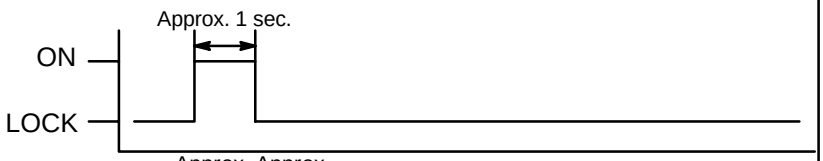


Insert the key into the ignition key cylinder.

Turn the ignition switch from ON to LOCK at approx. 1 sec. intervals for 1 to 5 times according to the desired mode.

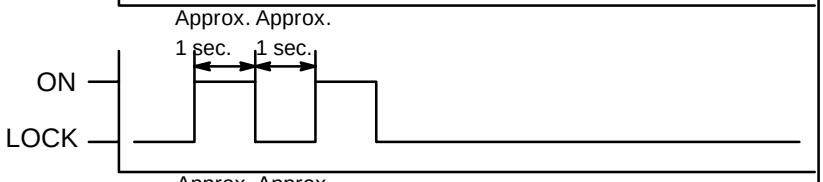
Add mode

ON – LOCK change occurs 1 time



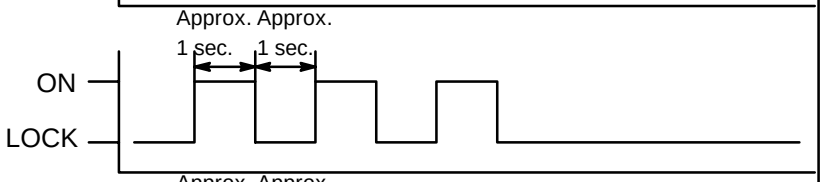
Rewrite mode

ON – LOCK change occurs 2 times



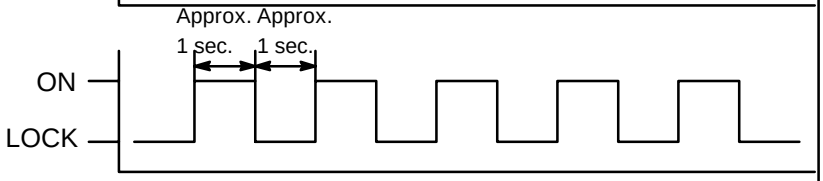
Confirmation mode

ON – LOCK change occurs 3 times



Erase mode

ON – LOCK change occurs 5 times



Remove the key from the ignition key cylinder.

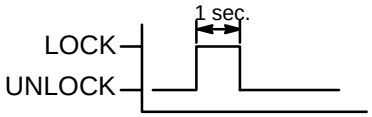
Within 20 secs.

When add mode, rewrite mode or erase mode been selected.

The receiver automatically performs the LOCK–UNLOCK operation once, twice or 5 times at 1 sec. intervals to inform the technician whether the add mode, rewrite mode or erase mode has been selected.

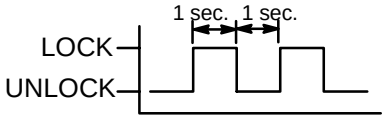
LOCK–UNLOCK occurs once

Indicates that add mode has been selected.



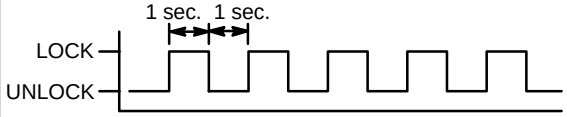
LOCK–UNLOCK occurs twice

Indicates that rewrite mode has been selected.



LOCK–UNLOCK occurs 5 times

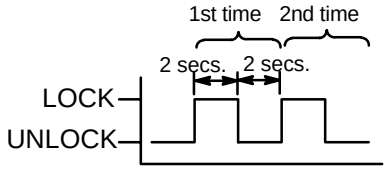
Indicates that erase mode has been selected.



When confirmation mode is selected.

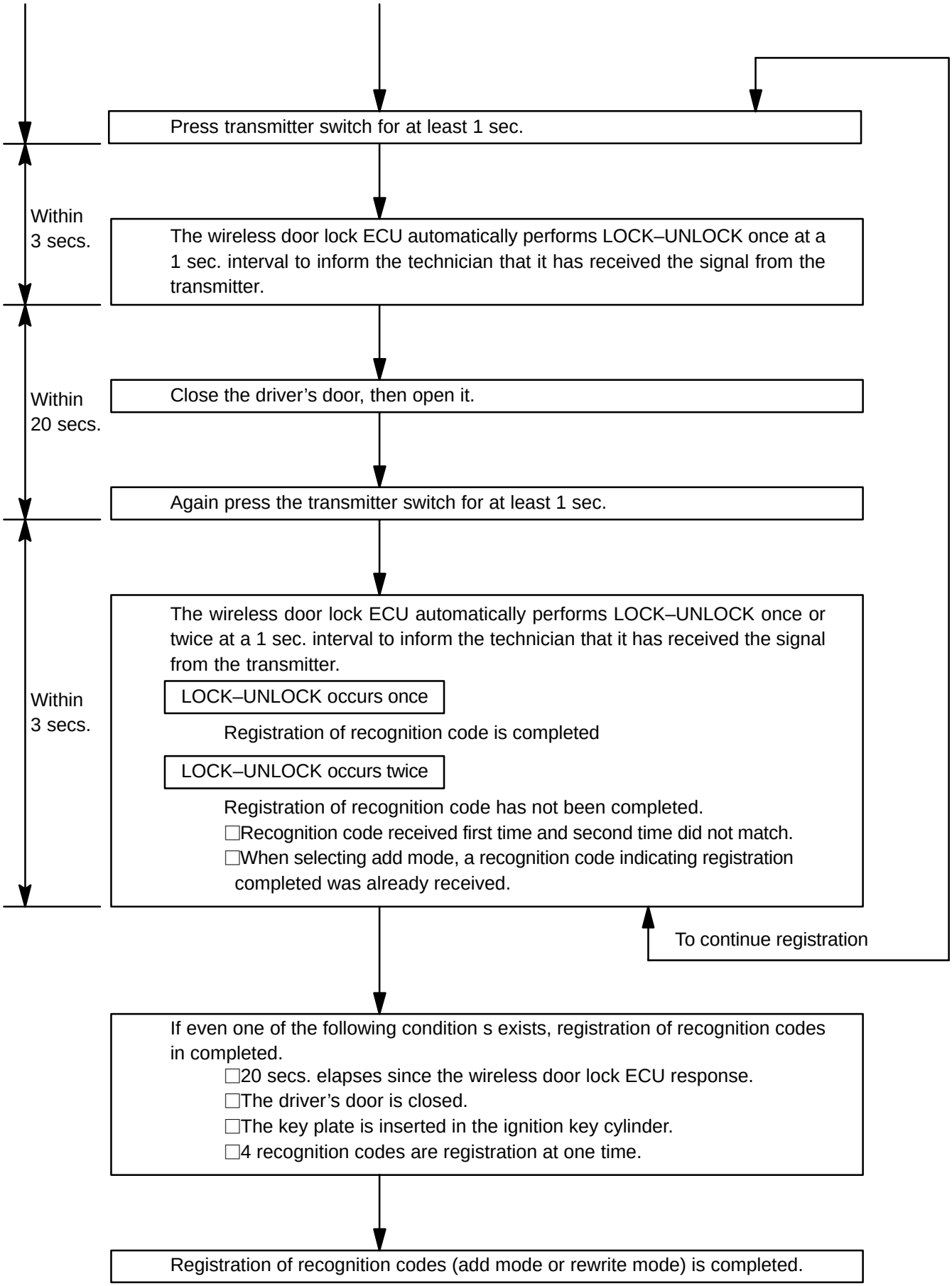
The receiver automatically performs the LOCK–UNLOCK operation 0 to 4 times at 2 sec. intervals to inform the technician of the number of registered codes.

Example:
LOCK–UNLOCK occurs twice:
2 recognition codes are registered.



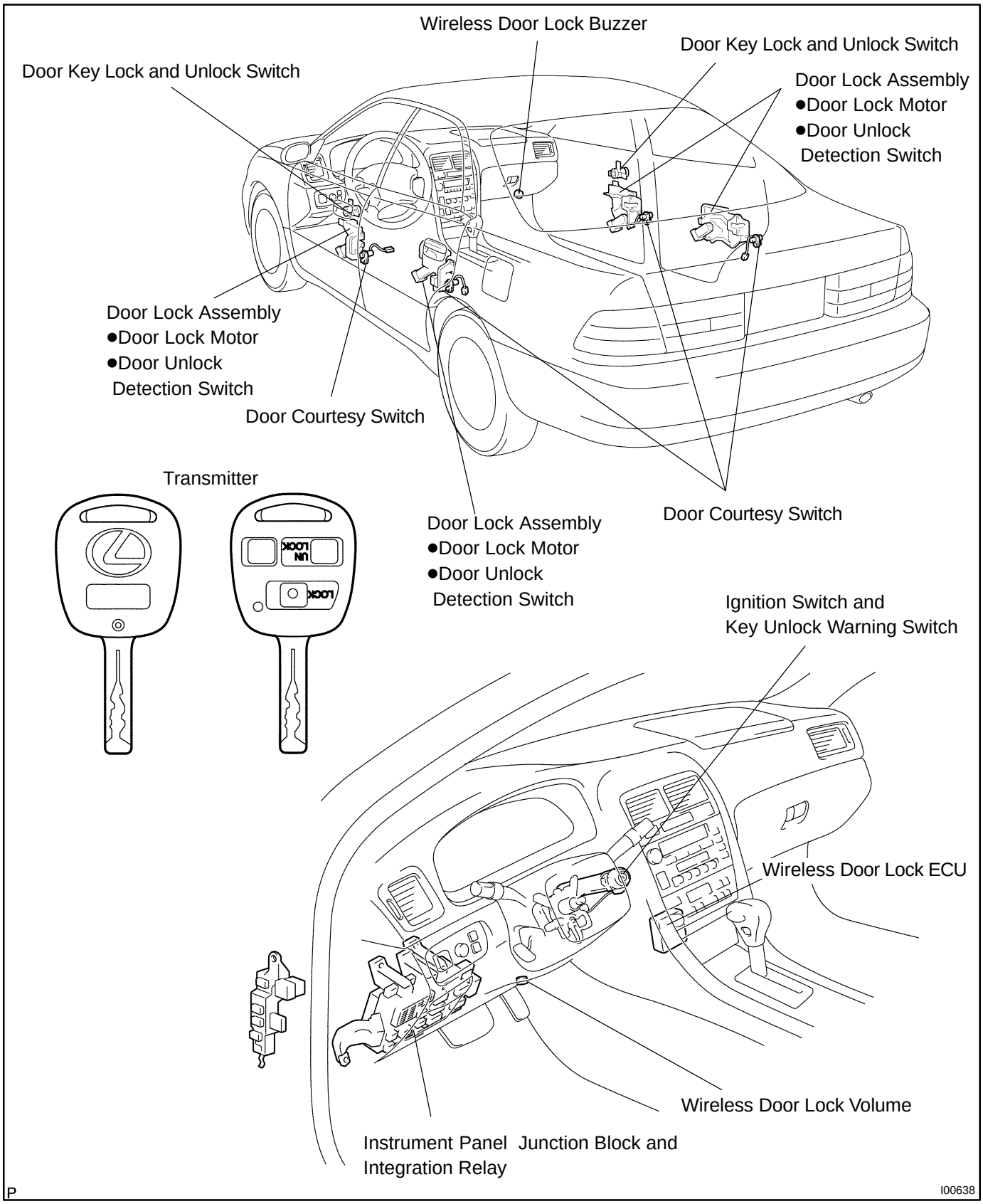
Erase Mode

Registration of recognition code (Confirmation mode) and erase mode completed.


Press transmitter switch for at least 1 sec.
Within 3 secs.
The wireless door lock ECU automatically performs LOCK–UNLOCK once at a 1 sec. interval to inform the technician that it has received the signal from the transmitter.
Within 20 secs.
Close the driver's door, then open it.
Again press the transmitter switch for at least 1 sec.
Within 3 secs.
The wireless door lock ECU automatically performs LOCK–UNLOCK once or twice at a 1 sec. interval to inform the technician that it has received the signal from the transmitter.
LOCK–UNLOCK occurs once
Registration of recognition code is completed
LOCK–UNLOCK occurs twice
Registration of recognition code has not been completed.
□Recognition code received first time and second time did not match.
□When selecting add mode, a recognition code indicating registration completed was already received.
To continue registration
If even one of the following condition s exists, registration of recognition codes in completed.
□20 secs. elapses since the wireless door lock ECU response.
□The driver's door is closed.
□The key plate is inserted in the ignition key cylinder.
□4 recognition codes are registration at one time.
Registration of recognition codes (add mode or rewrite mode) is completed.

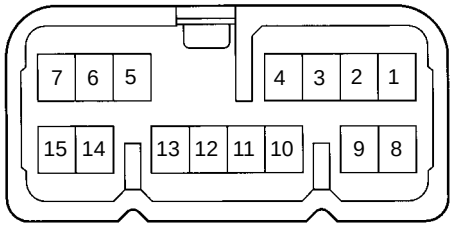
DI0DT–03

PARTS LOCATION



DI0DU–01

TERMINALS OF ECM



I00227

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
2 – 3 (BZR2 – BZR)	Y – B	Buzzer does not sound.	Below 1 V
		Buzzer sounds.	8 – 10 V
4 – Ground (TRLY – Ground)	G – R	Taillight does not light up.	Below 1 V
		Taillight light up.	8 – 10 V
5 – Ground (T – Ground)	G – W	Luggage compartment door key operated switch ”ON”.	Below 1 Ω
		Luggage compartment door key operated switch ”OFF”.	1MΩ or higher
7 – Ground (UL3 – Ground)	R – G	Door key lock and unlock switch ”UNLOCK”. (Driver’s Door)	Below 1.5 V
		Door key lock and unlock switch ”LOCK”. (Driver’s Door)	8 – 10 V
8 – Ground (+B – Ground)	R	Always.	10 – 14 V
10 – Ground (KSW – Ground)	L– B	Key unlock warning switch ”ON”. (Ignition key is inserted into key cylinder)	Below 1 V
		Key unlock warning switch ”OFF”. (Ignition key pull out key cylinder)	10 – 14 V
11 – Ground (LSWD – Ground)	L – R	Door unlock detection switch ”ON”.	Below 1 V
		Door unlock detection switch ”OFF”.	10 – 14 V
13 – Ground (IG – Ground)	B – R	Turn the ignition switch ”OFF” or ”ACC”.	Below 1 V
		Turn the ignition switch ”ON”.	10 – 14 V
14 – Ground (CTY – Ground)	R – W	Door courtesy switch ”ON”.	Below 1 V
		Door courtesy switch ”OFF”.	10 – 14 V
15 – Ground (L – Ground)	L – W	Door key lock and unlock switch ”LOCK”.	Below 1 V
		Door key lock and unlock switch does not”OFF” or ”UNLOCK”.	8 – 10 V

DI0DV–01

PROBLEM SYMPTOMS TABLE

Perform troubleshooting of the circuit for the applicable problem symptom in the order given in the chart below. Proceed to the page located for each circuit.

HINT:

- Troubleshooting of the wireless door lock control system is based on the premise that the door lock control system and theft deterrent system are operating normally. Accordingly, before troubleshooting the wireless door lock control system, first make certain that the door lock control system and theft deterrent system are operating normally.
- If the instruction ”Proceed to next circuit inspection shown on matrix chart” is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- If the trouble still reappears even through there are no abnormalities in any of the other circuits, check and replace the Wireless Door Lock ECU as the last step.

Symptom	Suspect Area	See page
All function of wireless door lock control system do no operate.	1. ECU Power Source Circuit. 2. Ignition Switch Circuit. 3. Door Courtesy Switch Circuit. 4. Door Key Lock and Unlock Switch Circuit. (Unlock Side) 5. Door Key Lock and Unlock Switch Circuit. (Lock Side) 6. Key Unlock Warning Switch Circuit. 7. Wireless Door Lock ECU.	DI–457 DI–459 DI–469 DI–463 DI–465 DI–467 IN–27
Only door unlock operation is not possible (Lock operation is possible).	1. Door Key Lock and Unlock Switch Circuit (Unlock Side) 2. Door Unlock Detection Switch Circuit 3. Wireless Door Lock ECU.	DI–463 DI–461 IN–27
Only door lock operation is not possible (Unlock operation is possible).	1. Door Key Lock and Unlock Switch Circuit (Lock Side) 2. Wireless Door Lock ECU	DI–465 IN–27
Only transmitter misoperation prevention function is not possible.	1. Key Unlock Warning Switch Circuit 2. Wireless Door Lock ECU	DI–465 IN–27
Wireless door lock function operates even when each door is opened.	1. Door Courtesy Switch Circuit 2. Wireless Door Lock ECU	DI–469 IN–27
Wireless door lock functions incorrectly. (Although one door is unlocked, when the transmitter switch is pressed, all doors unlock.)	1. Door Unlock Detection Switch Circuit 2. Wireless Door Lock ECU	DI–461 IN–27
Wireless door lock operates, but the buzzer does not sound.	1. Wireless Door Lock Buzzer Circuit 2. Wireless Door Lock ECU	DI–471 IN–27
Wireless door lock operates, but the taillight does not respond.	1. Taillight Relay Circuit 2. Wireless Door Lock ECU	DI–457 IN–27

DI0DW–01

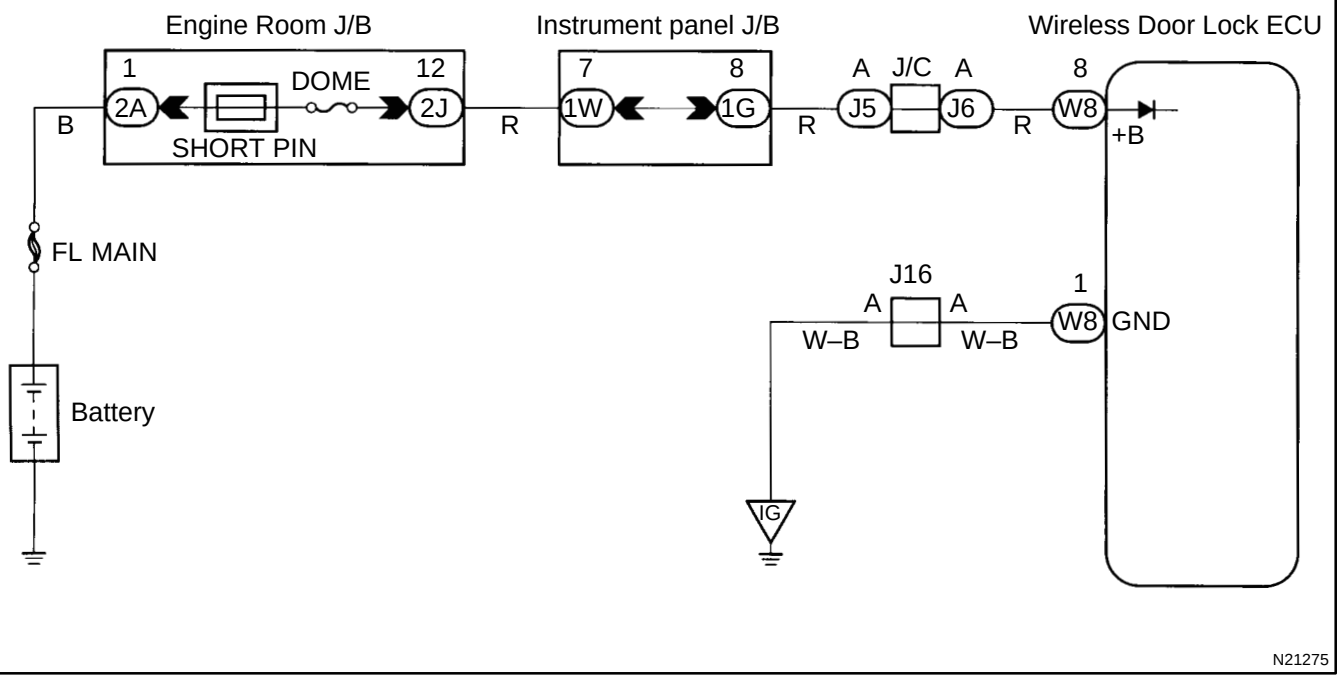
CIRCUIT INSPECTION

ECU Power Source Circuit

CIRCUIT DESCRIPTION

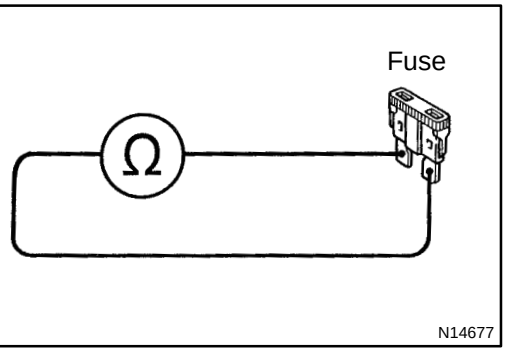
Battery positive voltage is always applied the terminal +B of the wireless door lock ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check DOME fuse.**



PREPARATION:

Remove DOME fuse from engine room junction block.

CHECK:

Check continuity of DOME fuse.

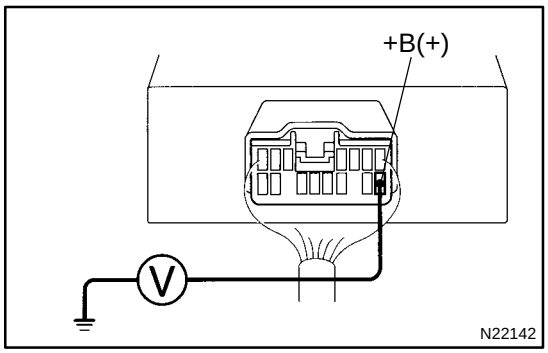
OK:

Below 1.0 Ω or continuity

NG → **Check for short in all the harness and components connected to DOME fuse. (See attached wiring diagram.)**

OK

2	**Check voltage between terminals +B and ECU connector.**



PREPARATION:
Remove the wireless door lock ECU from No.1 instrument panel brace.
CHECK:
Measure voltage between terminals +B of ECU connector.
OK:
Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–456).**

NG

3	**Check for open in harness and connector between terminal GND of ECU and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and repair harness and connector between ECU and battery.

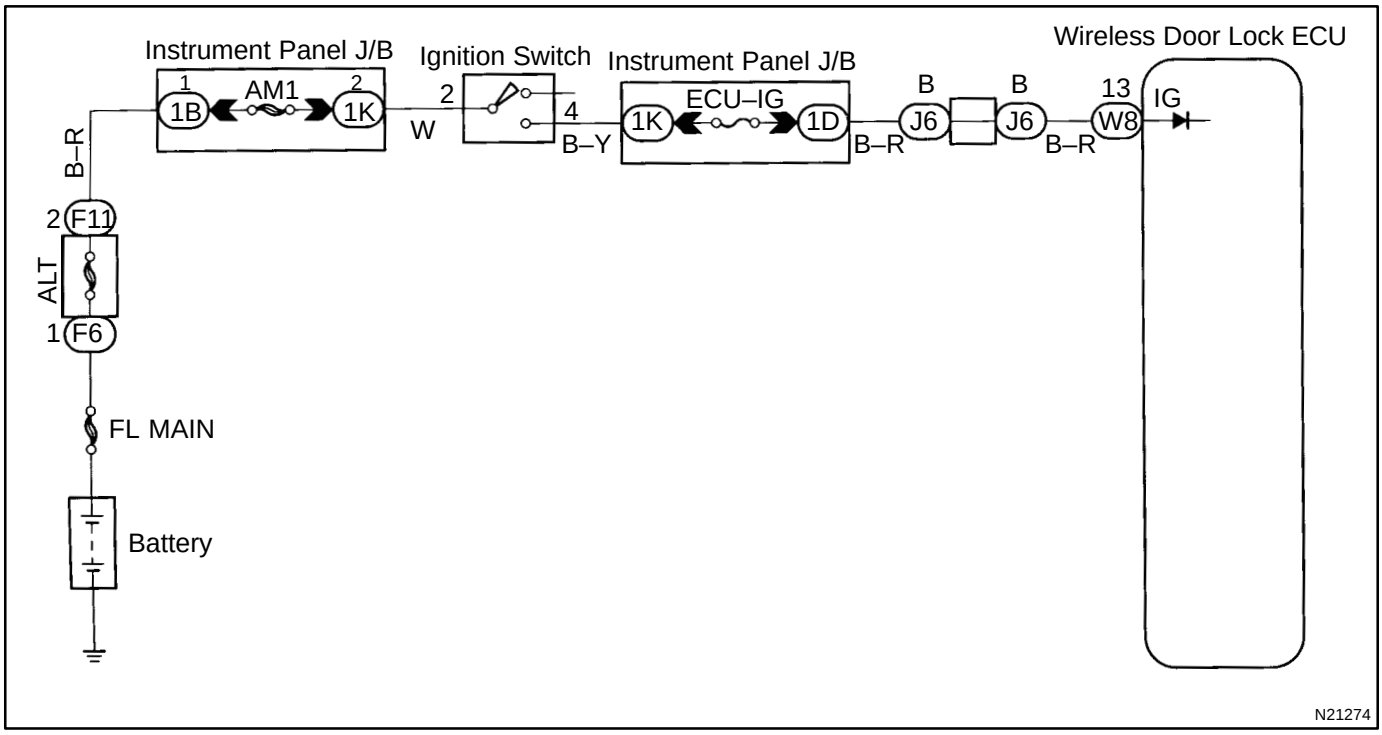
DI0DX–01

Ignition Switch Circuit

CIRCUIT DESCRIPTION

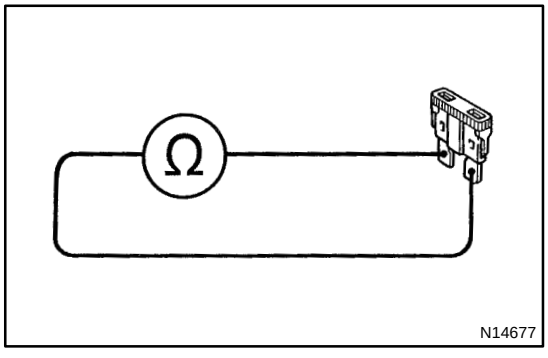
When the ignition switch is turned to the ON position, battery positive voltage is applied to the terminal IG of the ECU. Furthermore, power supplied from the terminal IG of the ECU is used as power for the wireless door lock buzzer.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ECU–IG fuse.**



PREPARATION:

(a) Remove front lower panel.

(b) Remove ECU–IG fuse from instrument panel junction block.

CHECK:

Check continuity of ECU–IG fuse.

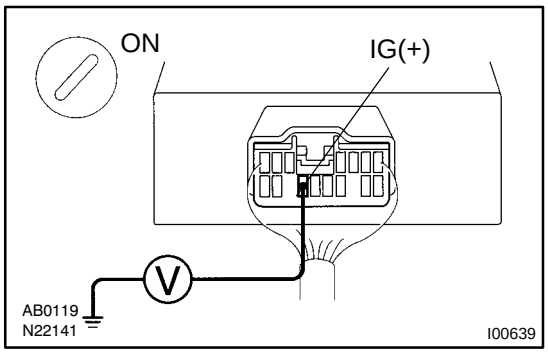
OK:

Continuity

NG → **Check for short in all the harness and components connected to ECU–IG fuse. (See attached wiring diagram.)**

OK

2	Check voltage between terminal IG of ECU and body ground.



PREPARATION:

(a) Disconnect the ECU connector.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals IG of ECU connector and body ground.

OK:

Voltage: 10 ~ 14 V

OK → **Check and replace ECU.**

NG

Check and repair harness and connector between ECU and battery (See page IN–27).

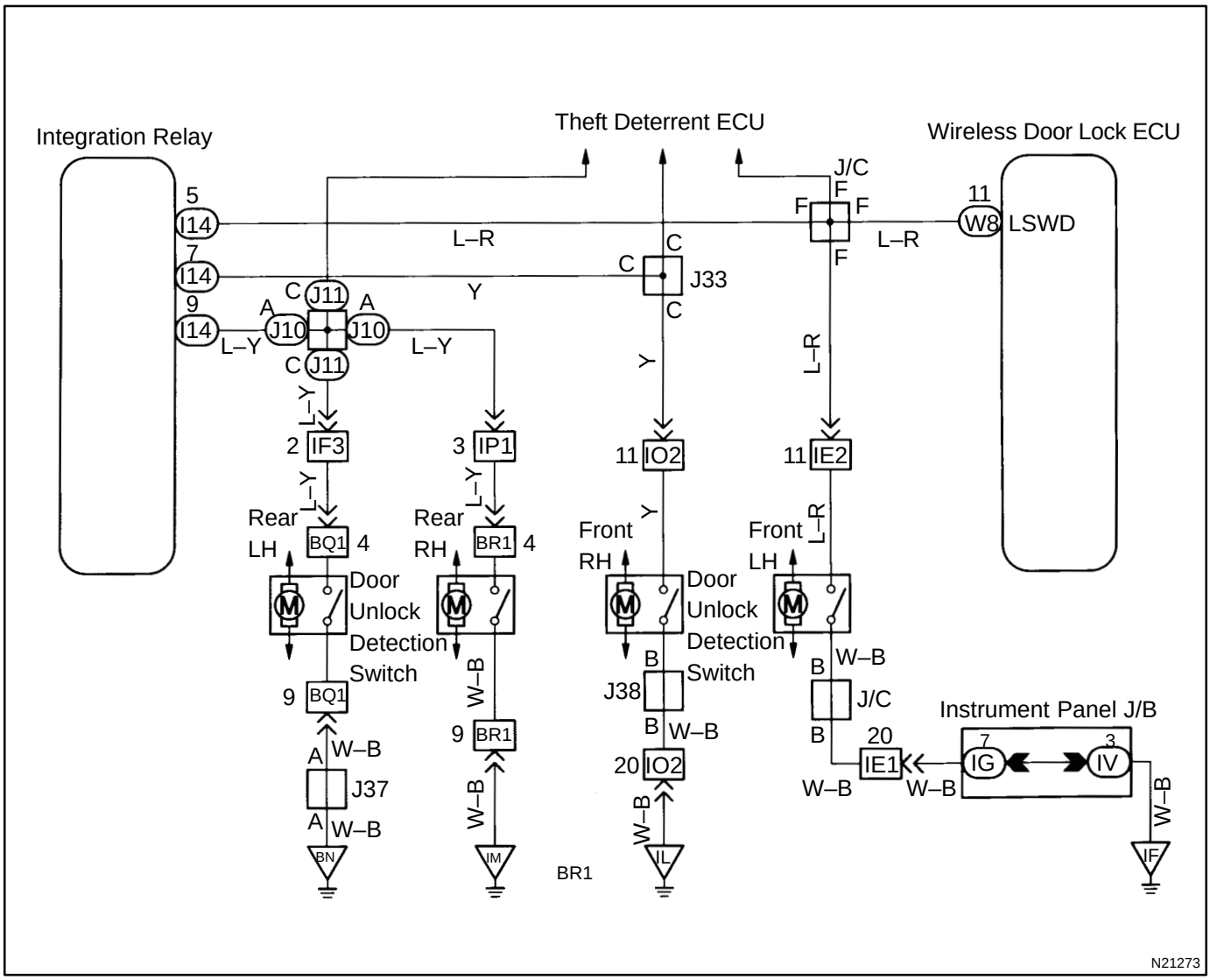
DI0E0–01

Door Unlock Detection Switch Circuit

CIRCUIT DESCRIPTION

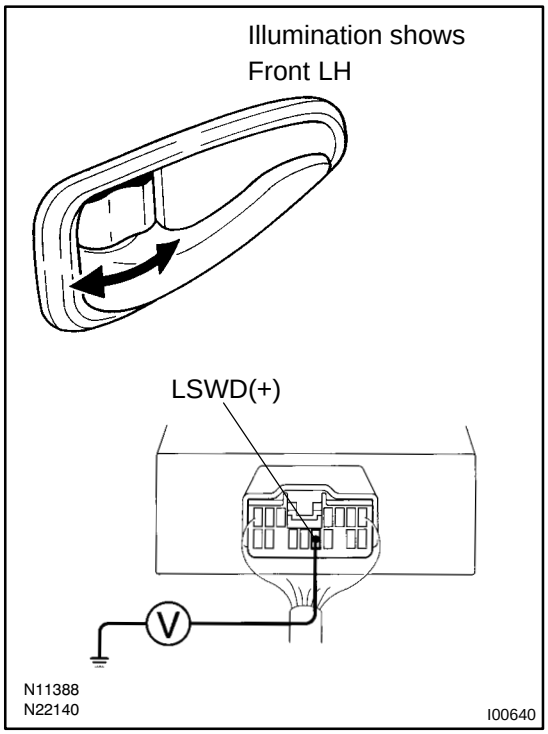
The door unlock detection switch is built into the door lock motor assembly. The switch is OFF when the door lock knob is in Lock Position, and is ON When the Knob is in Unlock position.
Furthermore, the door unlock detection switch circuit has terminal +B connected inside the theft deterrent ECU, when the door unlock detection switch is OFF, batter positive voltage is applied to the terminal of the door unlock detection switch circuit of the wireless door lock ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals LSWD, LSWP and LSWR of wireless door lock ECU connector and body ground.**



PREPARATION:

Remove the wireless door lock ECU from No.1 instrument panel brace.

CHECK:

Measure voltage between terminals LSWD, LSWP and LSWR of wireless door lock ECU connector and body ground, when the respective door lock knob involved is pushed to the lock side.

OK:

Voltage 10 – 14 V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–456).**

NG

Check and repair harness and connector between wireless door lock ECU and door unlock detection switch.

DI0E2–01

Door Key Lock and Unlock Switch Circuit (Unlock Side)

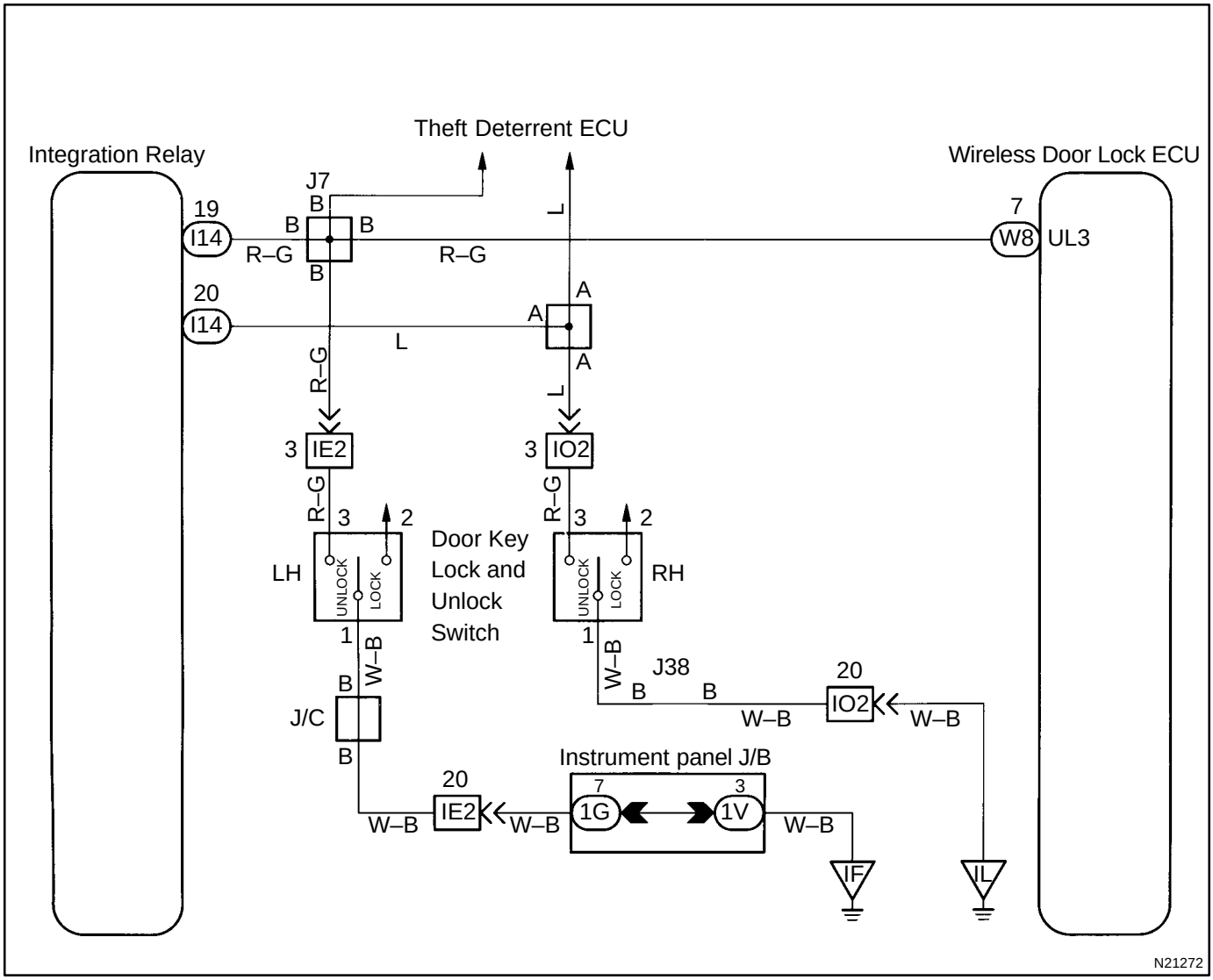
CIRCUIT DESCRIPTION

The key operated switch is built into the door key cylinder. When the key is turned to the lock side, the lock terminal of the switch is grounded, and when the key is turned to the unlock side the unlock terminal is grounded.

Furthermore, the door key lock and unlock switch circuit has terminal +B connected inside the theft deterrent ECU, when neither the lock or unlock terminal of the key lock and unlock switch are grounded, battery positive voltage is applied to the door key lock and unlock switch circuit of the wireless door lock ECU.

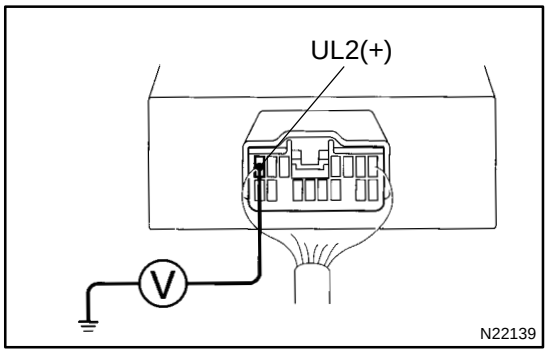
(Tr inside the ECU coming ON causes the wireless door lock ECU to output a signal to unlock all the doors.)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals UL2 of wireless door lock ECU connector and body ground.**



PREPARATION:

Remove the wireless door lock ECU from No.1 instrument panel brace.

CHECK:

Measure voltage between terminal UL2 of wireless door lock ECU connector and body ground.

OK:

Voltage: 10 – 14V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–456).**

NG

Check and repair harness and connector between wireless door lock ECU and door key lock and unlock switch.

DI0E5–01

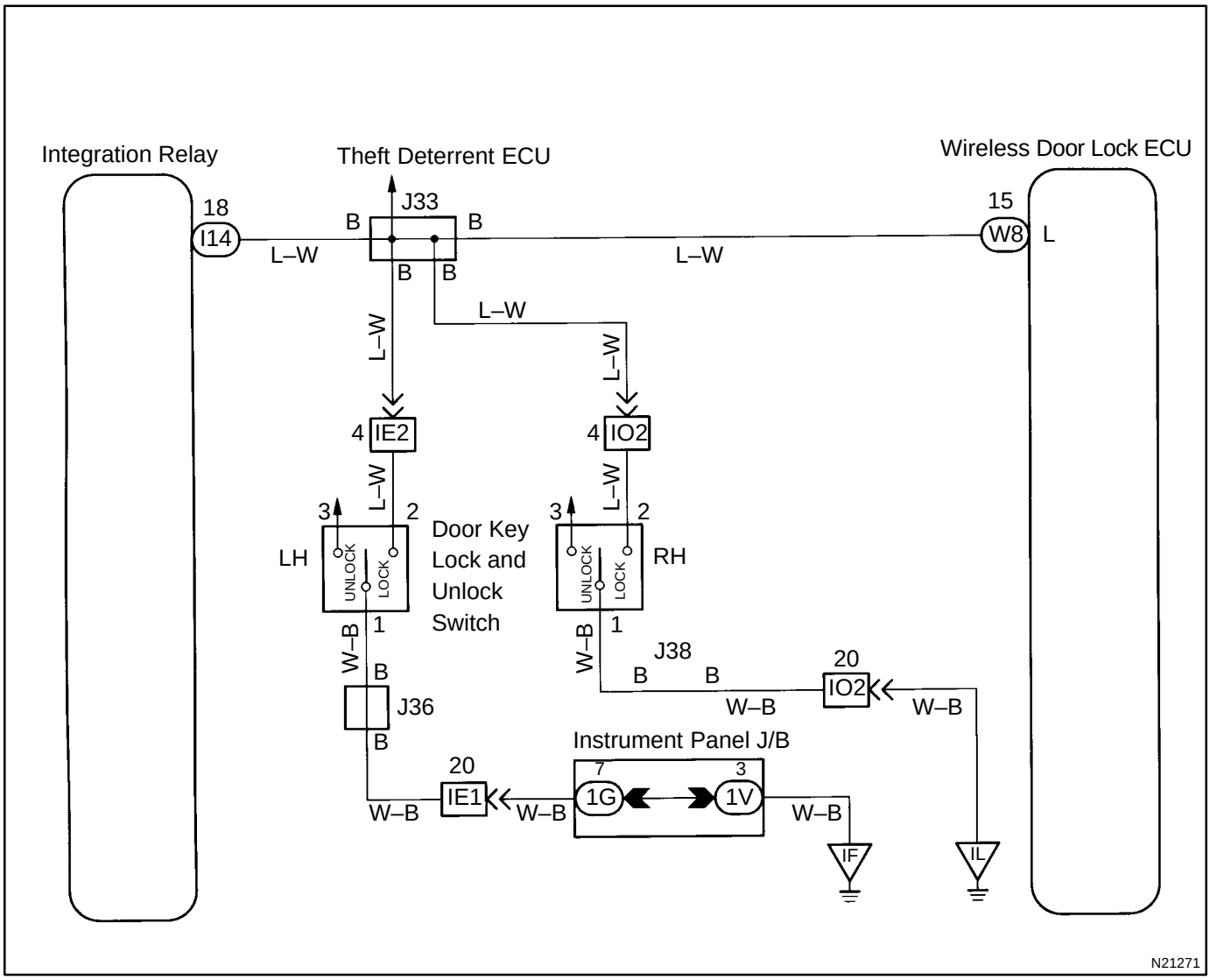
Door Key Lock and Unlock Switch Circuit (Lock Side)

CIRCUIT DESCRIPTION

Refer to page DI–463.

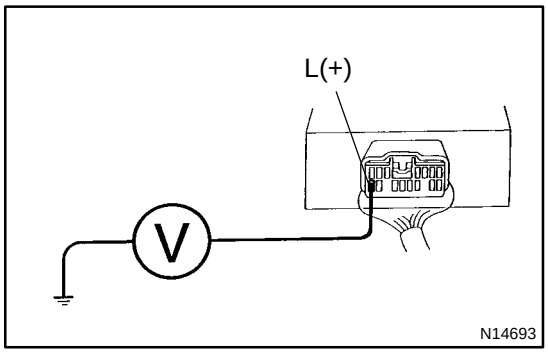
Tr inside the wireless door lock ECU coming ON causes the theft deterrent ECU to output a signal to lock all the doors.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal L of wireless door lock ECU connector and body ground.**



PREPARATION:

Remove the wireless door lock ECU from No.1 instrument panel brace.

CHECK:

Measure voltage between terminal L of wireless door lock ECU connector and body ground.

OK:

Voltage 10 – 14 V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–456).**

NG

Check and repair harness and connector between wireless door lock ECU and door key lock and unlock switch.

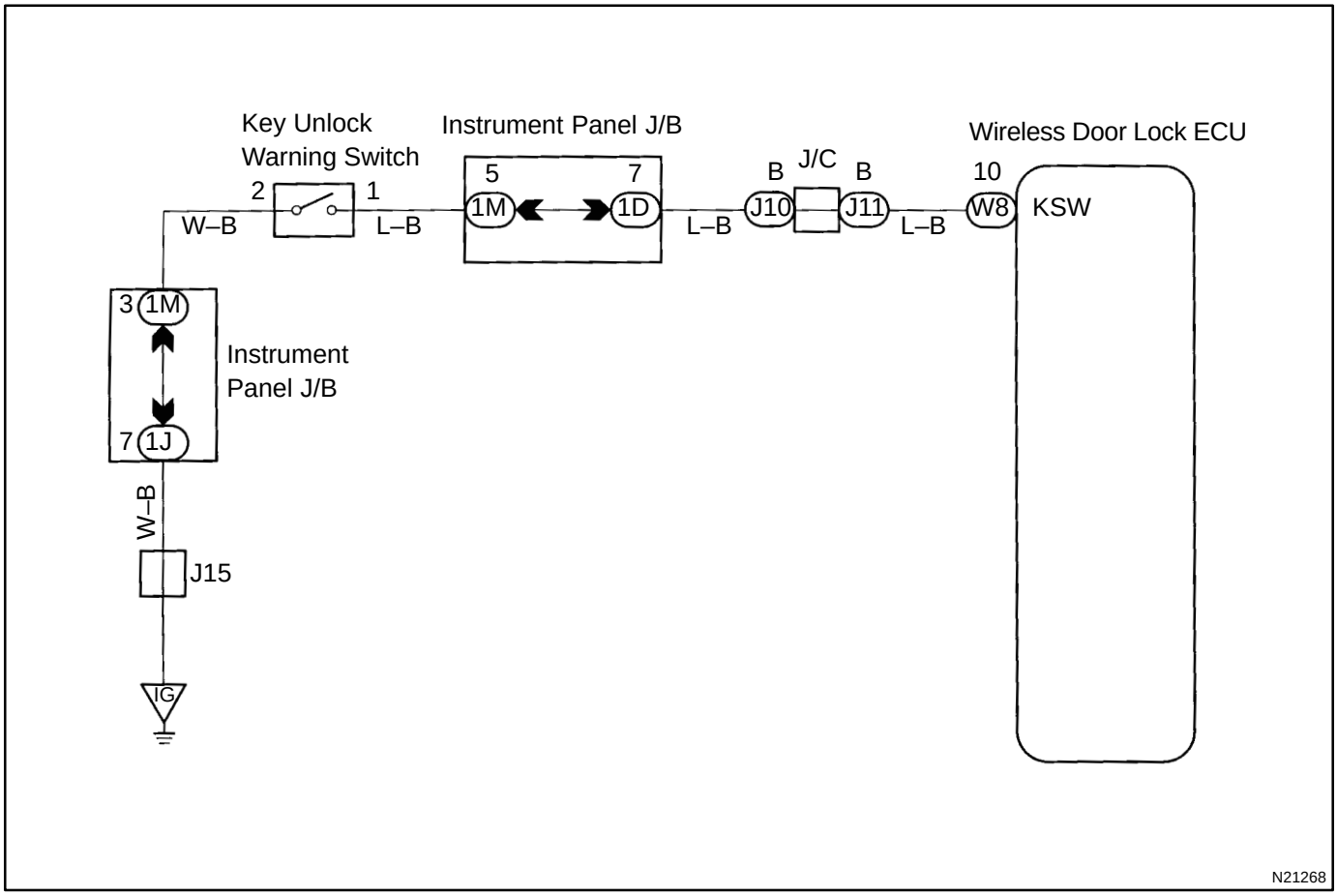
DI0E7–01

Key Unlock Warning Switch Circuit

CIRCUIT DESCRIPTION

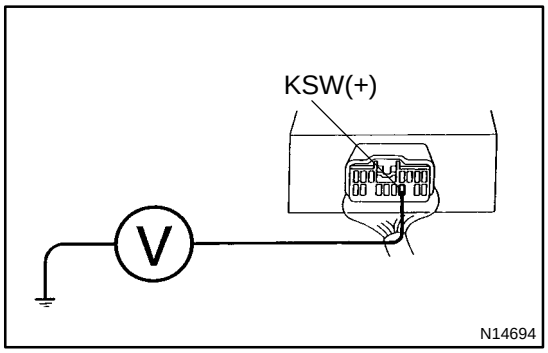
When the key is inserted in the ignition key cylinder, the key unlock warning switch comes ON, and when the key is not inserted the switch is OFF.
When the key unlock warning switch is ON, the ECU operates the transmitter misoperation prevention function.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal KSW of wireless door lock ECU connector and body ground.**



PREPARATION:

Remove the wireless door lock ECU from No.1 instrument panel brace.

CHECK:

Measure voltage between terminal KSW of wireless door lock ECU connector and body ground, when key plate is not inserted in the key cylinder.

OK:

Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–456).**

NG

Check and repair harness and connector between wireless door lock ECU and key unlock warning switch.

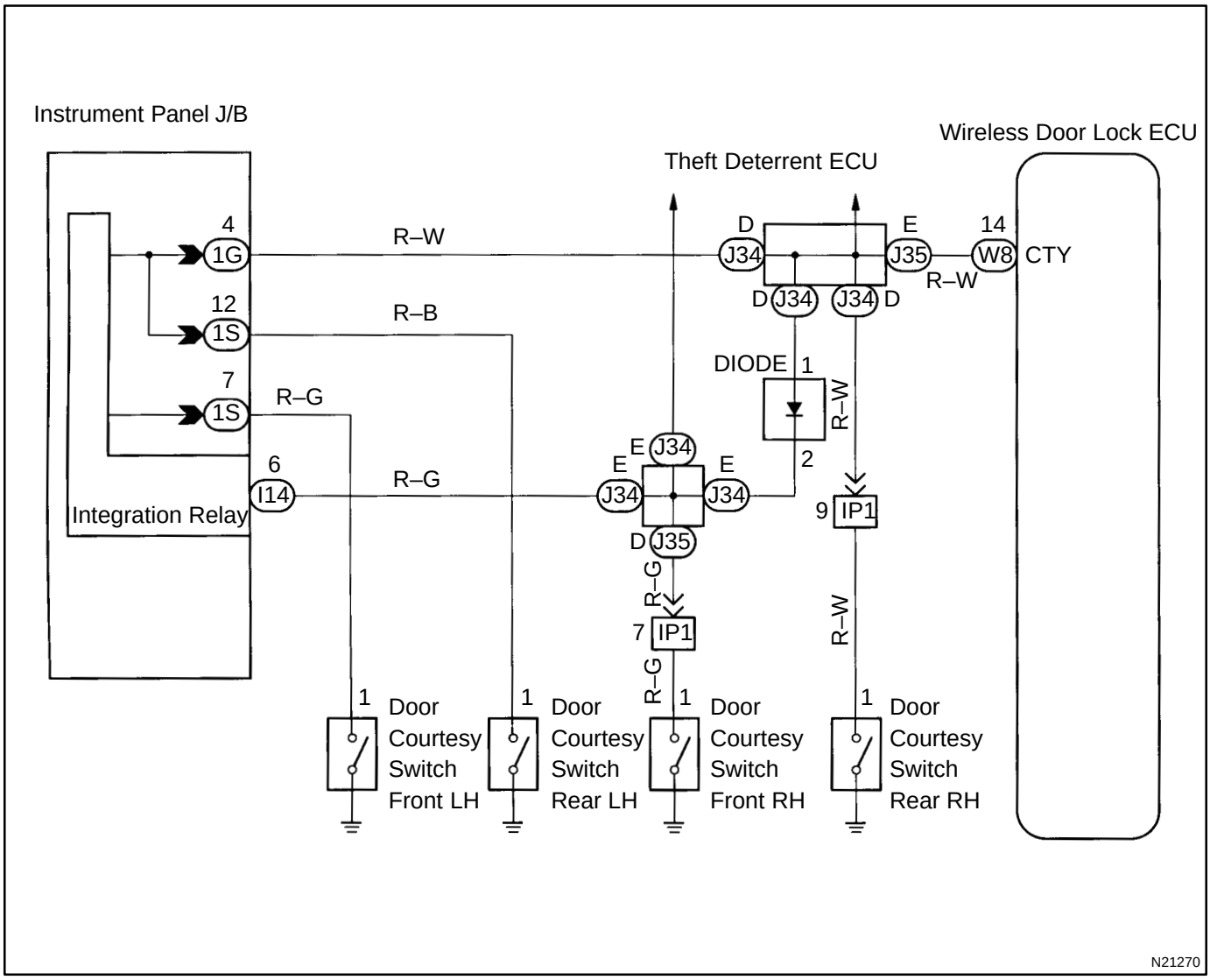
DI0E9–01

Door Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The door courtesy switch comes ON when the door is opened and goes OFF when door is closed. Furthermore. the door courtesy switch circuit has terminal +B connected inside the theft deterrent ECU . Battery positive voltage is applied to terminal DSWD of the theft deterrent ECU when all doors are closed, i.e., when the door courtesy switch of all doors are OFF.

WIRING DIAGRAM



INSPECTION PROCEDURE

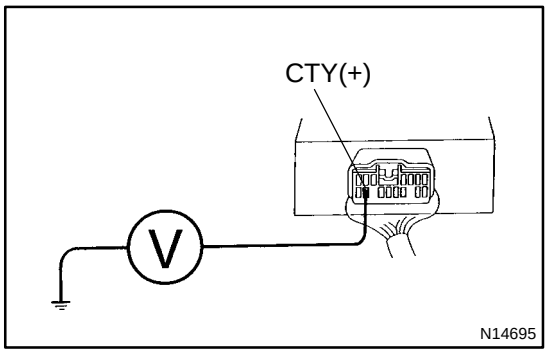
1	**Check operation of open door warning light.**

CHECK:
Check that open door warning light comes on when each door is opened, and goes off when all doors are closed.

NG → **Check open door warning light circuit**

OK

2	**Check voltage between terminal CTY of wireless door lock ECU connector and body ground.**



PREPARATION:
Remove the wireless door lock ECU from No.1 instrument panel brace.
CHECK:
Measure voltage between terminal CTY of wireless door lock ECU connector and body ground, when all doors are closed.
OK:

Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–456).**

NG

Check and repair harness and connector between wireless door lock ECU and door courtesy switch.

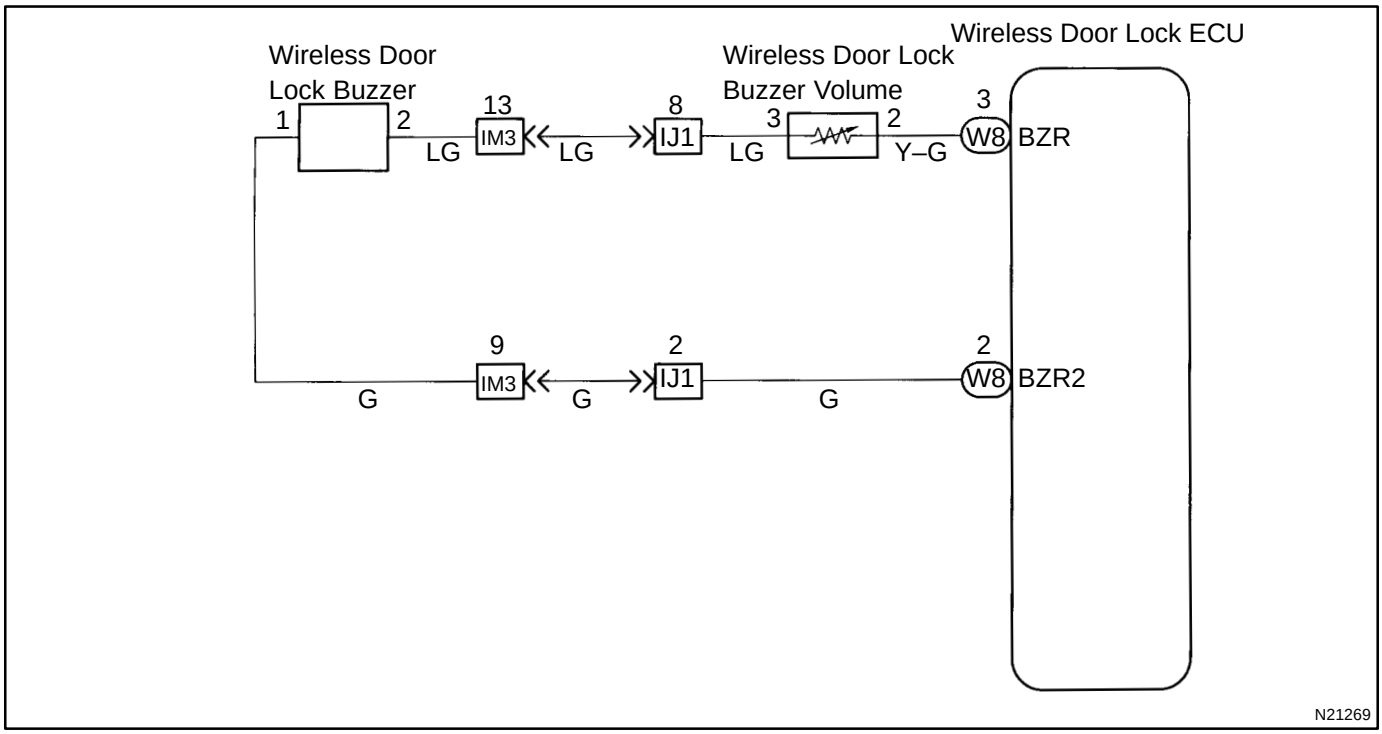
DI0EA–01

Wireless Door Lock Buzzer Circuit

CIRCUIT DESCRIPTION

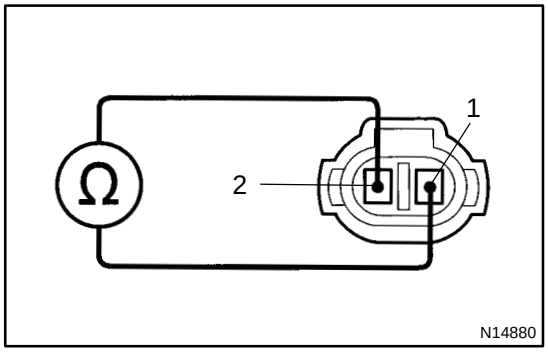
The volume of the buzzer can be controlled or turned off by the volume switch.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check wireless door lock buzzer.**

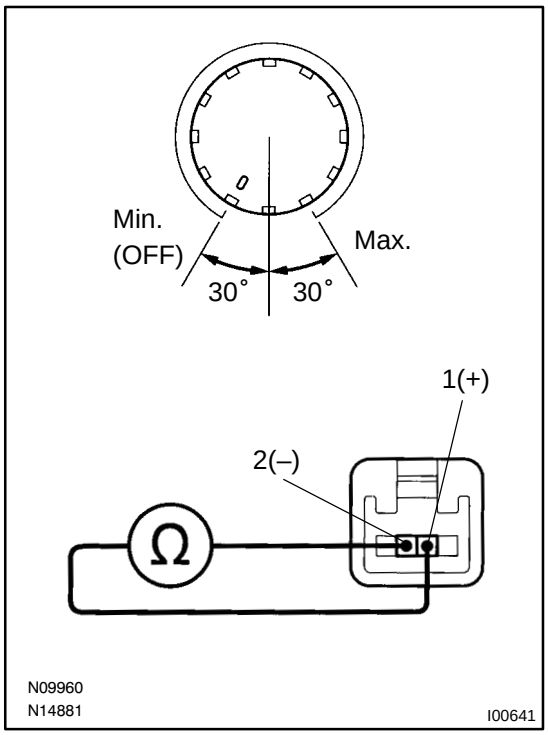


PREPARATION:
Remove wireless door lock buzzer.
CHECK:
Measure resistance between terminals.
OK:
Approx. : 1 kΩ

NG → **Replace wireless door lock volume.**

OK

2	Check wireless door lock volume.



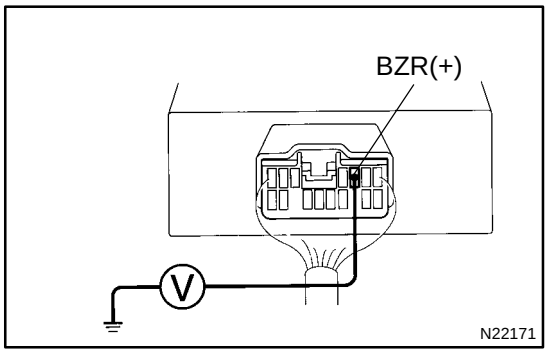
PREPARATION:
Remove wireless door lock volume.
CHECK:
Measure resistance between terminals.
OK:

OFF position: ∞ Ω
Min. position: 10 kΩ
Max. position: 0

NG → **Replace wireless door lock volume.**

OK

3	Check voltage between terminal BZR of wireless door lock ECU connector and body ground.



PREPARATION:
Remove the wireless door lock ECU from No.1 instrument panel brace.
CHECK:
Measure signal between terminal BZR and body ground, when transmitter is ON and OFF.
OK:

Door Lock position	Lock	Unlock
Signal	0.13 sec. Once signal	0.13 sec. Twice signal, 0.25 sec.

NG → **Replace wireless door lock ECU.**

OK →

Check and repair harness and connector between ECU and volume, volume and buzzer, buzzer and ECU.

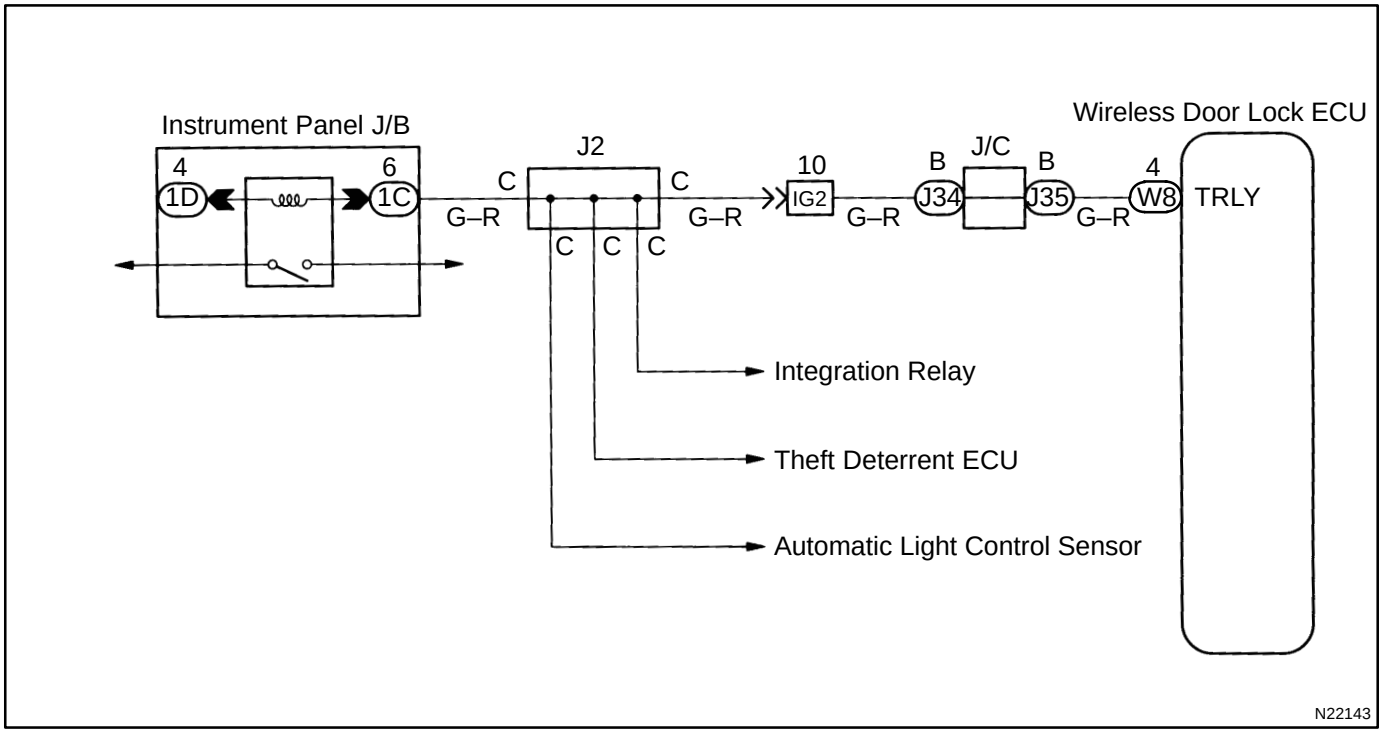
DI0EB–01

Taillight Relay Circuit

CIRCUIT DESCRIPTION

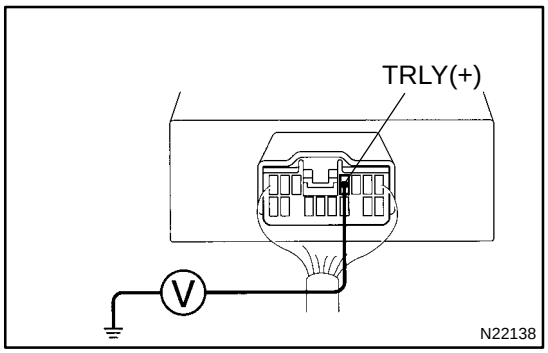
TRLY terminal outputs the signal once when pressing the LOCK switch of the transmitter and twice when pressing the UNLOCK switch and then makes the taillight come to light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal TRLY of wireless door lock ECU connector and body ground.**



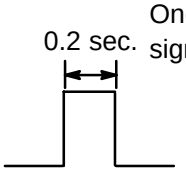
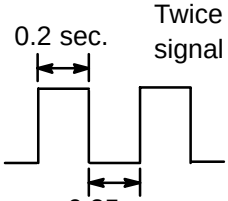
PREPARATION:

Remove the wireless door lock ECU from No.1 instrument panel brace.

CHECK:

Measure signal between terminal TRLY and body ground, when transmitter is ON and OFF.

OK:

Door Lock position	Lock	Unlock
Signal		

NG → **Replace wireless door lock ECU.**

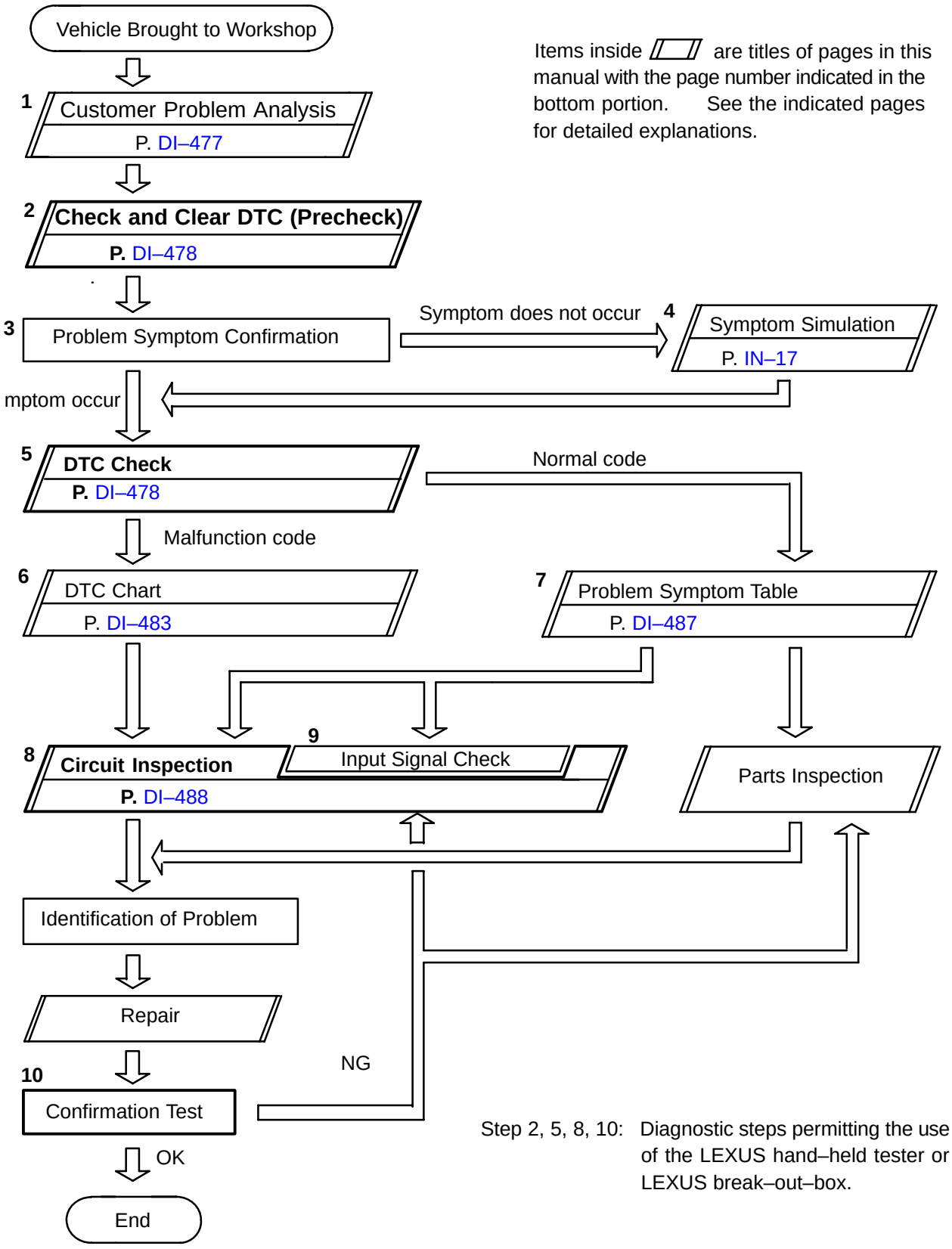
OK

Check and repair harness and connector between wireless door lock ECU and taillight relay circuit.

CRUISE CONTROL SYSTEM

DI0EF–01

HOW TO PROCEED WITH TROUBLESHOOTING



Items inside ▱ are titles of pages in this manual with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.

Step 2, 5, 8, 10: Diagnostic steps permitting the use of the LEXUS hand–held tester or LEXUS break–out–box.

DI0EH–01

CUSTOMER PROBLEM ANALYSIS CHECK

CRUISE CONTROL SYSTEM Check Sheet

Inspector's name: _____

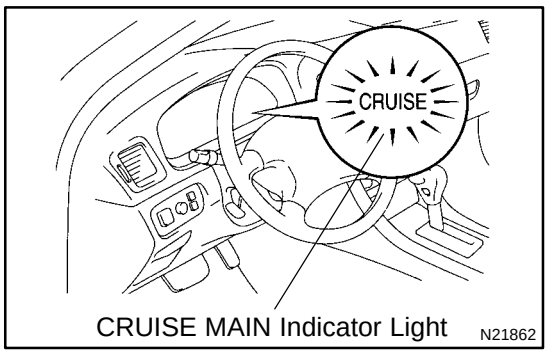
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Condition of Problem Occurrence	**Date of Problem Occurrence**	/ /
	How Often does Problem Occur?	☑ Continuous ☑ Intermittent (Times a day)
	Vehicle Speed when Problem Occurred	**km Mile**

Symptoms	☑ Auto cancel occurs	● Driving condition ☐ City driving ☐ Freeway ☐ Up hill ☐ Down hill ● After cancel occurred, did the driver activate cruise control again? ☐ Yes ☐ No
	☐ Cancel does not occur	☐ With brake ON ☐ Except D position shift ☐ At 40 km/h (25 mph) or less ☐ When control SW turns to CANCEL position
	☐ Cruise control malfunction	☐ Slip to acceleration side ☐ Slip to deceleration side ☐ Hunting occurs ☐ O/D cut off does not occur ☐ O/D does not return
	☐ Switch malfunction	☐ SET ☐ ACCEL ☐ COAST ☐ RESUME ☐ CANCEL
	☐	☐ Remains ON ☐ Does not light up ☐ Blinking

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI0EI–01



PRE–CHECK

1. DIAGNOSIS SYSTEM

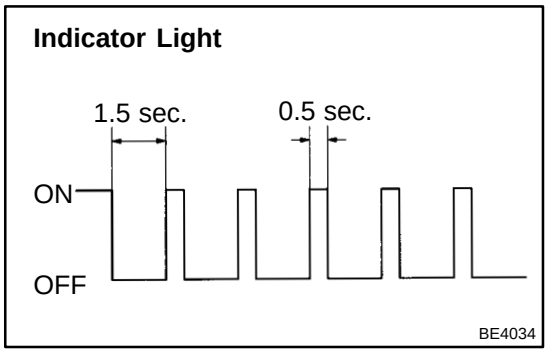
(a) INDICATOR CHECK

(1) Turn the ignition switch to ON.

(2) Check that the CRUISE MAIN indicator light comes on when the cruise control main switch is turned on, and that the indicator light goes off when the main switch is turned OFF.

HINT:

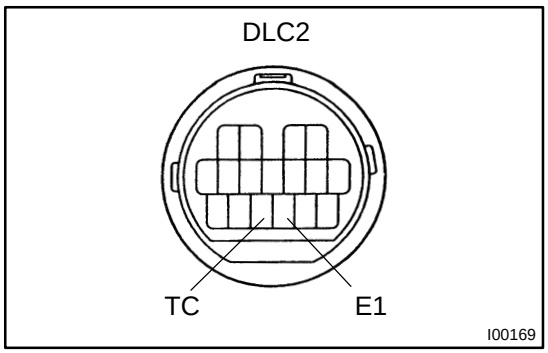
If the indicator check result is not normal, proceed to trouble-shooting (See page BE–2) for the combination meter section.



(b) DTC CHECK

HINT:

If a malfunction occurs in the No. 1 vehicle speed sensors or actuator, etc. during cruise control driving, the ECU actuates AUTO CANCEL of the cruise control and turns on and off the CRUISE MAIN indicator light to inform the driver of a malfunction. At the same time, the malfunction is stopped in memory as a diagnostic trouble code.



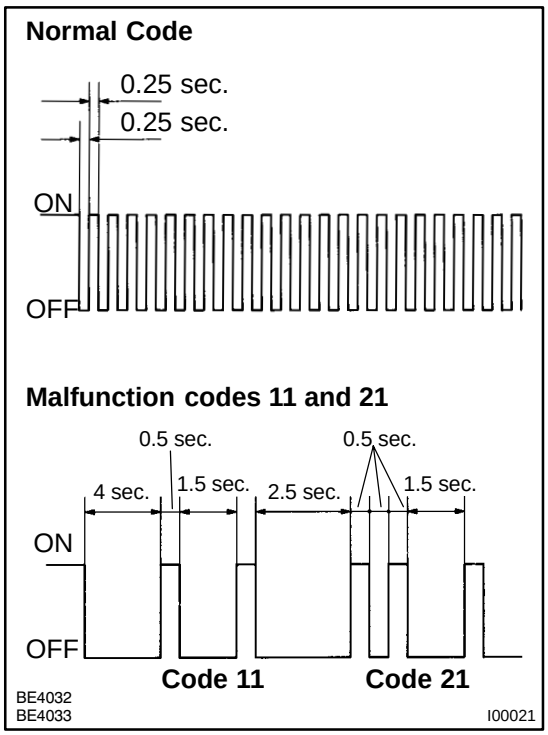
(c) OUTPUT OF DTC USING DIAGNOSIS CHECK WIRE

(1) Turn the ignition switch ON.

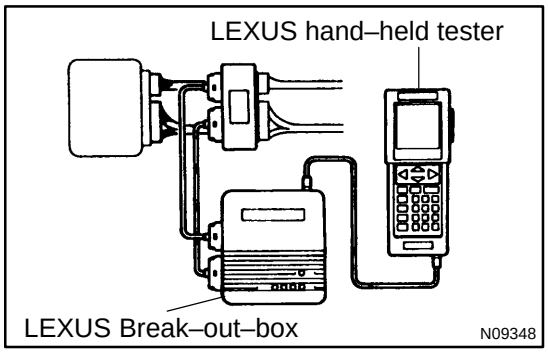
(2) Using SST, connect terminals Tc and E_1 of DLC2.

SST 09843–18020

(3) Read the DTC on the CRUISE MAIN indicator light.

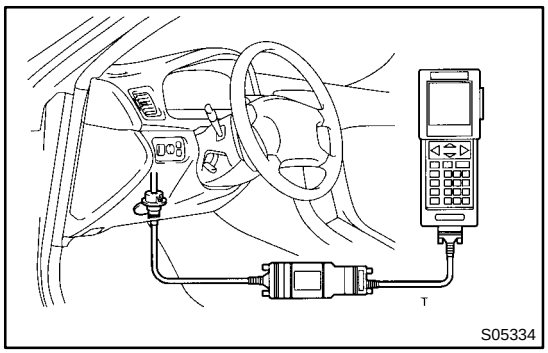


HINT:
If the DTC is not output, inspect the diagnosis circuit (See page DI–523).
As an example, the blinking patterns for codes; normal, 11 and 21 are shown in the illustration.



2. ECU TERMINAL VALUES MEASUREMENT BY USING LEXUS BREAK–OUT–BOX AND LEXUS HAND–HELD TESTER

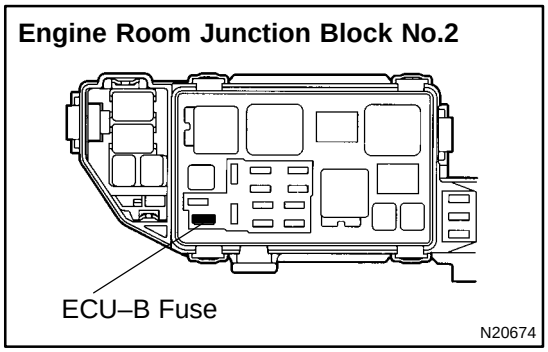
(a) Hook up the break–out–box and LEXUS hand–held tester to the vehicle.
(b) Read the ECU input/output values by following the prompts on the tester screen.
(c) Please refer to the LEXUS hand–held tester has a ”Snapshot” function. This records the measured data and is effective in the diagnosis of intermittent problems.



3. USING LEXUS HAND–HELD TESTER

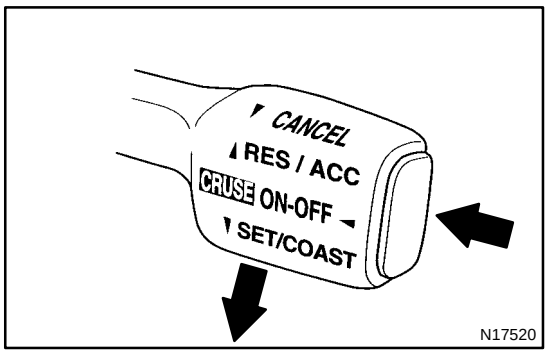
(a) Hook up the LEXUS hand–held tester to the DLC2.
(b) Monitor the ECU data by following the prompts on the tester screen.

HINT:LEXUS hand–held tester has a ”Snapshot” function which records the monitored data.
Please refer to the LEXUS hand–held tester operator’s manual for further details.



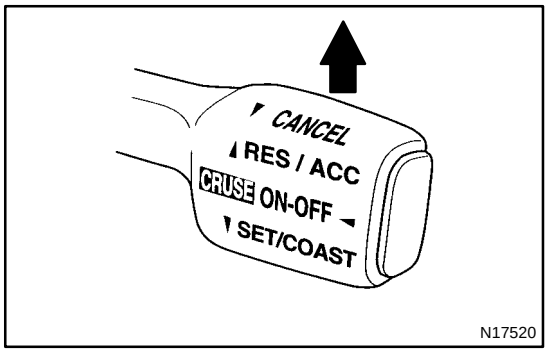
4. DTC CLEARANCE

(a) After completing repairs, the DTC retained in memory can be cleared by removing the ECU–B fuse for 10 seconds or more, with the ignition switch off.
(b) Check that the normal code is displayed after connecting the fuse.

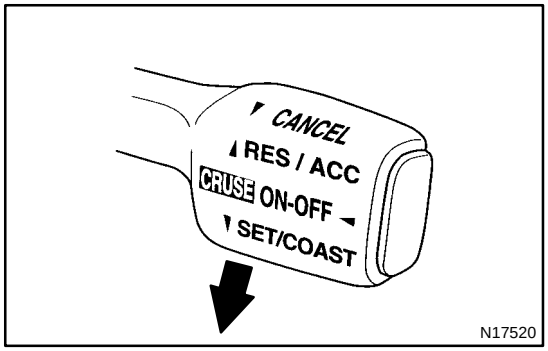


5. PROBLEM SYMPTOM CONFIRMATION (ROAD TEST)

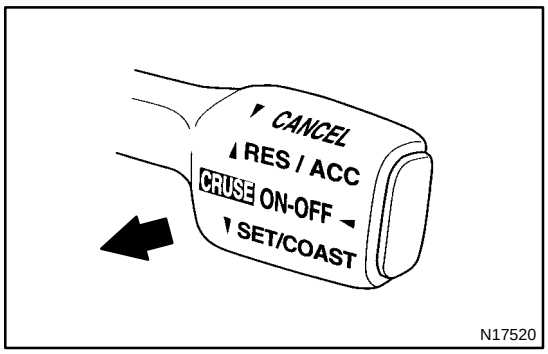
(a) SET INSPECTION
- (1) Push the main switch ON.
- (2) Drive at a desired speed (40 km/h (25 mph) or higher).
- (3) Press the control switch to the SET/COAST.
- (4) After releasing the switch, check that the vehicle cruises at the desired speed.



(b) ACCEL INSPECTION
- (1) Push the main switch ON.
- (2) Drive at a desired speed (40 km/h (25 mph) or higher).
- (3) Check that the vehicle speed is increased while the control switch turned to RES/ACC, and that the vehicle cruises at the set speed when the switch is released.
- (4) Momentarily press the control switch upward in the RES/ACC and then immediately release it. Check that the vehicle speed increases by about 1.5 km/h (Tap–up function).



(c) COAST INSPECTION
- (1) Push the main switch ON.
- (2) Drive at a desired speed (40 km/h (25 mph) or higher).
- (3) Check that the vehicle speed is decreased while the control switch is turned to SET/COAST, and the vehicle cruise at the set speed when the switch is released.
- (4) Momentarily press the control switch is turned to SET/COAST, and then immediately release it. Check that the vehicle speed decreases by about 1.5 km/h (Tap–down function).



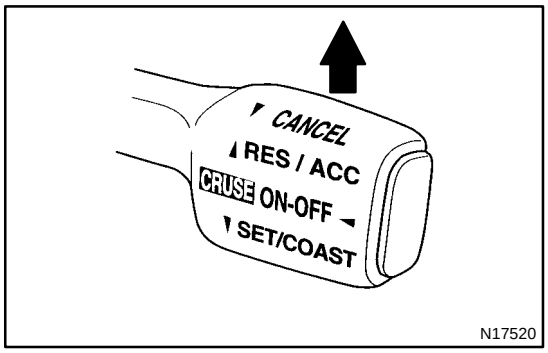
(d) CANCEL INSPECTION

(1) Push the main switch ON.

(2) Drive at a desired speed (40 km/h (25 mph) or higher).

(3) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.

- Depress the brake pedal
- Shift to except D position
- Push the main switch OFF
- Pull the cruise control switch to CANCEL



(e) RESUME INSPECTION

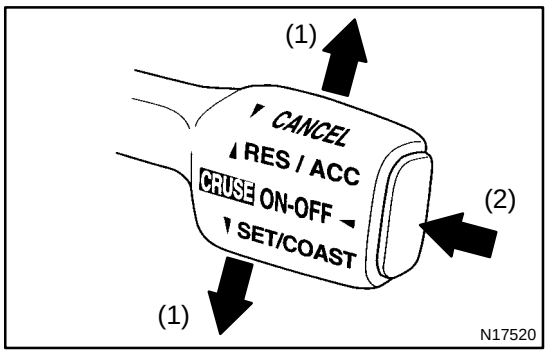
(1) Push the main switch ON.

(2) Drive at a desired speed (40 km/h (25 mph) or higher).

(3) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.

- Depress the brake pedal
- Shift to except D position
- Push the main switch OFF
- Pull the cruise control switch to CANCEL

(4) After the control switch is turned to RES/ACC at the driving speed of more than 40 km/h (25 mph), check that the vehicle restores the speed prior to the cancellation.



6. INPUT SIGNAL CHECK

HINT:

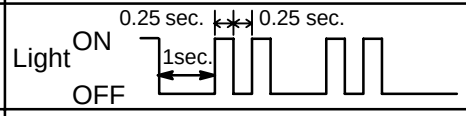
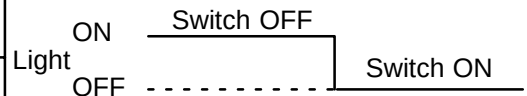
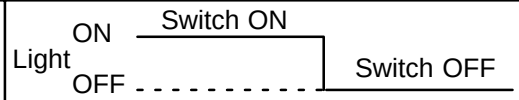
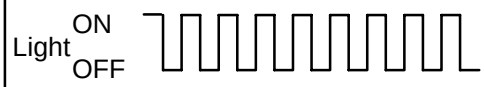
(1) For check No.1 ~ No.3
- Turn ignition switch ON.

(2) For check No.4
- Jack up the vehicle.
- Start the engine.
- Shift to D position.

(a) Press the control switch to SET/COAST or RES/ACC position and hold it down or hold it up ”1”.
(b) Push the main switch ON ”2”.
(c) Check that the CRUISE MAIN indicator light blinks twice or 3 times repeatedly after 3 seconds.
(d) Turn the SET/COAST or RES/ACC switch OFF.
(e) Operate each switch as listed in the table below.
(f) Read the blinking pattern of the CRUISE MAIN indicator light.
(g) After performing the check, turn the main switch OFF.

HINT:

When 2 or more signals are input to the ECU, the lowest numbered code will be displayed first.

No.	Operation Method	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
1	Turn SET/COAST switch ON		SET/COAST switch circuit is normal
2	Turn RES/ACC switch ON		RES/ACC switch circuit is normal
3	Turn CANCEL switch ON		CANCEL switch circuit is normal
	Turn stop light switch ON Depress brake pedal		Stop light switch circuit is normal
	Turn PNP switch OFF (Shift to except D position)		PNP switch circuit is normal
4	Drive at about 40 km/h (25 mph)or higher		Vehicle Speed Sensor is normal
	Drive at about 40 km/h (25 mph) or below		

DI0EJ–01

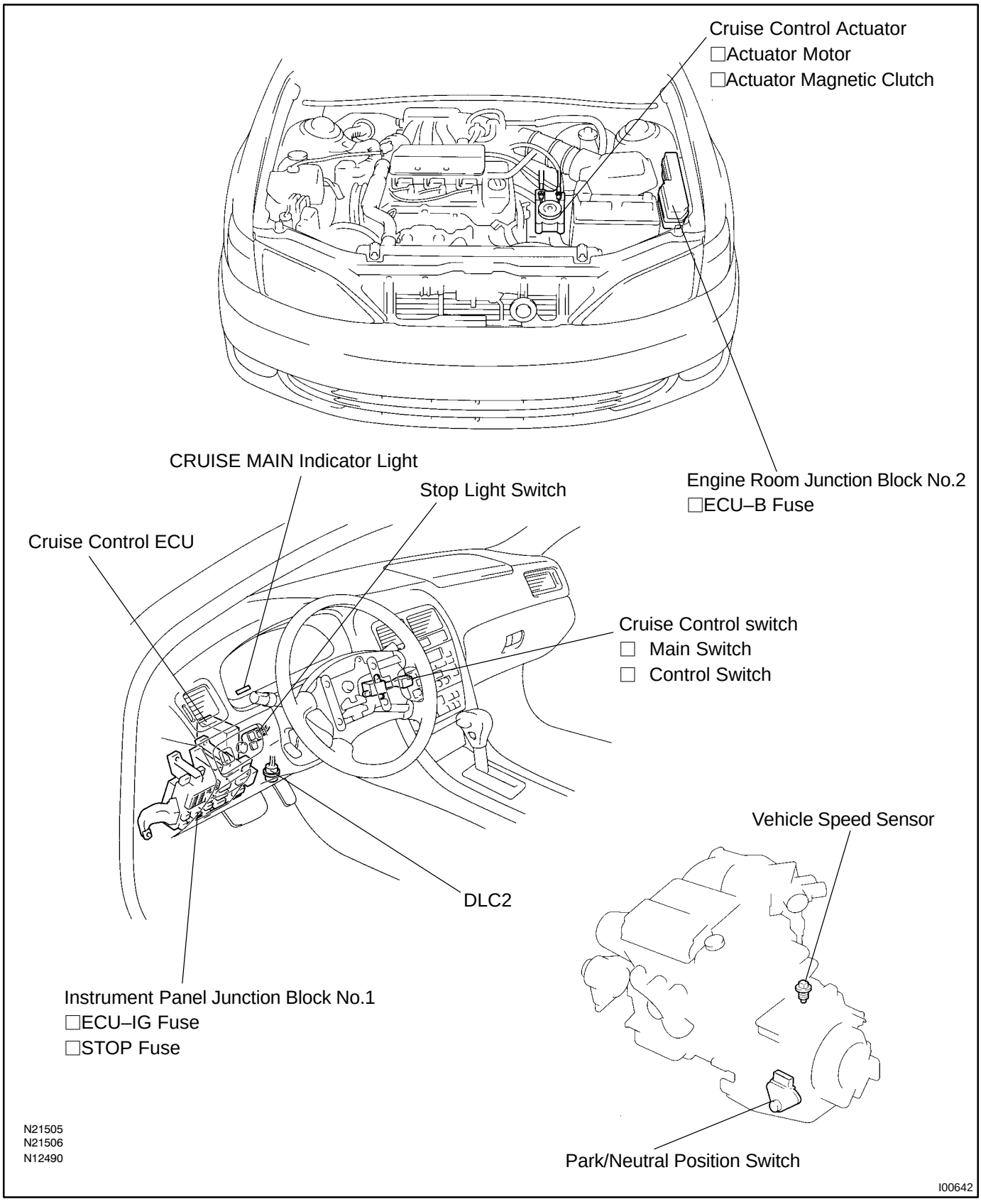
DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the appropriate page.

DTC No. (See Page)	Circuit Inspection	Trouble Area
11, 15 (DI–488)	●Actuator Motor Circuit	●Actuator motor ●Harness or connector between cruise control ECU and actuator motor ●Cruise control ECU
12 (DI–490)	●Actuator Magnetic Clutch Circuit	●STOP Fuse ●Stop light switch ●Actuator magnetic clutch ●Harness or connector between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground ●Cruise control ECU
14 (DI–493)	●Actuator Mechanical Malfunction	●Actuator motor (actuator lock: motor, arm) ●Cruise control ECU
21 (DI–493)	●Open in Vehicle Speed Sensor Circuit	●Combination meter ●Harness or connector between cruise control ECU and combination meter, combination meter and vehicle speed sensor ●Vehicle speed sensor ●Cruise control ECU
23 (DI–498)	●Vehicle Speed Signal Abnormal	●Vehicle speed sensor ●Cruise control ECU
32 (DI–499)	●Control Switch Circuit	●Cruise control switch ●Harness or connector between cruise control ECU and cruise control switch, cruise control switch and body ground ●Cruise control ECU
41	●Cruise control ECU	●Cruise control ECU
42	●Source voltage drop	●Power source
51 (DI–502)	●Idle Signal Circuit	●Throttle position sensor ●Harness or connector between ECM and throttle position sensor ●Harness or connector between cruise control ECU and ECM ●Cruise control ECU

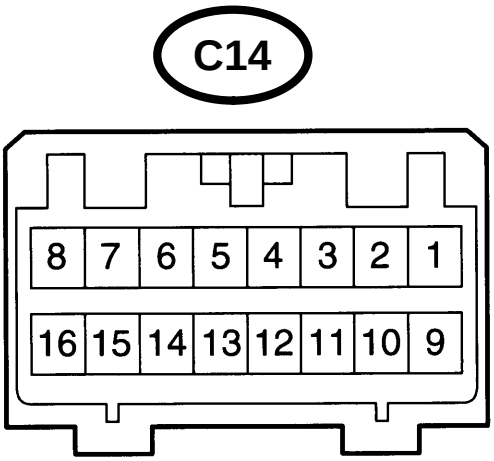
DI0EK–01

PARTS LOCATION



DI0EM–01

TERMINALS OF ECM



I00293

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
BATT ↔ GND (C14–1 ↔ C14–16)	L–Y ↔ W–B	Constant	10 – 16 V
STP– ↔ GND (C14–2 ↔ C14–16)	G–W ↔ W–B	Depress brake pedal	10 – 16 V
		Release brake pedal	Below 1 V
D ↔ GND (C14–3 ↔ C14–16)	W–R ↔ W–B	Shift to except D position	Below 1 V
		Shift to D position	10 – 16 V
PI ↔ GND (C14–4 ↔ C14–16)	B–Y ↔ W–B	Ignition switch ON Cruise control main switch ON	Below 1.2 V
		Ignition switch ON Cruise control main switch OFF	10 – 16 V
TC ↔ GND (C14–5 ↔ C14–16)	Y–B ↔ W–B	Ignition switch ON	10 – 16 V
		Ignition switch ON Connect terminals TC and E1 of diagnostic check connector	Below 1 V
ECT ↔ GND (C14–6 ↔ C14–16)	BR–Y ↔ W–B	During driving Gear position 3rd	10 – 16 V
		During driving Gear position O/D	Below 1 V
MC ↔ GND (C14–7 ↔ C14–16)	LG–B ↔ W–B	During cruise control driving COAST switch hold ON	9 – 15 V
		During cruise control driving ACC switch hold ON	Below 1 V
L ↔ GND (C14–8 ↔ C14–16)	L–B ↔ W–B	During cruise control driving	9 – 15 V
		Except during cruise control driving	Below 1 V
B ↔ GND (C14–9 ↔ C14–16)	Y ↔ W–B	Ignition switch ON	10 – 16 V
CCS ↔ GND (C14–10 ↔ C14–16)	G ↔ W–B	Ignition switch ON	10 – 16 V
		Ignition switch ON CANCEL switch hold ON	4.2 – 8.8 V
		Ignition switch ON SET/COAST switch hold ON	2.5 – 6.3 V
		Ignition switch ON RES/ACC switch hold ON	0.8 – 3.7 V

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
CMS ↔ GND (C14–11 ↔ C14–16)	G–B ↔ W–B	Ignition switch ON Main switch OFF	10 – 16 V
		Ignition switch ON Main switch ON	Below 0.5 V
SPD ↔ GND (C14–12 ↔ C14–16)	G–O ↔ W–B	Engine start Stoppage a car.	Below 1.5 V or 4.7 – 16 V
		During driving (Pulse generated).	3 – 7 V
IDL ↔ GND (C14–13 ↔ C14–16)	Y–L ↔ W–B	Ignition switch ON Throttle valve fully opened.	10 – 16 V
		Ignition switch ON Throttle valve fully closed.	Below 1.5 V
OD ↔ GND (C14–14 ↔ C14–16)	BR–Y ↔ W–B	During cruise control driving OD switch ON.	10 – 16 V
		During cruise control driving OD switch OFF (3rd driving)	Below 1 V
MO ↔ GND (C14–15 ↔ C14–16)	B–W ↔ W–B	During cruise control driving ACC switch hold ON	9 – 15 V
		During cruise control driving COAST switch hold ON	Below 1 V
GND ↔ Body Ground (C14–16 ↔ Body Ground)	W–B ↔ Body Ground	Constant	Below 1 V

DI0EN–01

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
SET not occurring or CANCEL occurring. (DTC is Normal)	1. Main Switch Circuit (Cruise control switch) 2. Vehicle Speed Sensor 3. Control Switch Circuit (Cruise control switch) 4. Stop Light Switch Circuit 5. Park/Neutral Position Switch Circuit 6. Actuator Motor Circuit 7. Cruise Control Cable 8. Cruise Control ECU	DI–519 DI–495 DI–499 DI–505 DI–511 DI–488 DI–525 IN–27
SET not occurring or CANCEL occurring. (DTC dose not output)	1. ECU Power Source Circuit 2. Cruise Control ECU	DI–514 IN–27
Actual vehicle speed deviates above or below the set speed.	1. Cruise Control Cable 2. Vehicle Speed Signal Abnormal 3. Electronically Controlled Transmission Communication Circuit 4. Actuator Motor Circuit 5. Idle Signal Circuit (main throttle position sensor) 6. Cruise Control ECU	DI–525 DI–498 DI–508 DI–488 DI–502 IN–27
Gear shifting frequent between 3rd O/D when driving on uphill road. (Hurting)	1. Electronically Controlled Transmission Communication Circuit 2. Cruise Control ECU	DI–508 IN–27
Cruise control not cancelled, even when brake pedal is depressed.	1. Cruise Control Cable 2. Stop Light Switch Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	DI–525 DI–505 DI–488 IN–27
Cruise control not cancelled, even when transmission is shifted to ”N” position.	1. Cruise Control Cable 2. Park/Neutral Position Switch Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	DI–525 DI–511 DI–488 IN–27
Control switch does not operate. (SET/COAST, ACC/RES, CANCEL not possible)	1. Cruise Control Cable 2. Control Switch Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	DI–525 DI–499 DI–488 IN–27
SET possible at 40 km/h (25 mph) or less, or CANCEL does not operate at 40 km/h (25 mph) or less.	1. Cruise Control Cable 2. Vehicle Speed Signal Abnormal 3. Actuator Motor Circuit 4. Cruise Control ECU	DI–525 DI–498 DI–488 IN–27
Poor response is ACCEL and RESUME modes.	1. Cruise Control Cable 2. Electronically Controlled Transmission Communication Circuit 3. Actuator Motor Circuit 4. Cruise Control ECU	DI–525 DI–508 DI–488 IN–27
O/D does not RESUME, even though the road is not uphill.	1. Electronically Controlled Transmission Communication Circuit 2. Cruise Control ECU	DI–508 IN–27
DTC memory is erased.	1. Back–up Power Source Circuit 2. Cruise Control ECU	DI–517 IN–27
DTC is not output, or is output when is should not be.	1. Diagnosis Circuit 2. Cruise Control ECU	DI–523 IN–27
Cruise MAIN indicator light remains ON or fall to light up.	Cruise MAIN Indicator Light Switch Circuit	DI–521

DI0EO–01

CIRCUIT INSPECTION

DTC	11, 15	Actuator Motor Circuit

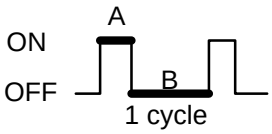
CIRCUIT DESCRIPTION

The actuator motor is operated by signals from the ECU. Acceleration and deceleration signals are transmitted by changes in the Duty Ratio (See note below).

Duty Ratio

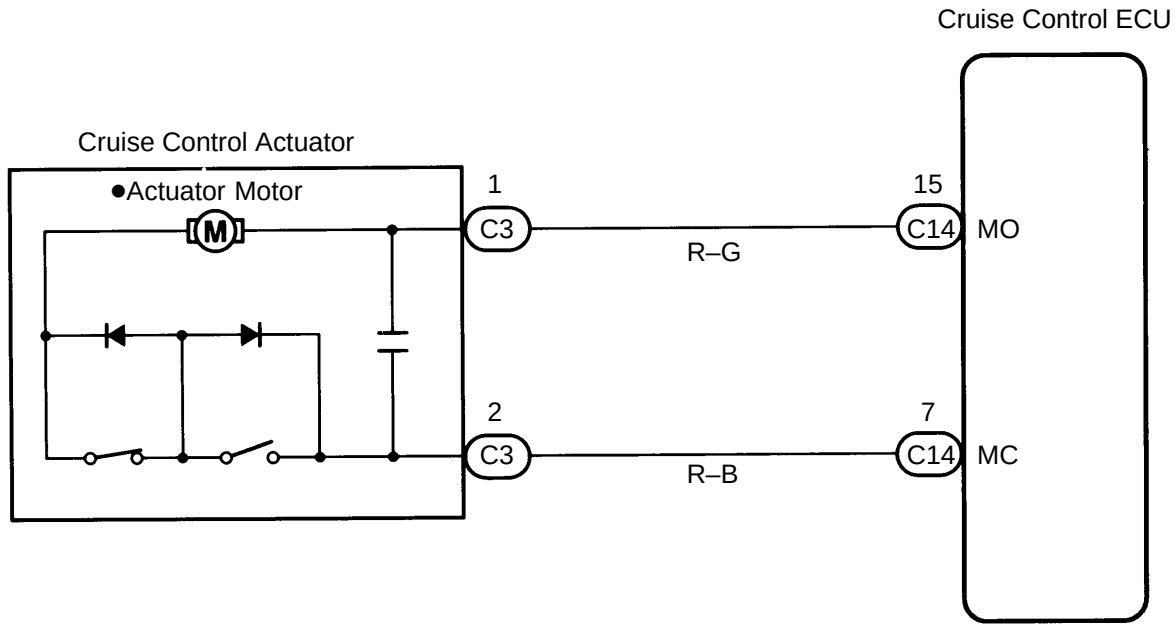
The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non–continuity, then.

$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$



DTC No.	Detection Item	Trouble Area
11	□Short in actuator motor circuit.	□Actuator motor □Harness or connector between cruise control ECU and actuator motor □Cruise control ECU
15	□Open in actuator motor circuit.	□Actuator motor

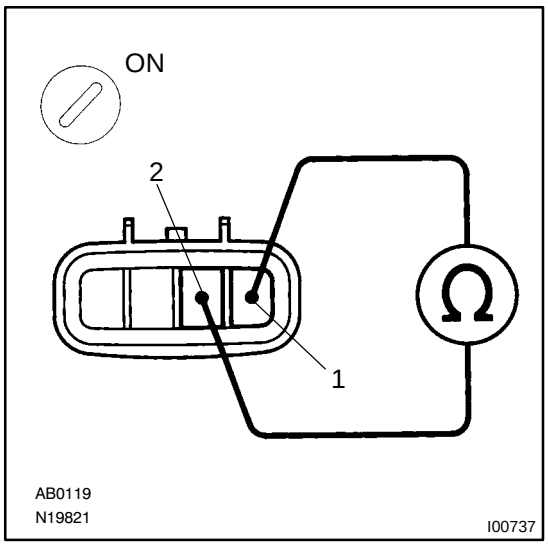
WIRING DIAGRAM



N21216

INSPECTION PROCEDURE

1	**Check resistance between terminals MO and MC of actuator motor.**



PREPARATION:

(a) Turn ignition switch OFF.

(b) Disconnect the actuator connector.

CHECK:

Measure resistance between terminals 1 and 2.

HINT:

If control plate position is fully opened or fully closed, resistance can not measure.

OK:

Resistance: more than 4.2 Ω

NG → **Replace cruise control actuator.**

OK

2	**Check for open and short in harness and connectors between cruise control ECU and actuator motor (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU. (See page IN–27).

DI0EP–01

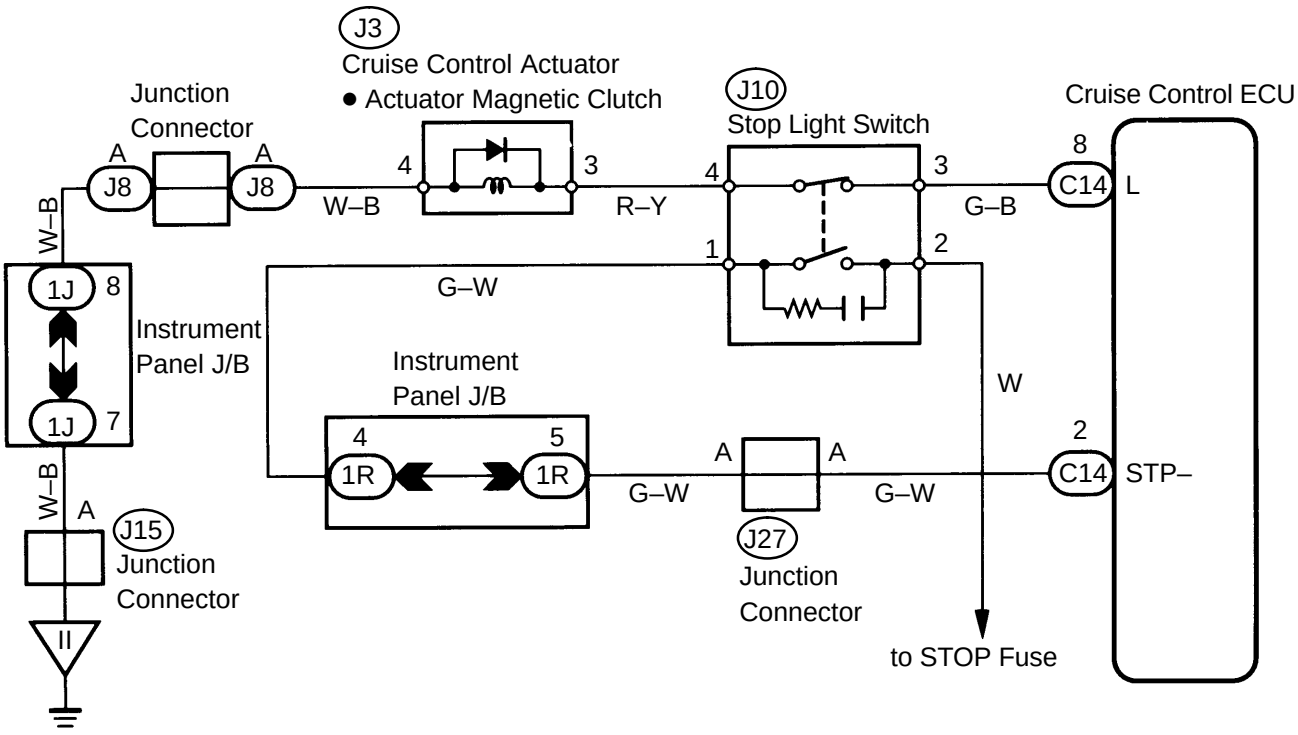
DTC	12	Actuator Magnetic Clutch Circuit

CIRCUIT DESCRIPTION

This circuit turns on the magnetic clutch inside the actuator during cruise control operation according to the signal from the ECU. If a malfunction occurs in the actuator or speed sensor, etc. during cruise control operation, the rotor shaft between the motor and control plate is released.
When the brake pedal is depressed, the stop light switch turns on, supplying electrical power to the stop light. Power supply to the magnetic clutch is mechanically cut and the magnetic clutch is turned OFF.
When driving downhill, if the vehicle speed exceeds the set speed by 15 km/h (9 mph), the ECU turns the safety magnet clutch OFF. If the vehicle speed later drops to within 10 km/h (6 mph) above the set speed, then cruise control at the set speed is resumed.

DTC No.	Detection Item	Trouble Area
12	□ Short in actuator magnetic clutch circuit. □ Open (0.8 sec.) in actuator magnetic clutch circuit.	□ STOP Fuse □ Stop light switch □ Actuator magnetic clutch □ Harness or connector between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground □ Cruise control ECU

WIRING DIAGRAM

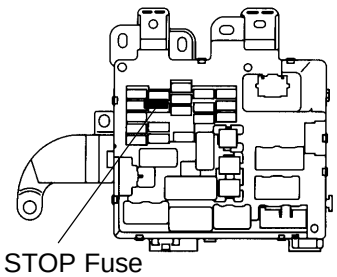


1997 LEXUS ES300 (RM511U)

INSPECTION PROCEDURE

1	**Check STOP fuse.**

Instrument Panel Junction Block No.1



PREPARATION:

(a) Turn ignition switch OFF.

(b) Remove the STOP fuse from instrument panel junction block No.1.

CHECK:

Check fuse continuity.

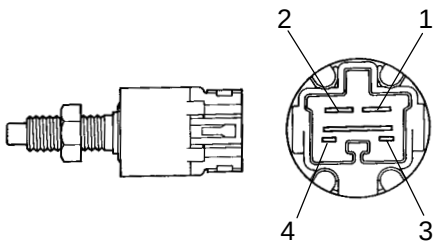
OK:

There is continuity.

NG → **Replace STOP fuse.**

OK

2	**Check stop light switch.**



PREPARATION:

Disconnect the stop light switch connector.

CHECK:

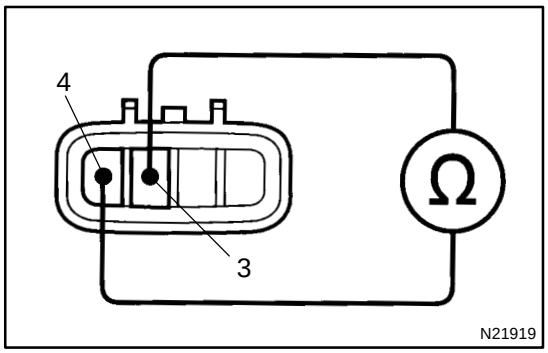
Check continuity between terminals.

Switch position	Continuity
Switch pin free (Brake pedal depressed)	1 – 2
Switch pin pushed in (Brake pedal released)	3 – 4

NG → **Replace stop light switch.**

OK

3	**Check resistance between terminals L and GND of actuator magnetic clutch.**



PREPARATION:

(a) Turn ignition switch OFF.

(b) Disconnect the actuator connector.

CHECK:

Measure resistance between terminals 3 and 4.

OK:

Resistance: 34.65 ~ 42.35 Ω.

NG → **Replace cruise control actuator.**

OK

4	**Check for open and short in harness and connectors between cruise control ECU and actuator magnetic clutch, actuator magnetic clutch and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU (See page IN–27).

DI0EQ–01

DTC	14	Actuator Mechanical Malfunction

CIRCUIT DESCRIPTION

The circuit detects the rotation position of the actuator control plate and sends a signal to the ECU.

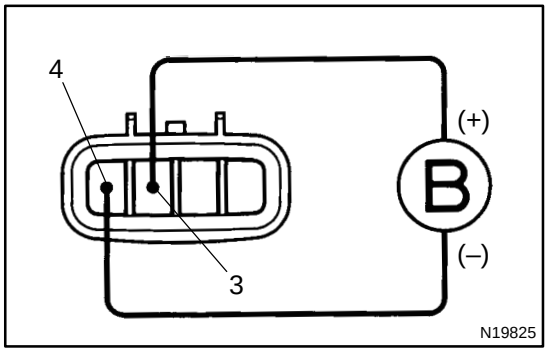
DTC No.	Detection Item	Trouble Area
14	●Cruise control actuator mechanical malfunction.	●Actuator lock: (motor, arm) ●Actuator motor ●Cruise control ECU

WIRING DIAGRAM

See page DI–488.

INSPECTION PROCEDURE

1	Check cruise control actuator arm locking operation



PREPARATION:

(a) Turn ignition switch OFF.

(b) Disconnect the actuator connector.

CHECK:

Connect the positive (+) lead from the battery to the terminal 3 of actuator and the negative (–) lead to terminal 4.

NOTICE:

Do not connect the high tension cables to the wrong battery terminal. You will damage the cruise control actuator.

(a) Move the control plate by hand.

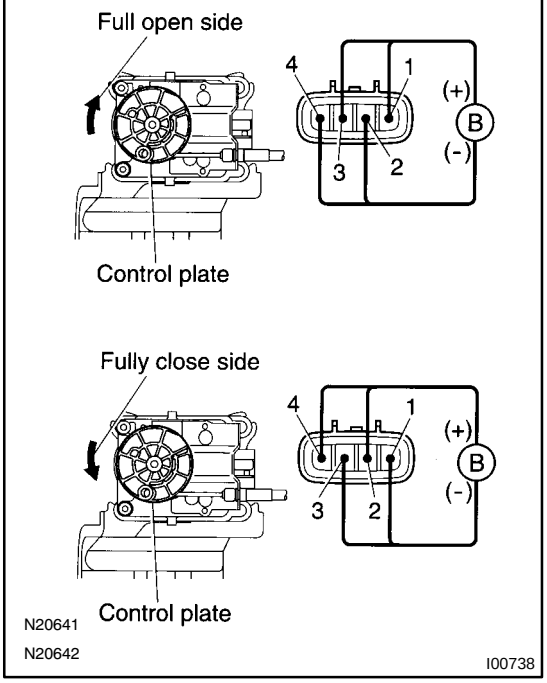
OK:

Control plate doesn't move.

NG → **Replace cruise control actuator.**

OK

2	Check cruise control actuator operation.



PREPARATION:

(a) Turn ignition switch OFF.

(b) Disconnect the actuator connector.

CHECK:

Connect the positive (+) lead from the battery to terminals 1 and 3 of actuator, connect the negative (–) lead to terminals 2 and 4 of actuator.

OK:

Control arm moves to full open side

CHECK:

Connect the positive (+) lead from the battery to terminals 2 and 4 of actuator, connect the negative (–) lead to terminals 1 and 3 of actuator.

OK:

Control arm moves to full close side

NG → **Replace cruise control actuator.**

OK

3	Check harness and connector between cruise control ECU and cruise control actuator (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

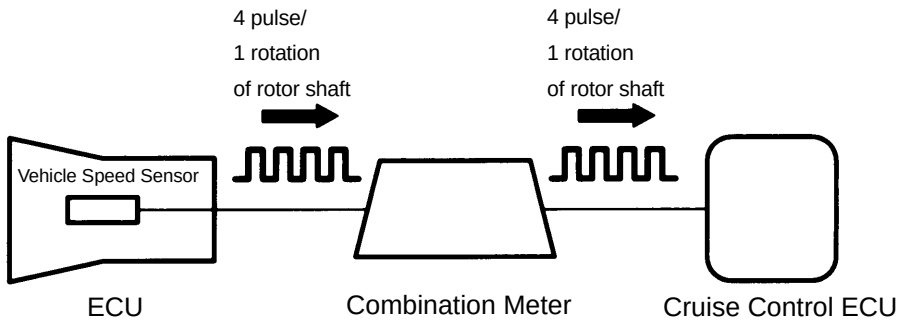
Check and replace cruise control ECU (See page IN–27).

DI0ER–01

DTC	21	Open in Vehicle Speed Sensor Circuit

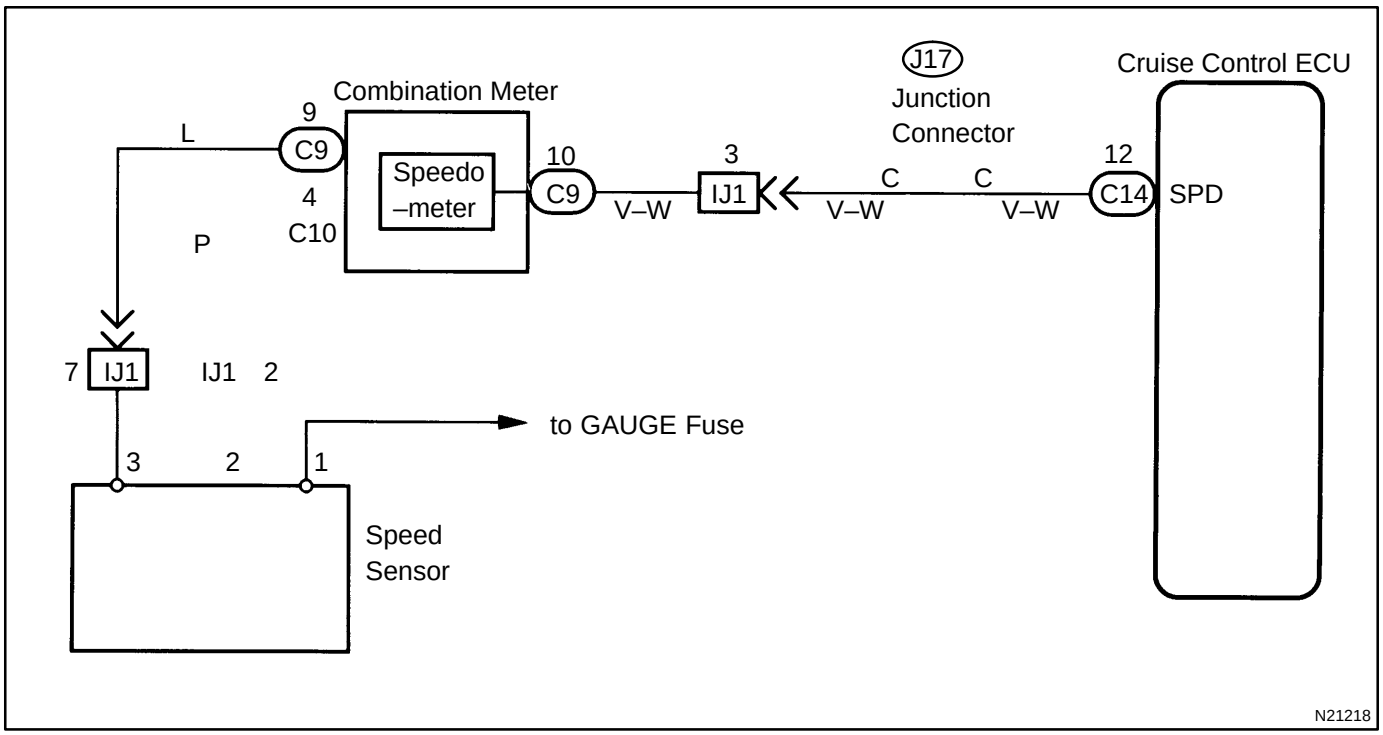
CIRCUIT DESCRIPTION

The vehicle speed sensor circuit is sent to cruise control ECU as vehicle speed signal.
The rotor shaft is driven by the gear of the transmission.
For each rotation of the shaft, the vehicle speed sensor sends a 4 pulse signal through the combination meter to the cruise control ECU (See the following).
This signal is converted inside the combination meter and sent as a 4–pulse signal to the cruise control ECU.
The ECU calculates the vehicle speed from this pulse frequency.



DTC No.	Detection Item	Trouble Area
21	●Speed signal is not input to the cruise control ECU while cruise control is set.	●Combination meter ●Harness or connector between cruise control ECU and combination meter, combination meter and vehicle speed sensor ●Vehicle speed sensor ●Cruise control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Input signal check.**

Input Signal	Indicator Light Blinking Pattern
Drive at about 40 km/h (25 mph) or below	Light: ON — OFF
Drive at about 40 km/h (25 mph) or higher	Light: ON / OFF

CHECK:

(a) See input signal check on page DI–478.

(b) Check indicator light operation when driving with vehicle speed above 40 km/h (25 mph), and with vehicle speed below 40 km/h (25 mph).

OK:

Vehicle speed above 40 km/h (25 mph):
Indicator light blinks

Vehicle speed below 40 km/h (25 mph):
Indicator light stays on

OK → **Check and replace cruise control ECU (See page IN–27).**

NG

2	**Check speedometer circuit (See Combination meter troubleshooting on page BE–2).**

NG → **Repair or replace harness, connector or combination meter assembly.**

OK

3	**Check harness and connector between cruise control ECU and combination meter, combination meter and vehicle speed sensor (See page DI–493).**

NG → **Repair or replace harness or connector.**

OK

4	**Check vehicle speed sensor (See page BE–92).**

NG → **Replace vehicle speed sensor.**

OK

Check and replace cruise control ECU (See page IN–27).

DI0ES–01

DTC	23	Vehicle Speed Signal Abnormal

CIRCUIT DESCRIPTION

See page DI–495.

DTC No.	Detection Item	Trouble Area
23	●Vehicle speed sensor pulse is abnormal.	●Vehicle speed sensor ●Cruise control ECU

WIRING DIAGRAM

See page DI–495.

INSPECTION PROCEDURE

1	**Check vehicle speed sensor (See page BE–92).**

NG → **Replace vehicle speed sensor.**

OK

Check and replace cruise control ECU (See page IN–27).

DI0EU–01

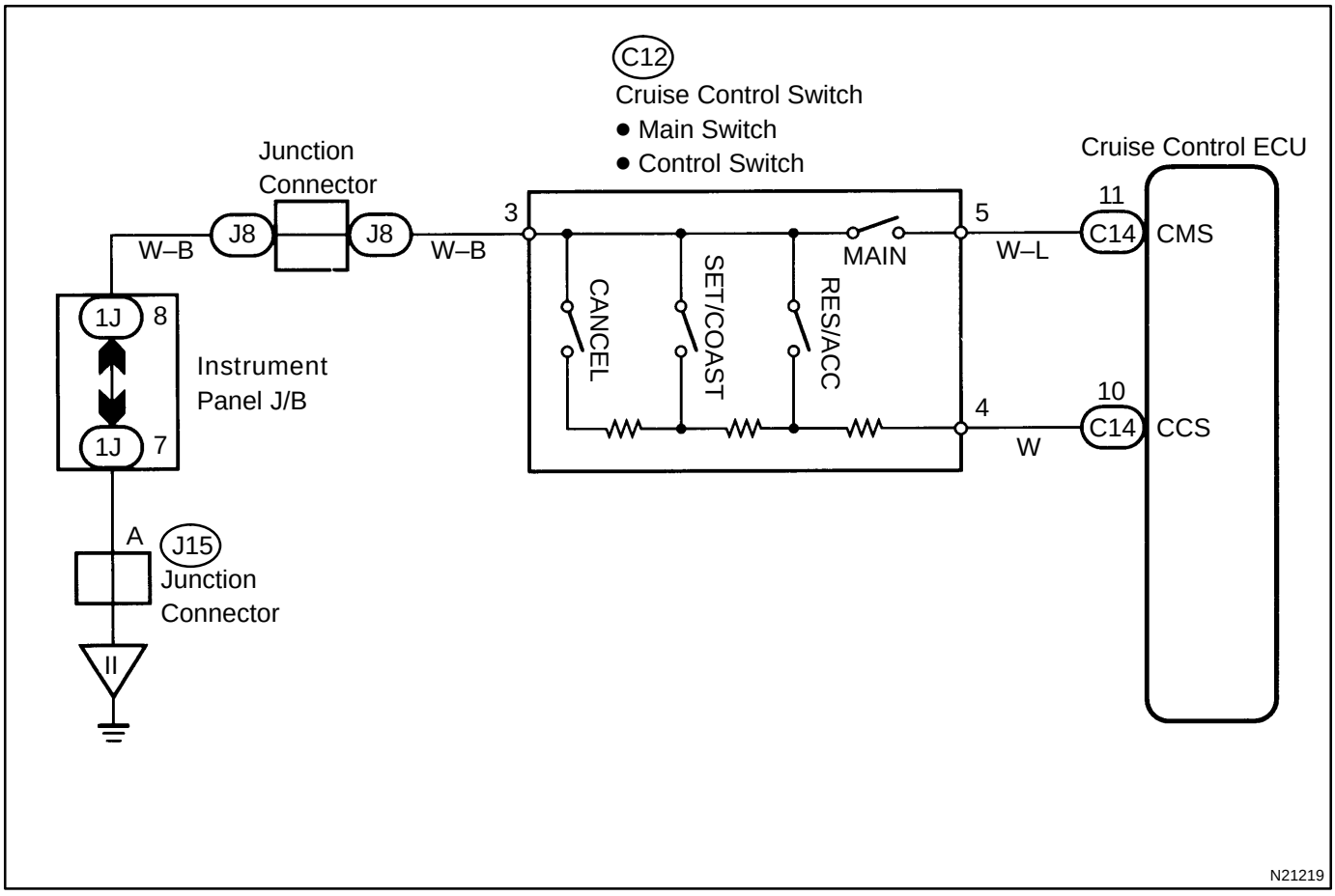
DTC	32	Control Switch Circuit (Cruise Control Switch)

CIRCUIT DESCRIPTION

This circuit carries the SET/COAST, RESUME/ACCEL and CANCEL signals (each voltage) to the ECU.

DTC No.	Detection Item	Trouble Area
32	□Short in control switch circuit.	□Cruise control switch □Harness or connector between cruise control ECU and cruise control switch, cruise control switch and body ground □Cruise control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Input signal check.**

Input Signal	Indicator Light Blinking Pattern
SET/COAST switch	2 Pulses: ON / OFF
RESUME/ACCEL switch	3 Pulses: ON / OFF
CANCEL switch	SW OFF / SW ON: ON / OFF

PREPARATION:

See input signal check on page DI–478.

CHECK:

Check the indicator light operation when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned on.

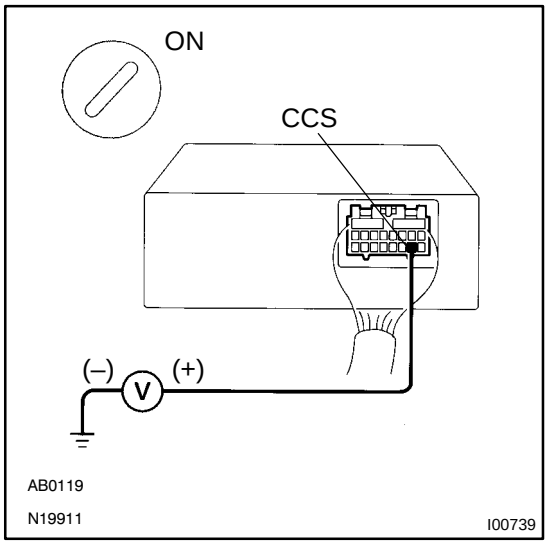
OK:

SET/COAST, RESUME/ACCEL switch
The signals shown in the table on the left should be output when each switch is ON. The signal should disappear when the switch is turned OFF.
CANCEL switch
The indicator light goes off when the cancel switch is turned ON.

OK	**Wait and see.**

NG

2	**Check voltage between terminals CCS of cruise control ECU connector and body ground.**



PREPARATION:

(a) Remove the ECU with connector still connected.
(b) Turn ignition switch ON.

CHECK:

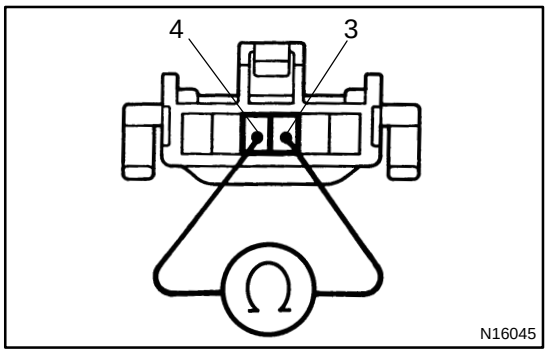
Measure voltage between terminals 18 of ECU connector and body ground, when each of the SET/COAST, RESUME/ACCEL and CANCEL is turned ON.

Switch position	Resistance (V)
Neutral	10 – 16 V
RES/ACC	0.8 – 3.7 V
SET/COAST	2.5 – 6.3 V
CANCEL	4.2 – 8.8 V

NG	**Proceed to next circuit inspection shown on problem symptom table (See page DI–487).**

OK

3	**Check control switch.**



PREPARATION:

(a) Remove steering wheel center pad.

(b) Disconnect the control switch connector.

CHECK:

Measure resistance between terminals 3 and 4 of control switch connector when control switch is operated.

Switch position	Resistance (Ω)
Neutral	∞ (No continuity)
RES/ACC	50 – 80
SET/COAST	180 – 220
CANCEL	400 – 440

NG → **Replace control switch.**

OK ↓

4	**Check harness and connector between cruise control ECU and cruise control switch, cruise control switch and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK ↓

5	**Input signal check (See step 1).**

OK → **Wait and see.**

NG ↓

Check and replace cruise control ECU (See page IN–27).

DI0EW–01

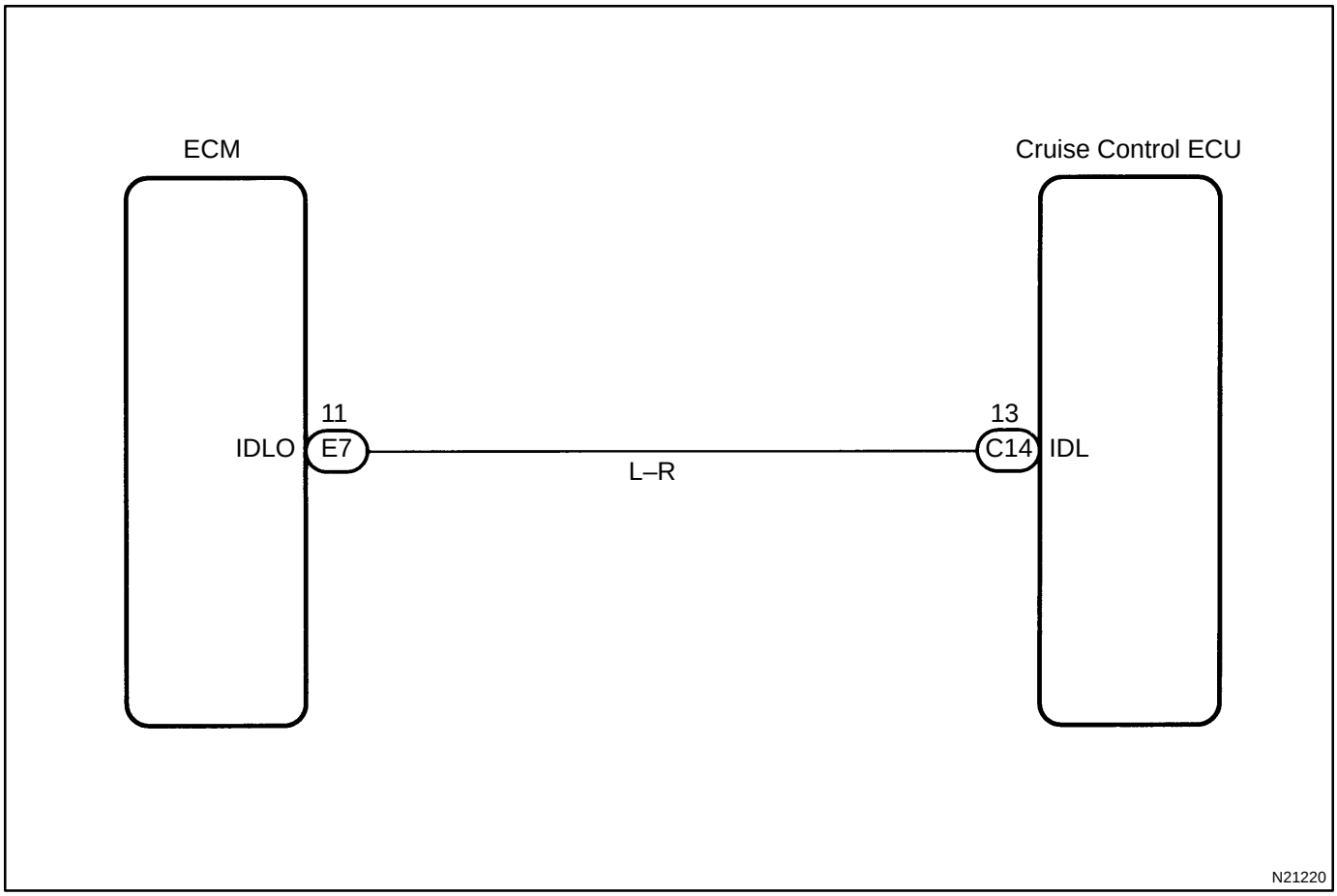
DTC	51	Idle Signal Circuit

CIRCUIT DESCRIPTION

When the idle switch in turned ON, a signal is sent to the ECU. The ECU uses this signal to correct the discrepancy between the throttle valve position and the actuator position sensor value to enable accurate cruise control at the set speed. If the idle switch is malfunctioning, problem symptoms also occur in the engine, so also inspect the engine.

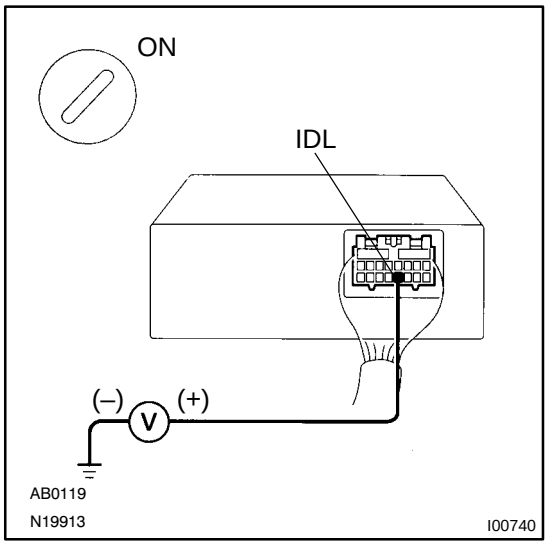
DTC No.	Detection Item	Trouble Area
51	●Short in idle signal circuit.	●Harness or connector between ECM and throttle position sensor ●Throttle position sensor ●Harness or connector between cruise control ECU and ECM ●Cruise control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal IDL of cruise control ECU connector and body ground.**



PREPARATION:

(a) Remove the ECU with connector still connected.
(b) Disconnect the ECM connector.
(c) Turn ignition switch ON.

CHECK:

Measure voltage between terminal IDL of ECU connector and body ground when the throttle valve is fully closed and fully opened.

OK:

Throttle valve position	Voltage
Fully opened	10 – 14 V
Fully closed	Below 2 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page DI–487).**

NG

2	**Check harness and connector between ECM and throttle position sensor (See page IN–27).**

NG → **Repair or replace harness or connector.**

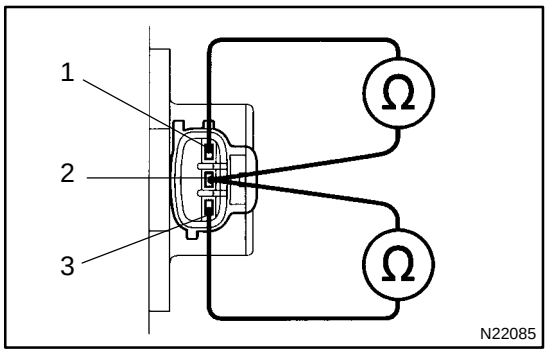
OK

3	**Check throttle position sensor circuit (See page DI–38).**

NG → **Replace throttle position sensor.**

OK

4	Check throttle position sensor.



PREPARATION:

Disconnect the throttle position sensor connector.

CHECK:

Measure resistance between terminals 1, 3 and 2 of throttle position sensor connector.

OK:

Terminals	Throttle valve position	Resistance
1 – 2	–	2.5 ~ 5.9 kΩ
2 – 3	Fully opened	0.2 ~ 6.3 kΩ
2 – 3	Fully closed	2.0 ~ 10.2 kΩ

NG → **Replace throttle position sensor.**

OK

5	Check for open and short in harness and connector between cruise control ECU and ECM (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU (See page IN–27).

DI0EZ–01

Stop Light Switch Circuit

CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the ECU. When the ECU receives this signal, it cancels the cruise control.

A fail–safe function is provided so that the cancel functions normally, even if there is a malfunction in the stop light signal circuit.

The cancel conditions are: Battery positive voltage at terminal STP–

When the brake is on, battery positive voltage normally applies through the STOP fuse and stop light switch to terminal STP– of the ECU, and the ECU turns the cruise control off.

If the harness connected to terminal STP– has an open circuit, terminal STP– will have battery positive voltage and the cruise control will be turned off.

Also, when the brake is on, the magnetic clutch circuit is cut mechanically by the stop light switch, turning the cruise control off. (See page DI–490 for operation of the magnetic clutch)

WIRING DIAGRAM

See page DI–490.

INSPECTION PROCEDURE

1	**Check operation of stop light.**

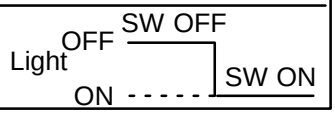
CHECK:

Check that stop light comes on when brake pedal is depressed, and turns off when brake pedal is released.

NG → **Check stop light system (See page BE–2).**

OK

2	**Input signal check.**

Input Signal	Indicator Light Blinking Pattern
Stop Light switch ON	

CHECK:

(a) See input signal check on DI–478.

(b) Check the indicator light when the brake pedal is depressed.

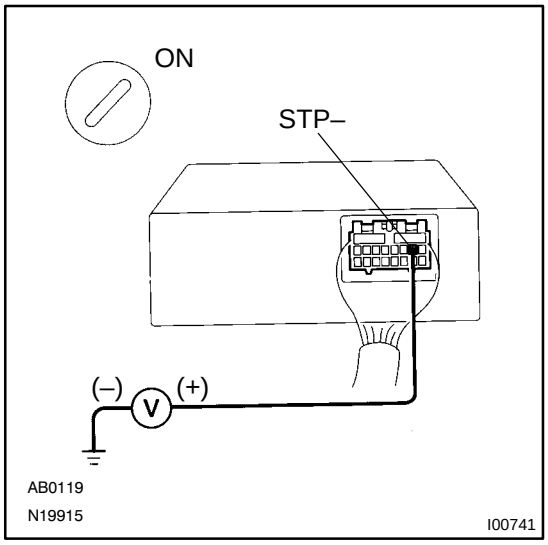
OK:

The indicator light goes off when the brake pedal is depressed.

OK → **Proceed to next circuit inspection shown on problem symptom table (See page DI–487).**

NG

3	Check voltage between terminal STP– of cruise control ECU connector and body ground.



PREPARATION:

(a) Remove the ECU with connectors still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal STP– of cruise control ECU connector and body ground, when the brake pedal is depressed and released.

OK:

Depressed	10 – 14 V
Released	Below 1 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page DI–487).**

NG

4	Check for open in harness and connectors between terminal STP– of cruise control ECU and stop light switch (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU (See page IN–27).

DI0F2–01

Electronically Controlled Transmission Communication Circuit

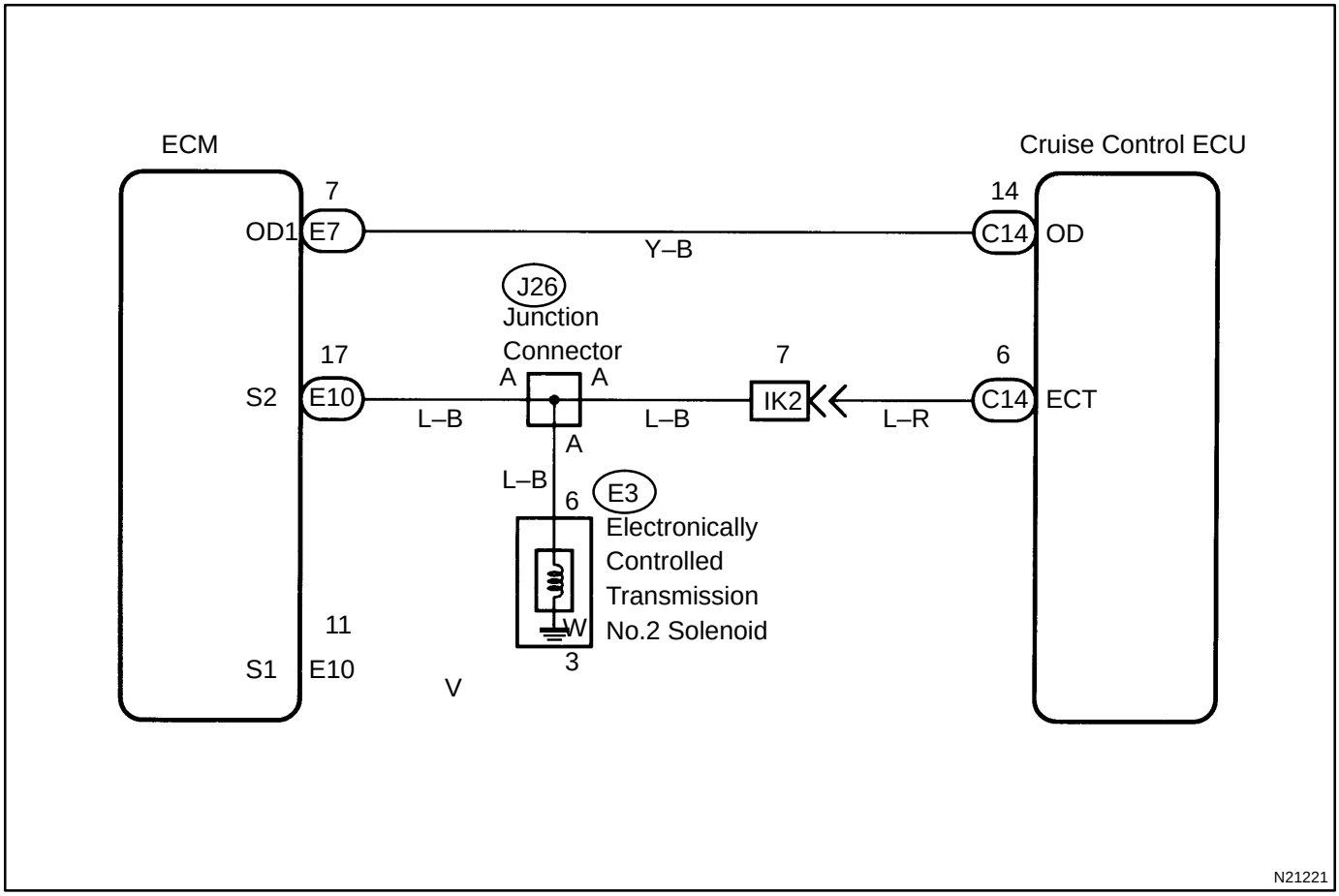
CIRCUIT DESCRIPTION

When driving uphill under cruise control, in order to reduce shifting due to ON–OFF overdrive operation and to provide smooth driving, when down shifting in the electronically controlled transmission occurs, a signal to prevent upshift until the end of the up hill slope is sent from the cruise control ECU to the electronically controlled transmission.

Terminal ECT of the cruise control ECU detects the shift change signal (output to electronically controlled transmission No. 2 solenoid) from the ECM.

If vehicle speed down, also when terminal ECT of the cruise control ECU receives down shifting signal, it sends a signal from terminal OD to ECM to cut overdrive until the end of the uphill slope, and the gear shifts are reduced and gear shift points in the electronically controlled transmission are changed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of overdrive.**

PREPARATION:

Test drive after engine warms up.

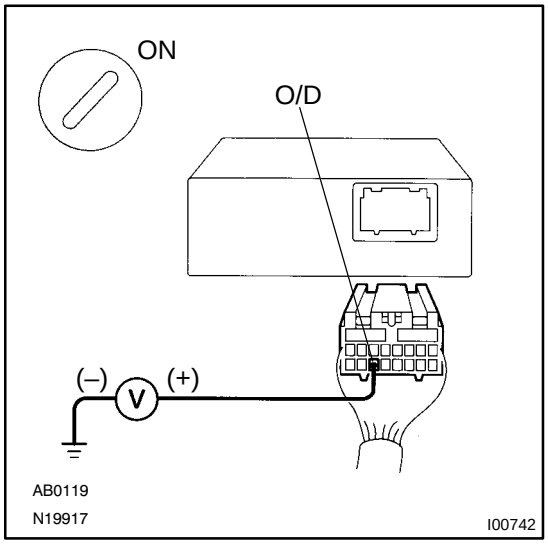
CHECK:

Check that overdrive ON ↔ OFF occurs with operation of OD switch ON–OFF.

NG → **Check and repair electronically controlled transmission.**

OK

2	**Check voltage between terminal OD of harness side connector of cruise control ECU and body ground.**



PREPARATION:

(a) Remove the ECU with connector still connected.
(b) Turn ignition switch ON.
(c) Disconnect the ECU connector.

CHECK:

Measure voltage between terminal OD of harness side connector of ECU and body ground.

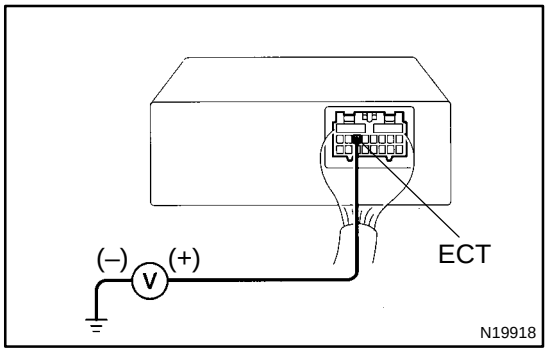
OK:

Voltage: 10 – 14 V

NG → **Go to step 5.**

OK

3	Check voltage between terminal ECT of cruise control ECU connector and body ground (On test drive).



PREPARATION:

(a) Connect the ECU connector.

(b) Test drive after engine warms up.

CHECK:

Check voltage between terminal ECT of ECU connector and body ground when OD switch is ON and OFF.

OK:

OD switch position	Voltage
ON	8 – 14 V
OFF	Below 0.5 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page DI–487).**

NG

4	Check harness and connector between terminal ECT of cruise control ECU and electronically controlled transmission solenoid (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU.

5	Check harness and connector between terminal OD of cruise control ECU and terminal OD1 of ECM (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU (See page IN–27).

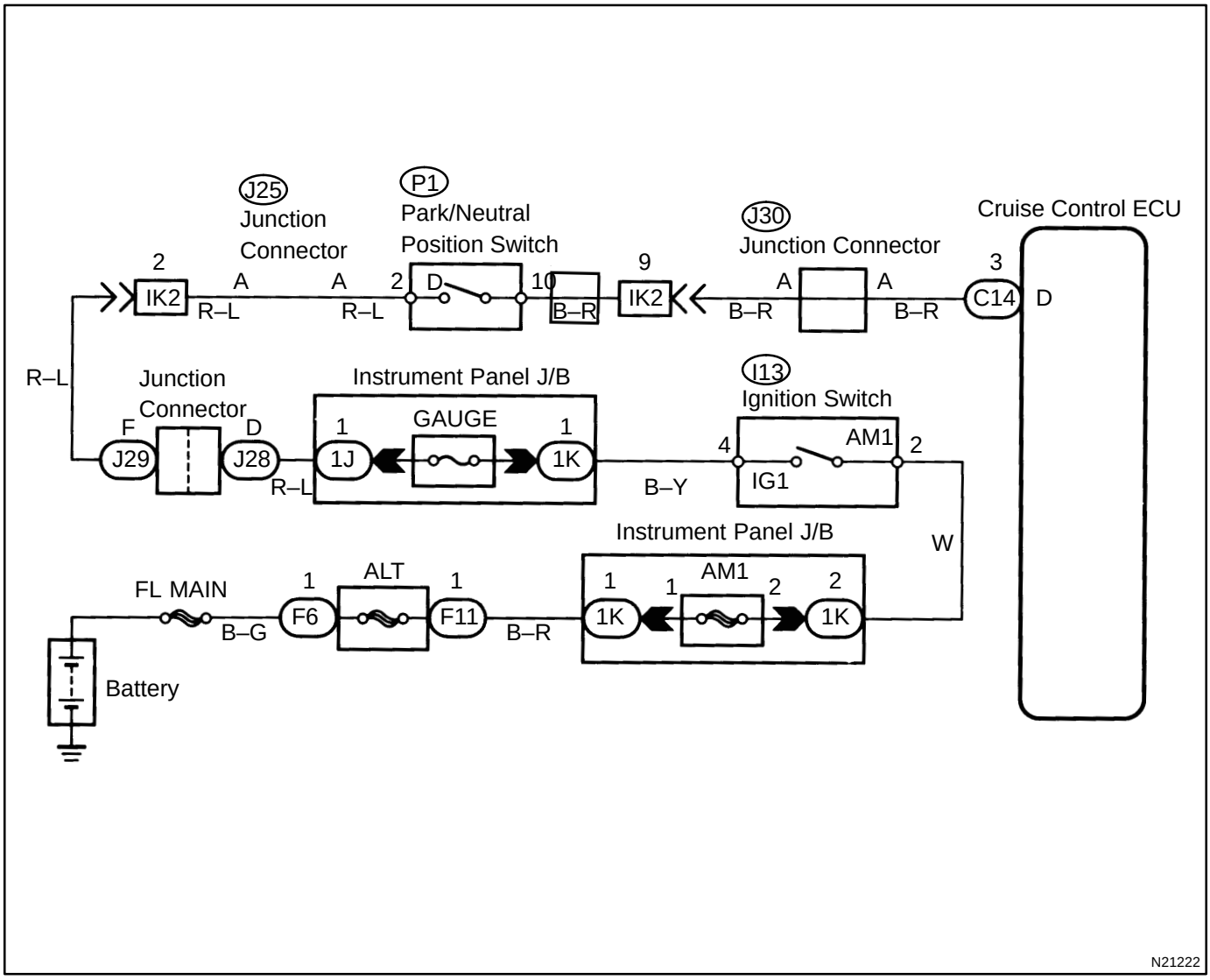
DI0F4–01

Park/Neutral Position Switch Circuit

CIRCUIT DESCRIPTION

When the shift position is put in except D position, a signal is sent from the park/neutral position switch to the ECU. When this signal is input during cruise control driving, the ECU cancels the cruise control.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check starter operation.**

CHECK:

Check that the starter operates normally and that the engine starts.

NG → **Proceed to engine troubleshooting. (See page ST–1).**

OK ↓

2	**Input signal check.**

Input Signal	Indicator Light Blinking Pattern
Turn PNP switch OFF (Shift to except D position)	Light: ON (SW ON) / OFF (SW OFF)

PREPARATION:

See input signal check on page DI–478.

CHECK:

Check the indicator light when shifting into except D position.

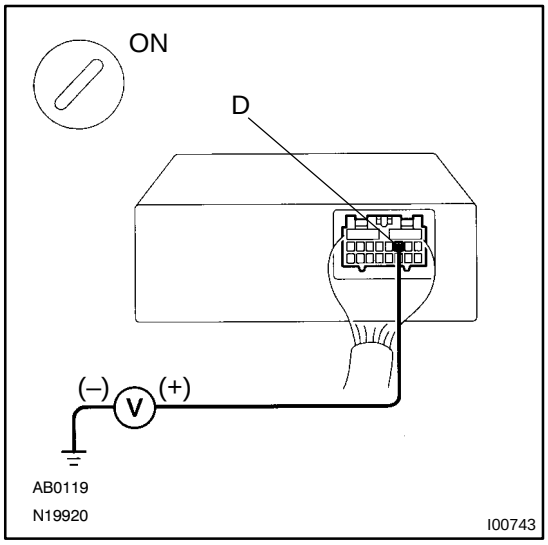
OK:

The indicator light goes off when shifting into except D position.

OK → **Proceed to next circuit inspection shown on problem symptom table (See page DI–487).**

NG ↓

3	Check voltage between terminal D of cruise control ECU connector and body ground.



PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminal D of ECU connector and body ground when shifting into D position and other positions.
OK:

Shift Position	Voltage
D position	10 – 14 V
Other positions	Below 1 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page DI–487).**

NG

4	Check harness and connector between cruise control ECU and park/neutral position switch (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

Check and replace cruise control ECU (See page IN–27).

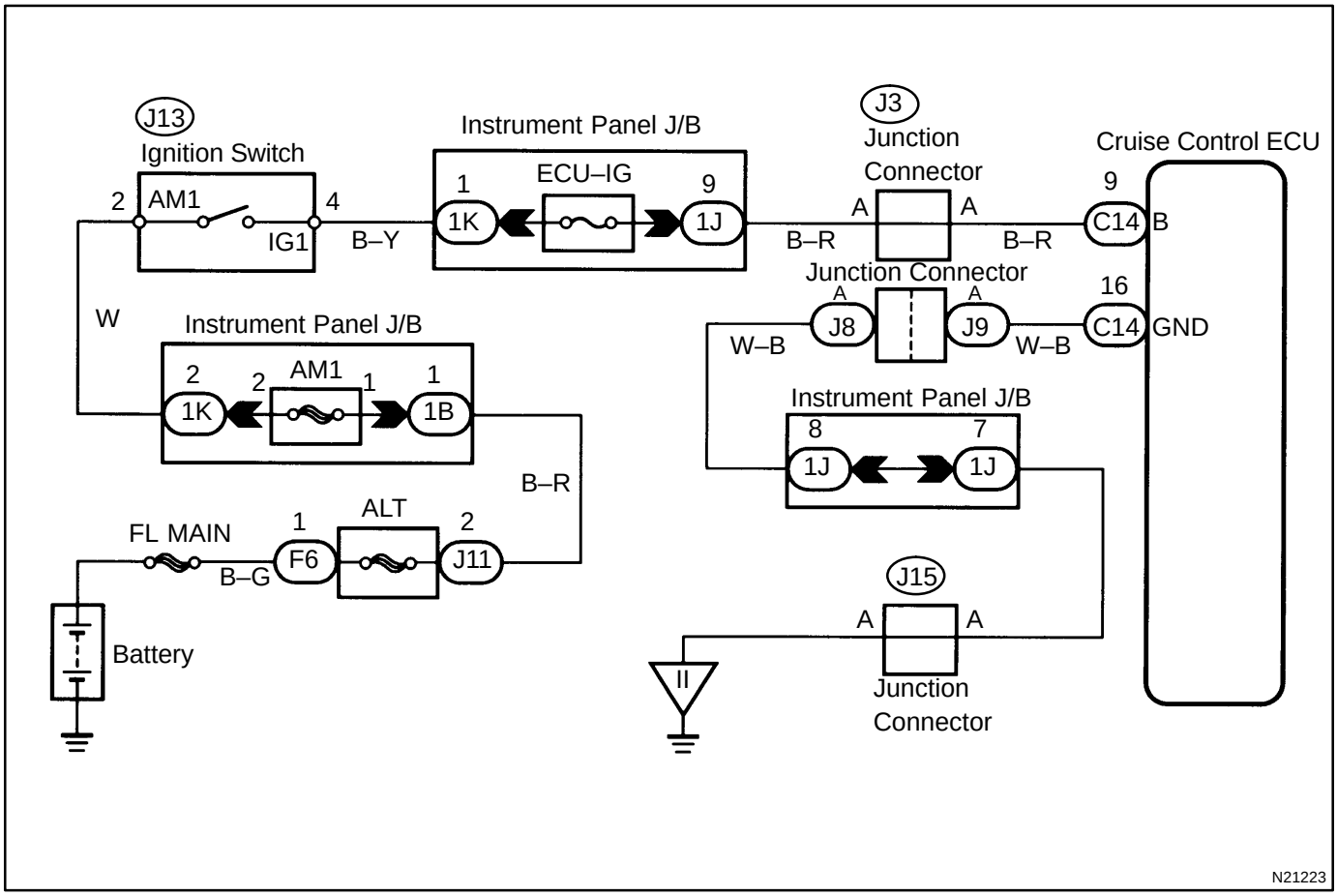
DI0F6–01

ECU Power Source Circuit

CIRCUIT DESCRIPTION

The ECU power source supplies power to the actuator and sensors, etc.. When terminal GND and the cruise control ECU case are grounded.

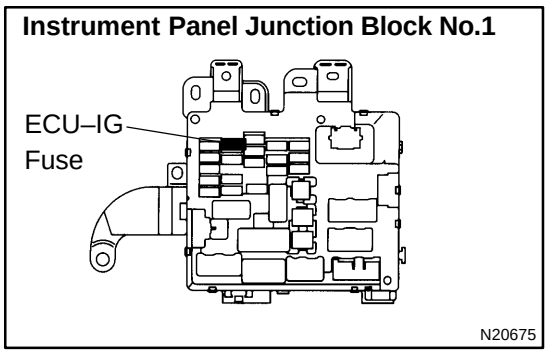
WIRING DIAGRAM



N21223

INSPECTION PROCEDURE

1	Check ECU–IG fuse.

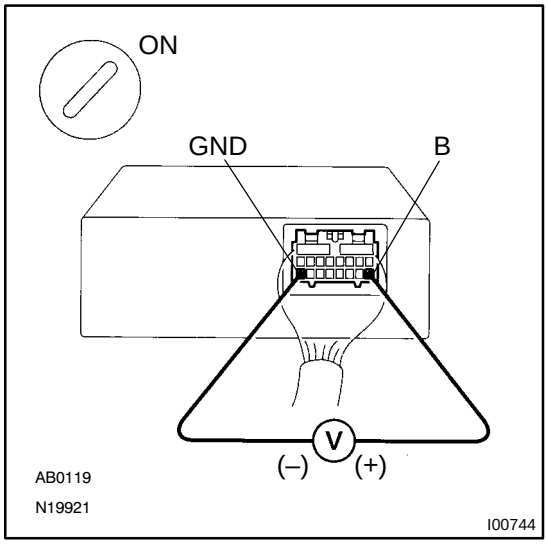


PREPARATION:
Remove the ECU–IG fuse from instrument panel junction block No.1.
CHECK:
Check continuity of ECU–IG fuse.
OK:
Continuity

NG → **Check for short in all the harness and components connected to ECU–IG fuse.**

OK ↓

2	Check voltage between terminals B and GND of cruise control ECU connector.

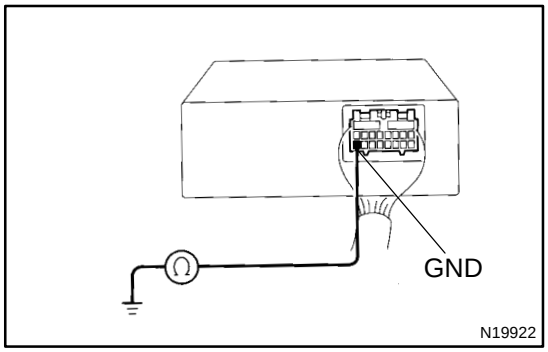


PREPARATION:
(a) Remove the ECU with connector still connected.
(b) Turn ignition switch ON.
CHECK:
Measure voltage between terminals B and GND of ECU connector.
OK:
10 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page DI–487).**

NG ↓

3	**Check resistance between terminal GND of cruise control ECU connector and body ground.**



CHECK:
Measure resistance between terminal GND of ECU connector and body ground.
OK:
Resistance: Below 1 Ω

NG → **Repair or replace harness or connector.**

OK

Check and repair harness and connector between cruise control ECU and battery (See page IN–27).

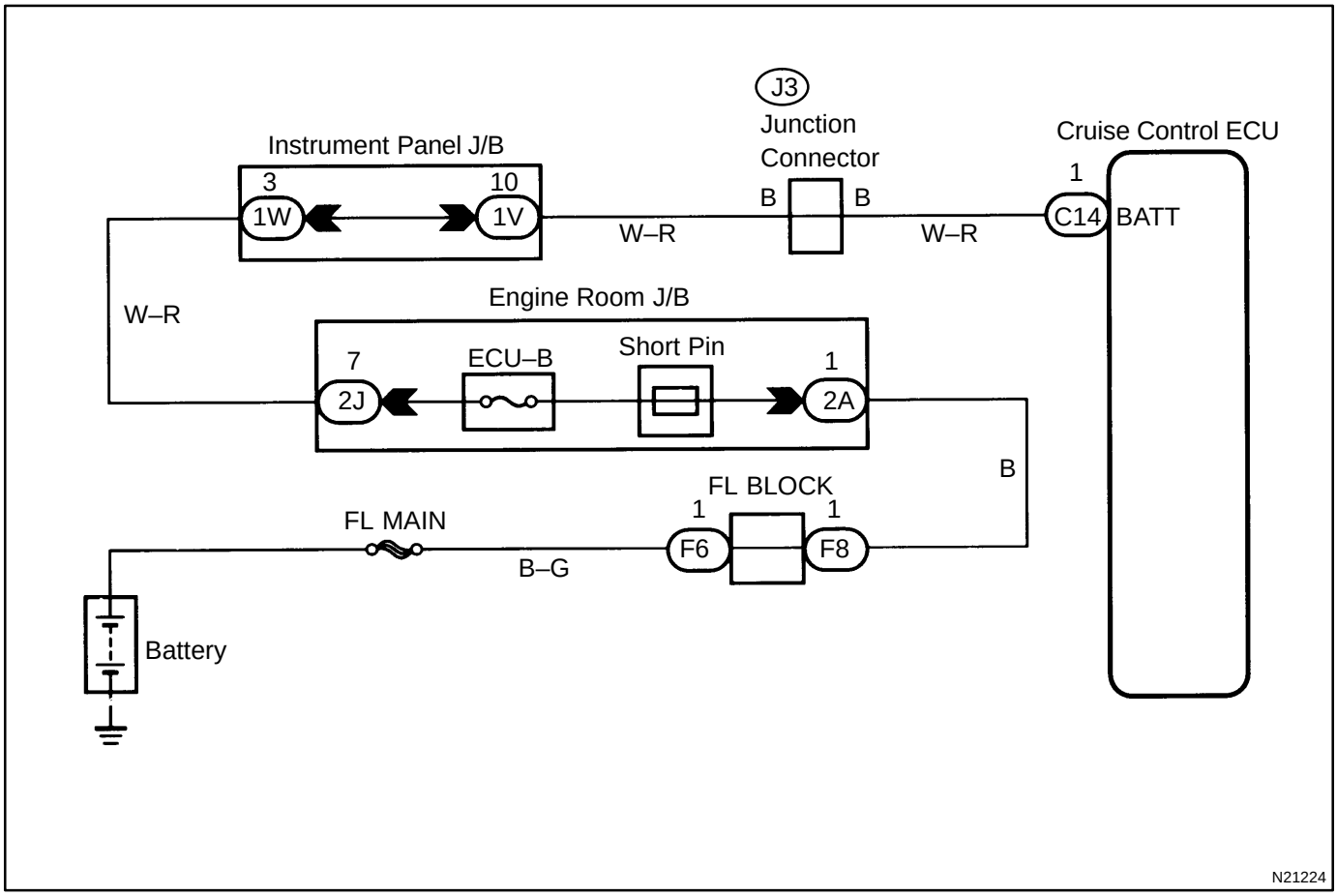
DI0F8–01

Back–up Power Source Circuit

CIRCUIT DESCRIPTION

The ECU back–up power source provides power even when the ignition is off and is used for DTC memory, etc..

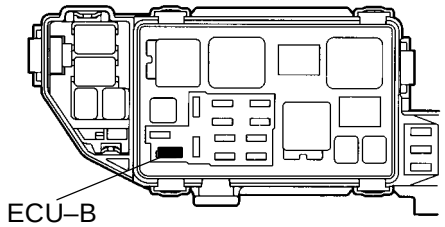
WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check ECU–B fuse.

Engine Room Junction Block No.2

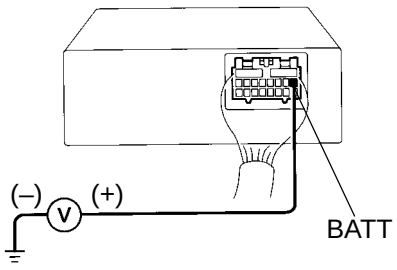


PREPARATION:
Remove the ECU–B fuse from engine room junction block No.2.
CHECK:
Check continuity of ECU–B fuse.
OK:
Continuity

NG → **Check for short in all the harness and components connected to the ECU–B fuse.**

OK

2	Check voltage between terminal BATT of cruise control ECU connector and body ground.



PREPARATION:
Remove the ECU with connector still connected.
CHECK:
Measure voltage between terminal BATT of ECU connector and body ground.
OK:
Voltage: 10 – 14 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page DI–487).**

NG

Check and repair harness and connector between battery and cruise control ECU (See page IN–27).

DI0FA–01

Main Switch Circuit (Cruise Control Switch)

CIRCUIT DESCRIPTION

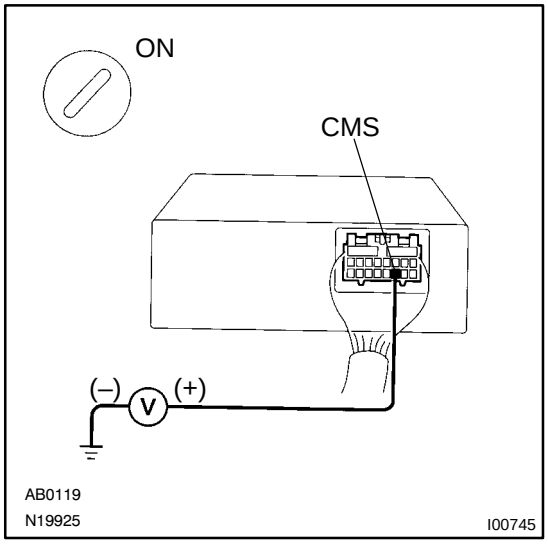
When the cruise control main switch is turned off, the cruise control does not operate.

WIRING DIAGRAM

See page DI–499.

INSPECTION PROCEDURE

1	**Check voltage between terminal CMS of cruise control ECU connector and body ground.**



PREPARATION:

(a) Remove the ECU with connector still connected.

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminal CMS of cruise control ECU connector when main switch is held on and off.

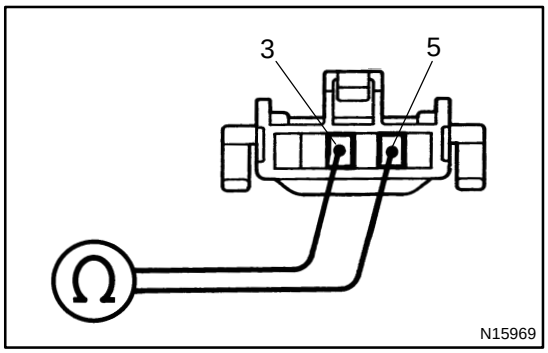
OK:

Main switch	Voltage
OFF	10 – 14 V
ON	Below 0.5 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page DI–487).**

NG

2	Check main switch continuity.



PREPARATION:

(a) Remove steering wheel center pad (See page SR–11).

(b) Disconnect the control switch connector.

CHECK:

Check continuity between terminals 3 and 5 of control switch connector when main switch is held on and off.

OK:

Switch position	Tester connection	Specified condition
OFF	3 – 5	No continuity
Hold ON	3 – 5	Continuity

NG → **Replace control switch.**

OK ↓

3	Check harness and connector between cruise control ECU and main switch (See page IN–27).

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace cruise control ECU (See page IN–27).

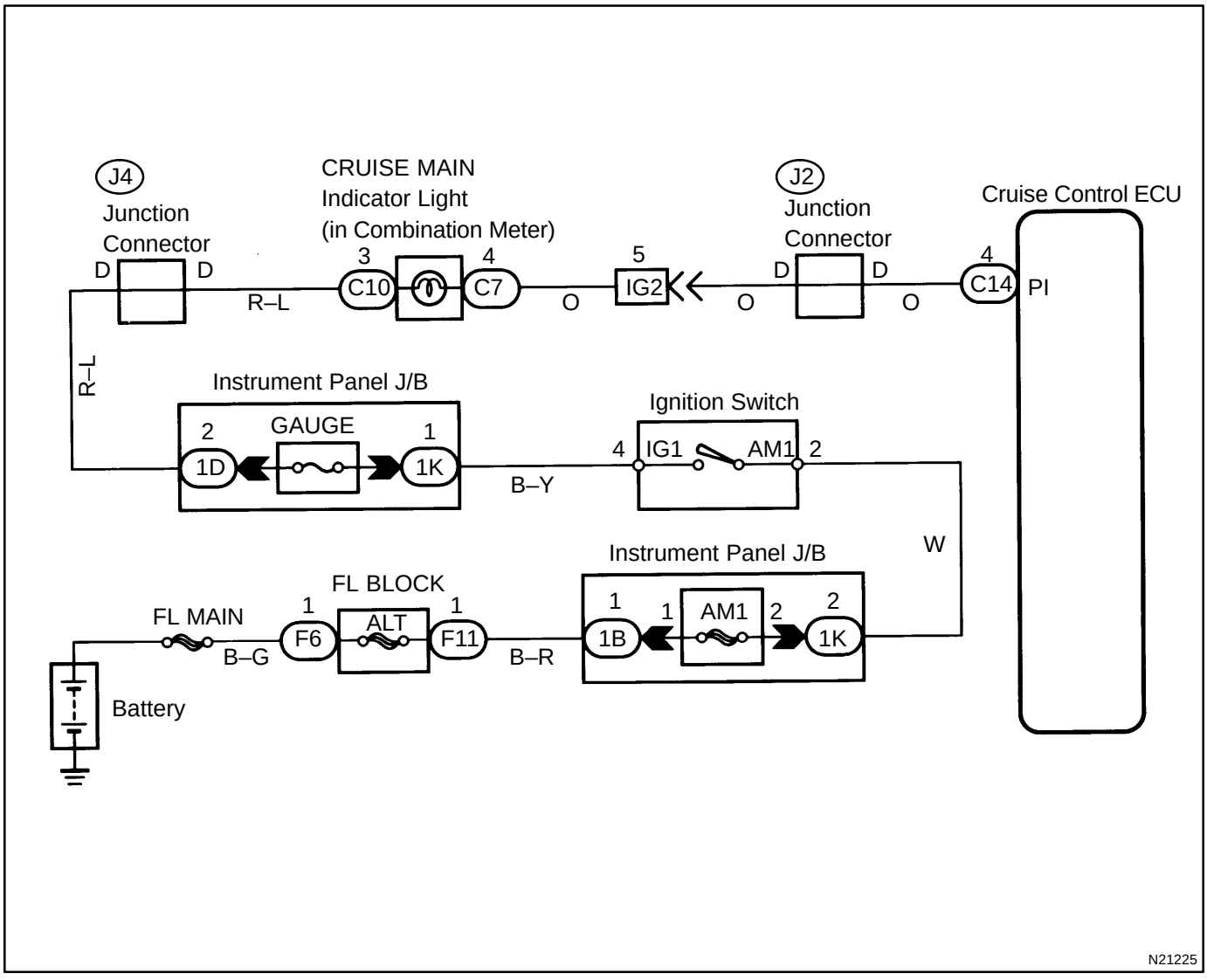
DI0FD–01

CRUISE MAIN Indicator Light Circuit

CIRCUIT DESCRIPTION

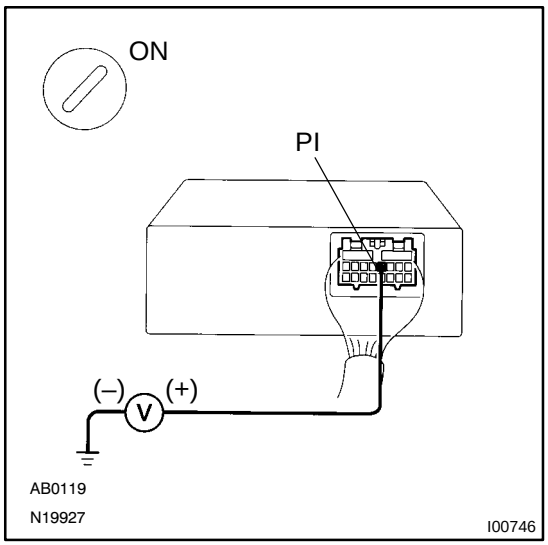
When the cruise control main switch is turned ON, CRUISE MAIN indicator light lights up.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals PI and GND of cruise control ECU connector.**



PREPARATION:
Tun ignition switch ON.
CHECK:
Measure voltage between terminals PI and GND of cruise control ECU connector when main switch on and off.
OK:

Switch position	Voltage
OFF	10 – 16 V
ON	Below 1.2 V

OK → **Proceed to next circuit inspection shown on problem symptom table (See page DI–487).**

NG

2	**Check combination meter (See page BE–2).**

NG → **Replace combination meter.**

OK

Check and replace cruise control ECU (See page IN–27).

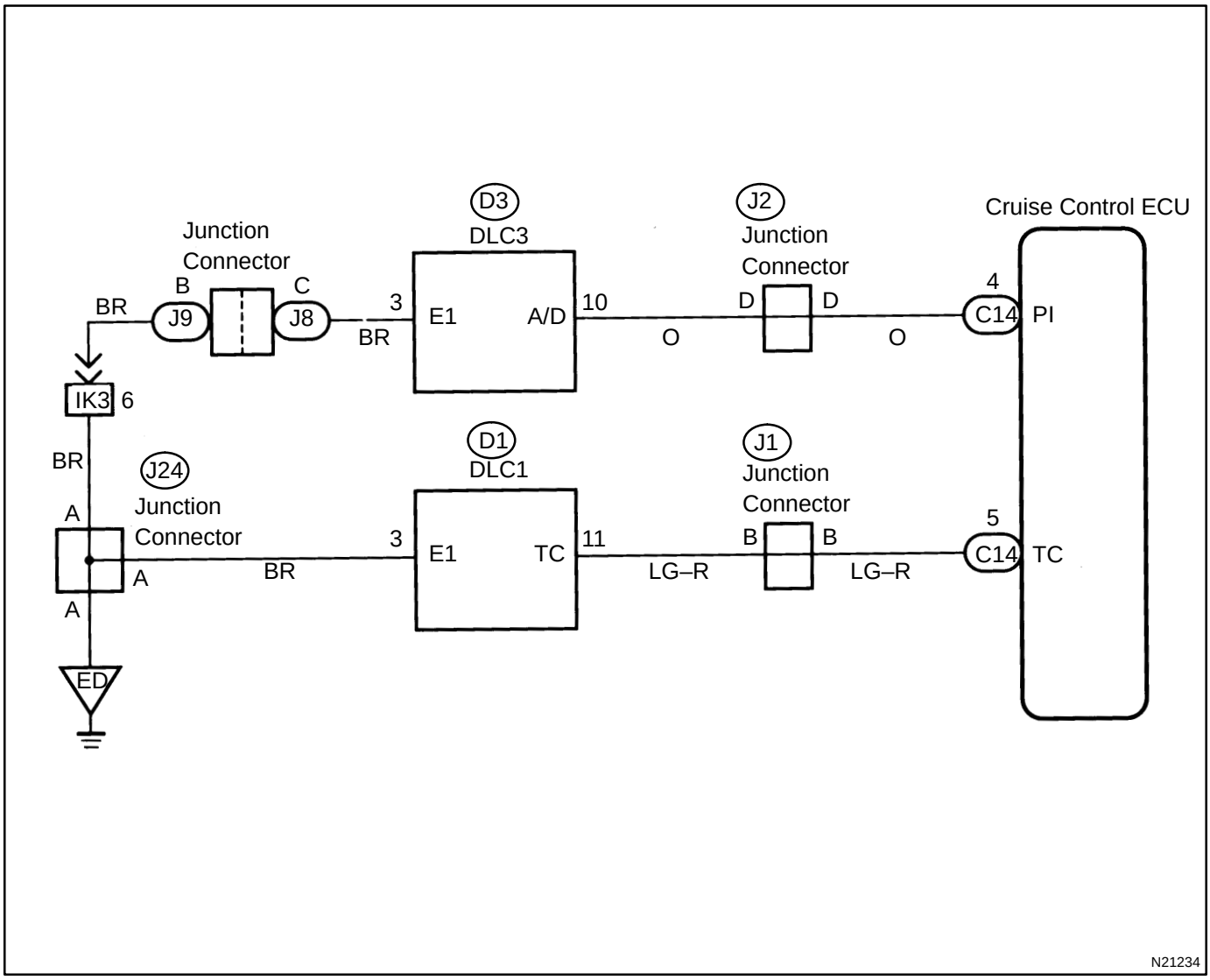
DI0FF–01

Diagnosis Circuit

CIRCUIT DESCRIPTION

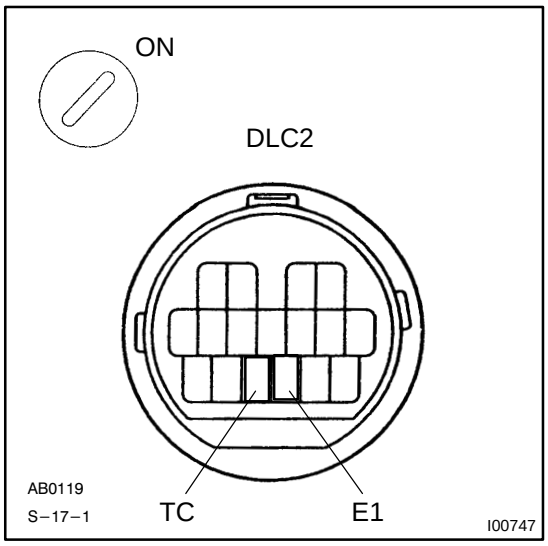
This circuit sends a signal to the ECU that DTC output is required.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals Tc and E_1 of DLC2.**



PREPARATION:
Turn ignition switch ON.
CHECK:
Measure voltage between terminals Tc and E_1 of DLC2.
OK:
Voltage: 10 – 14 V

OK	**Proceed to next circuit inspection shown on problem symptom table (See page DI–487).**

NG

2	**Check harness and connector between cruise control ECU and DLC2, DLC2 and body ground (See page IN–27).**

NG	**Repair or replace harness or connector.**

OK

Check and replace cruise control ECU (See page IN–27).

DI0FH–01

Actuator Control Cable

INSPECTION PROCEDURE

1	**Actuator control cable inspection**

OK:

(a) Check that the actuator, control cable throttle link are properly installed and that the cable and link are connected correctly.

(b) Check that the actuator and bell crank are operating smoothly.

(c) Check that the cable is not loose or too tight.

OK:

Freeplay: less than 10 mm

HINT:

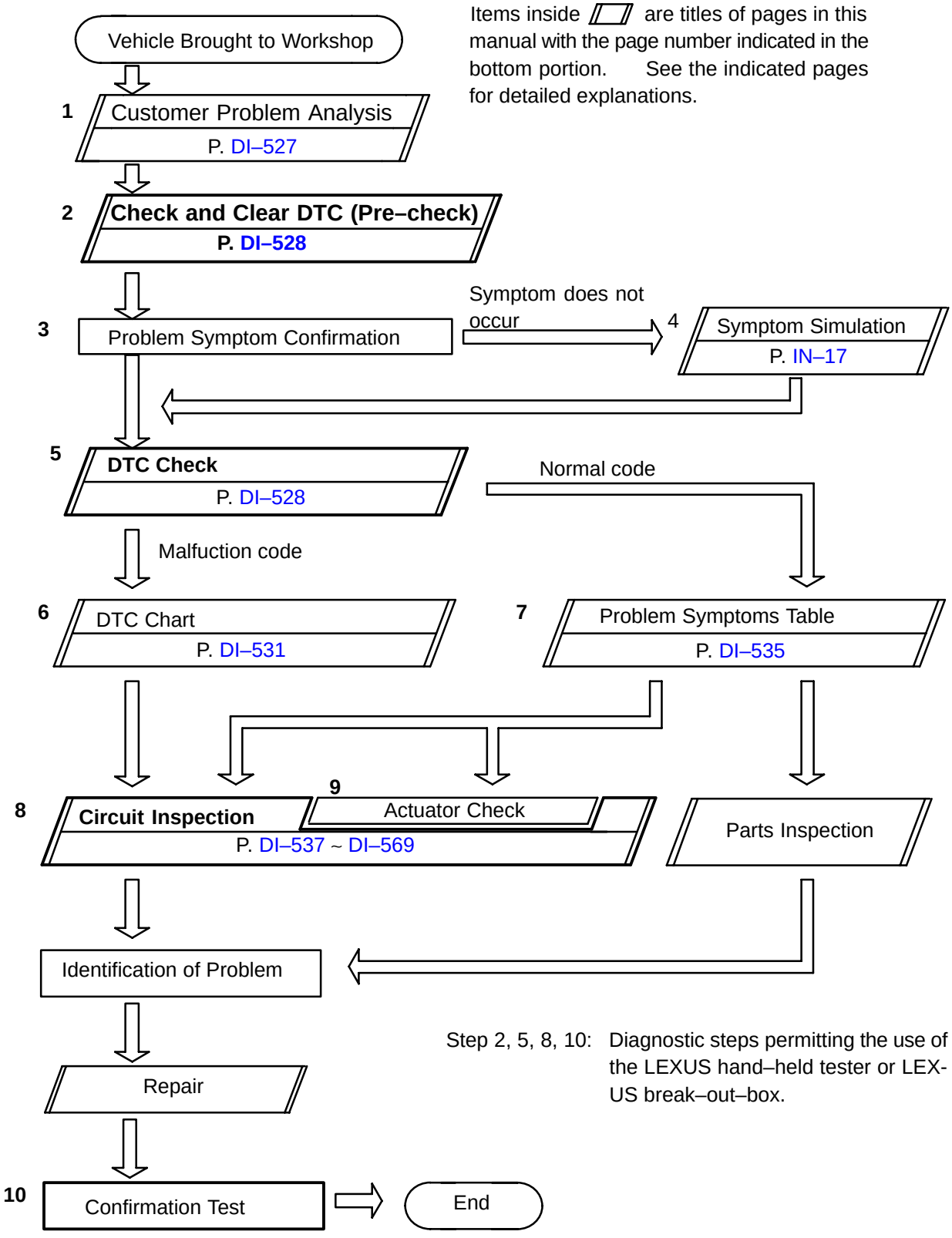
- If the control cable is very loose, the vehicle's loss of speed going uphill will be large.
- If the control cable is too tight, the idle RPM will become high.

AIR CONDITIONING SYSTEM

DI0D2–01

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.



DI0D3–01

CUSTOMER PROBLEM ANALYSIS CHECK

AIR CONDITIONING SYSTEM Check Sheet

Inspector's name:

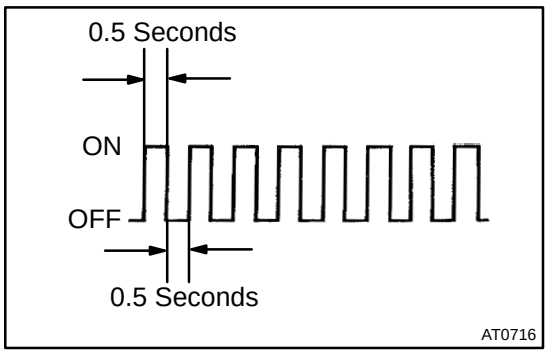
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date vehicle Brought In	/ /	**Odometer Reading**	**km Miles**

Date of Problem Occurrence	/ /
How Often does Problem Occur?	● Continuous ● Intermittent (times a day)
Weather	● Fine ● Cloudy ● Snowy ● Various / Other
Outdoor Temperature	● Hot ● Warm ● Cool ● Cold (Approx. °F °C)

Symptoms	**Air Flow Control is Faulty**	● Blower motor doe not operation ● Blower motor speed does not change (Always Hi, Always Med, Always Lo)
	Temperature Control is Faulty	● Cabin temperature does not go down ● Cabin temperature does not rese ● Response is slow
	Air Inlet Control is Faulty	● Cannot change between FRS and REC (Always Fresh or always Recirculating)
	Vent Control is Faulty	● Mode will not change ● Will not enter the desired mode

DTC Check	**1st Time**	● Normal Code ● Malfunction Code (Code)
	2nd Time	● Normal Code ● Malfunction Code (Code)

DI0D4–01



PRE–CHECK

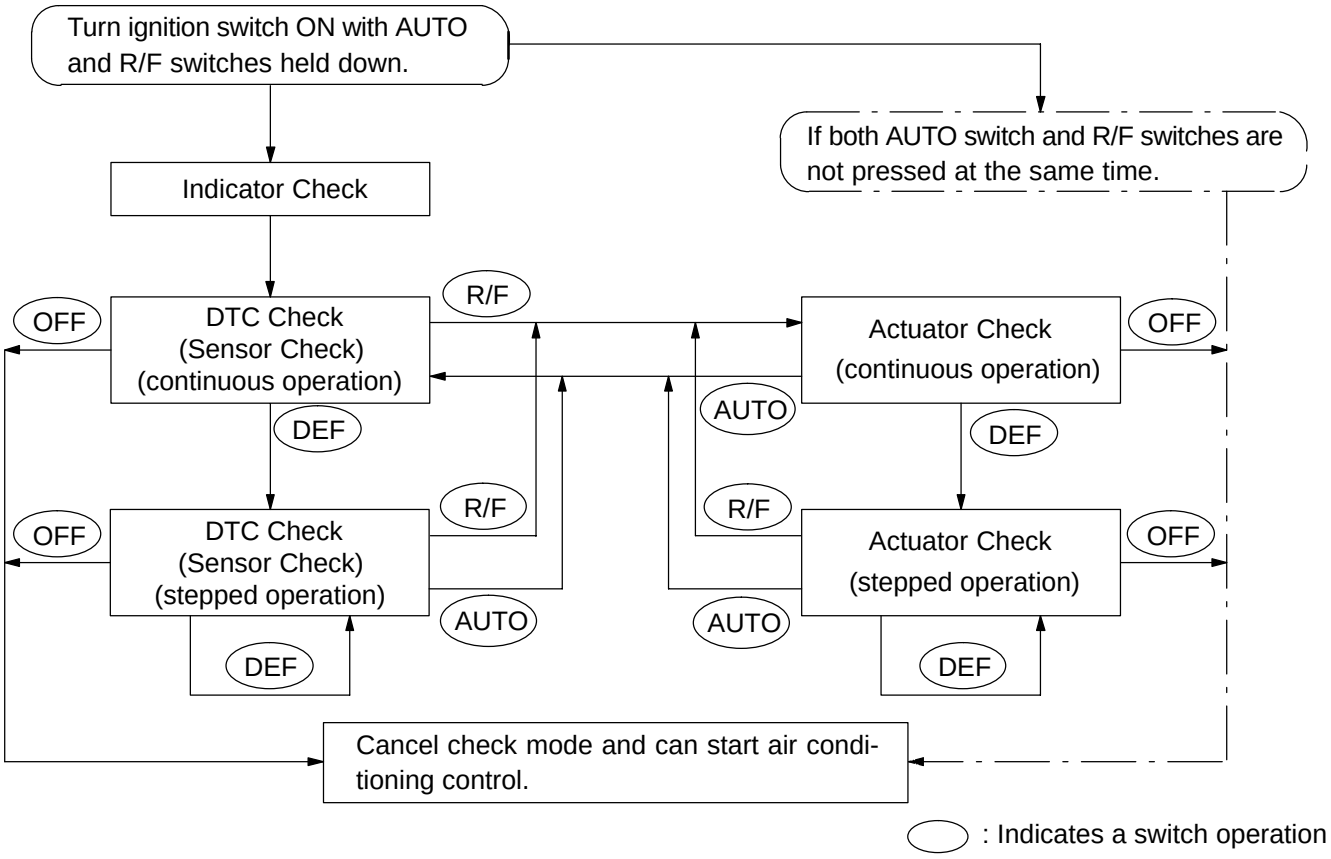
1. WARNING FOR A/C COMPRESSOR LOCK

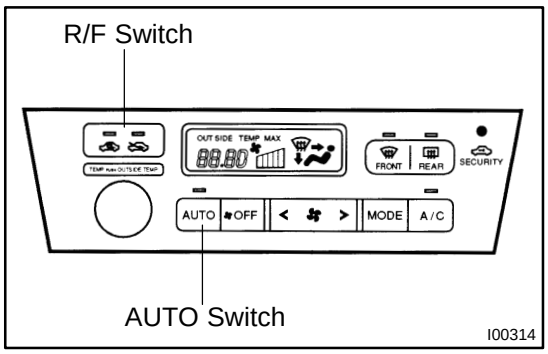
If compressor lock occurs during air conditioning operation, the A/C switch indicator on the air conditioning control assembly starts blinking to warn the driver.

When this occurs, check for compressor lock (DTC 22) using DTC check then proceed to inspect the circuit or the component (See page DI–552).

2. LIST OF OPERATION METHODS

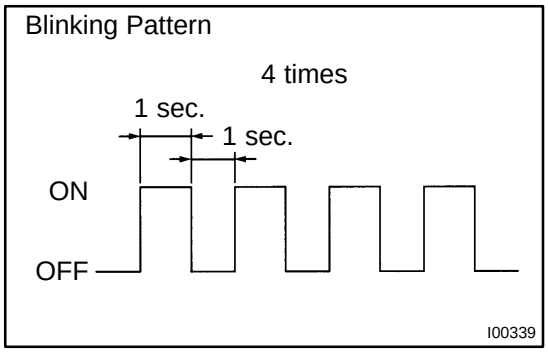
By operating each of the air conditioning control switches as shown the diagram below, it is possible to enter the diagnosis check mode.





3. INDICATOR CHECK

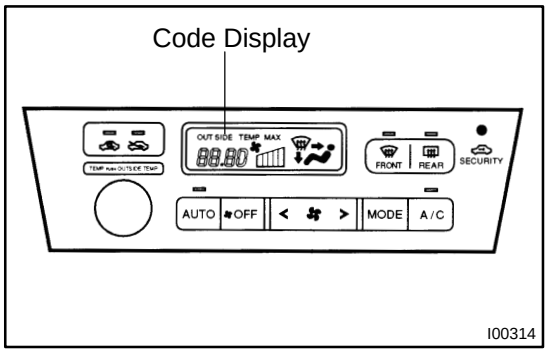
(a) Turn the ignition switch on while pressing the air conditioning control AUTO switch and R/F switch simultaneously.



(b) Check that the indicators light up and go off at second intervals 4 times in succession.

HINT:

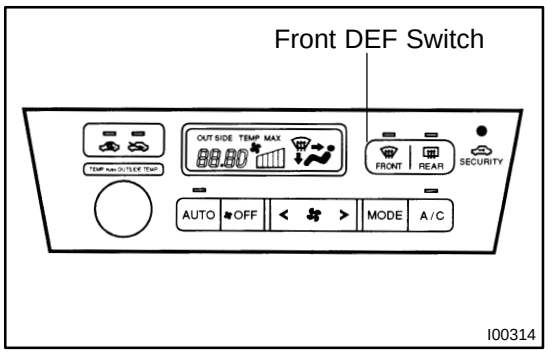
- After the indicator check is completed, the system enters the DTC begins automatically.
- Press the OFF switch when desiring to cancel the check mode.



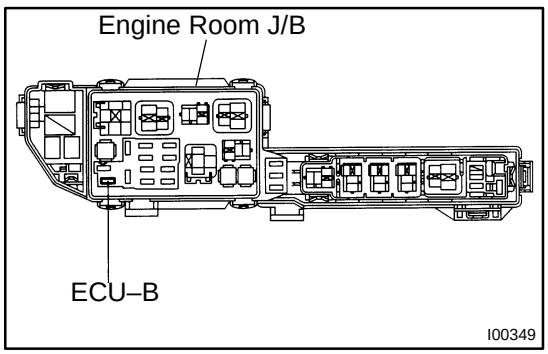
4. DTC CHECK (SENSOR CHECK)

(a) Perform an indicator check. After the indicator check is completed, the system enters the DTC check mode automatically.

(b) Read the code displayed on the panel. Refer to the list of codes on page DI–531 when reading the codes. (Trouble code are output at the temperature display.)



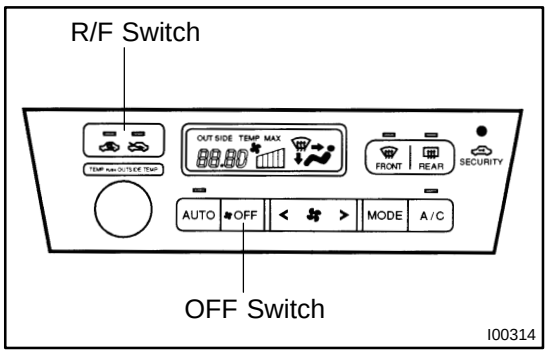
(c) If the slower display is desired, press the front DEF switch and change it to stepped operation. Each time the front DEF switch is pressed, the display changes by 1 step.



5. CLEARING DTC

(a) Pull out the ECU–B fuse in engine room J/B for 10 sec. or longer to clear the DTC memory.

(b) After reinserting the fuse, check that the normal code is output.



6. ACTUATOR CHECK

(a) After entering the DTC check mode (Sensor Check Mode) press the R/F switch.

(b) Since each damper, motor and relay automatically operates at 1 second intervals beginning in order from 10 in the temperature display, check the temperature and air flow visually and by hand.

If the slower display is desired, press the DEF switch and change it to step operation. Each time the DEF switch is pressed, the display changes by 1 step.

HINT:

- Code are displayed in order from the smaller to the larger numbers.
- To cancel the check mode, press the OFF switch.

Step No.	Display Code	Conditions				
		Blower Motor	Air Flow Vent	Air Inlet Damper	Magnetic Clutch	Air Mix Damper
1	0	OFF	FACE	FRESH	OFF	Cool side (0 % open)
2	1	1	FACE	FRESH	OFF	Cool side (0 % open)
3	2	3	FACE	FRESH	ON	Cool side (0 % open)
4	3	3	FACE	FRS/REC	ON	Cool side (0 % open)
5	4	3	FACE	RECIRC	ON	Cool/Hot (50 % open)
6	5	3	BI–LEVEL	RECIRC	ON	Cool/Hot (50 % open)
7	6	3	FOOT	RECIRC	ON	Hot side (100 % open)
8	7	3	FOOT	RECIRC	ON	Hot side (100 % open)
9	8	3	FOOT/DEF	RECIRC	ON	Hot side (100 % open)
10	9	5	DEF	RECIRC	ON	Hot side (100 % open)

DI0D5–01

DIAGNOSTIC TROUBLE CODE CHART

If malfunction code is displayed during the DTC check (sensor check), check the circuit listed for that code in the table below (Proceed to the page given for that circuit).

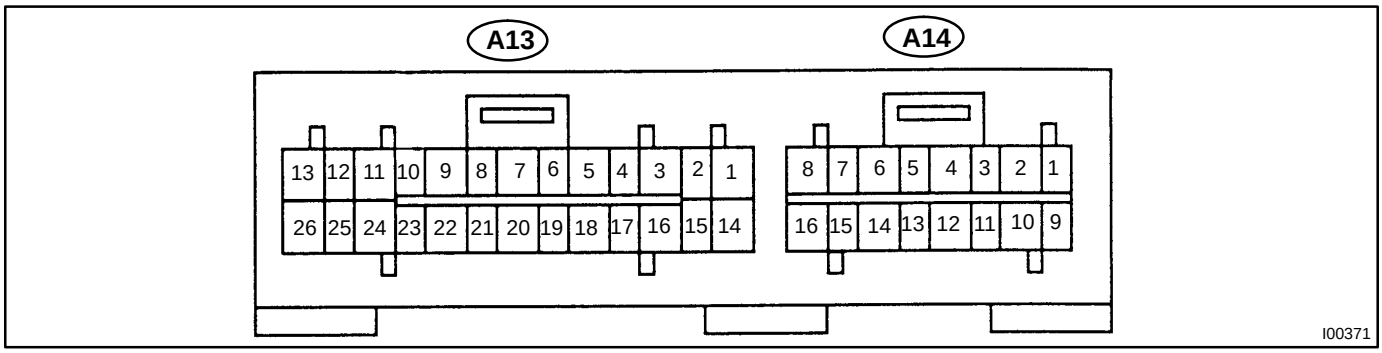
DTC No. (See Page)	Detection Item	Trouble Area	Memory
00	Normal	–	–
11*1 (DI–537)	Room temperature sensor circuit	●Room temp. Sensor ●ECU ●Harness or connector between room temp. sensor and A/C control assembly	□ (8.5 min. or more)
12*2 (DI–540)	Ambient temperature sensor circuit	●Ambient temp. Sensor ●Harness or connector between ambient temp. sensor and ECU ●ECU	□ (8.5 min. or more)
13 (DI–543)	Evaporator temperature sensor circuit	●Evaporator temp. Sensor ●Harness or connector between evaporator temp. sensor and ECU ●ECU	□ (8.5 min. or more)
14 (DI–546)	Engine coolant temperature sensor circuit	●Engine coolant temp. sensor ●Harness or connector between engine coolant temp. sensor and ECU ●Harness or connector between ECM and A/C ECU ●ECU	–
21*3 (DI–549)	Solar sensor circuit (short)	●Solar sensor ●Harness or connector between solar sensor and ECU ●ECU	□ (8.5 min. or more)
	Solar sensor circuit (open)		–
22*4 (DI–552)	Compressor lock sensor circuit	●Compressor Drive Belt ●Compressor lock sensor ●Compressor ●Harness or connector between compressor and ECU, compressor lock sensor ●ECU	–
23 (DI–554)	Pressure sensor circuit	●Pressure switch ●Harness or connector between pressure switch and ECU ●Refrigerant pipe line ●ECU	–
31 (DI–557)	Air mix damper position sensor circuit	●Air mix damper position sensor ●ECU ●Harness or connector between air mix damper position sensor and ECU	□ (1 min. or more)
32 (DI–560)	Air inlet damper position sensor circuit	●Air inlet damper position sensor ●ECU ●Harness or connector between air inlet damper position sensor and ECU	□ (1 min. or more)
41 (DI–557 DI–563)	Air mix control servomotor	●Air mix control servomotor ●Air mix damper position sensor ●Harness or connector between air mix damper servomotor and ECU ●ECU	□ (15 sec.)
42 (DI–560 DI–566)	Air inlet control servomotor	●Air inlet control servomotor ●Air inlet damper position sensor ●Harness or connector between air inlet damper, servomotor and ECU ●ECU	□ (15 sec.)

HINT:

- *1: If the room temp. is approx. –18.6˚C (–3.7˚F) or lower, trouble code 11 may be output even though the system is normal.
- *2: If the ambient temp. is approx. –52.9˚C (–61.4˚F) or lower, a malfunction code may be output even though the system is normal.
- *3: If the check is being performed in a dark place, DTC 21 (solar sensor circuit abnormal) could be displayed.
- *4:Compressor lock (DTC22) is indicated only for a current occurring malfunction (See page DI–552). To confirm DTC 22, perform the following steps.
  (1) With the engine ON, enter the DTC check mode.
  (2) Press the F/R switch to enter actuator check mode, and set the operation to Step No.3.
  (3) Press the AUTO switch to return to DTC check mode.
  (4) The DTC is displayed after approx. 3 secs..
- *5: The ECU memorizes the DTC of the respective malfunction it has occurred for the period of the time indicated in the brackets.

DI0D6–01

TERMINALS OF ECM



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
MGCR ↔ GND (A14–2 ↔ A13–14)	L–Y ↔ W–B	Start the engine and push AUTO switch. A/C switch ON	Below 1 V
		Start the engine and push AUTO switch. A/C switch OFF	10 – 14 V
TAM ↔ SG (A14–3 ↔ A13–1)	Y ↔ W–R	IG ON. Ambient Temp.: 25 °C (77 °F)	1.35 – 1.75 V
		IG ON. Ambient Temp.: 40 °C (104 °F)	0.85 – 1.25 V
TR ↔ SG (A14–4 ↔A13–1)	G–Y ↔ W–R	IG ON. Room Temp.: 25 °C (77 °F)	1.8 – 2.2 V
		IG ON. Room Temp.: 40 °C (104 °F)	1.2 – 1.6 V
TS ↔ SG (A14–5 ↔ A13–1)	W ↔ W–R	IG ON. Sensor subjected to electrical light.	1 V or more
		IG ON. Sensor covered by cloth	Below 1 V
TE ↔ SG (A14–6 ↔ A13–1)	L–W ↔ W–R	IG ON. Evaporator Temp.: 0 °C (32 °F)	2.0 – 2.4 V
		IG ON. Evaporator Temp.: 15 °C (59 °F)	1.4 – 1.8 V
TPI ↔ SG (A14–7 ↔ A13–1)	P–L ↔ W–R	Push Recircu Switch	3.5 – 4.5 V
		Push Fresh Switch	0.5 – 1.8 V
TP ↔ SG (A14–8 ↔ A13–1)	B–Y ↔ W–R	Set Temp.: Max. Cool	3.5 – 4.5 V
		Set Temp.: Max. Hot	0.5 – 1.8 V
PSW ↔ GND (A14–9 ↔ A13–14)	L–B ↔ W–B	IG ON.	Below 1 V
ACT ↔ GND (A14–10 ↔ A13–14)	LG–R ↔ W–B	Start the Engine (Idling). Operate the Compressor	10 – 14 V
		Start the Engine (Idling). Do not operate Compressor	Below 1.5 V
AC1 ↔ GND (A14–13 ↔ A13–14)	B–Y ↔ W–B	Start the engine. A/C Switch ON.	Below 1 V
		Start the engine. A/C Switch OFF.	More than 1 V
TW2 ↔ SG (A14–14 ↔ A13–1)	V ↔ W–R	Engine Coolant Temp.: 0 °C (32 °F)	2.8 – 3.8 V
		Engine Coolant Temp.: 40 °C (104 °F)	1.8 – 2.2 V
		Engine Coolant Temp.: 70 °C (158 °F)	0.9 – 1.3 V
BLW ↔ GND (A14–16 ↔ A13–14)	B–W ↔ W–B	IG ON. Operate the Blower Motor	Below 1.5 V
SG ↔ Body (A13–1 ↔ Body Ground)	W–R ↔ Body Ground	Always	1 Ω or less
ILL ↔ GND (A13–2 ↔ A13–14)	G ↔ W–B	Turn the Light Control Switch to TAIL position.	10 – 14 V
LOCK ↔ GND (A13–3 ↔ A13–14)	W–L ↔ W–B	IG OFF. at 20 °C (68 °F)	65 – 125 Ω
FACE ↔ GND (A13–4 ↔ A13–14)	L–W ↔ W–B	IG ON. Air Flow: FACE	Below 1 V
SECU ↔ GND (A13–5 ↔ A13–14)	↔ W–B	IG ON.	Below 1 V

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
AIF ↔ AIR (A13–6 ↔A13–7)	L–Y ↔ R	IG ON.	13 – 19 Ω
AMC ↔ AMH (A13–8 ↔ A13–9)	P ↔ G–R	IG ON.	13 – 19 Ω
HR ↔ GND (A13–10 ↔ A13–14)	L–W ↔ W–B	IG ON. Operate the Blower Motor	Below 1 V
		IG ON. Do not operate the Blower Motor	10 – 14 V
S5 ↔ SG (A13–11 ↔ A13–1)	L ↔ W–R	IG ON.	4 – 6 V
S5 ↔ TS (A13–11 ↔A14–5)	L ↔ W	IG ON. Sensor Subjected to Electrical Light.	Below 4 V
		IG ON. Sensor Covered by a Cloth.	4 – 4.5 V
ILL+ ↔ GND (A13–12 ↔ A13–14)	G ↔ W–B	Turn the Light Control Switch to TAIL position.	10 – 14 V
B+ ↔ GND (A13–13 ↔ A13–14)	W–R ↔ W–B	IG OFF.	10 – 14 V
GND ↔Body Ground (A13–14 ↔ Body Ground)	W–B ↔ Body Ground	Always	1 Ω or less
IGN ↔ GND (A13–16 ↔ A13–14)	B–O ↔ W–B	Start the Engine	10 – 14 V
B/L ↔ GND (A13–17 ↔ A13–14)	L ↔ W–B	IG ON. Air Flow: BI–LEVEL.	Below 1 V
FOOT ↔ GND (A13–18 ↔ A13–14)	L–R ↔ W–B	IG ON. Air Flow: FOOT.	Below 1 V
F/D ↔ GND (A13–19 ↔ A13–14)	B–L ↔ W–B	IG ON. Air Flow: FOOT/DEF	Below 1 V
DEF ↔ GND (A13–20 ↔ A13–14)	L–O ↔ W–B	IG ON. Air Flow: DEF	Below 1 V
RDFG ↔ GND (A13–23 ↔ A13–14)	L–G ↔ W–B	Rear Defogger Switch ON.	Below 1 V
		Rear Defogger Switch OFF	10 – 14 V
TELI ↔ GND (A13–24 ↔ A13–14)	L–R ↔ W–B	IG ON. Hand Free Telephone ON.	Below 1 V
TC ↔ GND (A13–25 ↔ A13–14)	B–R ↔ W–B	Light Control Switch Position: TAIL. Rheostat Volume: Most Upward	10 – 14 V
		Light Control Switch Position: TAIL. Rheostat Volume: Most Downward	Below 1 V
IG+ ↔ GND (A13–16 ↔ A13–14)	L–B ↔ W–B	IG ON.	10 – 14 V

DI0D7–01

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Whole functions of the A/C system does not operate.	1. IG power source circuit 2. ECU (A/C control assembly)	DI–576 IN–27
Air Flow Control: No blower operation	1. Heater main relay circuit 2. Blower motor circuit 3. Engine coolant temperature sensor circuit 4. IG power source circuit 5. ECU (A/C control assembly)	DI–580 DI–583 DI–546 DI–576 IN–27
Air Flow Control: No blower control	1. Blower motor circuit 2. IG power source circuit 3. Heater main relay circuit	DI–583 DI–576 DI–580
Air Flow Control: Insufficient air out	Blower motor circuit	DI–583
Temperature Control: No cool air comes out	1. Volume of refrigerant 2. Drive Belt Tension 3. Inspect refrigeration system with manifold gauge set 4. Compressor lock sensor circuit 5. Compressor circuit 6. Pressure switch circuit 7. Igniter circuit 8. Air mix control servomotor circuit 9. Air mix damper position sensor circuit 10. Room temp. sensor circuit 11. Ambient temp. sensor circuit 12. A/C control assembly	AC–3 AC–14 AC–3 DI–552 DI–569 DI–554 DI–585 DI–557 DI–563 DI–560 DI–537 DI–540 IN–27
Temperature Control: No warm air comes out	1. Air mix control servomotor circuit 2. Air mix damper position sensor circuit 3. Ambient temp. sensor circuit 4. Room temp. sensor circuit 5. Evaporator temp. sensor circuit 6. A/C control assembly 7. Heater radiator (in heater unit)	DI–557 DI–563 DI–560 DI–540 DI–537 DI–543 IN–27 AC–23
Temperature Control: Output air is warmer or cooler than the set temperature or response is slow.	1. Volume of refrigerant 2. Drive Belt Tension 3. Inspect refrigeration system with manifold gauge set 4. Cooling fan system 5. Ambient temp. sensor circuit 6. Evaporator temp. sensor circuit 7. Solar sensor circuit 8. Air mix damper position sensor circuit 9. Engine coolant temp. sensor 10. Air mix control servomotor circuit 11. Compressor 12. Condenser 13. Receiver 14. Evaporator 15. Heater radiator (in heater unit) 16. Expansion valve 17. A/C control assembly	AC–3 AC–14 AC–3 AC–104 DI–540 DI–543 DI–549 DI–560 DI–546 DI–557 DI–563 AC–35 AC–45 AC–42 AC–48 AC–23 AC–55 IN–27
Temperature Control: No temperature control (only Max. cool or Max. warm)	1. Air mix control servomotor circuit 2. Air mix damper position sensor circuit 3. A/C control assembly	DI–557 DI–563 DI–560 IN–27

No air inlet control	1. Air inlet damper position sensor circuit 2. Air inlet control servomotor circuit 3. A/C control assembly	DI–560 DI–560 DI–566 IN–27
No air outlet control	1. Air outlet control servomotor circuit 2. A/C control assembly	DI–574 IN–27
Engine idle up does not occur, or is continuous	1. Compressor circuit 2. Igniter circuit 3. A/C control assembly	DI–569 DI–585 IN–27
Blinking of A/C switch indicator.	1. Compressor lock sensor circuit 2. A/C control assembly	DI–552 IN–27
Set temperature value displayed does not much up with operation of temperature control switch.	A/C control assembly	IN–27
Brightness does not changes when rheostat volume or light control switch it turned.	1. Illumination light system 2. A/C control assembly	BE–2 IN–27
Unable to access the diagnosis mode.	A/C control assembly	IN–27
DTC not recorded. Set mode is cleared when IG switch is turned off.	1. Back–up power source circuit 2. A/C control assembly	DI–578 IN–27

DI0D8–01

CIRCUIT INSPECTION

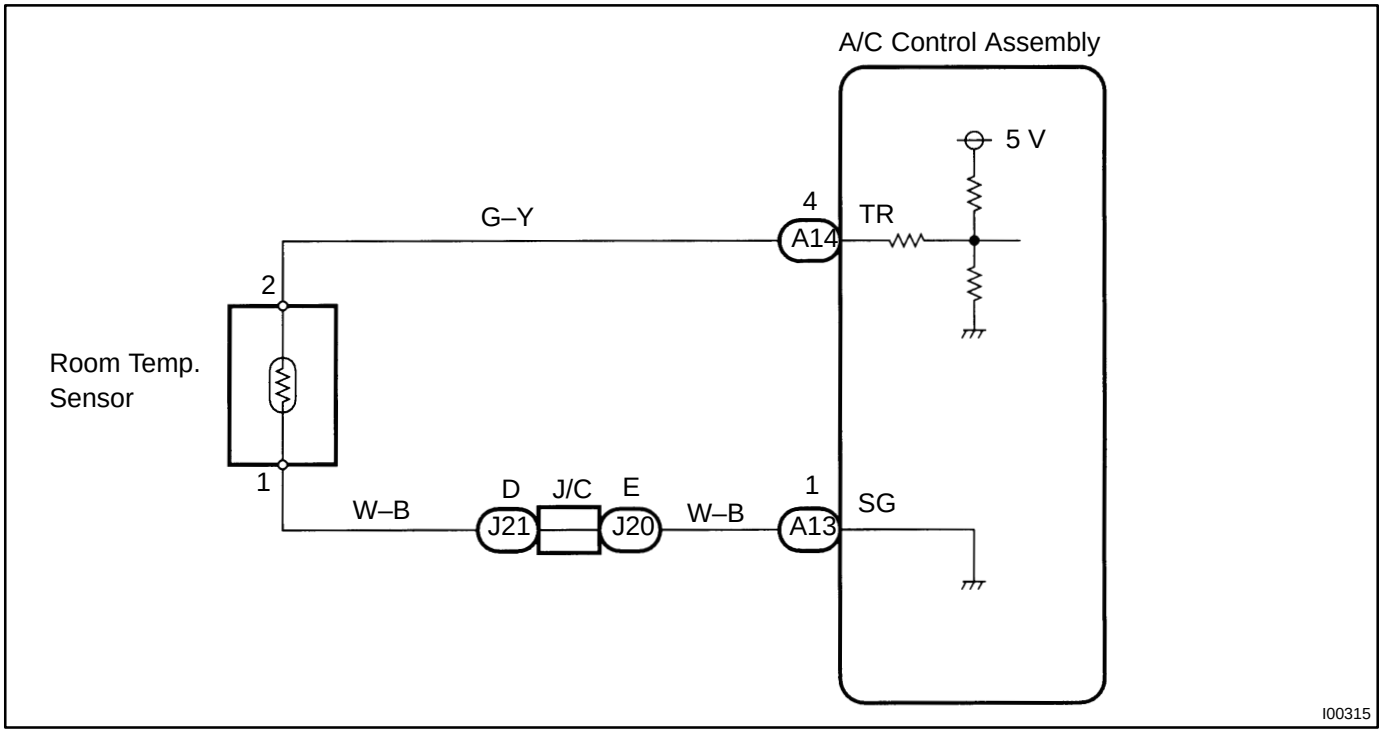
DTC	11	Room Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the cabin and sends the appropriate signals to the A/C control assembly.

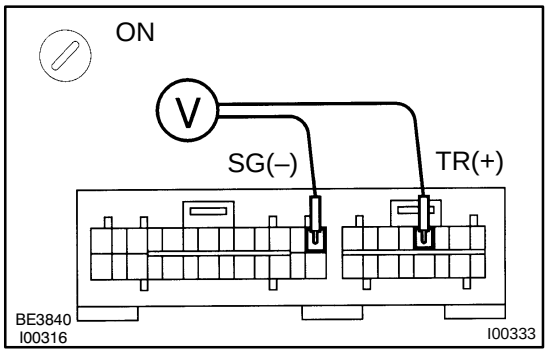
DTC No.	Detection Item	Trouble Area
11	Open or short in room temperature sensor circuit	●Room temperature sensor ●Harness or connector between room temp. sensor and A/C control Assembly ●A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TR and SG of air conditioning control assembly connector



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page BO–79).

(b) Turn the ignition switch ON.

CHECK:

Check voltage between terminals TR and SG of air conditioning control assembly connector at each temperature.

OK:

at 25˚C (77˚F): 1.8 – 2.2 V

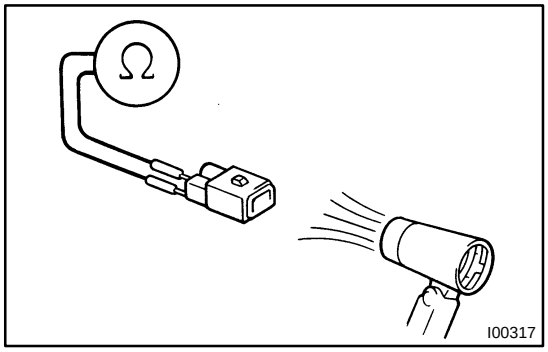
at 40˚C (104˚F): 1.2 – 1.6 V

NG → **Go to step 2.**

OK

Proceed to next circuit inspection shown on matrix chart (See page DI–535). However, if DTC 11 is displayed, check and replace air conditioning control assembly.

2	Check room temperature sensor.



PREPARATION:

(a) Remove room temperature sensor from safety pad No.2 (See page BO–79).

(b) Disconnect room temperature sensor connector.

CHECK:

Check resistance between terminals 1 and 2 of room temperature sensor connector at each temperature.

OK:

at 25˚ (77˚F): 1.6 – 1.8 kΩ

at 40˚ (104˚F): 0.5 – 0.7 kΩ

HINT:

As the temperature increases, the resistance decreases.

NG → **Replace room temperature sensor.**

OK

3	**Check harness and connector between air conditioning control assembly and room temperature sensor (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace air conditioning control assembly.

DI0D9–01

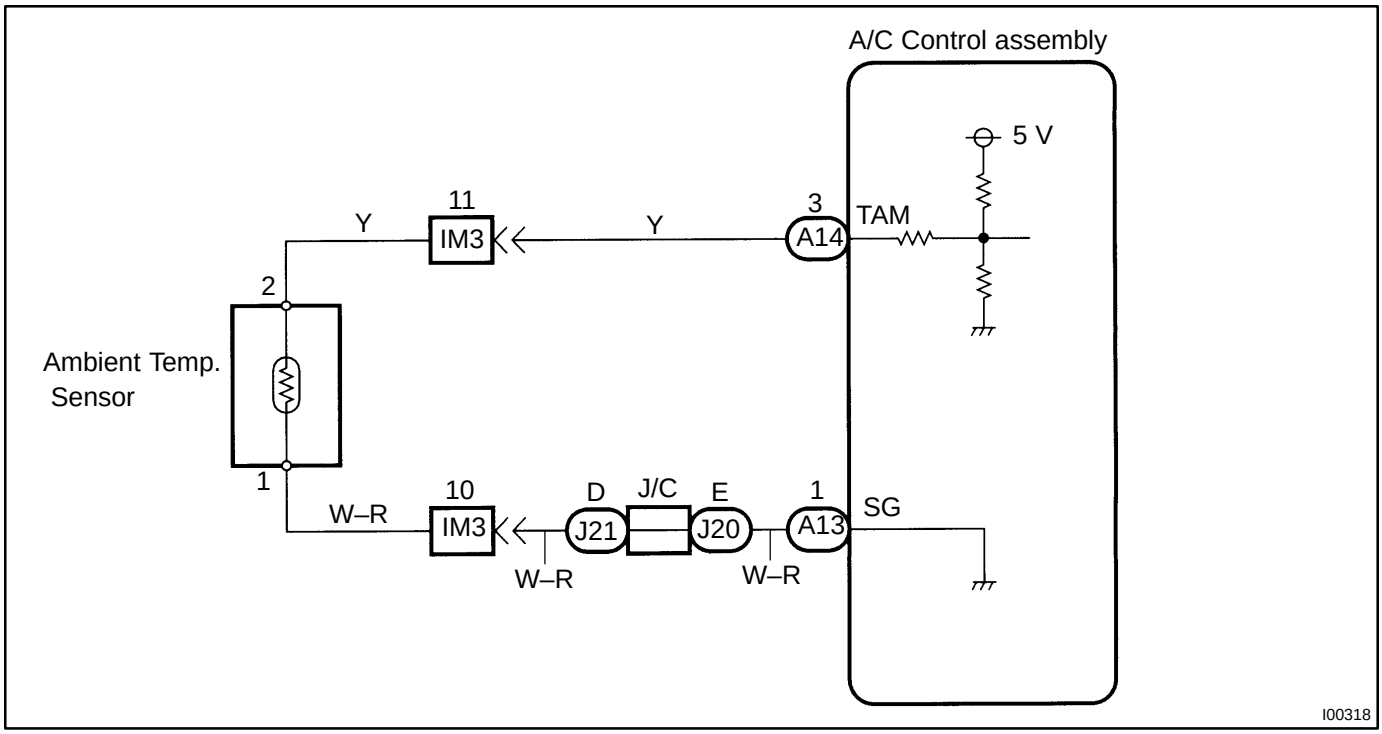
DTC	12	Ambient Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the ambient temperature and sends the appropriate signals to the A/C control assembly.

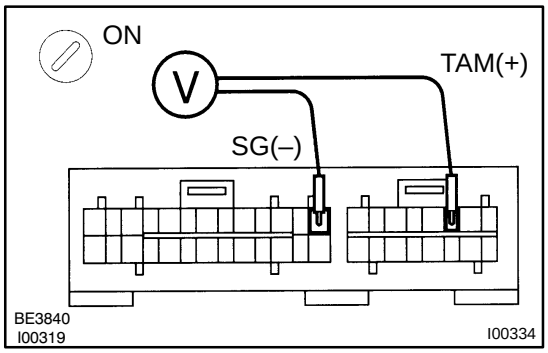
DTC No.	Detection Item	Trouble Area
12	Open or short in ambient temperature sensor circuit	●Ambient temperature sensor ●Harness or connector between ambient temperature sensor and A/C control assembly ●A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TAM and SG of air conditioning control assembly connector.



PREPARATION:

(a) Remove the A/C control assembly with connectors still connected (See page BO–79).

(b) Turn ignition switch ON.

CHECK:

Check voltage between terminals TAM and SG of A/C control assembly connector at each temperature.

OK:

Voltage

at 25 ˚C (77 ˚F): 1.35 – 1.75 V

at 40 ˚C (104 ˚F): 0.85 – 1.25 V

HINT:

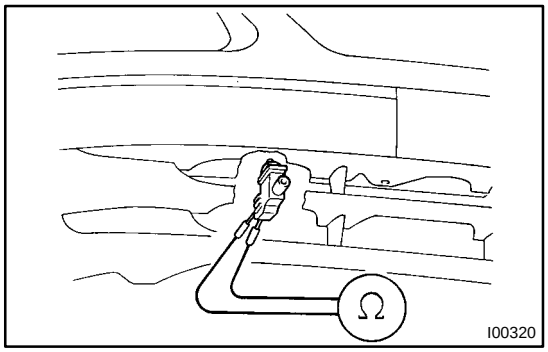
As the temperature increases, the voltage decreases.

NG	Go to step 2.

OK

Proceed to the next circuit inspection shown on matrix chart (See page DI–535). However, if DTC 12 is displayed, check and replace A/C control assembly.

2	Check ambient temperature sensor.



PREPARATION:

Disconnect ambient temperature sensor connector.

CHECK:

Check resistance between terminals 1 and 2 of ambient temperature sensor connector at each temperature.

OK:

Resistance

at 25 ˚C (77 ˚F): 1.6 – 1.8 kΩ

at 40 ˚C (104 ˚F): 0.5 – 0.7kΩ

NG	Replace ambient temperature sensor.

OK

3	**Check harness and connector between A/C control assembly and ambient temperature sensor (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace A/C control assembly.

DI0DA–01

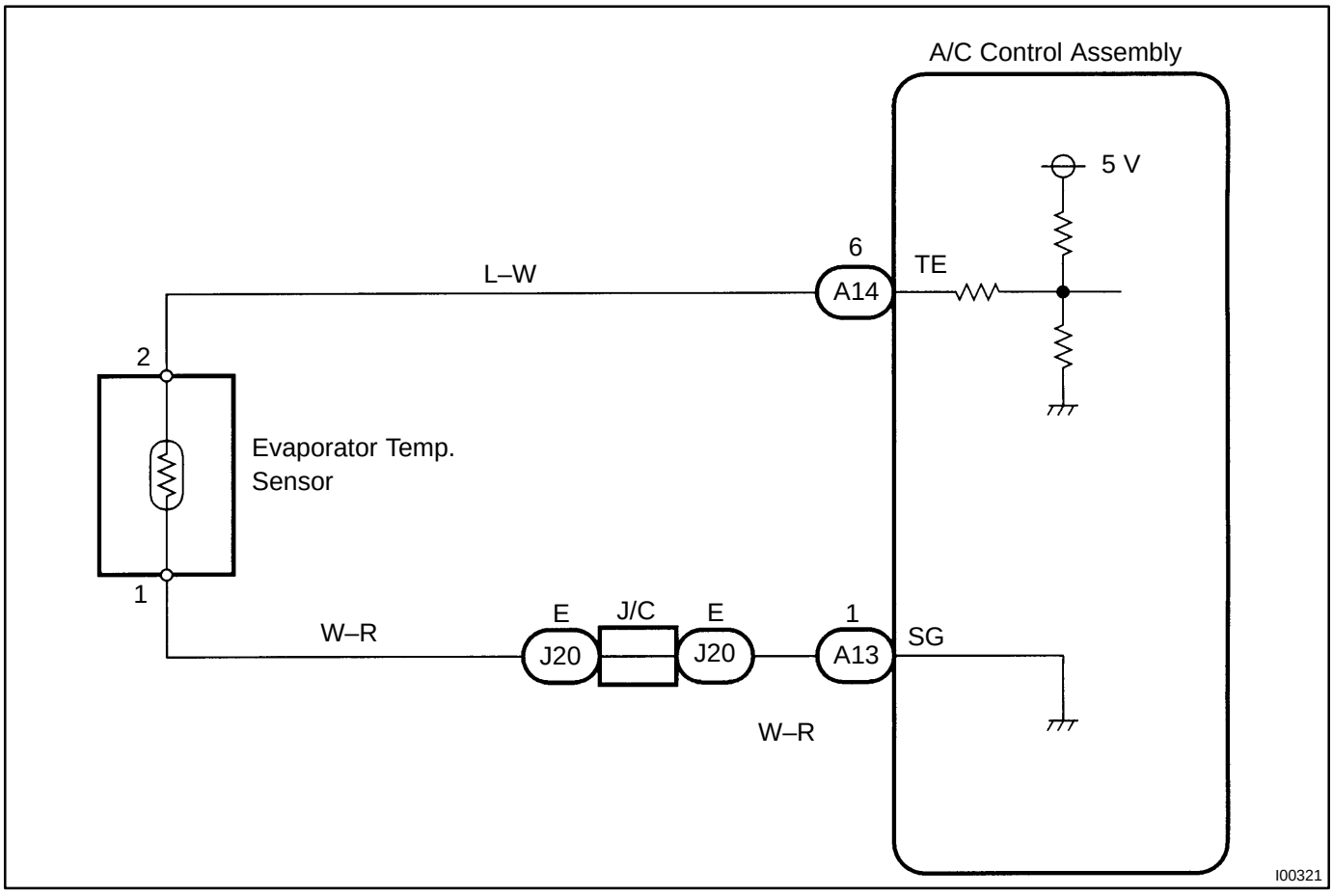
DTC	13	Evaporator Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the cooling unit and sends the appropriate signals to the A/C control assembly.

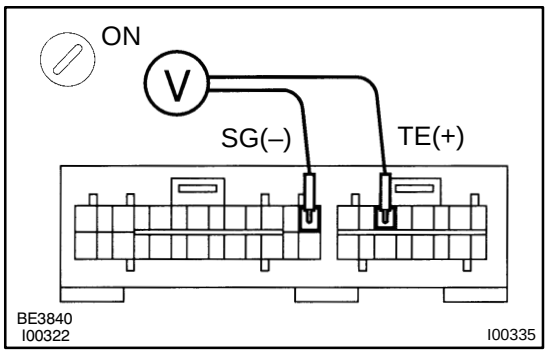
DTC No.	Detection Item	Trouble Area
13	Open or short in evaporator temperature sensor circuit.	●Evaporator temperature sensor. ●Harness or connector between evaporator temperature sensor and A/C control assembly. ●A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TE and SG of A/C control assembly connector.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page BO–79).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals TE and SG of A/C control assembly connector at each temperature.

OK:

Voltage
at 0 °C (32 °F): 2.0 – 2.4 V
at 15 °C (59 °F): 1.4 – 1.8 V

HINT:

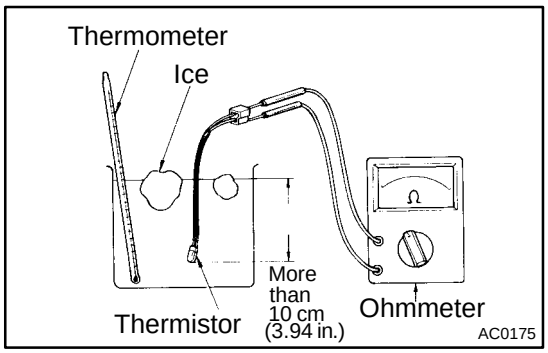
As the temperature increases, the voltage decreases.

NG → **Go to step 2**

OK

Proceed to next circuit inspection shown on matrix chart (See page DI–535). However, if DTC 13 is displayed, check and replace A/C control assembly.

2	Check evaporator temperature sensor.



PREPARATION:

Remove evaporator temperature sensor (See page AC–88).

CHECK:

Check resistance between terminals 1 and 2 of evaporator temperature sensor connector at each temperature.

OK:

Resistance
at 0 °C (32 °F): 4.6 – 5.1 kΩ
at 15 °C (59 °F): 2.1 – 2.6 kΩ

HINT:

As the temperature increases, the voltage decreases.

NG → **Replace evaporator temperature sensor.**

OK

3	**Check harness and connector between A/C control assembly and evaporator temperature sensor (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace A/C control assembly.

DI0DB–01

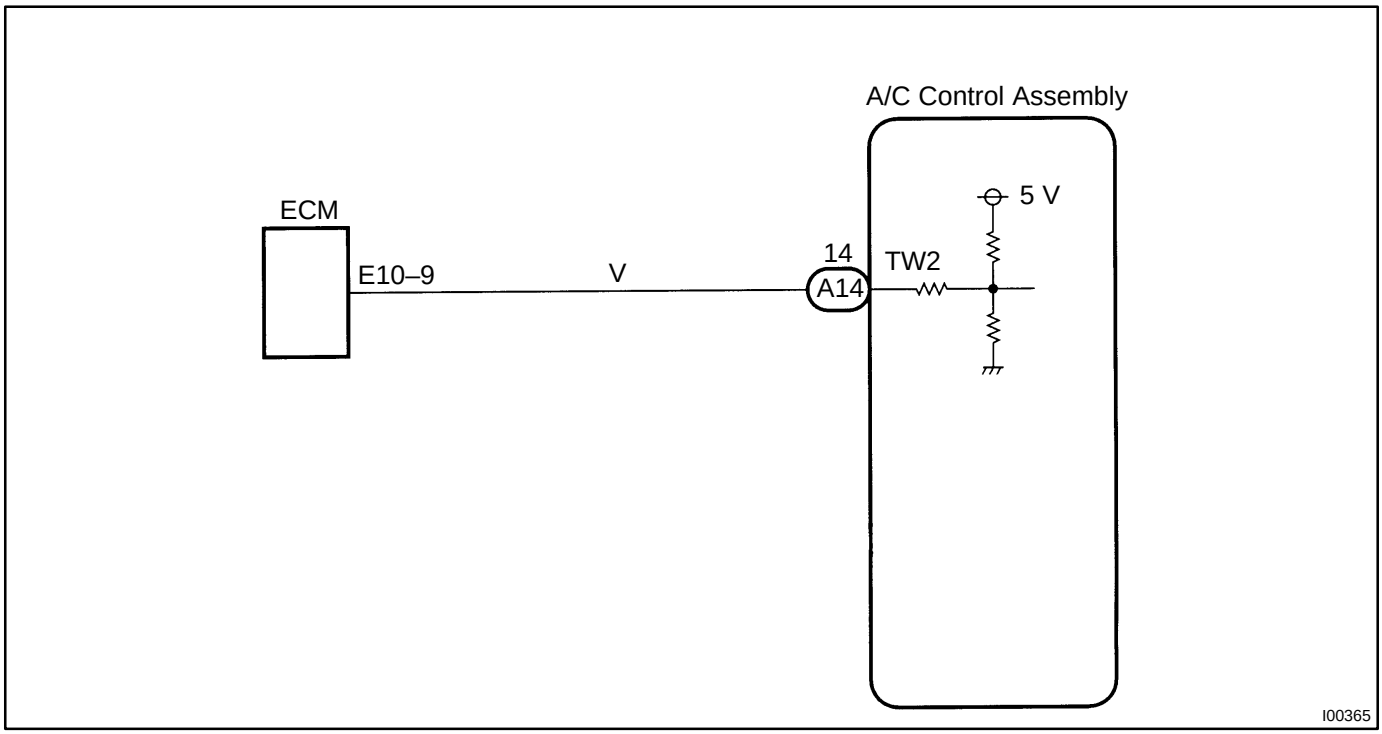
DTC	14	Engine Coolant Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the engine coolant temperature and sends the appropriate signals to the A/C control assembly. These signals are used for warm up control when the engine is cold.

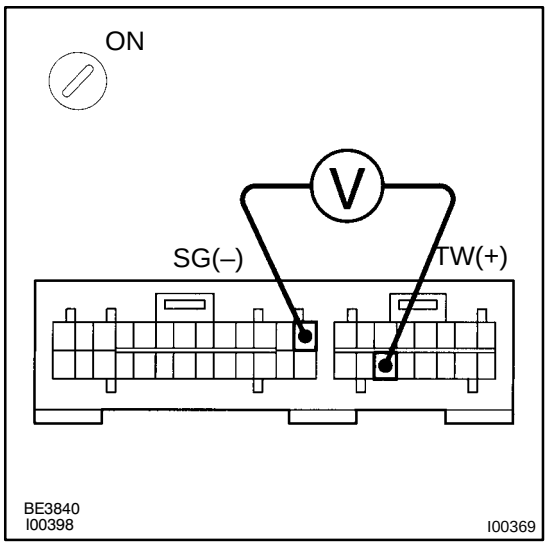
DTC No.	Detection Item	Trouble Area
14	Open or short in ECT sensor circuit.	●ECT sensor ●Harness or connector between ECT sensor and A/C control assembly ●A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals TW and SG of A/C control assembly connector.**



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page BO–79).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals TW and SG of A/C control assembly connector at each temperature.

OK:

Voltage
at 0 ˚C (32 ˚F): 2.8 – 3.2 V
at 40 ˚C (104 ˚F): 1.8 – 2.2 V
at 70 ˚C (158 ˚F): 0.9 – 1.3 V

HINT:

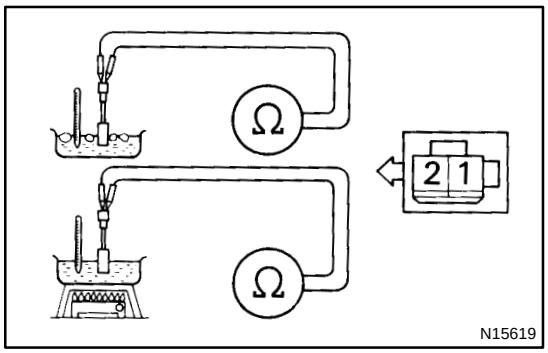
As the temperature increases, the voltage decreases.

NG → **Go to step 2**

OK

Proceed to next circuit inspection shown on matrix chart (See page DI–535). However, if DTC 14 is displayed, check and replace A/C control assembly.

2	Check engine coolant temperature sensor.



PREPARATION:

(a) Remove A/C unit (See page AC–23).

(b) Remove engine coolant temperature sensor.

CHECK:

Measure resistance between terminals 1 and 2 of engine coolant temperature sensor connector at each temperature.

OK:

Resistance
at 0 °C (32 °F): 50 kΩ or less
at 40 °C (104 °F): 2.5 – 2.7 kΩ
at 100 °C (212 °F): 0.2 kΩ or more

HINT:

As the temperature increases, the voltage decreases.

NG → **Replace engine coolant temperature sensor.**

OK

3	Check harness and connector between A/C control assembly and ECT sensor (See page IN–27).

NG → **Repair or replace harness or connector.**

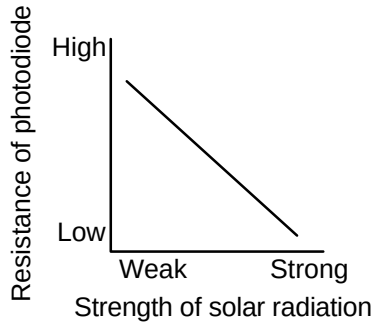
OK

Check and replace A/C control assembly.

DI0DC–01

DTC	21	Solar Sensor Circuit

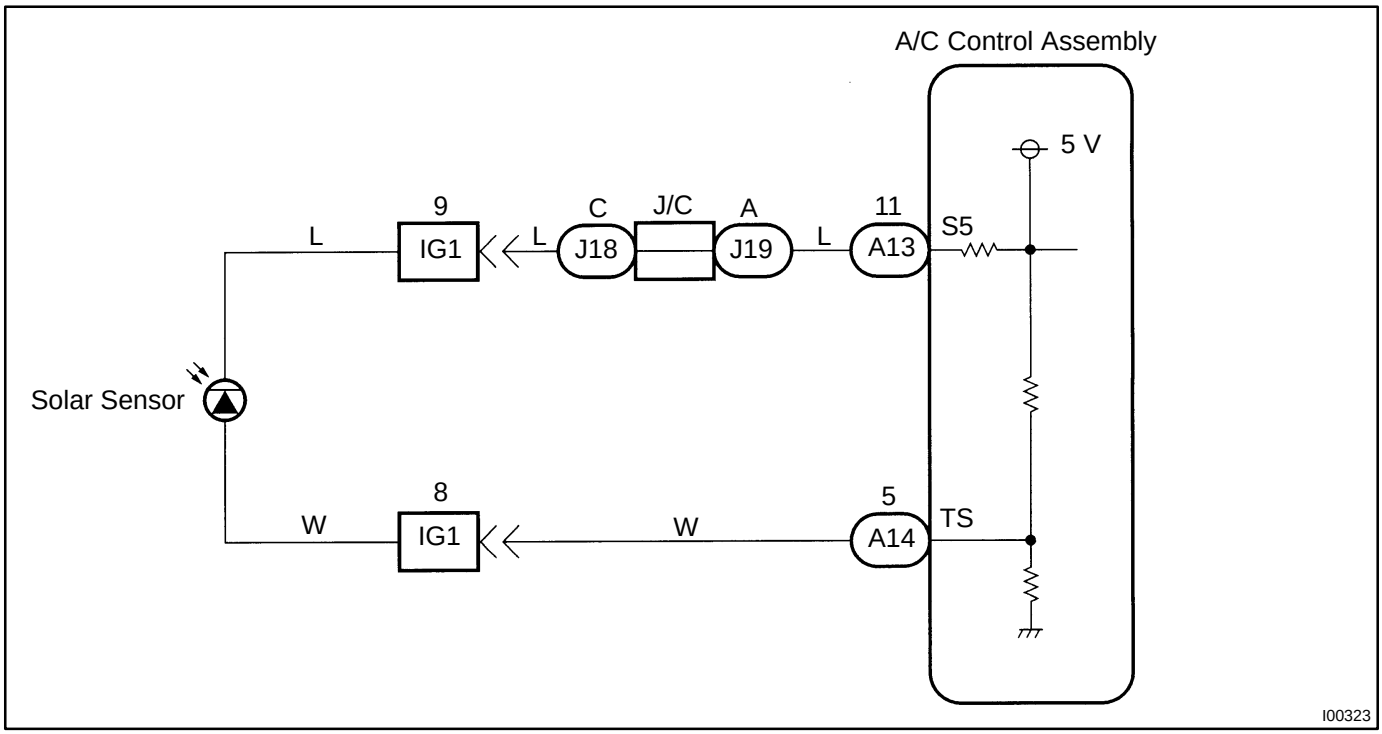
CIRCUIT DESCRIPTION



A photo diode in the solar sensor detects solar radiation and sends signals to the A/C control assembly.

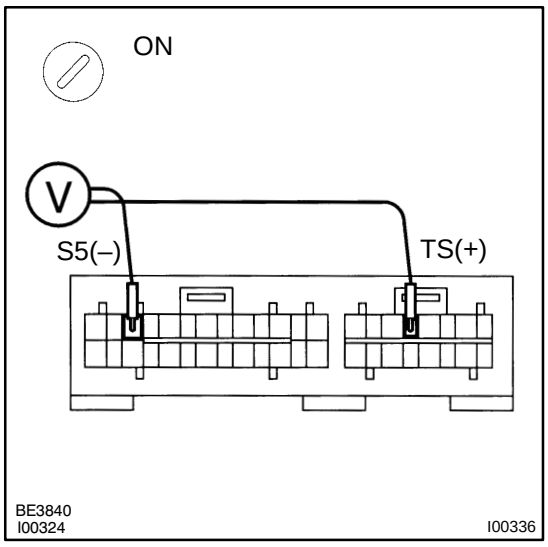
DTC No.	Detection Item	Trouble Area
21	Open or short in solar sensor circuit. (Please note that display of DTC 21 is not abnormal when the sensor is not receiving solar radiation.)	●Solar sensor ●Harness or connector between solar sensor and A/C control assembly ●A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals S5 and TS of A/C control assembly connector.**



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page BO–79).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals S5 and TS of A/C control assembly connector when the solar sensor is subjected to an electric light, and when the sensor is covered by a cloth.

OK:

Condition	Voltage
Sensor subjected to electric light	Below 4.0 V
Sensor covered by a cloth	4.0 – 4.5 V

HINT:

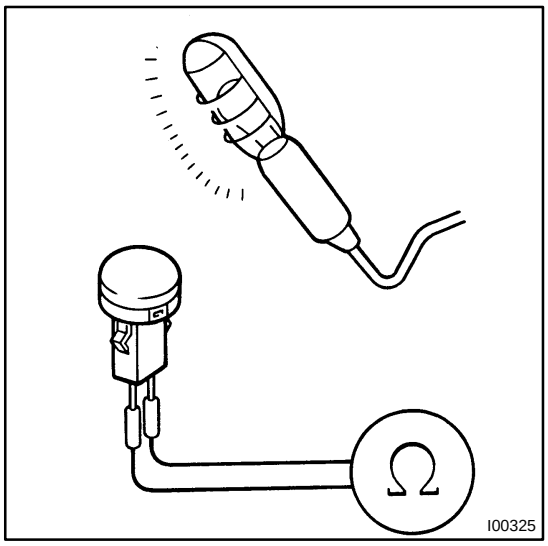
As the inspection light is gradually moved away from the sensor, the voltage increases.

NG	**Go to step 2**

NG

Proceed to next circuit inspection shown on matrix chart (See page DI–535). However, if DTC 21 is displayed, check and replace A/C control assembly.

2	Check solar sensor.



PREPARATION:

(a) Remove instrument panel (See page BO–79).

(b) Disconnect solar sensor connector.

CHECK:

(a) Cover the sensor by a cloth.

(b) Measure resistance between terminals 1 and 2 of solar sensor connector.

HINT:

Connect positive (+) lead of ohmmeter to terminal 2 and negative (–) lead to terminal 1 of the solar sensor.

OK:

Resistance: ∞Ω (No continuity)

PREPARATION:

Remove the cloth from the solar sensor and subject the sensor to electric light.

CHECK:

Measure resistance.

OK:

Resistance: Below 10 kΩ (Continuity)

HINT:

As the electric light is moved gradually away from the sensor, the resistance increases.

NG → **Replace solar sensor.**

OK ↓

3	Check harness and connector between A/C control assembly and solar sensor (See page IN–27).

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace A/C control assembly.

DI0DD–01

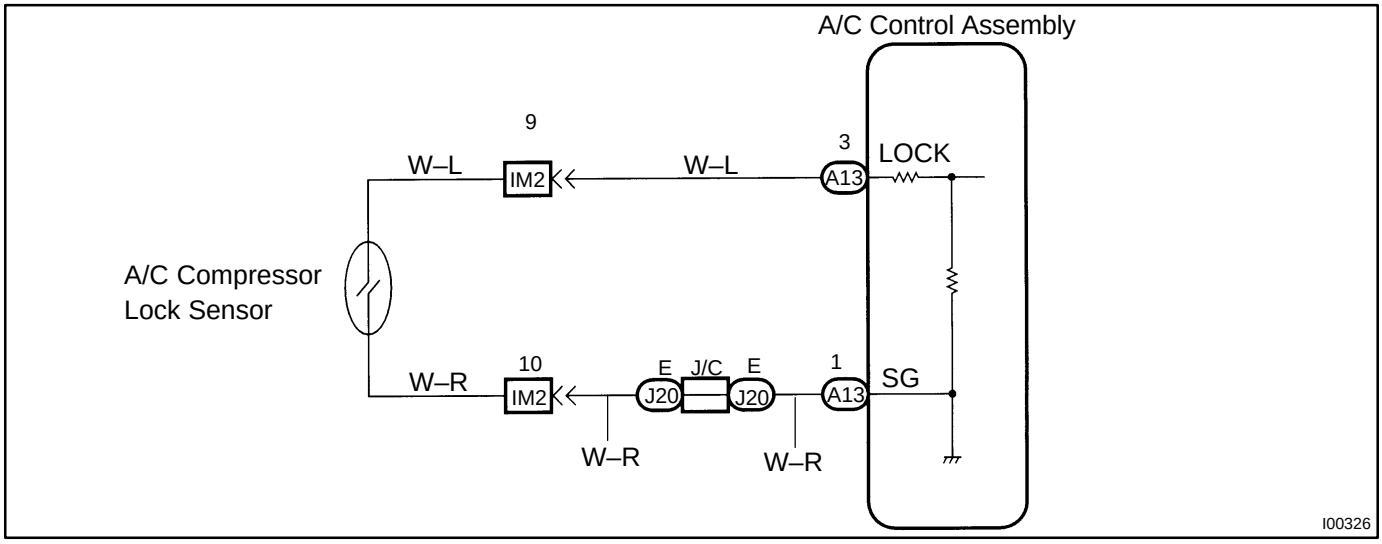
DTC	22	Compressor Lock Sensor Circuit

CIRCUIT DESCRIPTION

This sensor sends 4 pulses par engine revolution to the A/C control assembly. If the number ratio of the compressor speed divided by the engine speed is smaller than a predetermined value, the A/C control assembly turns the compressor off. And, the indicator flashes at about 1 second intervals.

DTC No.	Detection Item	Trouble Area
22	All conditions below are detected for 3 secs. or more. (a) Engine speed: 450 rpm or more (b) Ratio between engine and compressor speed deviates 20 % or more in comparison to normal operation.	●Compressor ●Compressor drive belt ●Compressor lock sensor ●Harness and connector between compressor and A/C control assembly ●A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check compressor.

PREPARATION:

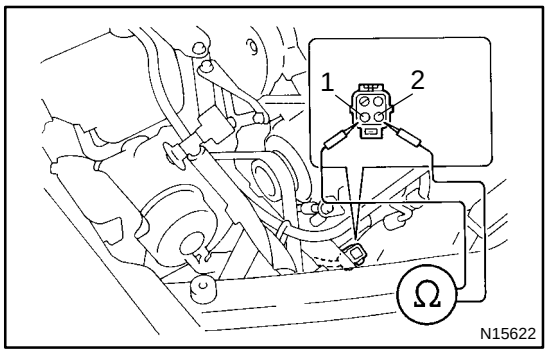
(a) Check compressor drive belt tension (See page AC–14).

(b) Check if the compressor does not lock during operation with engine started and blower switch and A/C switch ON.

NG → **Adjust drive belt tension or repair compressor.**

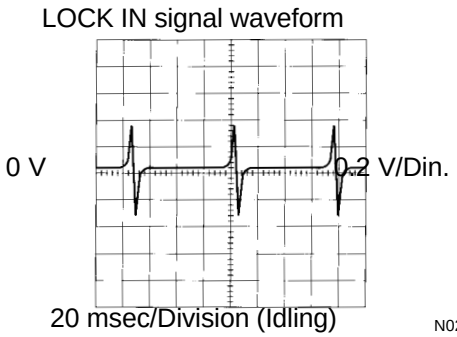
OK

2	Check compressor lock sensor.



PREPARATION:
Disconnect compressor lock sensor connector.
CHECK:
Measure resistance between terminals 1 and 2 of compressor lock sensor connector.
OK:
Resistance: at 20 ˚C (68 ˚F): 65 – 125 Ω

Reference: Inspection using oscilloscope



During cranking or idling, measure voltage between terminals LOCK IN and SG of A/C control assembly.
HINT:
The correct waveform appears as shown in the illustration on the left.

NG → **Replace compressor lock sensor.**

OK ↓

3	Check harness and connector between A/C control assembly and compressor lock sensor (See page IN–27).

NG → **Repair or replace harness or connector.**

OK ↓

Proceed to next circuit inspection shown on matrix chart (See page DI–535). However, if DTC 22 is displayed, check and replace A/C control assembly.

DI0DE–01

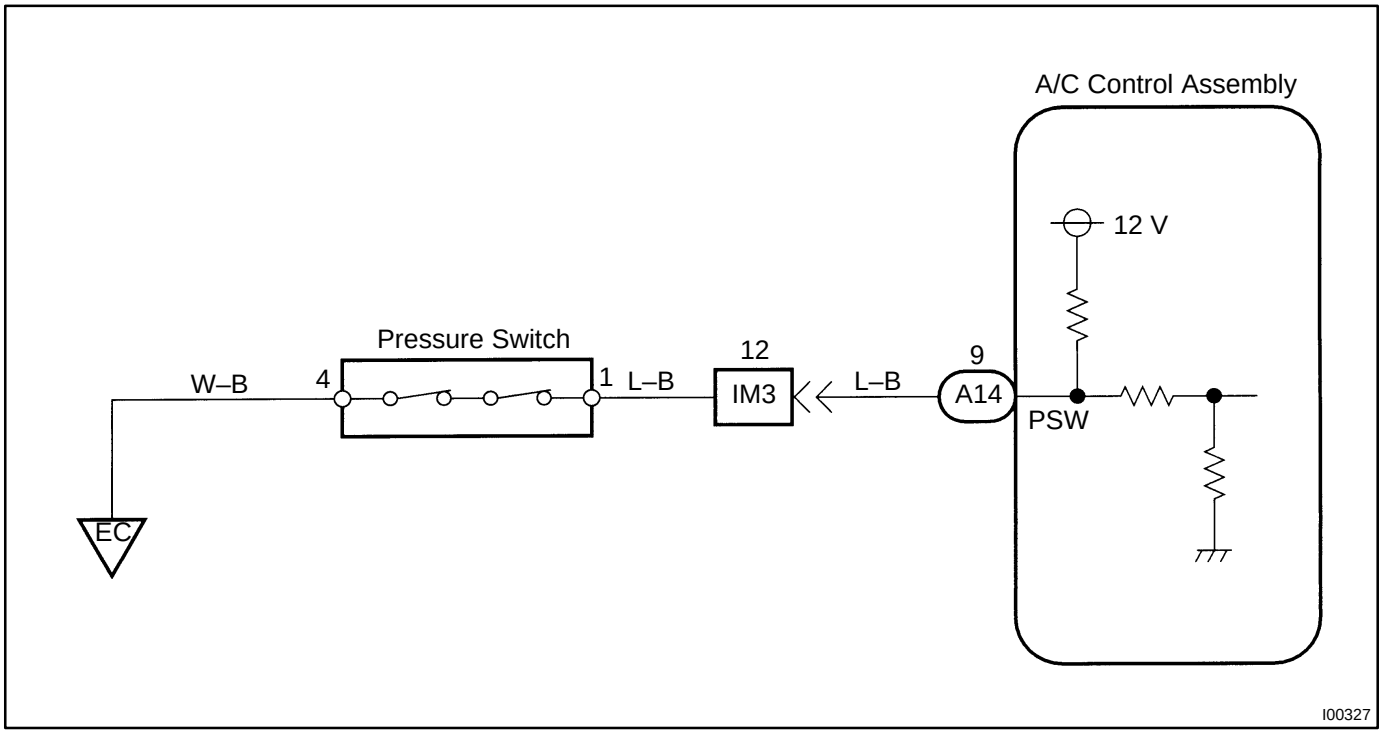
DTC	23	Pressure Switch Circuit

CIRCUIT DESCRIPTION

This pressure switch sends the appropriate signals to the A/C control assembly when the air conditioning refrigerant pressure drops too low or rises too high. When the A/C control assembly receives these signals, if outputs signals via the ECM to switch off the compressor relay and turns the magnetic clutch off.

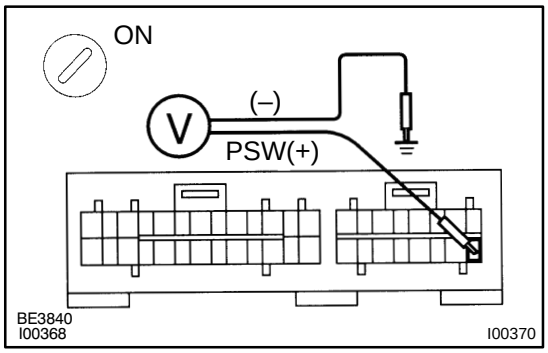
DTC No.	Detection Item	Trouble Area
23	●Open in pressure sensor circuit. ●Abnormal refrigerant pressure. below 196 kPa (2.0 kgf/cm^2, 28 psi) over 3,140 kPa (32.0 kgf/cm^2, 455 psi)	●Pressure switch ●Harness or connector between pressure switch and A/C control assembly. ●Refrigerant pipe line. ●A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals PSW of A/C control assembly and body ground.



PREPARATION:

(a) Install the manifold gauge set (See page AC–17).

(b) Turn ignition switch ON.

CHECK:

Check voltage between terminals PSW of A/C control assembly connector and body ground when air conditioning gas pressure is changed.

OK:

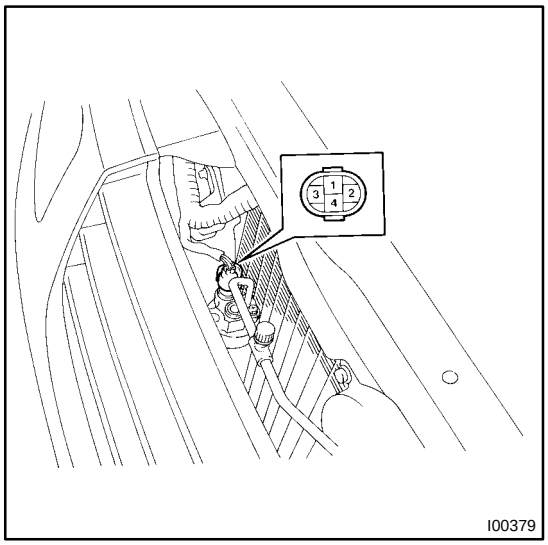
The voltage changes with gas pressure, as shown in the diagram below.

Low Pressure Cut Side	Reference: High Pressure Cut Side
ON (0 V) 225 kPa 196 kPa OFF (12 V)	ON (0 V) 2,550 kPa 3,140 kPa OFF (12 V)

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–535).**

NG

2	Check pressure switch.



PREPARATION:

Disconnect pressure switch connector.

CHECK:

Check continuity between terminals 1 and 4 of pressure switch when air conditioning gas pressure is changed.

OK:

The continuity changes with gas pressure as shown below.

Low Pressure Cut Side	Reference: High Pressure Cut Side
ON (continuity 225 kPa 196 kPa OFF (no continuity	ON (continuity) 2,550 kPa 3,140 kPa OFF (no continuity)

NG → **Replace pressure switch.**

OK

3	**Check harness and connector between A/C control assembly and pressure switch, pressure switch and body ground (See page IN–27).**

NG → **Repair or replace harness or connector.**

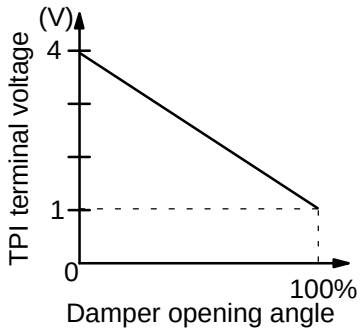
OK

Check and replace A/C control assembly.

DI0DF–01

DTC	31, 41	Air Mix Damper Position Sensor Circuit

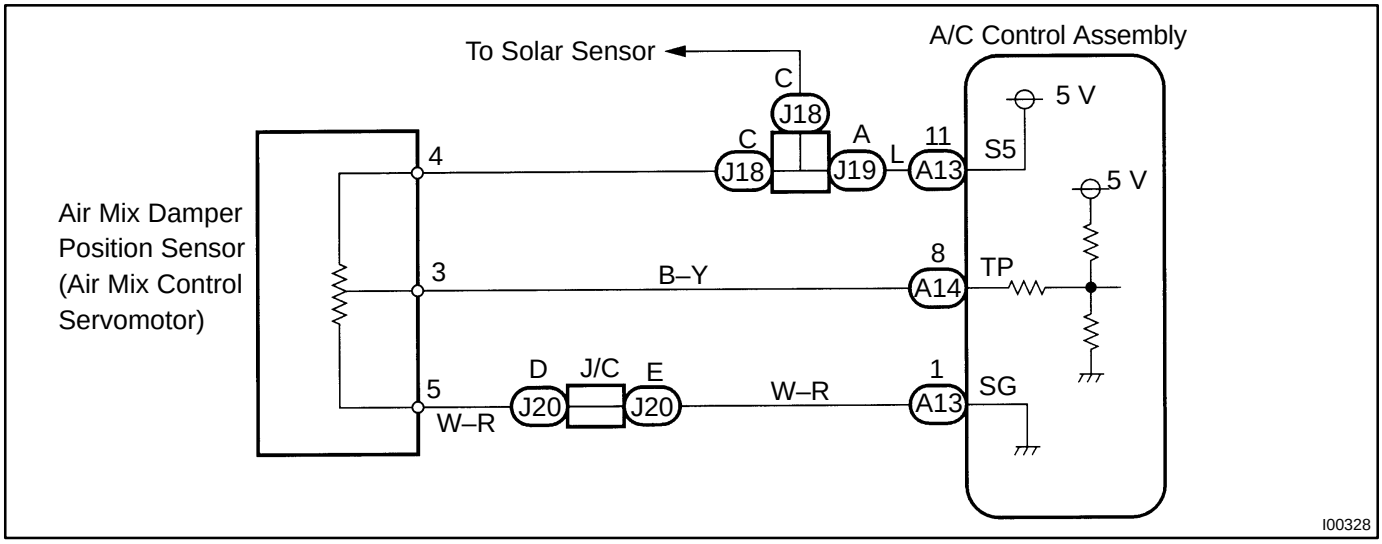
CIRCUIT DESCRIPTION



This sensor detects the position of the air mix damper and sends the appropriate signals to the A/C control assembly. The position sensor is built into the air mix control servomotor.

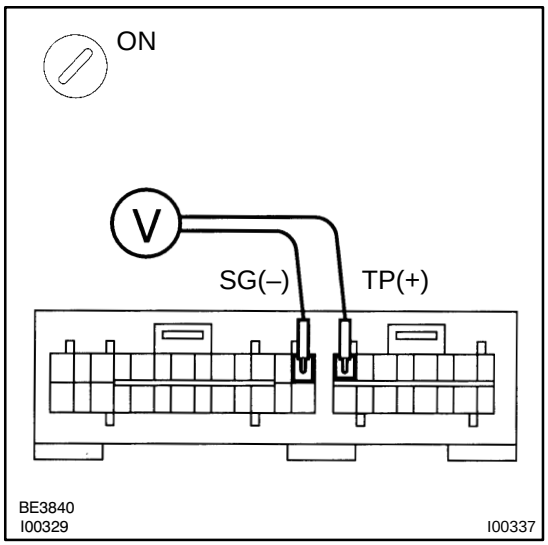
DTC No.	Detection Item	Trouble Area
31	Short to ground or power source circuit in air mix damper position sensor circuit.	●Air mix damper position sensor ●Harness of connector between air mix control servomotor and A/C control assembly ●A/C control assembly
41	Air mix damper position sensor value does not change even if ECM operates air mix control servomotor.	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals TP and SG of A/C control assembly connector.**



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page BO–79).

(b) Turn ignition switch ON.

CHECK:

Change the set temperature to activate the air mix damper, and measure the voltage between terminals TP and SG of A/C control assembly connector each time when the set temperature is changed.

OK:

Set Temperature	Voltage
Max. cool	3.5 – 4.5 V
Max. hot	0.5 – 1.8 V

HINT:

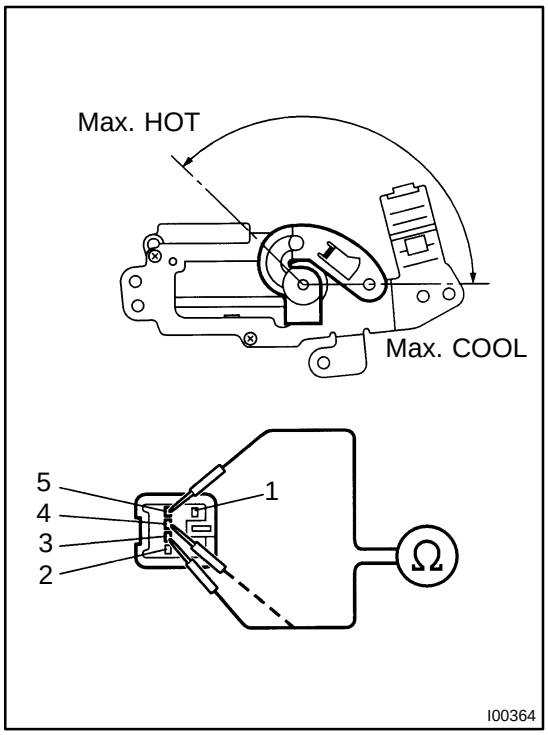
As the set temperature increases, the voltage decreases gradually without interruption.

NG → **Go to step 2.**

OK →

Proceed to next circuit inspection shown on matrix chart (See page DI–535). However, if DTC 31 or 41 is displayed, check and replace A/C control assembly.

2	Check air mix damper position sensor.



PREPARATION:

(a) Remove air mix control servomotor (See page AC–73).

(b) Disconnect air mix control servomotor connector.

CHECK:

Measure resistance between terminals 4 and 5 of air mix control servomotor connector.

OK:

Resistance: 4.8 – 7.2 kΩ

CHECK:

While operating air mix control servomotor as shown in the procedure on page DI–563, measure resistance between terminals 3 and 5 of air mix control servomotor connector.

OK:

Position	Resistance
Max. cool	3.8 – 5.8 kΩ
Max. hot	0.95 – 1.45 kΩ

HINT:

As the air mix control servomotor moves from cool side to hot side, the resistance decreases gradually without interruption.

NG → **Replace air mix control servomotor.**

OK

3	Check harness and connector between A/C control assembly and air mix control servomotor (See page IN–27).

NG → **Repair or replace harness or connector.**

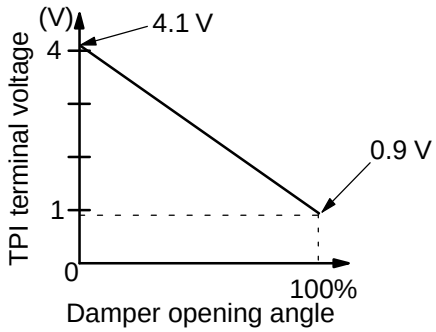
OK

Check and replace A/C control assembly.

DI0DG–01

DTC	32, 42	Air Inlet Damper Position Sensor Circuit

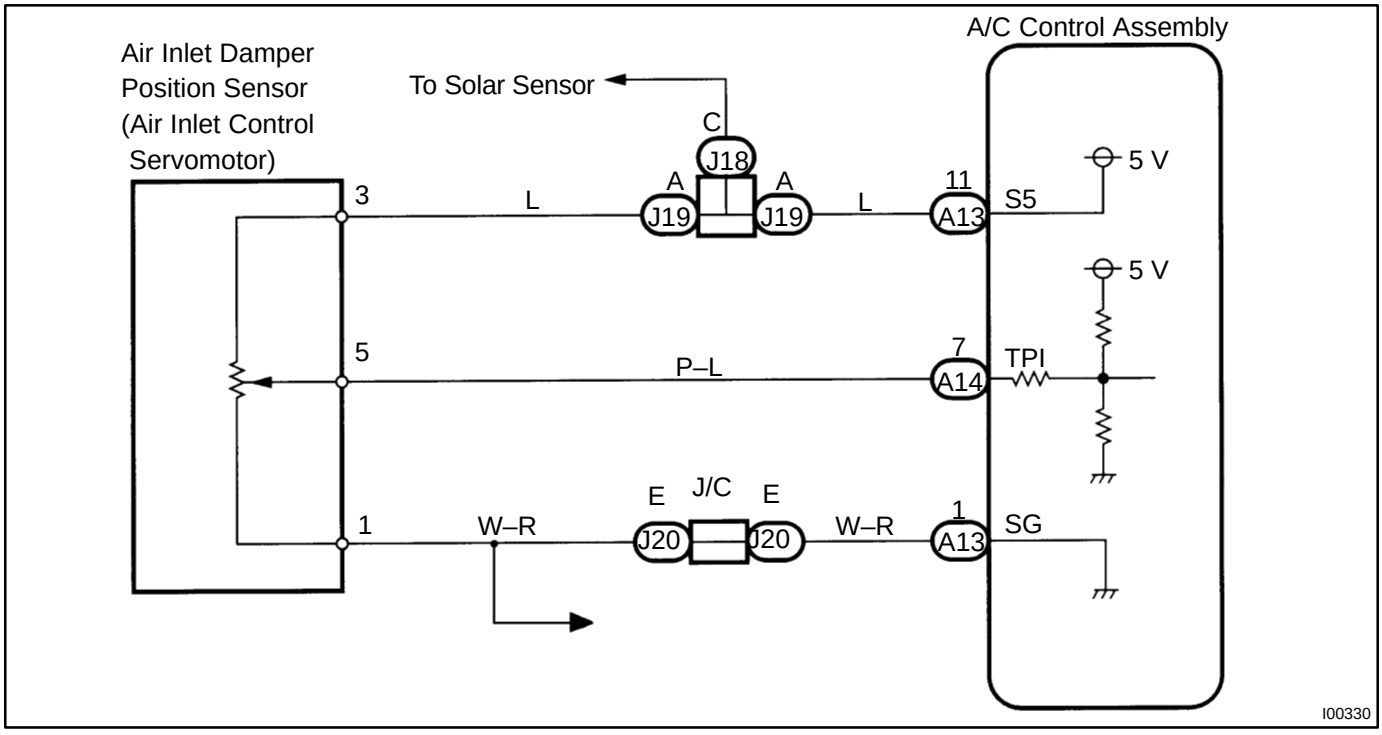
CIRCUIT DESCRIPTION



This sensor detects the position of the air inlet damper and sends the appropriate signals to the A/C control assembly. The position sensor is built into the air inlet control servomotor.

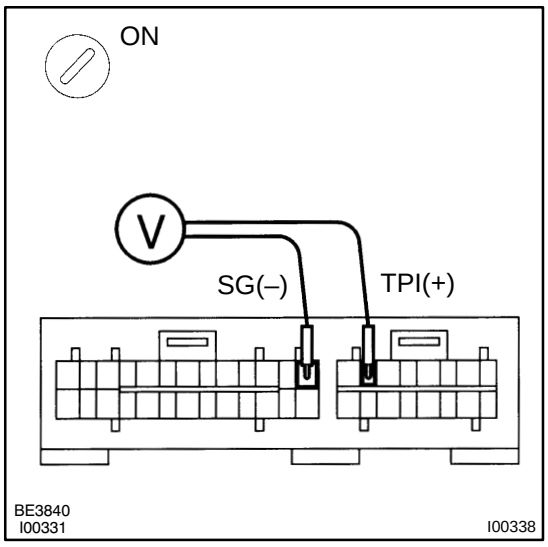
DTC No.	Detection Item	Trouble Area
32	Short to ground or power source circuit in air inlet damper position sensor circuit.	●Air inlet damper position sensor. ●Harness or connector between air inlet control servomotor and A/C control assembly. ●A/C control assembly.
42	Air inlet damper position sensor value does not change even if A/C control assembly operates air inlet control servomotor.	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals TPI and SG of A/C control assembly connector.**



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page BO–79).

(b) Turn ignition switch ON.

CHECK:

Press REC/FRS switch to change air inlet between fresh and recirculation air, and measure voltage between terminals TPI and SG of A/C control assembly when the air inlet servomotor operates.

OK:

REC/FRS Switch	Voltage
REC	3.5 – 4.5 V
FRS	0.5 – 1.8 V

HINT:

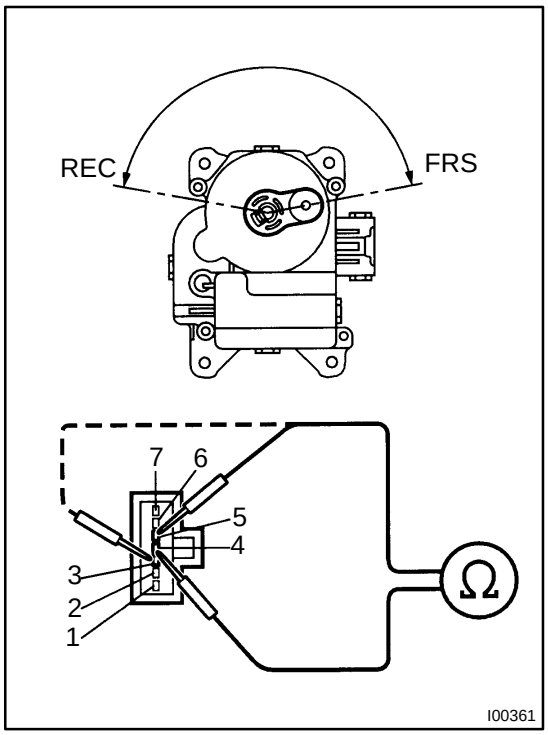
As the air inlet control servomotor is moved from REC side to FRS side, the voltage decreases gradually without interruption.

NG → **Go to step 2.**

OK

Proceed to next circuit inspection shown on matrix chart (See page DI–535). However, if DTC 32 or 42 is displayed, check and replace A/C control assembly.

2	Check air inlet damper position sensor.



PREPARATION:

(a) Remove air inlet control servomotor (See page AC–70).

(b) Disconnect air inlet control servomotor connector.

CHECK:

Measure resistance between terminals 4 and 5 of air inlet control servomotor connector.

OK:

Resistance: 4.2 – 7.8 kΩ

CHECK:

While operating air inlet control servomotor as in the procedure on page , measure resistance between terminals 3 and 4 of air inlet control servomotor connector.

OK:

Resistance:

Damper Position	Resistance
REC side	3.4 – 6.4 kΩ
FRS side	0.76 – 1.4 kΩ

HINT:

As the air inlet control servomotor is moved from REC side to FRS side, the voltage decreases gradually without interruption.

NG → **Replace air mix control servomotor.**

OK ↓

3	Check harness and connector between A/C control assembly and air inlet control servomotor (See page IN–27).

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace A/C control assembly.

DI0DH–01

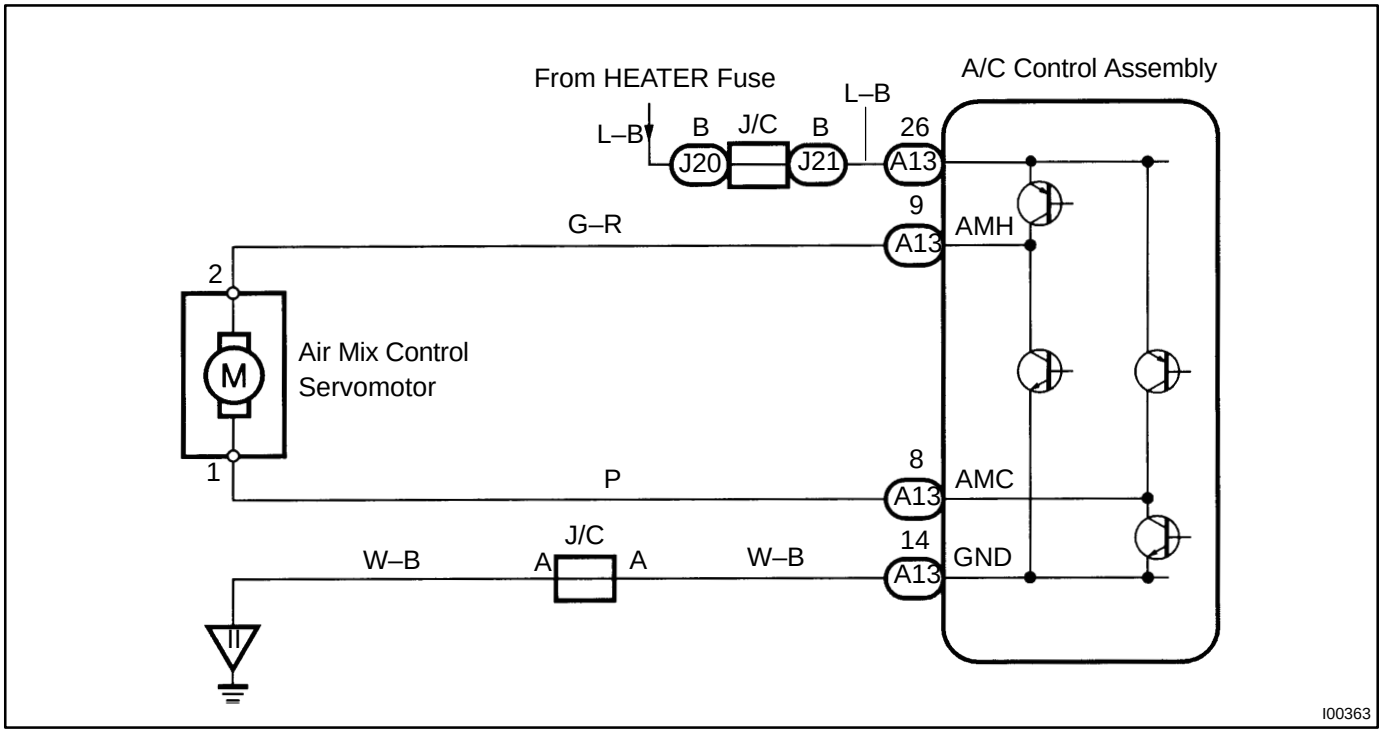
DTC	41	Air Mix Control Servomotor Circuit

CIRCUIT DESCRIPTION

This air mix control sevomotor is controlled by the A/C control assembly and moves the air mix damper to the disired position.

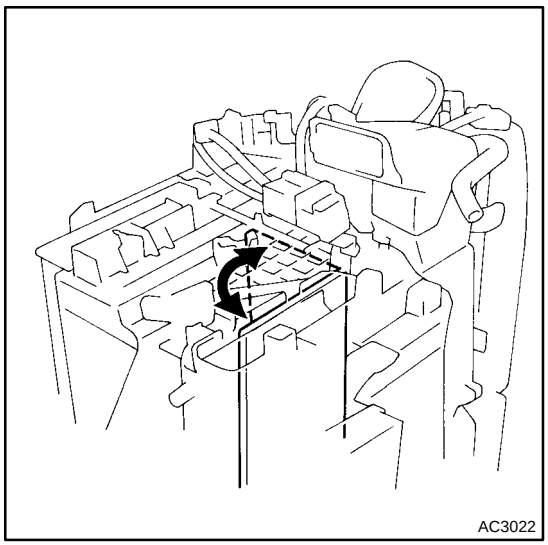
DTC No.	Detection Item	Trouble Area
41	Air mix damper position sensor value does not change even if A/C control assembly operates air mix control servomotor.	●Air mix control sevomotor ●Air mix damper position sensor ●Harness or connector between A/C control assembly and air mix control servomotor, air mix damper position sensor. ●A/C control assenbly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Actuator check



PREPARATION:

(a) Warm up the engine.

(b) Set to the actuator check mode (See page DI–528).

(c) Press the DEF switch and change it to step operation.

CHECK:

Press the DEF switch and check the operation of the air mix damper and the condition of the blower.

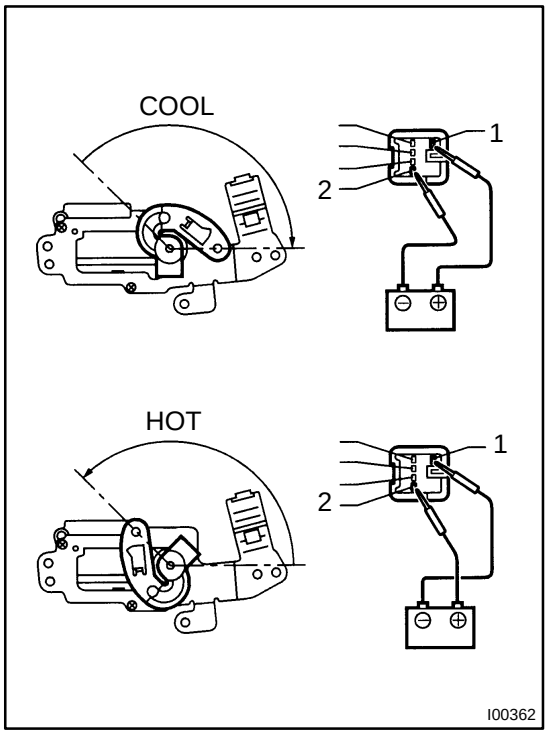
OK:

Display Code	Air Mix Damper	Condition
0 – 3	0 % (Fully closed)	Cool air comes out
4 – 5	50 %	
6 – 9	100 % (Fully opened)	Warm air comes out

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–535).**

NG

2	Check air mix control servomotor.



PREPARATION:

Remove ari mix control servomotor (See page AC–73).

CHECK:

Connect positive (+) lead to terminal 1 and the negative (–) lead to terminal 2.

OK:

The lever turns smoothly to HOT side.

CHECK:

Connect negative (–) lead to terminal 1 and positive (+) lead to terminal 2.

OK:

The lever turns smoothly to HOT side.

NG → **Repair or replace harness or connector.**

OK

3	**Check harness and connector between A/C control assembly and air mix control servomotor (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Chek and replace A/C control assembly (See page IN–27).

DI0DI–01

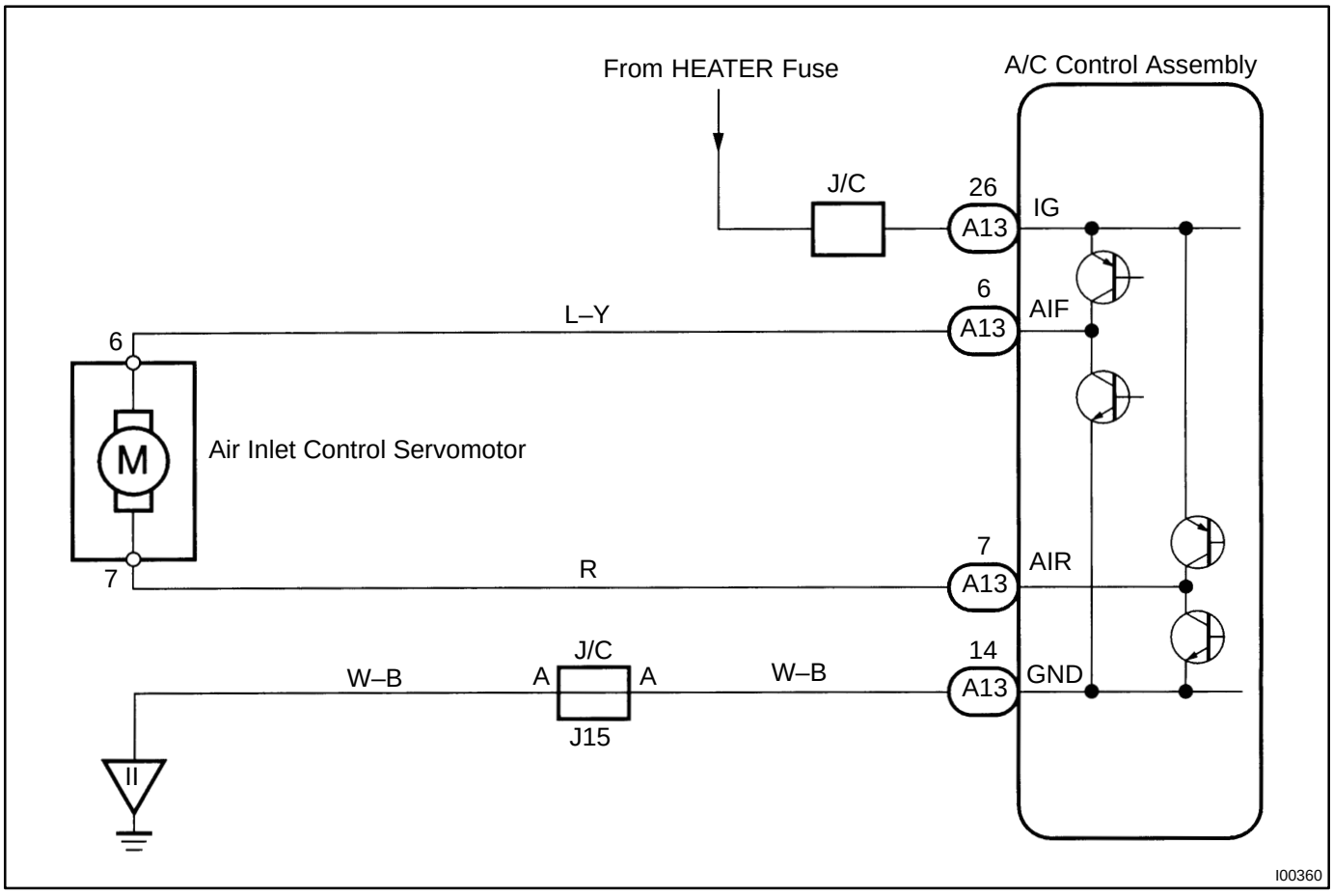
DTC	42	Air Inlet Control Servomotor Circuit

CIRCUIT DESCRIPTION

The air inlet control servomotor is controlle by the A/C control assembly and moves the air inlet damper to the desired position.

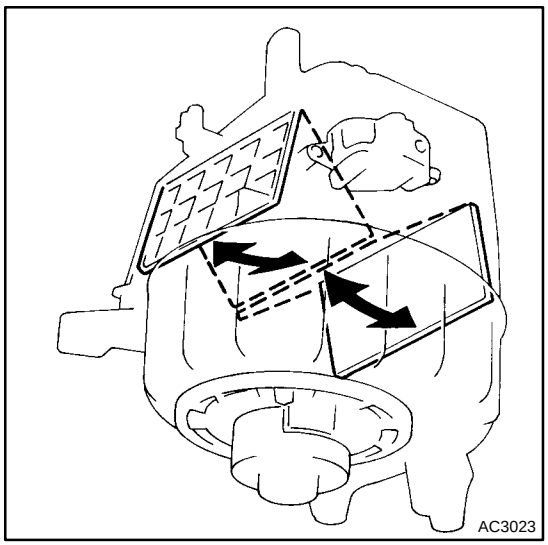
DTC No.	Detection Item	Trouble Area
42	Air inlet damper position sensor value does not change even if A/C control assembly operates air inlet control servomotor.	●Air inlet damper position sensor. ●Harness or connector between air inlet control servomotor and A/C control assembly. ●A/C control assembly.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Actuator check.



PREPARATION:

(a) Remove glove box to see and check the air inlet damper operation.

(b) Set to the actuator check mode (See page DI–528).

(c) Press the DEF switch and change it to step operation.

CHECK:

Press the DEF switch and check the operation air inlet damper.

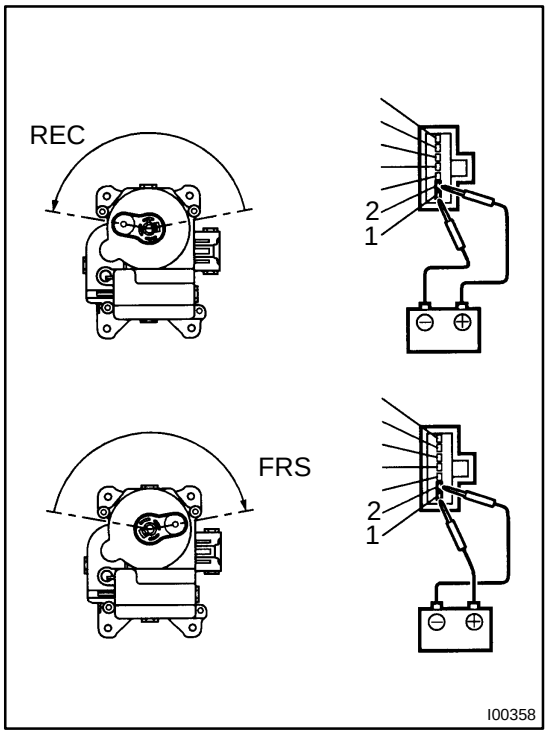
OK:

Display Code	Air Inlet Damper
0 – 2	FRS
3	REC/FRS
4 – 9	REC

OK	Proceed to next circuit inspection shown on matrix chart (See page DI–535).

NG

2	Check air inlet control servomotor.



PREPARATION:

Remove air inlet control servomotor (See page AC–70).

CHECK:

Connect positive (+) lead to terminal 2 and negative (–) lead to terminal 1.

OK:

The lever moves smoothly to REC position.

CHECK:

Connect negative (–) lead to terminal 2 and positive (+) lead to terminal 1.

OK:

The lever moves smoothly to FRS position.

NG	Replace air inlet control servomotor assembly.

OK

3	**Check harness and connector between A/C control assembly and air inlet control servomotor. (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Check and replace A/C control assembly.

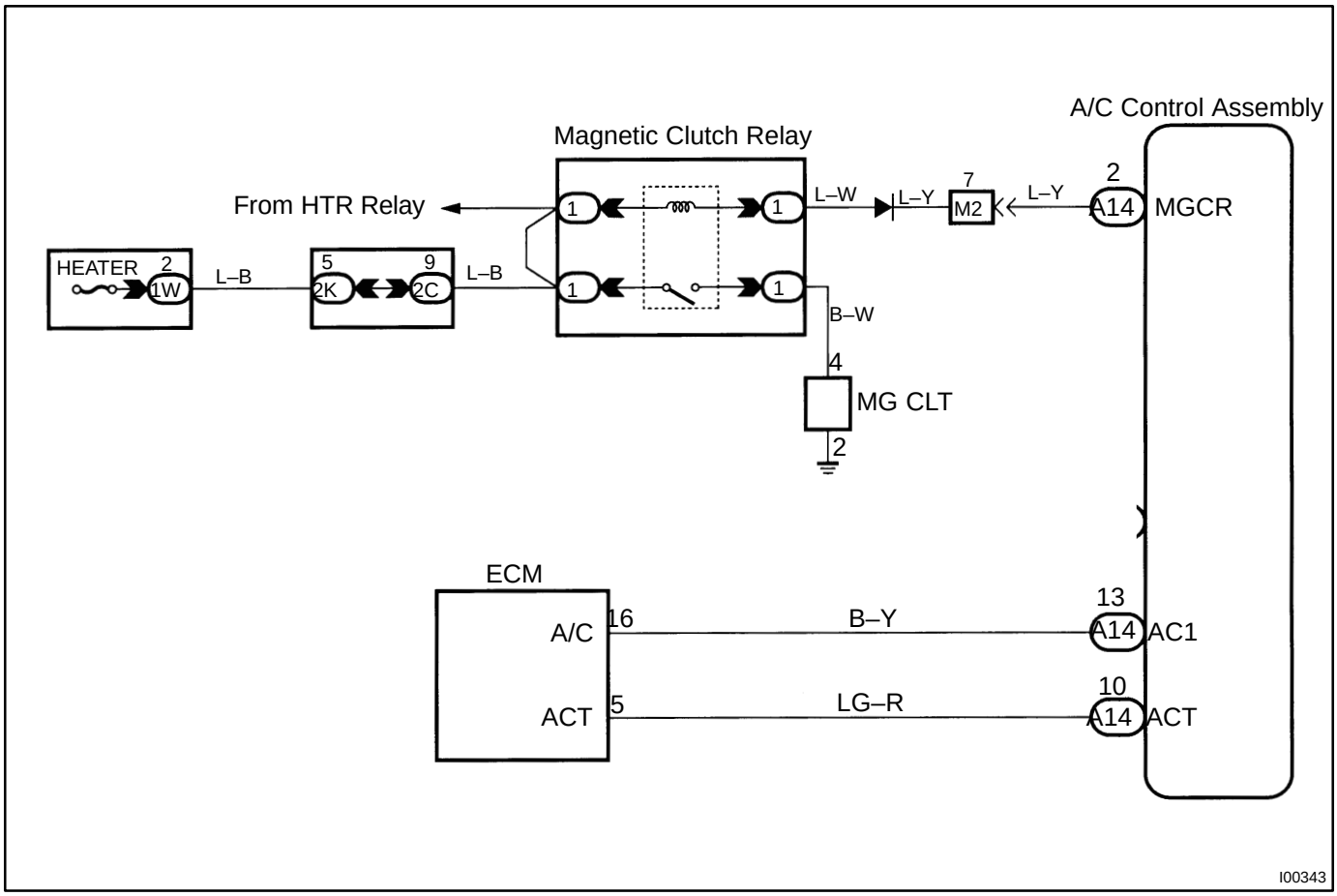
DI0DJ–01

Compressor Circuit

CIRCUIT DESCRIPTION

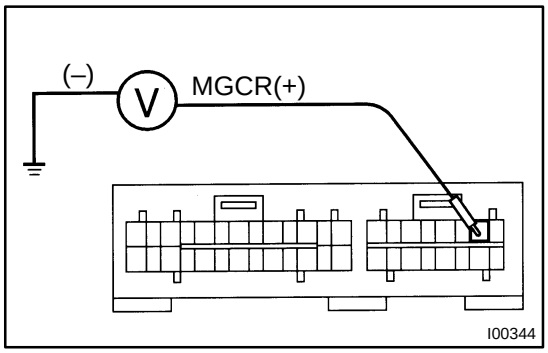
The A/C control assembly outputs the magnetic clutch ON signal from terminal AC1 to the ECM. When the ECM receives this signal, it sends a signal from terminal ACT and switches the A/C magnetic clutch relay ON, thus turning on the A/C magnetic clutch.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal MGC of A/C control assembly connector and body ground.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page BO–79).

(b) Start the engine and push AUTO switch.

CHECK:

Check voltage between terminal MGC of A/C control assembly connector and body ground when magnetic clutch is ON and OFF by A/C switch.

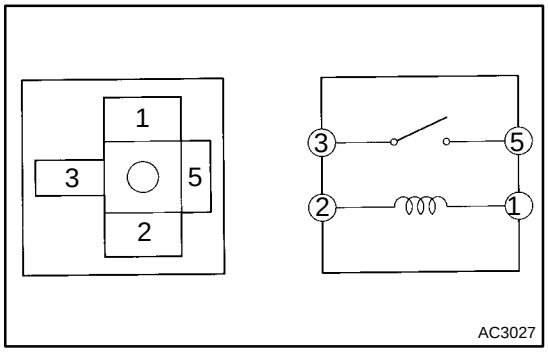
OK:

A/C switch	Voltage
ON	Below 1 V
OFF	10 – 14 V

NG → **Go to step 5.**

OK

2	Check magnetic clutch relay.



PREPARATION:

Remove magnetic clutch relay from R/B No.5.

CHECK:

Check continuity between each pair of terminals shown below of magnetic clutch relay.

OK:

Tester connection	Specified condition
1 – 2	62.5 – 90.9 Ω
3 – 5	No continuity

PREPARATION:

Apply battey positive (+) voltage between terminals 1 and 2.

CHECK:

Check continuity between terminals 3 and 5.

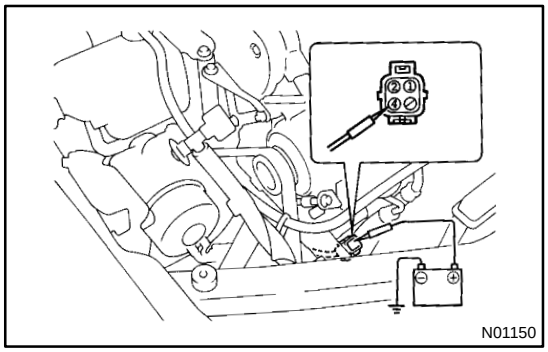
OK:

There is continuity.

NG → **Replace magnetic clutch relay.**

OK

3	Check A/C magnetic clutch.



PREPARATION:
Disconnect magnetic clutch connector.
CHECK:
Connect positive (+) lead connected to battery to magnetic clutch connector terminal 4.
OK:
Magnetic clutch is energized.

NG → **Repair A/C magnetic clutch.**

OK

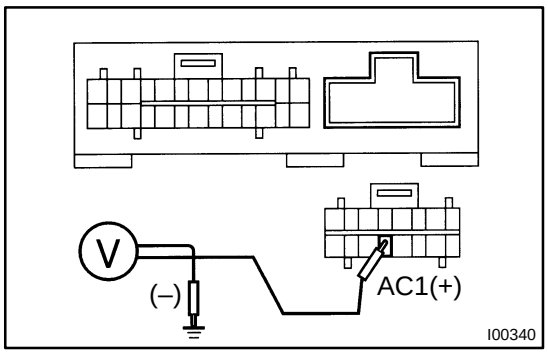
4	Check harness and connector between magnetic clutch relay and A/C compressor, A/C compressor and body ground (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

Proceed to next circuit inspeciton shown on matrix chart (See page DI–535).

5	Check voltage between terminal AC1 of A/C control assembly connector side and body ground.

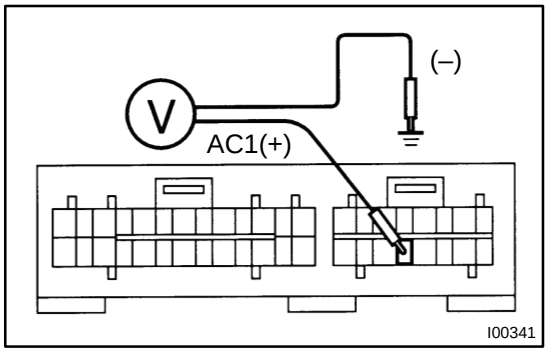


PREPARATION:
(a) Disconnect A/C control connector.
(b) Ignition switch ON.
CHECK:
Check voltage between terminal AC1 of A/C control assembly harness side connector.
OK:
Voltage: 10 – 14 V

NG → **Check and replace ECM.**

Ok

6	Check voltage between terminal AC1 of A/C control assembly connector and body ground.



PREPARATION:

(a) Remove A/C control assembly with connector still connected (See page BO–79).

(b) Start the engine and push AUTO switch.

CHECK:

Check the voltage between terminal AC1 of A/C control assembly connector and body ground when magnetic clutch is ON and OFF by A/C switch.

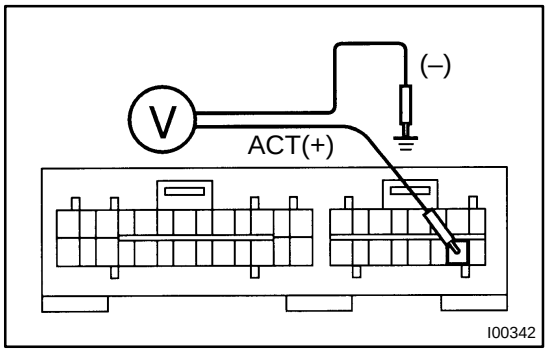
OK:

Magnetic clutch	Voltage
ON	Below 1 V
OFF	10 – 14 V

NG → **Check and replace A/C control assembly.**

OK

7	Check voltage between terminal ACT of A/C control assembly and body ground.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page BO–79).

(b) Start the engine and push AUTO switch.

CHECK:

Check the voltage between terminal ACT of A/C control assembly and body ground.

OK:

A/C switch	Voltage
ON	10 – 14 V
OFF	Below 1.5 V

NG → **Check and replace ECM.**

OK

8	**Check voltage between terminal ACT of ECM connector and body ground (See page IN–27).**

NG → **Check and replace ECM.**

OK

9	**Check harness and connector between A/C control assembly and ECM (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Proceed to next circuit inspection shown on matrix chart (See page DI–535).

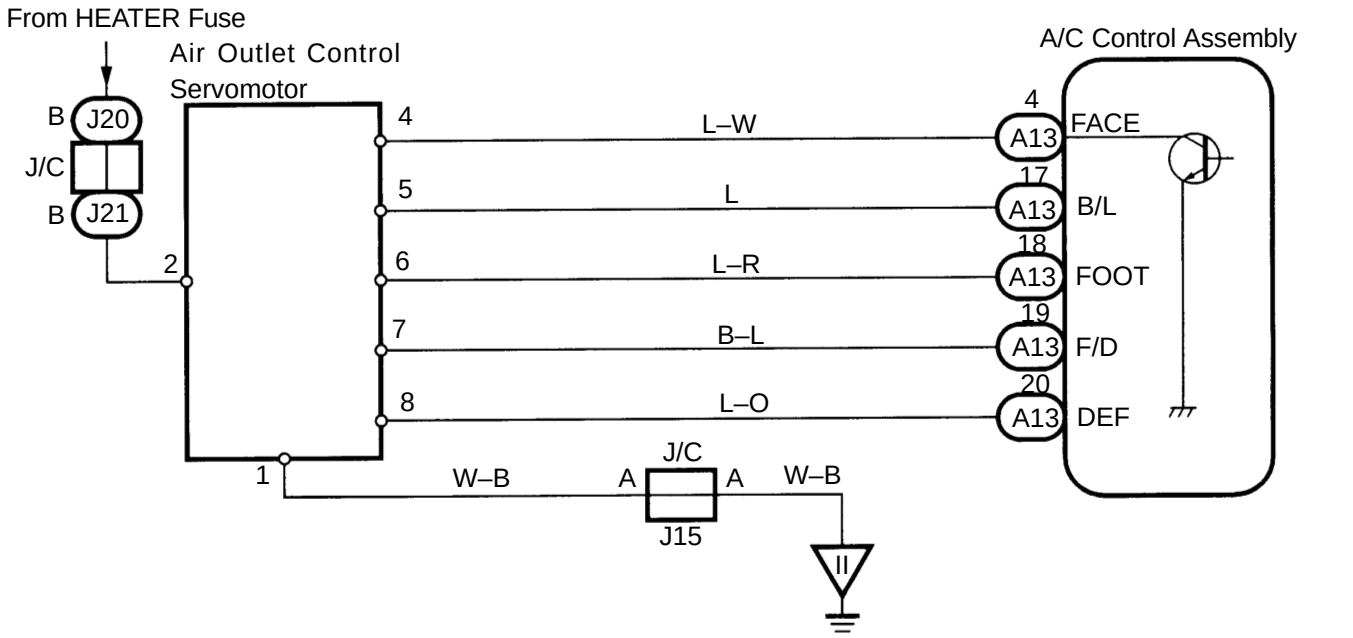
DI0DK–01

Air Outlet Control Servomotor Circuit

CIRCUIT DESCRIPTION

This circuit turns the servomotor and changes each mode damper position by signals from the A/C control assembly. When the AUTO switch is ON, the A/C control assembly changes the mode automatically between FACE, BI–LEVEL. and FOOT according to the temperature setting.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Actuator check.**

Display Code	Air Flow Mode
0 – 4	FACE
5	BI–LEVEL
6 – 7	FOOT
8	FOOT DEF
9	DEF

PREPARATION:

(a) Set to the actuator check mode (See page DI–528).

(b) Press the DEF switch and change to step operation.

CHECK:

Press the DEF switch in order and check the condition of air flow mode.

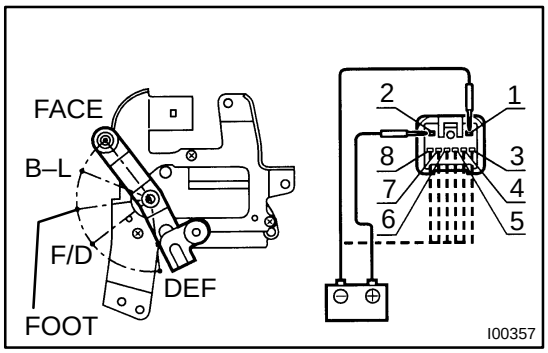
OK:

The mode changes with the change in the temperature displaly as shown in the table.

OK → **Proceed to next circuit inspeciton shown on matrix chart (See page DI–535).**

NG

2	Check air outlet control servomotor.



PREPARATION:

Remove air outlet control servomotor (See page AC–76).

CHECK:

(a) Connect positive (+) lead to teminal 2 and negative (–) lead to terminal 1.

(b) Check the lever operation when the negaitive (–) lead is connected to the teminals shown below.

OK:

The lever moves smoothly to the position for each mode.

Ground Terminals	Mode
4	FACE
5	BI–LEVEL
6	FOOT
7	FOOT DEF
8	DEF

NG → **Replace air outlet control servomotor.**

OK

3	Check harness and connector between A/C control assembly and air outlet control servomotor, air outlet control servomotor and battery, ari outlet control servomotor and body ground (See page IN–27).

NG → **Repair or replace harness or connector.**

OK

Repair or replace A/C control assembly.

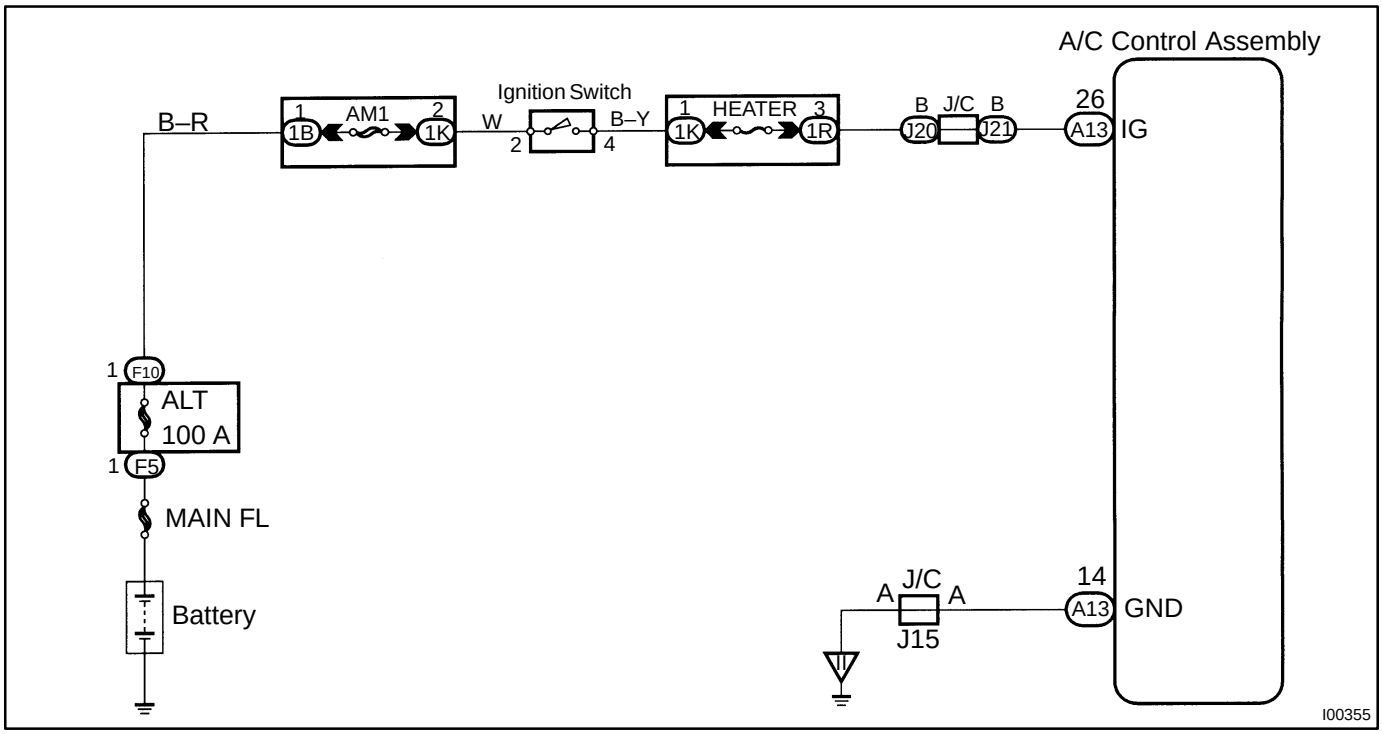
DI0DL–01

IG Power Source Circuit

CIRCUIT DESCRIPTION

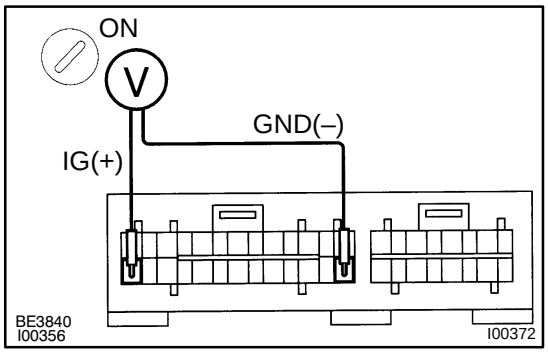
This is the power source for the A/C control assembly (contains the ECU) and servomotors, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals IG and GND of A/C control assembly connector.**



PREPARATION:

(a) Remove fromt ash receptacle (See page BO–79).

(b) Remove A/C control assembly with connectors still connected (See page BO–79).

(c) Turn ignition switch ON.

CHECK:

Measure voltage between terminals IG and GND of A/C control assembly.

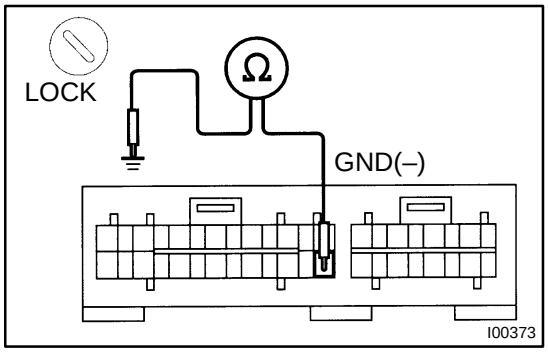
OK:

Voltage: 10 – 14 V

OK	**Proceed to next circuit inspection shown on matrix chart (See page DI–535).**

NG

2	Check continuity between terminal GND of A/C control assembly and body ground.

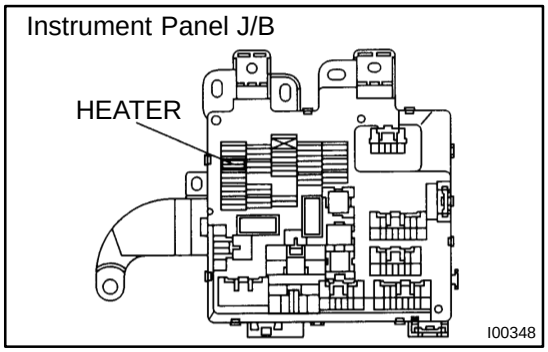


CHECK:
Measure resistance between terminal GND of A/C control assembly and body ground.
OK:
Resistance: Below 1 Ω

NG → **Repair or replace harness or connector.**

OK

3	Check HTR fuse.



PREPARATION:
Remove HEATER fuse in instrument panel J/B.
CHECK:
Check continuity of HEATR fuse.
OK:
There is continuity.

OK → **Check for shot in all the harness and components connected to the HEATER fuse (See page DI–576).**

OK

Check and repair harness and connector between A/C control assembly and battery.

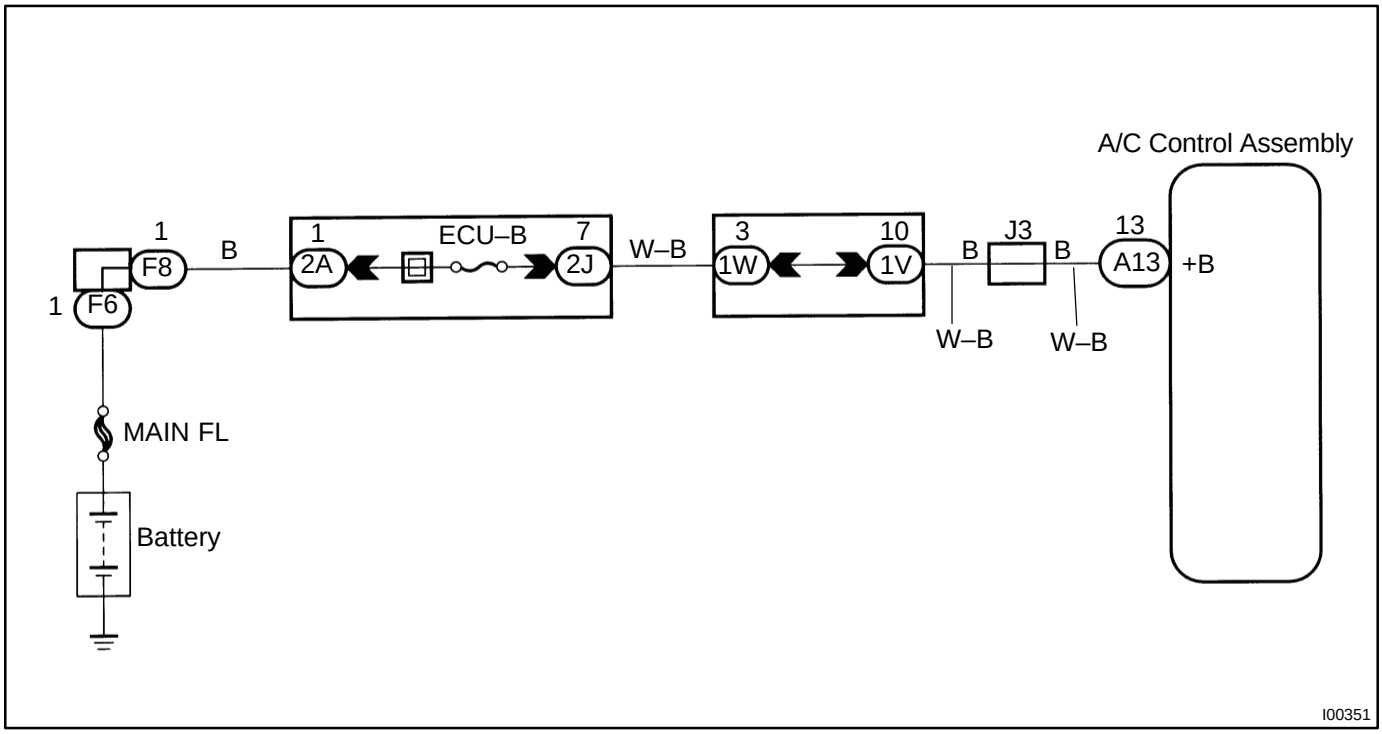
DI0DM–01

Back Up Power Source Circuit

CIRCUIT DESCRIPTION

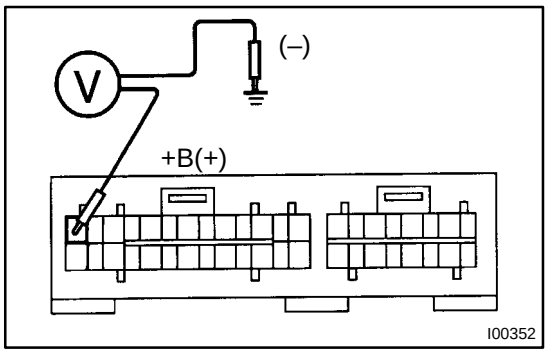
This is the back–up power source for the A/C control assembly. Power is supplied even when the ignition switch is off and is used for DTC memory, etc..

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal +B fo A/C control assembly connector and body ground.**



PREPARATION:

(a) Remove front ash receplacle (See page BO–79).

(b) Remove A/C control assembly with connectors still connected (See page BO–79).

CHECK:

Measure voltage between termimal +B of A/C control assembly connector and body ground.

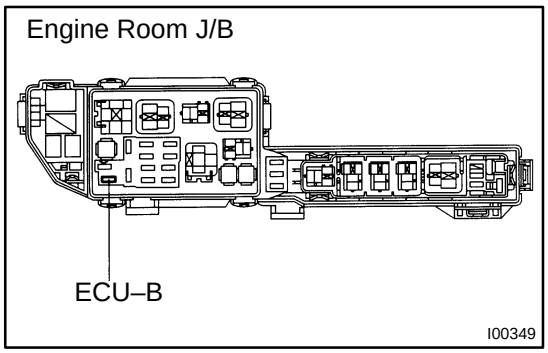
OK:

Voltage: 10 – 14 V

OK	**Proceed to nect circuit inspection shown on matrix chart (See page DI–535).**

NG

2	Check ECU–B fuse.



PREPARATION:

Remove ECU–B fuse from engine room J/B.

CHECK:

Check continuity of ECU–B fuse.

OK:

There is continuity.

NG → **Check for short in all the harness and components connected to the ECU–B fuse (See page DI–578).**

OK

Check and repair harness and connector between A/C control assembly and battery.

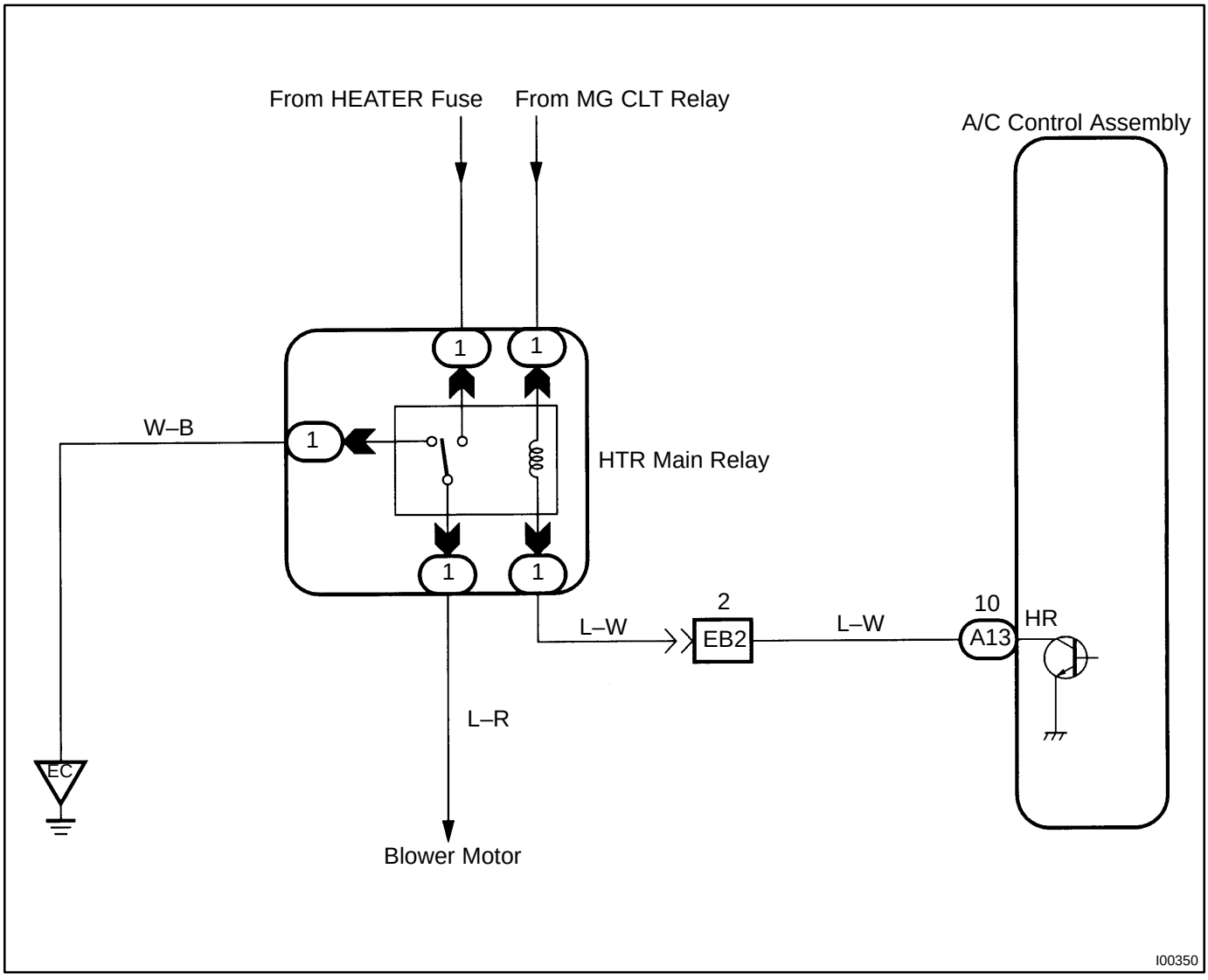
DI0DN–01

Heater Main Relay Circuit

CIRCUIT DESCRIPTION

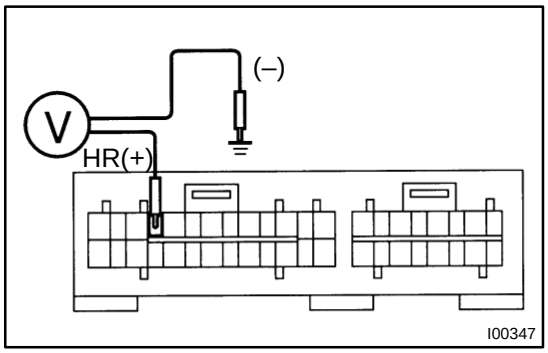
The heater main relay is switched on by signals from the A/C control assembly. It supplies power to the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal HR of A/C control assembly connector and body ground.**



PREPARATION:

(a) Remove front ash receptacle (See page BO–79).

(b) Remove A/C control assembly with connectors still connected (See page BO–79).

CHECK:

Measure voltage between terminal HR of A/C control assembly and body ground when ignition switch is ON and OFF.

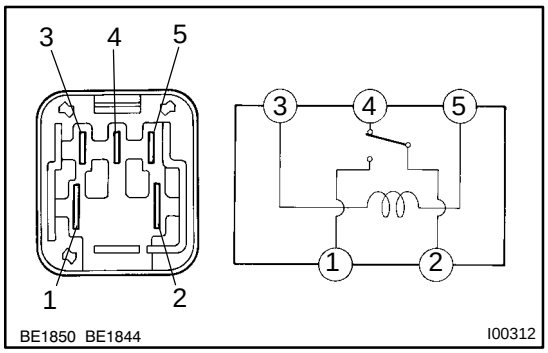
OK:

Ignition Switch	Voltage	
OFF	0V	
ON	Blower ON	0 V
	Blower OFF	10 – 14 V

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI–535).**

NG

2	Check heater main relay.



PREPARATION:
Remove heater main relay from .
CHECK:
Check continuity between each pair of terminals of heater main relay shown below.
OK:

Tester connection	Specified condition
1 – 4	No continuity
2 – 4	Continuity
3 – 5	62.5 – 90.9 Ω

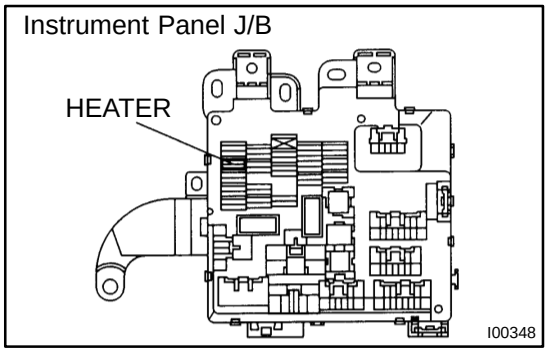
PREPARATION:
Apply battery positive voltage between terminals 3 and 5.
CHECK:
Check continuity between each pair of terminal shown below.
OK:

Tester connection	Specified condition
1 – 2	Continuity
2 – 4	No continuity

NG → **Replace heater main relay.**

OK

3	Check HEATER



PREPARATION:
Remove HEATER fuse from instrument panel J/B.
CHECK:
Check continuity of HEATER fuse.
OK:

There is continuity.

NG → **Check for short in all the harness and components connected to the HEATER fuse (See page DI–583).**

OK

Check and repair harness and connector between A/C control assembly and battery.

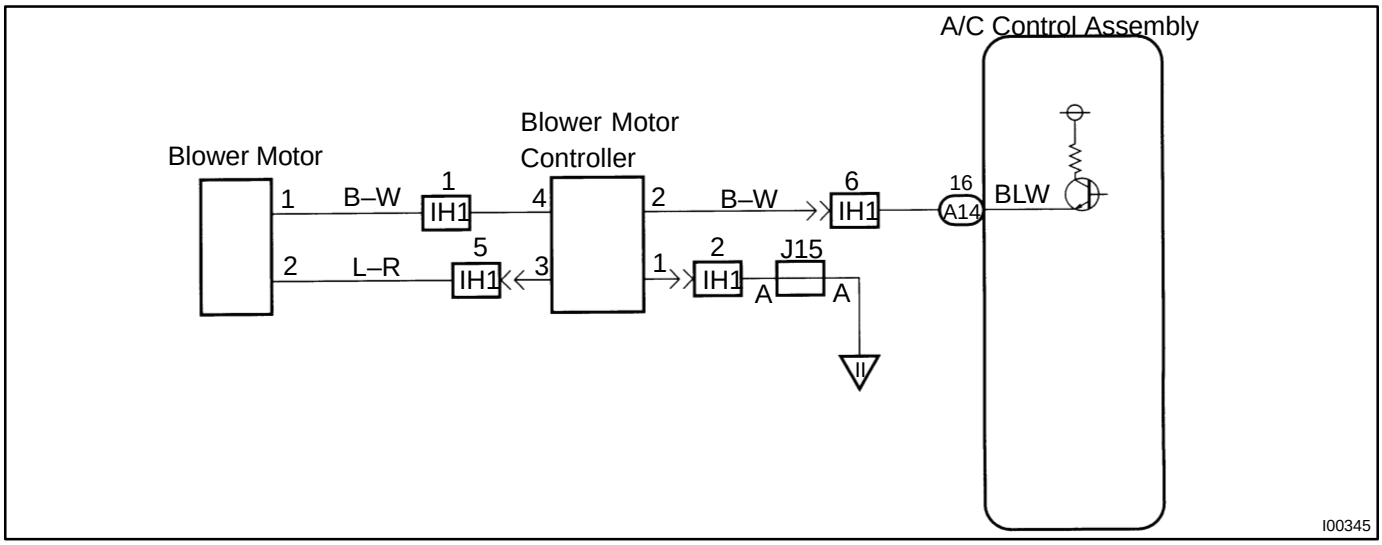
DI0DO–01

Blower Motor Circuit

CIRCUIT DESCRIPTION

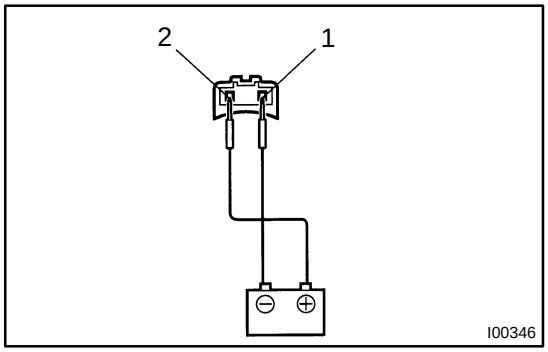
This is the power source for the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check blower motor.**



PREPARATION:

Remove blower motor (See page AC–61).

CHECK:

Connect positive (+) lead connected to terminal 2 of blower motor connector, negative (–) lead to terminal 1.

OK:

Blower motor operates smoothly.

NG → **Replace blower motor.**

OK

2	**Check harness and connector between battery and blower motor, blower motor and body ground. (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Proceed to next circuit inspection shown on matrix chart (See page DI–535).

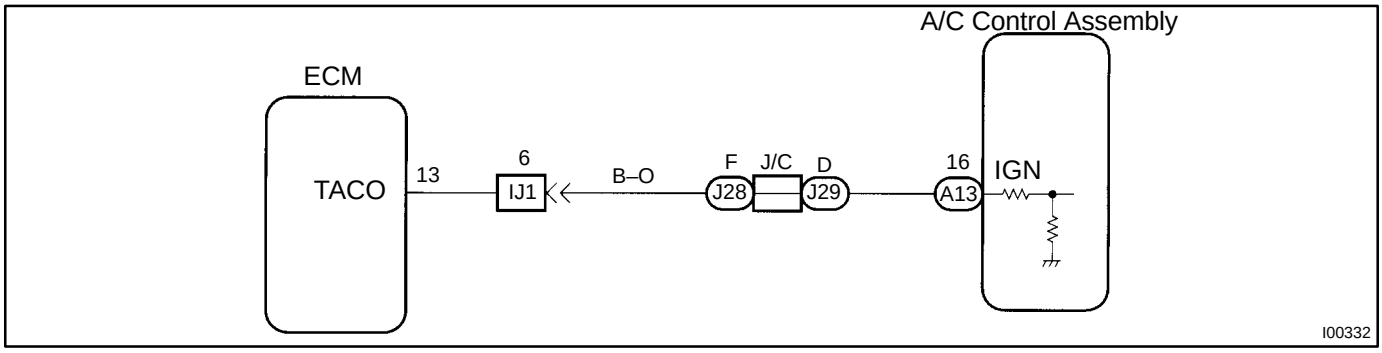
DI0DP–01

Igniter Circuit

CIRCUIT DESCRIPTION

This A/C control assembly monitors the engine speed through signals sent from the igniter. The A/C control assembly uses these signals and compressor speed signals to detect the compressor lock condition.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of tachometer.**

CHECK:

Check that the tachometer operates normally.

NG → **Proceed to combination meter troubleshooting (See page BE–58).**

OK

2	**Check harness and connector between A/C control assembly and igniter (See page IN–27).**

NG → **Repair or replace harness or connector.**

OK

Proceed to next circuit inspection shown on matrix chart (See page DI–535).

EMISSION CONTROL SYSTEM

EC01H–05

PURPOSE

The emission control systems are installed to reduce the amount of CO, HC and NOx exhausted from the engine ((3) and (4)), to prevent the atmospheric release of blow–by gas–containing HC (1) and evaporated fuel containing HC being released from the fuel tank (2).
The function of each system is shown in these table.

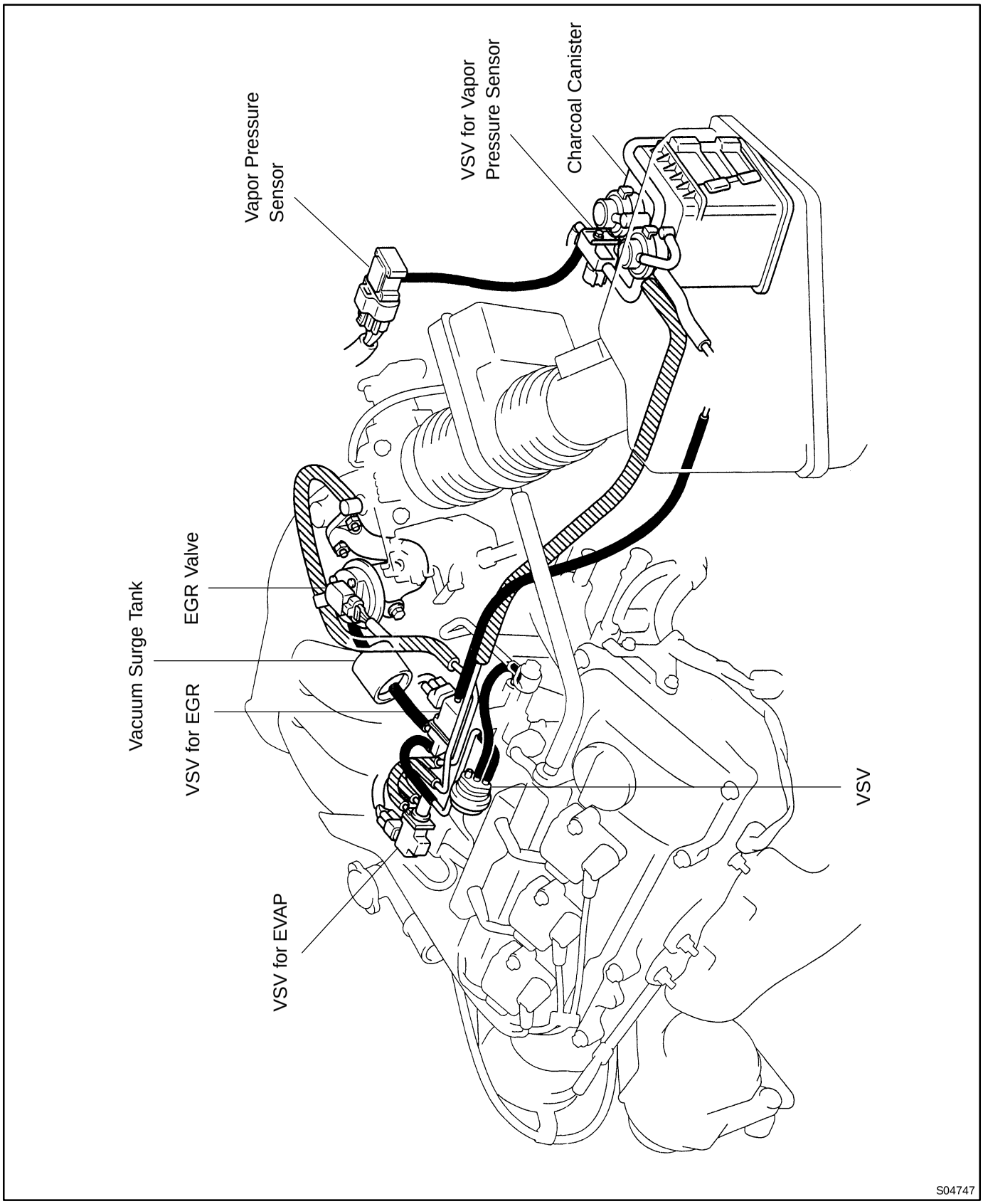
System	Abbreviation	Function
(1) Positive Crankcase Ventilation	PCV	Reduces HC
(2) Evaporative Emission Control	EVAP	Reduces evaporated HC
(3) Exhaust Gas Recirculation	EGR	Reduces NOx
(4) Three–Way Catalytic Converter	TWC	Reduces HC, CO and NOx
(5) Sequential Multiport Fuel injection*	SFI	Injects a precisely timed, optimum amount of fuel for reduced exhaust emissions

Remark: * For inspection and repair of the SFI system, refer to the SF section of this manual.

PARTS LAYOUT AND SCHEMATIC DRAWING

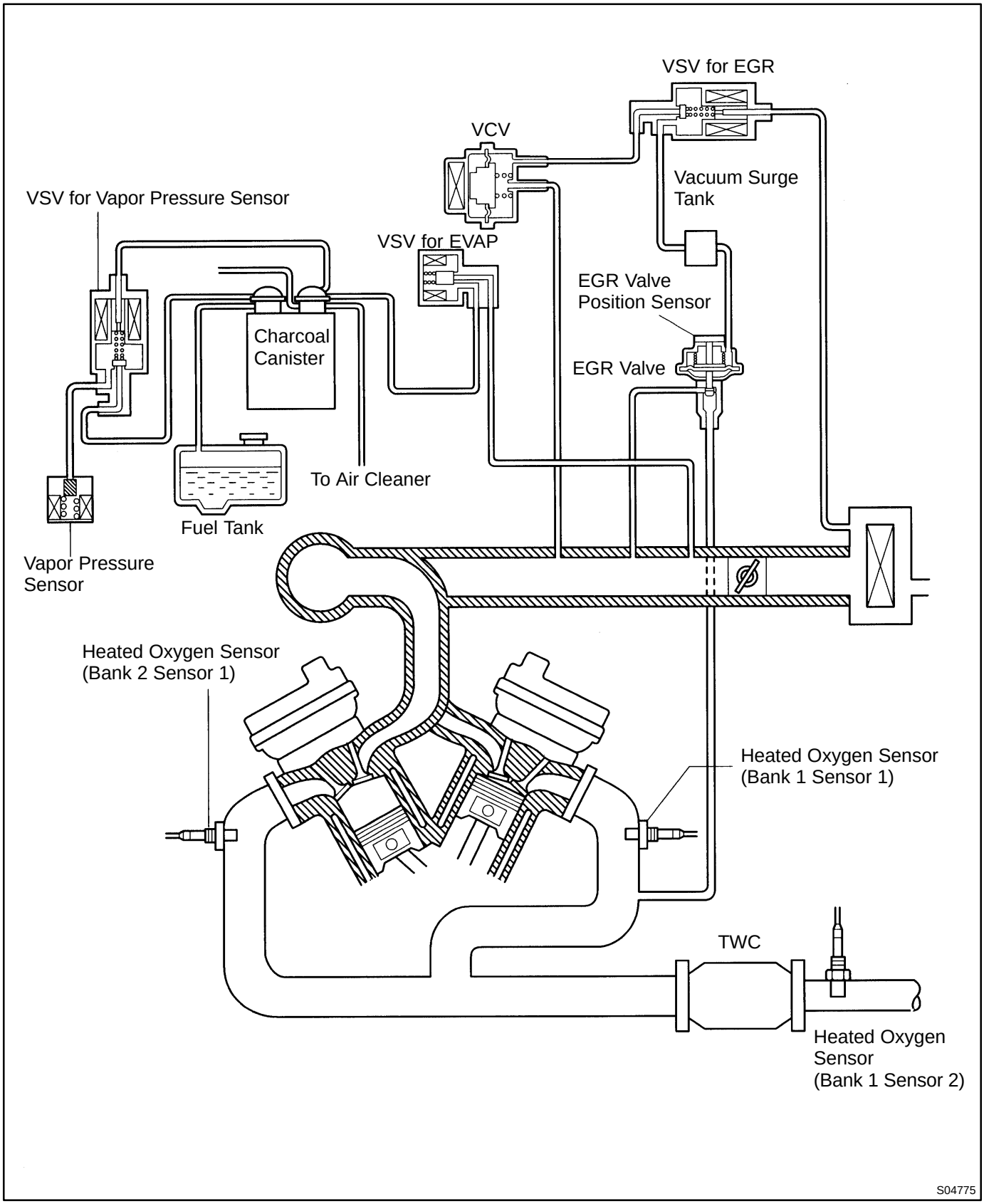
LOCATION

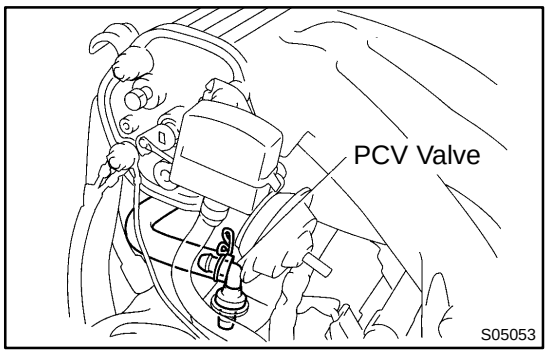
EC01I–01



EC01J–05

DRAWING





POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

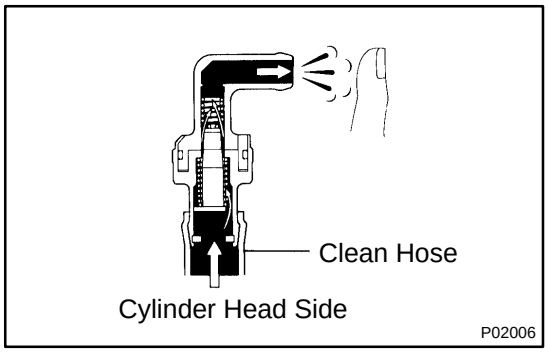
EC01K–01

INSPECTION

1. REMOVE PCV VALVE

(a) Disconnect the PCV hose from the PCV valve.

(b) Remove the PCV valve.



2. INSTALL CLEAN HOSE TO PCV VALVE

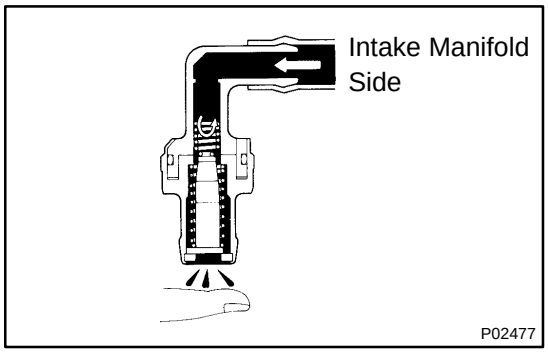
3. INSPECT PCV VALVE OPERATION

(a) Blow air into the cylinder head side, and check that air passes through easily.

CAUTION:

Do not suck air through the valve.

Petroleum substances inside the valve are harmful.

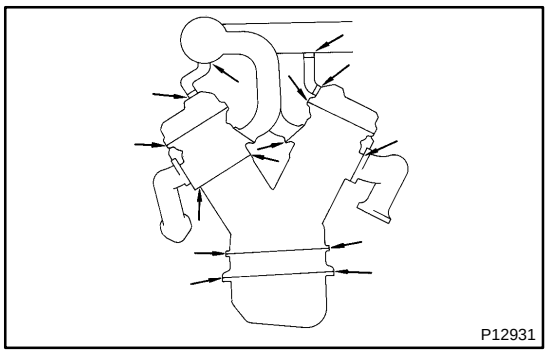


(b) Blow air into the intake manifold side, and check that air passes through with difficulty.

If operation is not as specified, replace the PCV valve.

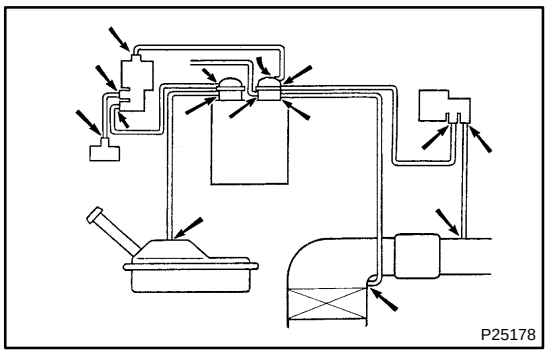
4. REMOVE CLEAN HOSE FROM PCV VALVE

5. REINSTALL PCV VALVE



6. VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

Check for cracks, leaks or damage.



EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM

EC01L–01

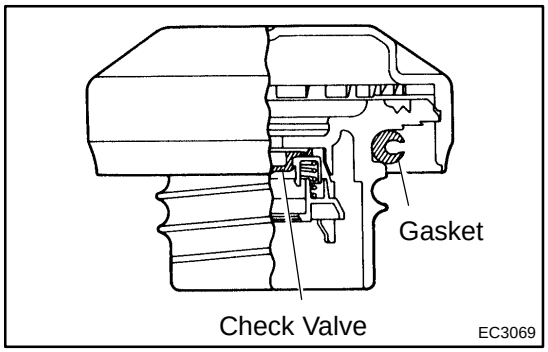
INSPECTION

1. VISUALLY INSPECT LINES AND CONNECTIONS

Look for loose connections, sharp bends or damage.

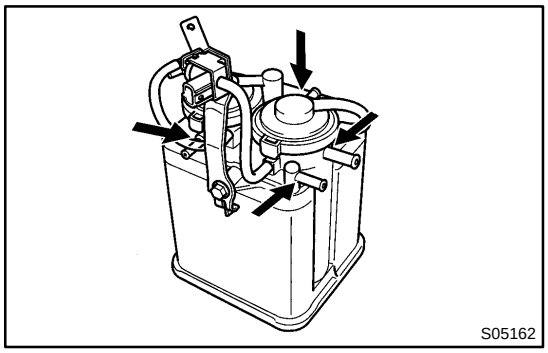
2. VISUALLY INSPECT FUEL TANK

Look for deformation, cracks or fuel leakage.



3. VISUALLY INSPECT FUEL TANK CAP

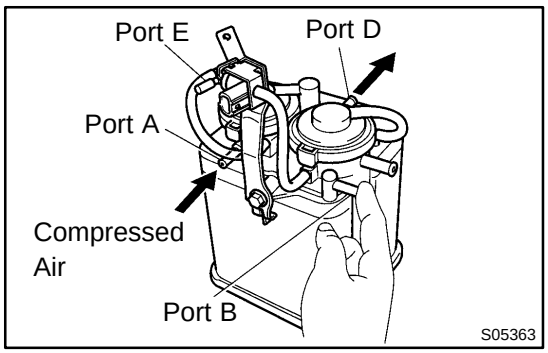
Check if the cap and/or gasket are deformed or damaged.
If necessary, repair or replace the cap.



4. REMOVE CHARCOAL CANISTER

5. VISUALLY INSPECT CHARCOAL CANISTER

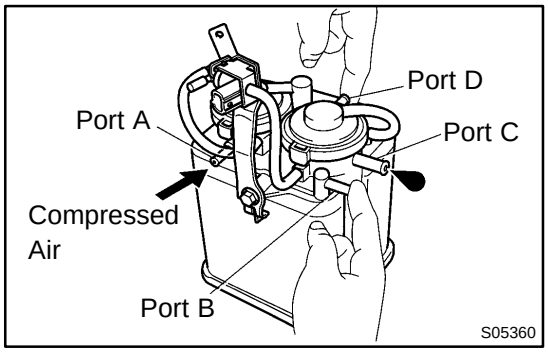
Look for cracks or damage.



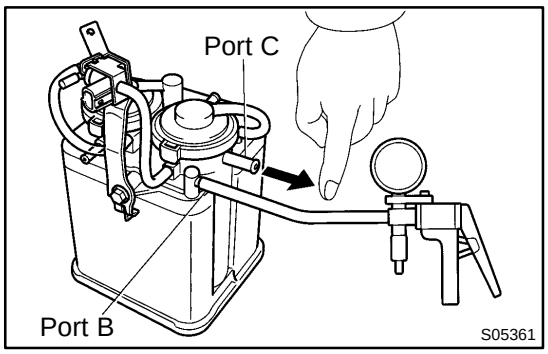
6. CHECK FOR CLOGGED FILTER, AND STUCK CHECK VALVE AND DIAPHRAGM

(a) Install the plug to port E.

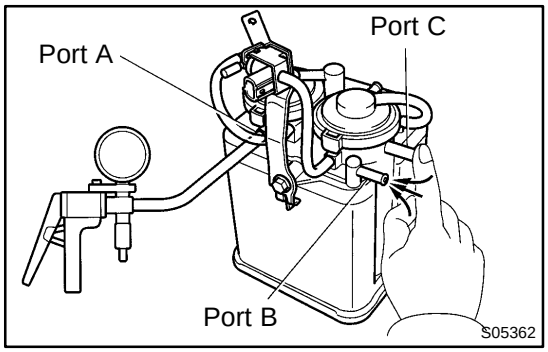
(b) While holding port B closed, blow air (1.76 kPa, 18 gf/cm^2, 0.26 psi) into port A and check that air flows from port D.



(c) While holding port B and port D closed, blow air (1.76 kPa, 18 gf/cm^2, 0.26 psi) into port A and check that air does not flow from port C.



(d) Apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to port B, check that the vacuum does not decrease when port C is closed, and check that the vacuum decreases when port C is released.



(e) While holding port C closed, apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to port A and check that air flows into port B.

If a problem is found, replace the charcoal canister.

(f) Remove the plug.

7. REMOVE VSV FOR EVAP

8. INSPECT VSV FOR EVAP
(See page SF–52)

9. REINSTALL VSV FOR EVAP

10. REMOVE VSV FOR VAPOR PRESSURE SENSOR

11. INSPECT VSV FOR VAPOR PRESSURE SENSOR
(See page SF–56)

12. REINSTALL VSV FOR VAPOR PRESSURE SENSOR

13. INSPECT VAPOR PRESSURE SENSOR
(See page SF–58)

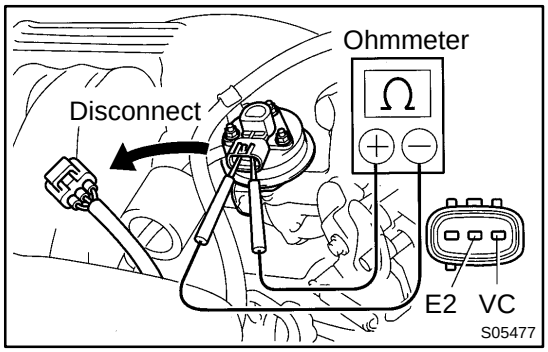
14. REINSTALL CHARCOAL CANISTER

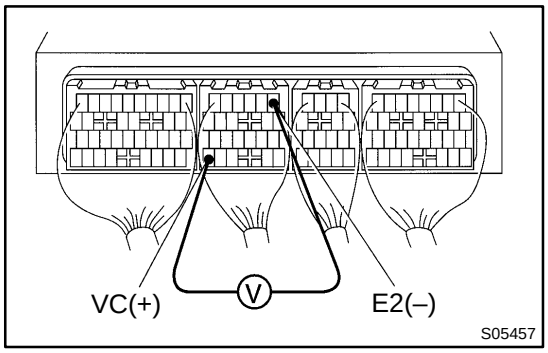
EXHAUST GAS RECIRCULATION (EGR) SYSTEM

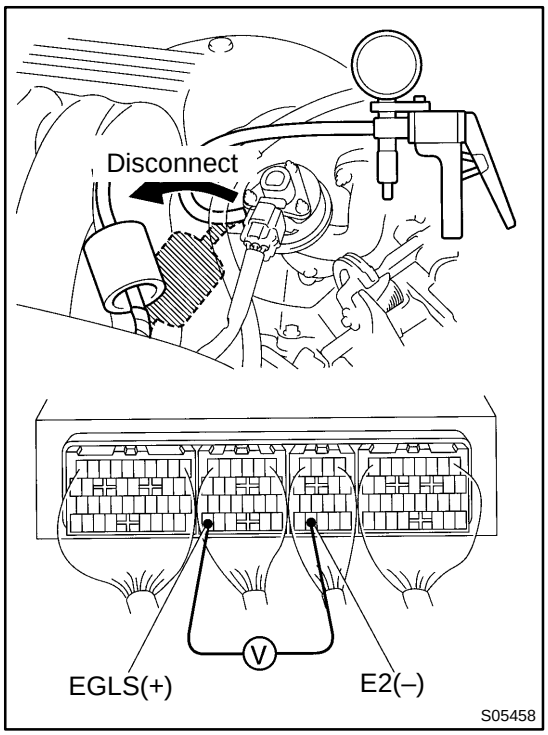
EC01M–02

INSPECTION

1. INSPECT EGR SYSTEM
(See page DI–118)







2. INSPECT EGR VALVE POSITION SENSOR

(a) Inspect the resistance of the EGR valve position sensor.
  (1) Disconnect the EGR valve position sensor connector.
  (2) Using an ohmmeter, measure the resistance between the terminals VC and E2.

Resistance: 1.5 – 4.3 kΩ

If the resistance is not as specified, replace the EGR valve position sensor.

  (3) Reconnect the EGR valve position sensor connector.

(b) Inspect the power output voltage of the EGR valve position sensor.
  (1) Disconnect the vacuum hose from the EGR valve.
  (2) Turn the ignition switch ON.
  (3) Connect a voltmeter to terminals VC and E2 of the ECU, and measure the power source voltage.

Voltage: 4.5 – 5.5 V

  (4) Connect a voltmeter to terminals EGLS and E2 of the ECU, and measure the power outlet voltage under the following conditions:
    • Using the MITYVAC (Hand–Held Vacuum Pump), apply a vacuum (17.3 kPa, 130 mmHg, 5.1 in.Hg) to the EGR valve.

Voltage: 3.2 – 5.1 V

    • Release the vacuum from the EGR valve.

Voltage: 0.4 – 1.6 V

If the voltage is not as specified, replace the EGR valve position sensor.

  (5) Reconnect the vacuum hose to the EGR valve.

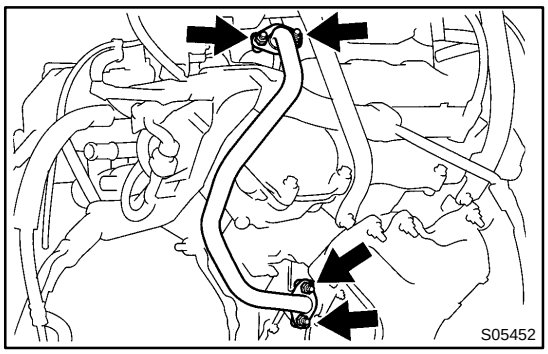
3. REMOVE EGR POSITION SENSOR

Remove the 3 nuts and EGR valve position sensor from the EGR valve.

Torque: 2 N·m (20 kgf·cm, 17 in.·lbf)

4. REINSTALL EGR POSITION SENSOR

Installation is the reverse order of removal.



5. REMOVE EGR VALVE

(a) Remove the EGR pipe.

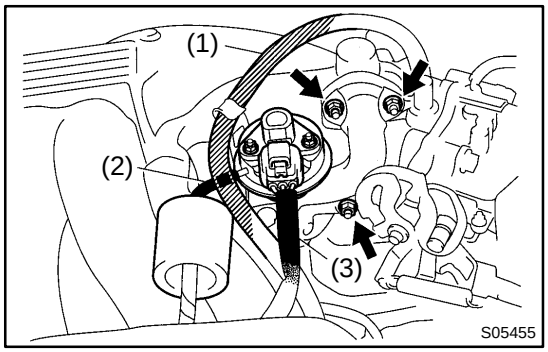
- Remove the 4 nuts, EGR pipe and 2 gaskets.

HINT:

Install 2 new gaskets.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

(b) Disconnect the EGR gas temperature sensor connector and clamp.



(c) Remove the EGR valve.

(1) Disconnect these hoses and connector:

- EVAP hose from EGR valve hook
- Vacuum hose from EGR valve
- EGR valve position sensor connector

(2) Remove the 3 nuts, EGR valve and gasket.

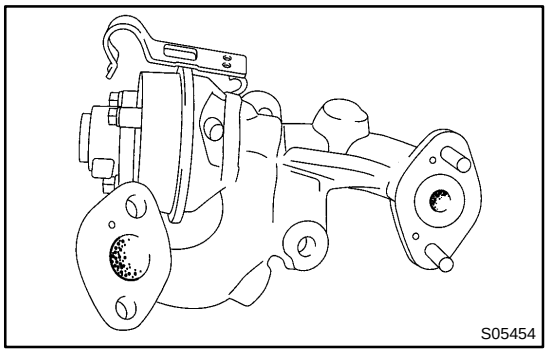
HINT:

Install a new gasket.

Torque:12 N·m (120 kgf·cm, 9 ft·lbf)

(d) Remove the EGR gas temperature sensor.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)



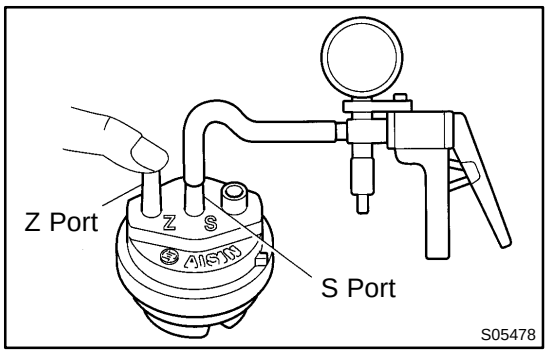
6. INSPECT EGR VALVE

Check for sticking and heavy carbon deposits.

If a problem is found, replace the EGR valve.

7. REINSTALL EGR VALVE

Installation is the reverse order of removal.

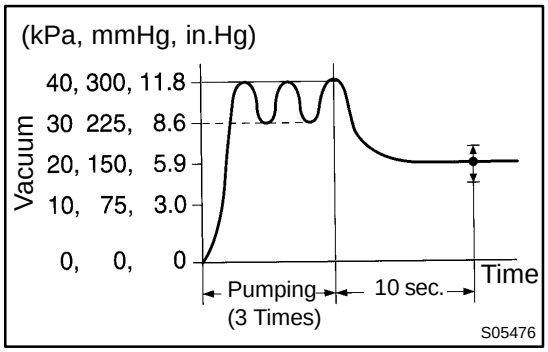


8. REMOVE VCV

9. INSPECT VCV

(a) Connect the MITYVAC (Hand–Held Vacuum Pump) to port S of the VCV.

(b) Plug port Z completely with fingers.



(c) Perform pumping 3 times and apply vacuum as shown in the illustration.

(d) Stop the performing pumping and check the indicated value of the MITYVAC after about 10 seconds.

Standard value:

15 – 24 kPa (112 – 180 mmHg, 4.4 – 7.1 in.Hg)

If the indicated value is not as specified, replace the VCV.

10. REINSTALL VCV

11. INSPECT VSV FOR EGR

(See page SF–50)

THREE–WAY CATALYTIC CONVERTER (TWC) SYSTEM

EC01P–01

INSPECTION

1. CHECK TWC FOR DENTS OR DAMAGE

If any part of the protector is damaged or dented to the extent that it contacts the three–way catalytic converter, repair or replace it.

2. CHECK EXHAUST PIPE CONNECTIONS FOR LOOSENESS OR DAMAGE

3. CHECK EXHAUST PIPE CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE

4. CHECK HEAT INSULATOR FOR DAMAGE

5. CHECK FOR ADEQUATE CLEARANCE BETWEEN CATALYTIC CONVERTER AND HEAT INSULATOR

THREE–WAY CATALYTIC CONVERTER (TWC) SYSTEM

EC01P–01

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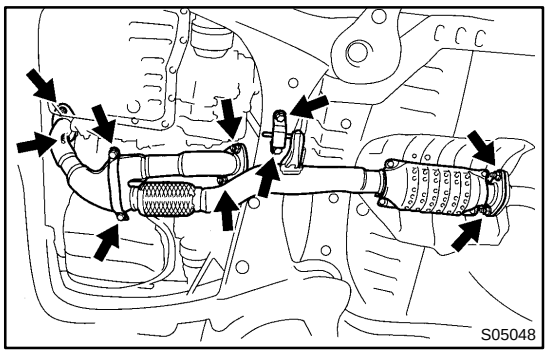
4. CHECK HEAT INSULATOR FOR DAMAGE

5. CHECK FOR ADEQUATE CLEARANCE BETWEEN CATALYTIC CONVERTER AND HEAT INSULATOR

EC01Q–01



REPLACEMENT

1. REMOVE CONVERTER

(a) Jack up the vehicle.

(b) Check that the converter is cool.

(c) Remove the 2 bolts and exhaust pipe stay.
Torque: 33 N·m (330 kgf·cm, 24 ft·lbf)

(d) Remove the 2 bolts, and disconnect the bracket.
Torque: 33 N·m (330 kgf·cm, 24 ft·lbf)

(e) Remove the 2 bolts and 2 nuts holding the front exhaust pipe to the center exhaust pipe.
Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

(f) Remove the 4 nuts holding the front exhaust pipe to the exhaust manifolds.
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)

(g) Remove the front exhaust pipe (converter) and 3 gaskets.

HINT:

At the time of installation, please refer to the following items.
Install 3 new gaskets.

2. INSTALL CONVERTER

Installation is the reverse order of removal.

CO/HC

EM03T–03

INSPECTION

HINT:

This check is used only to determine whether or not the idle CO/HC complies with regulations.

1. INITIAL CONDITIONS

(a) Engine at normal operating temperature

(b) Air cleaner installed

(c) All pipes and hoses of air induction system connected

(d) All accessories switched OFF

(e) All vacuum lines properly connected

HINT:

All vacuum hoses for EGR systems, etc. should be properly connected.

(f) SFI system wiring connectors fully plugged

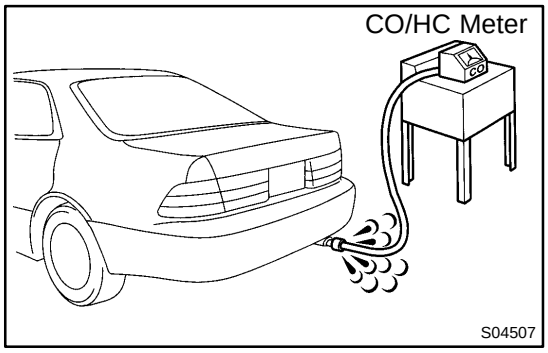
(g) Ignition timing check correctly

(h) Transmission in neutral position

(i) Tachometer and CO/HC meter calibrated by hand

2. START ENGINE

3. RACE ENGINE AT 2,500 RPM FOR APPROX. 180 SECONDS



4. INSERT CO/HC METER TESTING PROBE AT LEAST 40 cm (1.3 ft) INTO TAILPIPE DURING IDLING

5. IMMEDIATELY CHECK CO/HC CONCENTRATION AT IDLE AND/OR 2,500 RPM

HINT:

When doing the 2 mode (idle and 2,500 rpm) test, these measurement order prescribed by the applicable local regulations.

Troubleshooting

If the CO/HC concentration does not comply with regulations, troubleshoot in the order given below.
See the table below for possible causes, and then inspect and correct the applicable causes if necessary.

CO	HC	Problems	Causes
Normal	High	Rough idle	1. Faulty ignitions: ●Incorrect timing ●Fouled, shorted or improperly gapped plugs ●Open or crossed high–tension cords 2. Incorrect valve clearance 3. Leaky EGR valve 4. Leaky intake and exhaust valves 5. Leaky cylinders
Low	High	Rough idle (Fluctuating HC reading)	1. Vacuum leaks: ●PCV hoses ●EGR valve ●Intake manifold ●Air intake chamber ●Throttle body ●IAC valve ●Break booster line 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Plugged PCV valve 3. Faulty SFI systems: ●Faulty pressure regulator ●Defective ECT sensor ●Faulty ECM ●Faulty injectors ●Faulty throttle position sensor ●Faulty MAF meter

COMPRESSION

EM03U–03

INSPECTION

HINT:

If there is lack of power, excessive oil consumption or poor fuel economy, measure the compression pressure.

1. WARM UP AND STOP ENGINE

Allow the engine to warm up to normal operating temperature.

2. REMOVE IGNITION COILS AND HIGH–TENSION CORDS (See page IG–7)

3. REMOVE SPARK PLUGS

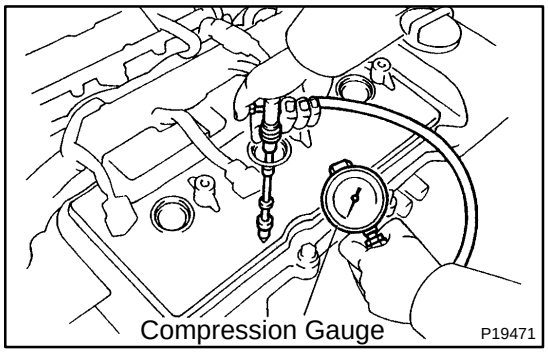
Using a 16 mm plug wrench, remove the 6 spark plugs.

4. CHECK CYLINDER COMPRESSION PRESSURE

(a) Insert a compression gauge into the spark plug hole.

(b) Fully open the throttle.

(c) While cranking the engine, measure the compression pressure.


Compression Gauge P19471

HINT:

Always use a fully charged battery to obtain engine speed of 250 rpm or more.

(d) Repeat steps (a) through (c) for each cylinder.

NOTICE:

This measurement must be done in as short a time as possible.

Compression pressure:
1,500 kPa (15.3 kgf/cm^2, 218 psi)
Minimum pressure:
1,000 kPa (10.2 kgf/cm^2, 145 psi)
Difference between each cylinder:
100 kPa (1.0 kgf/cm^2, 15 psi) or less

(e) If the cylinder compression in 1 or more cylinders is low, pour a small amount of engine oil into the cylinder through the spark plug hole and repeat steps (a) through (c) for cylinders with low compression.

- If adding oil helps the compression, it is likely that the piston rings and/or cylinder bore are worn or damaged.
- If pressure stays low, a valve may be sticking or seating is improper, or there may be leakage past the gasket.

5. REINSTALL SPARK PLUGS

6. INSTALL IGNITION COILS AND HIGH–TENSION CORDS (See page IG–8)

VALVE CLEARANCE

EM03V–04

INSPECTION

HINT:

Inspect and adjust the valve clearance when the engine is cold.

1. REMOVE RH FENDER APRON SEAL

2. DRAIN ENGINE COOLANT

3. REMOVE V–BANK COVER

(a) Using a 5 mm hexagon wrench, remove the 2 nuts.

(b) Disconnect the 2 clips, and remove the cover.

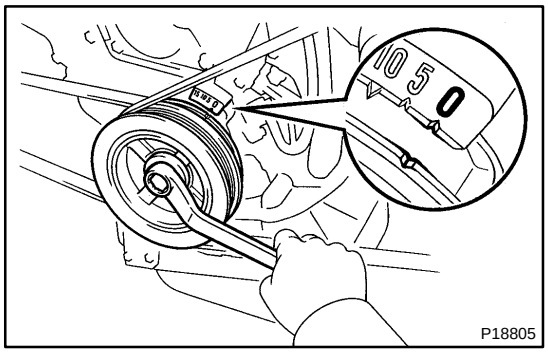
4. REMOVE HIGH–TENSION CODE SET
(See page IG–1)

5. REMOVE AIR INTAKE CHAMBER ASSEMBLY
(See page EM–30)

6. REMOVE IGNITION COILS

7. DISCONNECT RADIATOR HOSE FROM WATER OUTLET

8. REMOVE CYLINDER HEAD COVERS
(See page EM–30)

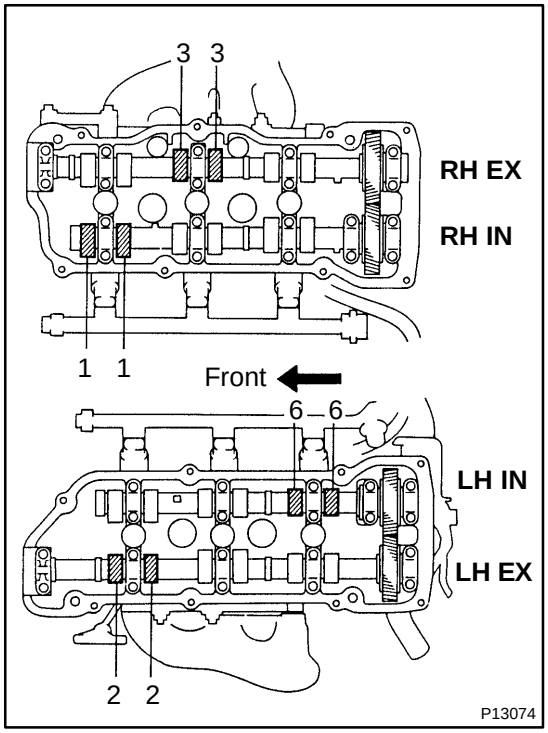


9. SET NO.1 CYLINDER TO TDC/COMPRESSION

(a) Turn the crankshaft pulley, and align its groove with the timing mark ”0” of the No.1 timing belt cover.

(b) Check that the valve lifters on the No.1 (IN and EX) are loose.

If not, turn the crankshaft 1 revolution (360˚) and align the mark as above.

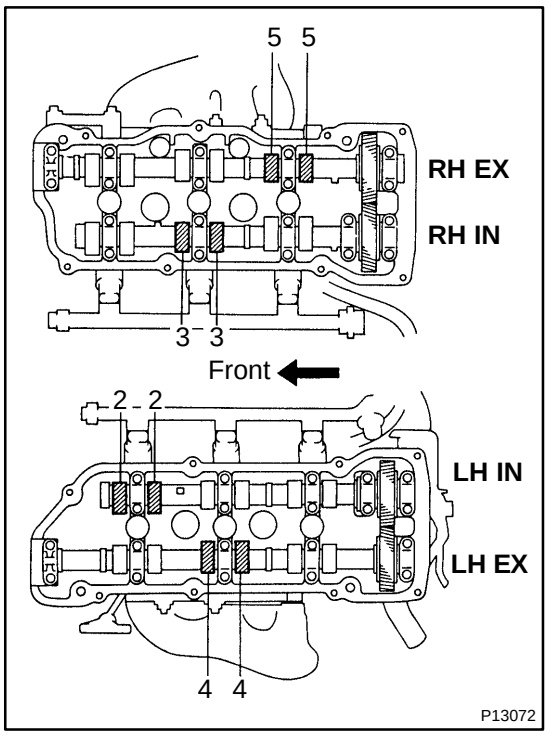


10. INSPECT VALVE CLEARANCE

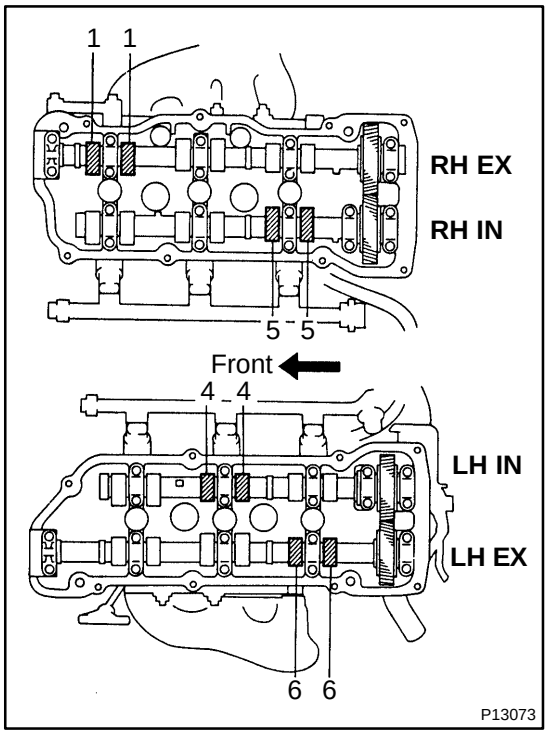
(a) Check only those valves indicated in the illustration.

- Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
- Record out of specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

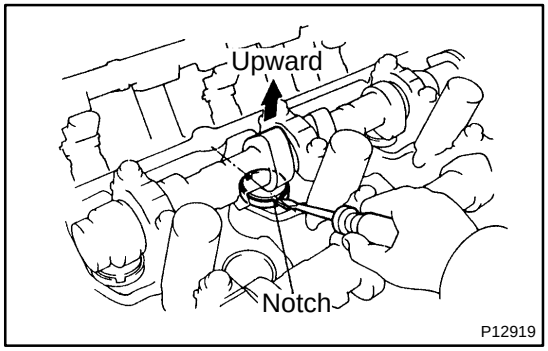
Valve clearance (Cold):
Intake: 0.15 – 0.25 mm (0.006 – 0.010 in.)
Exhaust 0.25 – 0.35 mm (0.010 – 0.014 in.)



(b) Turn the crankshaft 2/3 of a revolution (240˚), and check only the valves indicated in the illustration. Measure the valve clearance. (See procedure step (a))



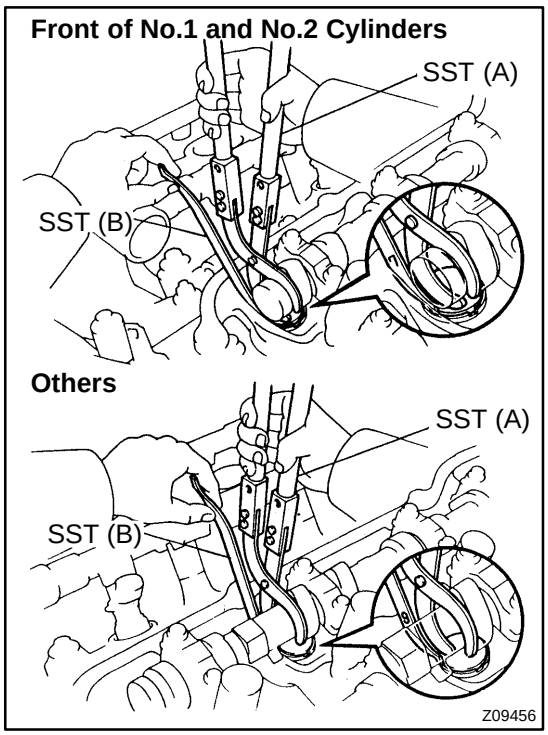
(c) Turn the crankshaft a further 2/3 of a revolution (240˚), and check only the valves indicated in the illustration. Measure the valve clearance.
(See procedure step (a))



11. ADJUST VALVE CLEARANCE

(a) Remove the adjusting shim.

- Turn the camshaft so that the cam lobe for the valve to be adjusted faces up.
- Turn the valve lifter with a screwdriver so that the notches are perpendicular to the camshaft.

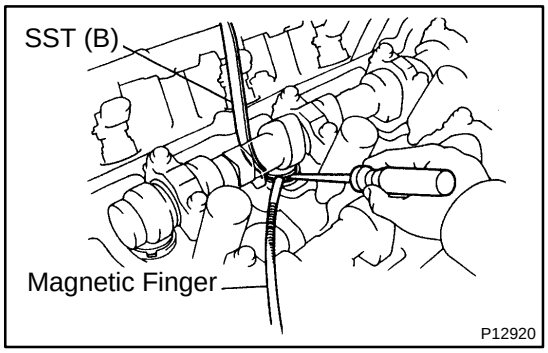


- Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter. Remove SST (A).

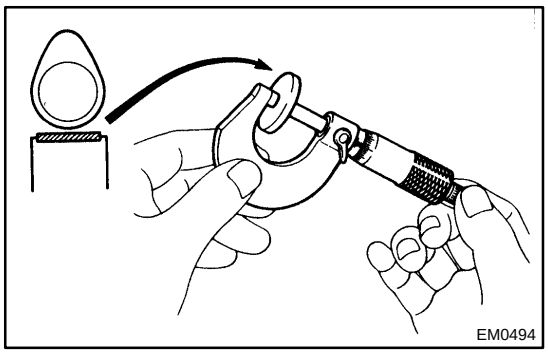
SST 09248–55040 (09248–05410, 09248–05420)

HINT:

- Apply SST (B) at a slight angle on the side marked with ”9” or ”7”, at the position shown in the illustration.
- When SST (B) is inserted too deeply, it will get pinched by the shim. To prevent it from being stuck, insert it gently from the intake side, at a slight angle.



- Using a small screwdriver and magnetic finger, remove the adjusting shim.



(b) Determine the replacement adjusting shim size according to these Formula or Charts:

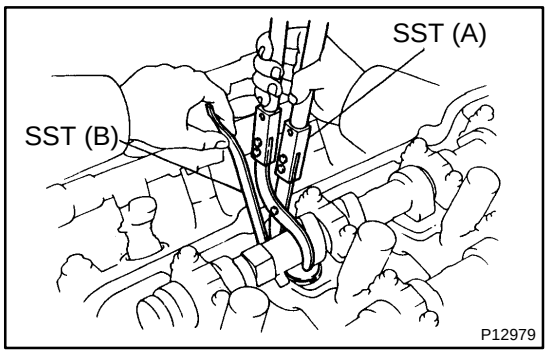
- Using a micrometer, measure the thickness of the removed shim.
- Calculate the thickness of a new shim so the valve clearance comes within the specified value.

T ..... Thickness of used shim
A ..... Measured valve clearance
N ..... Thickness of new shim
Intake: N = T + (A – 0.20 mm (0.008 in.))
Exhaust: N = T + (A – 0.30 mm (0.012 in.))

- Select a new shim with a thickness as close as possible to the calculated values.

HINT:

Shims are available in 17 sizes in increments of 0.050 mm (0.0020 in.), from 2.500 mm (0.0984 in.) to 3.300 mm (0.1299 in.).



(c) Install a new adjusting shim.
- Place a new adjusting shim on the valve lifter, with imprinted numbers facing down.
- Press down the valve lifter with SST (A), and remove SST (B).

SST 09248–55040 (09248–05410, 09248–05420)

(d) Recheck the valve clearance.

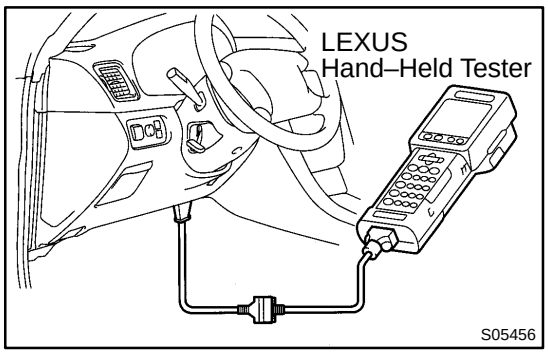
12. REINSTALL CYLINDER HEAD COVERS
(See page EM–52)
13. CONNECT RADIATOR HOSE TO WATER OUTLET
14. REINSTALL IGNITION COILS
15. REINSTALL AIR INTAKE CHAMBER ASSEMBLY
(See page EM–52)
16. INSTALL HIGH–TENSION CORD SET
(See page IG–1)
17. INSTALL V–BANK COVER
18. REFILL WITH ENGINE COOLANT
19. START ENGINE AND CHECK FOR LEAKS
20. REINSTALL RH FENDER APRON SEAL

Adjusting Shim Selection Chart (Intake)

| Measured clearance mm (in.) \ Installed shim thickness mm (in.) | 2.500 (0.0984) | 2.520 (0.0992) | 2.540 (0.1000) | 2.550 (0.1004) | 2.560 (0.1008) | 2.580 (0.1016) | 2.600 (0.1024) | 2.620 (0.1031) | 2.640 (0.1039) | 2.650 (0.1043) | 2.660 (0.1047) | 2.670 (0.1051) | 2.680 (0.1055) | 2.690 (0.1059) | 2.700 (0.1063) | 2.710 (0.1067) | 2.720 (0.1071) | 2.730 (0.1075) | 2.740 (0.1079) | 2.750 (0.1083) | 2.760 (0.1087) | 2.770 (0.1091) | 2.780 (0.1094) | 2.790 (0.1098) | 2.800 (0.1102) | 2.810 (0.1106) | 2.820 (0.1110) | 2.830 (0.1114) | 2.840 (0.1118) | 2.850 (0.1122) | 2.860 (0.1126) | 2.870 (0.1130) | 2.880 (0.1134) | 2.890 (0.1138) | 2.900 (0.1142) | 2.910 (0.1146) | 2.920 (0.1150) | 2.930 (0.1154) | 2.940 (0.1157) | 2.950 (0.1161) | 2.960 (0.1165) | 2.970 (0.1169) | 2.980 (0.1173) | 2.990 (0.1177) | 3.000 (0.1181) | 3.010 (0.1185) | 3.020 (0.1189) | 3.030 (0.1193) | 3.040 (0.1197) | 3.050 (0.1201) | 3.060 (0.1205) | 3.080 (0.1213) | 3.100 (0.1220) | 3.120 (0.1228) | 3.140 (0.1236) | 3.150 (0.1240) | 3.160 (0.1244) | 3.180 (0.1252) | 3.200 (0.1260) | 3.220 (0.1268) | 3.240 (0.1276) | 3.250 (0.1280) | 3.260 (0.1283) | 3.280 (0.1291) | 3.300 (0.1299) |
|---|---|---

Adjusting Shim Selection Chart (Exhaust)

| Measured clearance mm (in.) \ Installed shim thickness mm (in.) | 2.500 (0.0984) | 2.520 (0.0992) | 2.540 (0.1000) | 2.550 (0.1004) | 2.560 (0.1008) | 2.580 (0.1016) | 2.600 (0.1024) | 2.620 (0.1031) | 2.640 (0.1039) | 2.650 (0.1043) | 2.660 (0.1047) | 2.670 (0.1051) | 2.680 (0.1055) | 2.690 (0.1059) | 2.700 (0.1063) | 2.710 (0.1067) | 2.720 (0.1071) | 2.730 (0.1075) | 2.740 (0.1079) | 2.750 (0.1083) | 2.760 (0.1087) | 2.770 (0.1091) | 2.780 (0.1094) | 2.790 (0.1098) | 2.800 (0.1102) | 2.810 (0.1106) | 2.820 (0.1110) | 2.830 (0.1114) | 2.840 (0.1118) | 2.850 (0.1122) | 2.860 (0.1126) | 2.870 (0.1130) | 2.880 (0.1134) | 2.890 (0.1138) | 2.900 (0.1142) | 2.910 (0.1146) | 2.920 (0.1150) | 2.930 (0.1154) | 2.940 (0.1157) | 2.950 (0.1161) | 2.960 (0.1165) | 2.970 (0.1169) | 2.980 (0.1173) | 2.990 (0.1177) | 3.000 (0.1181) | 3.010 (0.1185) | 3.020 (0.1189) | 3.030 (0.1193) | 3.040 (0.1197) | 3.050 (0.1201) | 3.060 (0.1205) | 3.080 (0.1213) | 3.100 (0.1220) | 3.120 (0.1228) | 3.140 (0.1236) | 3.150 (0.1240) | 3.160 (0.1244) | 3.180 (0.1252) | 3.200 (0.1260) | 3.220 (0.1268) | 3.240 (0.1276) | 3.250 (0.1280) | 3.260 (0.1283) | 3.280 (0.1291) | 3.300 (0.1299) |
|---|---|---



IGNITION TIMING

EM03W–02

INSPECTION

1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

2. CONNECT LEXUS HAND–HELD TESTER OR OBDII SCAN TOOL

(a) Connect the LEXUS hand–held tester or OBDII scan tool to the DLC3.

(b) Please refer to the LEXUS hand–held tester or OBDII scan tool operator's manual for further details.

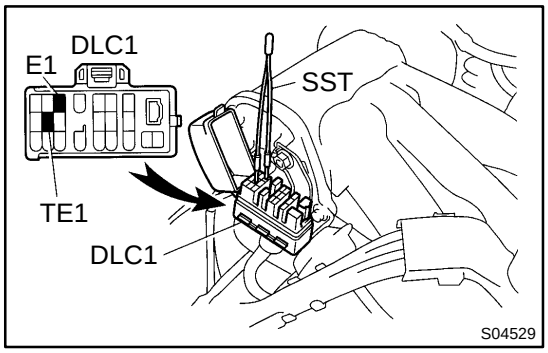
3. CONNECT TIMING LIGHT TO ENGINE

Connect the tester probe of a timing light to the No.1 high–tension cord for No.4 cylinder.

4. CHECK IDLE SPEED

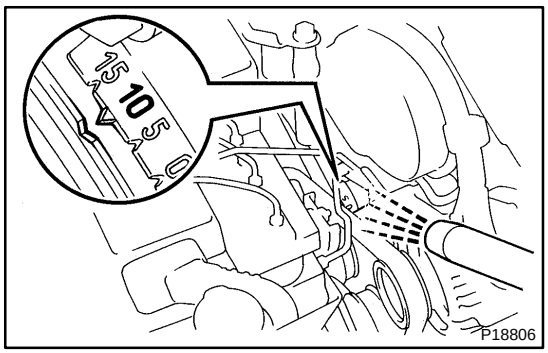
(a) Race the engine speed at 2,500 rpm for approx. 90 seconds.

(b) Check the idle speed.
Idle speed: 700 ± 50 rpm



5. INSPECT IGNITION TIMING

(a) Using SST, connect terminals TE1 and E1 of the DLC1.
SST 09843–18020



(b) Using a timing light, check the ignition timing.
Ignition timing:
8 – 12˚ BTDC @ idle
(Transmission in neutral position)

(c) Remove the SST from the DLC1.
SST 09843–18020

6. FURTHER CHECK IGNITION TIMING
Ignition timing:
7 – 24˚ BTDC @ idle
(Transmission in neutral position)

HINT:

The timing mark moves in a range between 7˚ and 24˚.

7. DISCONNECT TIMING LIGHT FROM ENGINE

8. DISCONNECT LEXUS HAND–HELD TESTER OR OBDII SCAN TOOL

IDLE SPEED

EM03X–03

INSPECTION

1. INITIAL CONDITIONS

(a) Engine at normal operating temperature
(b) Air cleaner installed
(c) All pipes and hoses of air induction system connected
(d) All accessories switched OFF
(e) All vacuum lines properly connected

HINT:

All vacuum hoses for EGR system, etc. should be properly connected.

(f) SFI system wiring connectors fully plugged
(g) Ignition timing check correctly
(h) Transmission in neutral position

2. CONNECT LEXUS HAND–HELD TESTER OR OBDII SCAN TOOL (See page EM–10)

3. INSPECT IDLE SPEED

(a) Race the engine speed at 2,500 rpm for approx. 90 seconds.
(b) Check the idle speed.

Idle speed: 700 ± 50 rpm

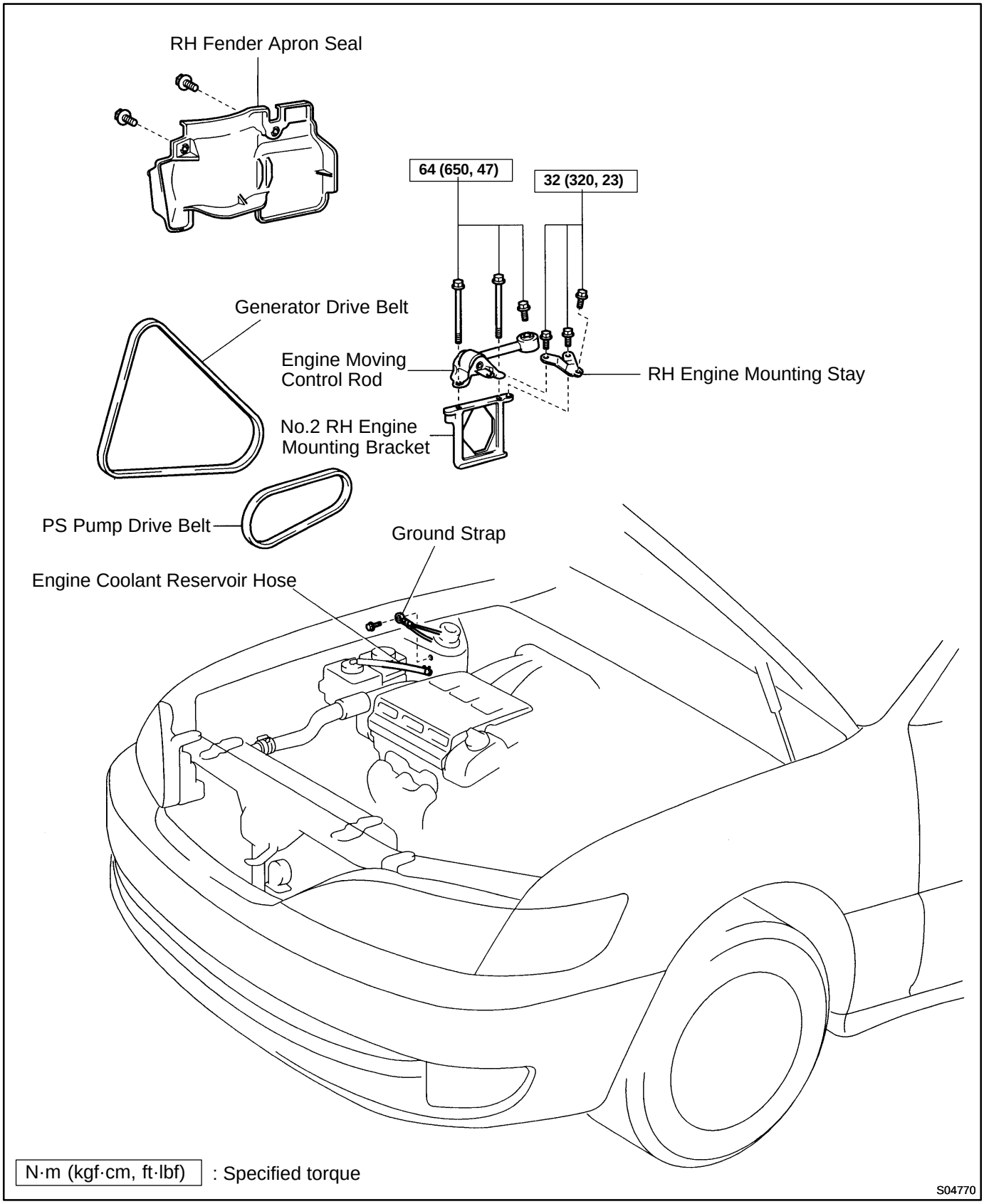
If the idle speed is not as specified, check the IAC valve and air intake system.

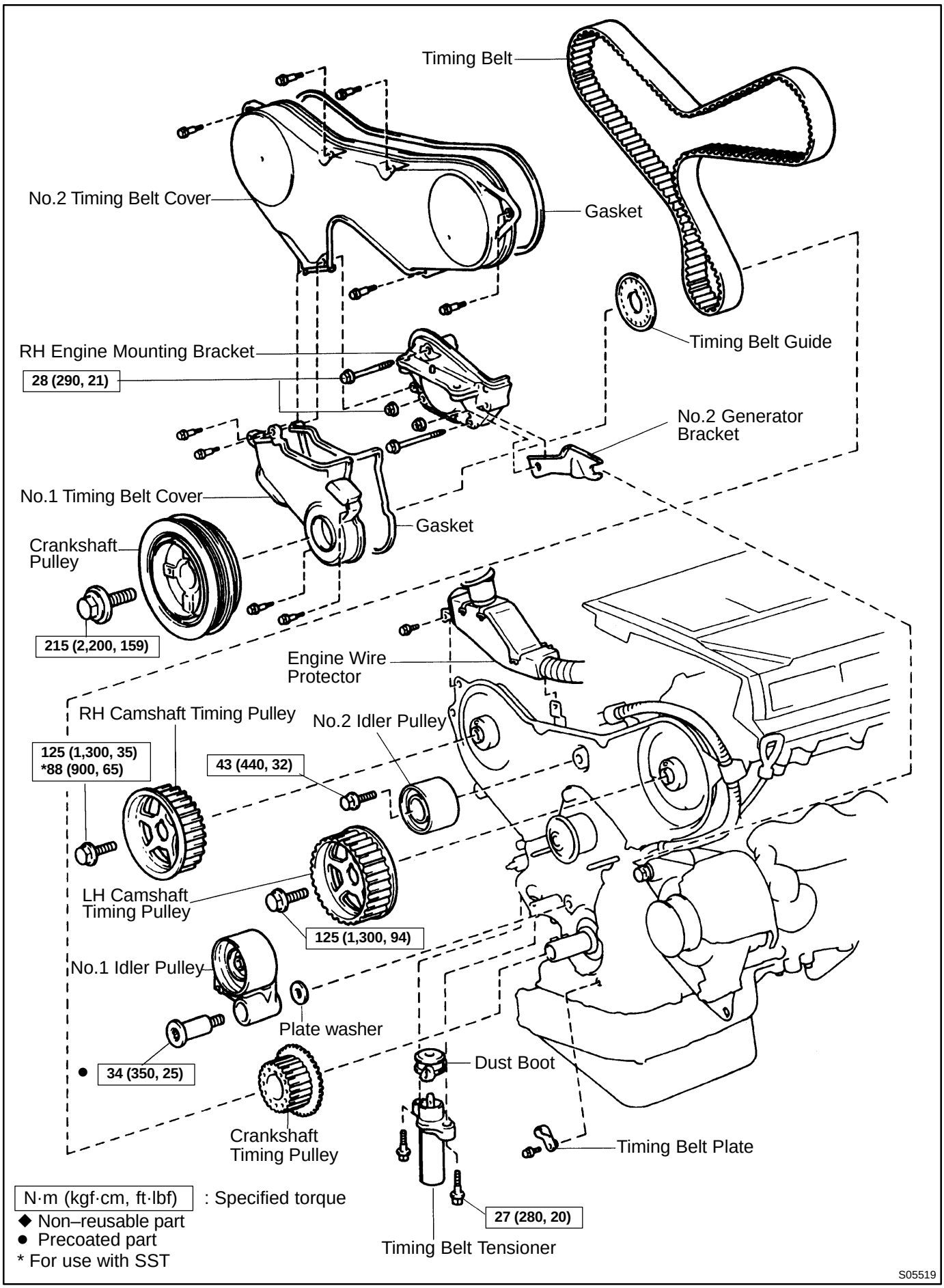
4. DISCONNECT LEXUS HAND–HELD TESTER OR OBDII SCAN TOOL

TIMING BELT

COMPONENTS

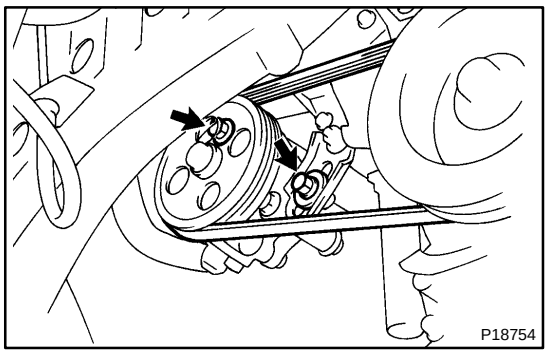
EM03Y–04




Timing Belt
No.2 Timing Belt Cover
Gasket
Timing Belt Guide
RH Engine Mounting Bracket
28 (290, 21)
No.2 Generator Bracket
No.1 Timing Belt Cover
Gasket
Crankshaft Pulley
215 (2,200, 159)
Engine Wire Protector
RH Camshaft Timing Pulley
No.2 Idler Pulley
125 (1,300, 35)
*88 (900, 65)
43 (440, 32)
LH Camshaft Timing Pulley
125 (1,300, 94)
No.1 Idler Pulley
Plate washer
● 34 (350, 25)
Dust Boot
Crankshaft Timing Pulley
Timing Belt Plate
27 (280, 20)
Timing Belt Tensioner
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
● Precoated part
* For use with SST
S05519

EM03Z–04

REMOVAL



1. REMOVE RH FRONT WHEEL

2. REMOVE RH FENDER APRON SEAL

3. REMOVE GENERATOR DRIVE BELT (See page CH–6)

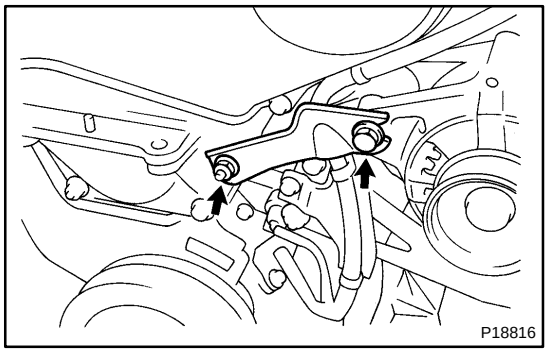
4. REMOVE PS PUMP DRIVE BELT

Loosen the 2 bolts, and remove the drive belt.

5. DISCONNECT ENGINE COOLANT RESERVOIR HOSE FROM WATER OUTLET

6. DISCONNECT GROUND STRAP CONNECTORS

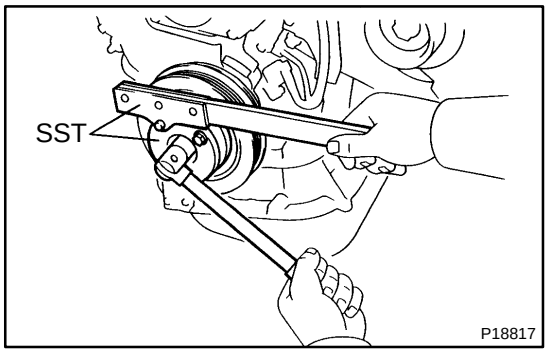
7. REMOVE RH ENGINE MOUNTING STAY, ENGINE MOVING CONTROL ROD AND NO.2 RH ENGINE MOUNTING BRACKET (See page EM–66)



8. REMOVE NO.2 GENERATOR BRACKET

(a) Loosen the generator pivot bolt.

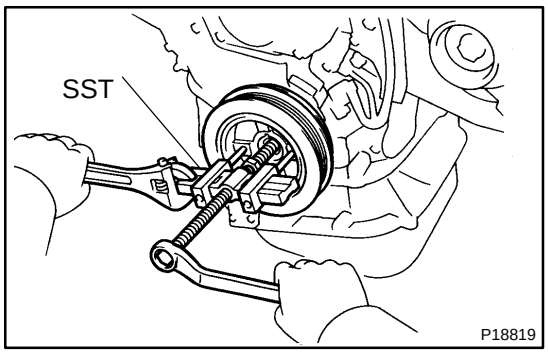
(b) Remove the nut and bracket.



9. REMOVE CRANKSHAFT PULLEY

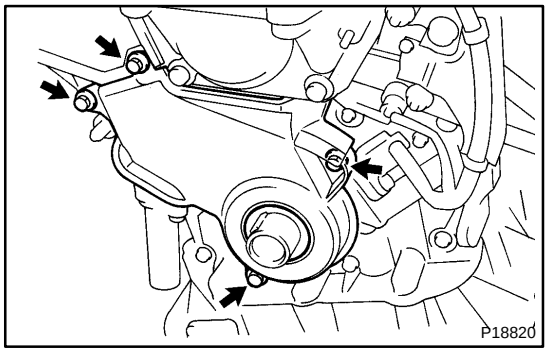
(a) Using SST, remove the pulley bolt.

SST 09213–54015 (91651–60855), 09330–00021



(b) Using SST, remove the pulley.

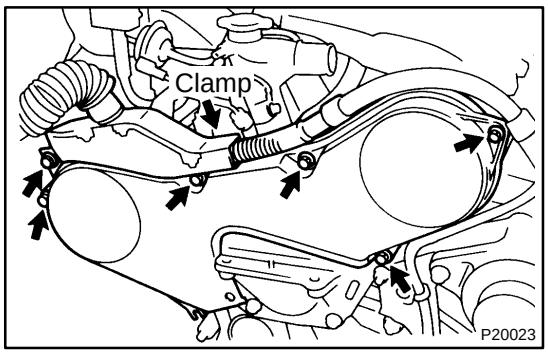
SST 09950–50010 (09951–05010, 09952–05010, 09953–05010, 09953–05020, 09954–05020)



10. REMOVE NO.1 TIMING BELT COVER

Remove the 4 bolts and timing belt cover.

11. REMOVE TIMING BELT GUIDE

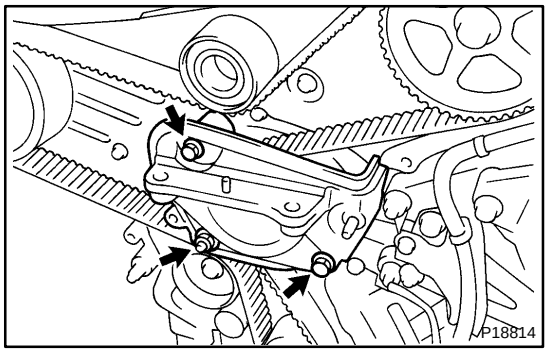


12. REMOVE NO.2 TIMING BELT COVER

(a) Remove the bolt, and disconnect the engine wire protector from the No.3 timing belt cover.

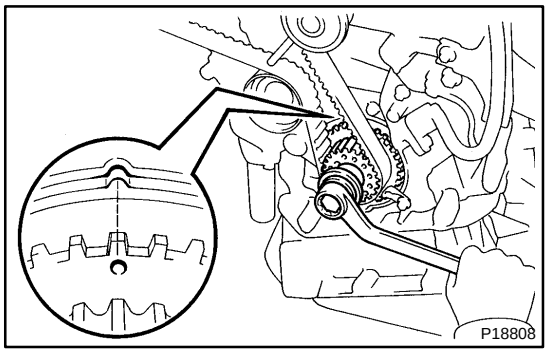
(b) Disconnect the engine wire protector clamp from the No.3 timing belt cover.

(c) Remove the 5 bolts and timing belt cover.



13. REMOVE RH ENGINE MOUNTING BRACKET

Remove the 2 bolts, nut and mounting bracket.



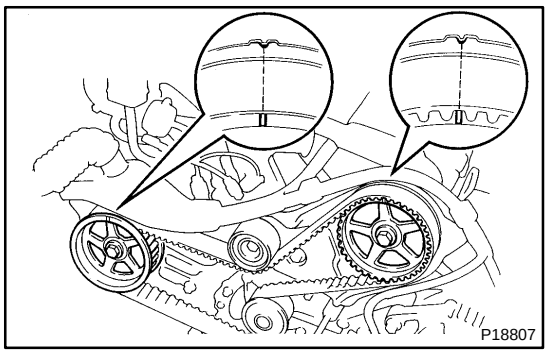
14. SET NO.1 CYLINDER TO TDC/COMPRESSION

(a) Temporarily install the crankshaft pulley bolt to the crankshaft.

(b) Turn the crankshaft, and align the timing marks of the crankshaft timing pulley and oil pump body.

NOTICE:

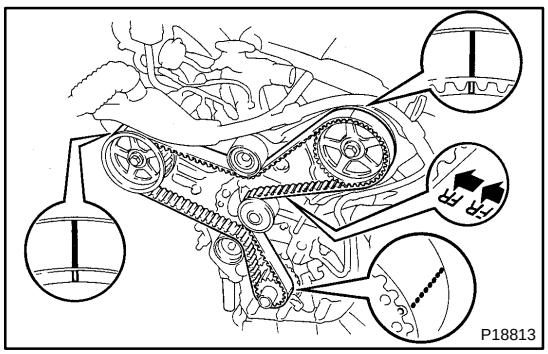
Always turn the crankshaft clockwise.



(c) Check that timing marks of the camshaft timing pulleys and No.3 timing belt cover are aligned.

If not, turn the crankshaft 1 revolution (360˚).

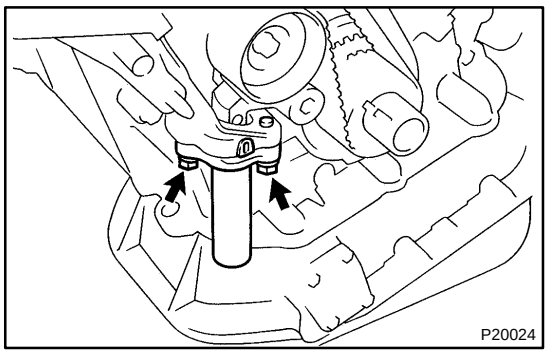
(d) Remove the crankshaft pulley bolt.



15. IF REUSING TIMING BELT, CHECK INSTALLATION MARKS ON TIMING BELT

Check that there are 3 installation marks and front mark on the timing belt.

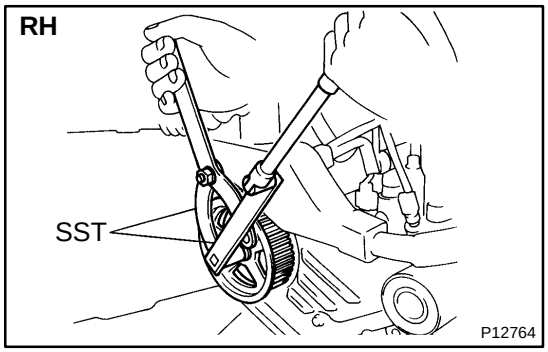
If the installation and front marks have disappeared, before removing the timing belt, place 3 new installation marks on the timing belt to match the timing marks of the timing pulleys, and place a new front mark on the timing belt.



16. REMOVE TIMING BELT TENSIONER

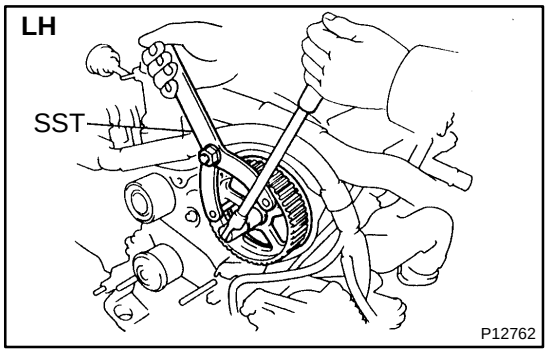
Alternately loosen the 2 bolts, and remove them, the tensioner and dust boot.

17. REMOVE TIMING BELT



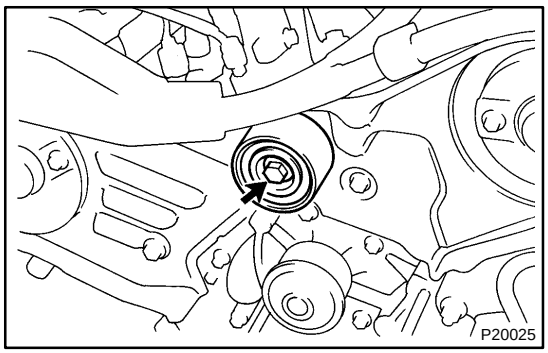
18. REMOVE CAMSHAFT TIMING PULLEYS

(a) Using SST, remove the bolt and RH timing pulley.
SST 09249–63010, 09960–10010 (09962–01000, 09963–01000)



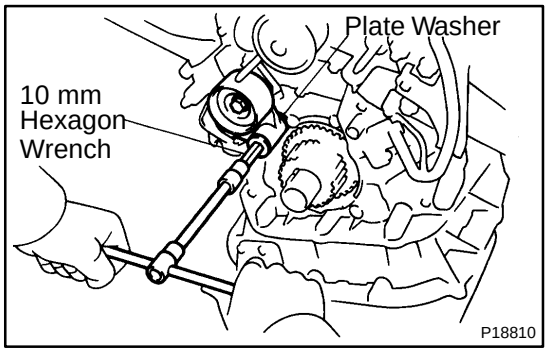
(b) Using SST, remove the LH timing pulley.
SST 09960–10010 (09962–01000, 09963–01000)

HINT:
Arrange the camshaft timing pulleys (RH and LH sides).



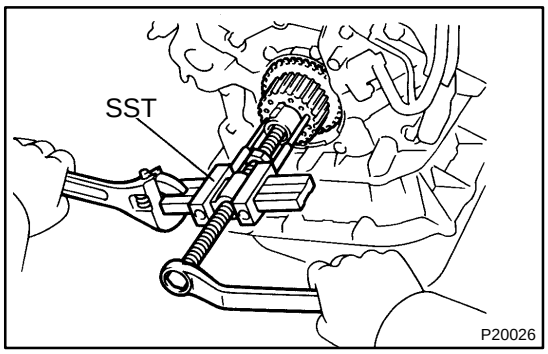
19. REMOVE NO.2 IDLER PULLEY

Remove the bolt and idler pulley.



20. REMOVE NO.1 IDLER PULLEY

Using a 10 mm hexagon wrench, remove the bolt, idler pulley and plate washer.



21. REMOVE CRANKSHAFT TIMING PULLEY

(a) Remove the bolt and timing belt plate.

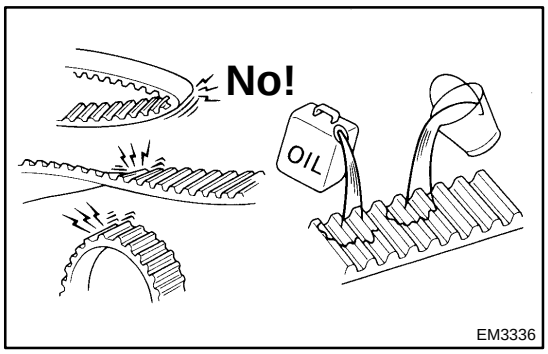
(b) Using SST, remove the crankshaft timing pulley.

SST 09950–50010 (09951–05010, 09952–05010, 09953–05010, 09953–05020, 09954–05010)

NOTICE:

Do not scratch the sensor part of the crankshaft timing pulley.

EM040–02



INSPECTION

1. INSPECT TIMING BELT

NOTICE:

- **Do not bend, twist or turn the timing belt inside out.**
- **Do not allow the timing belt to come into contact with oil, water or steam.**
- **Do not utilize timing belt tension when installing or removing the mount bolt of the camshaft timing pulley.**

If there are any defects, as shown in the illustrations, check these points:

(a) Premature parting
- Check for proper installation.
- Check the timing cover gasket for damage and proper installation.

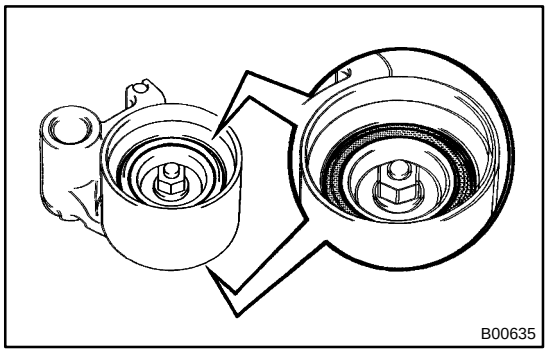
(b) If the belt teeth are cracked or damaged, check to see if either camshaft is locked.

(c) If there is noticeable wear or cracks on the belt face, check to see if there are nicks on the side of the idler pulley lock and water pump.

(d) If there is wear or damage on only one side of the belt, check the belt guide and the alignment of each pulley.

(e) If there is noticeable wear on the belt teeth, check timing cover for damage and check gasket has been installed correctly and for foreign material on the pulley teeth.

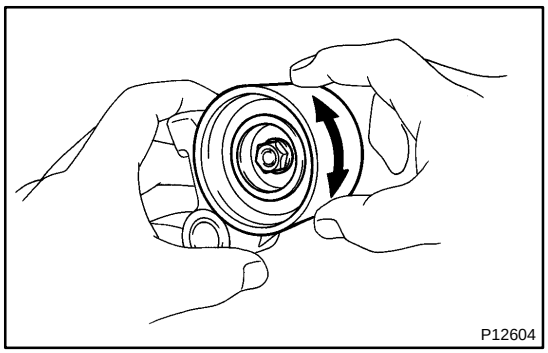
If necessary, replace the timing belt.



2. INSPECT IDLER PULLEYS

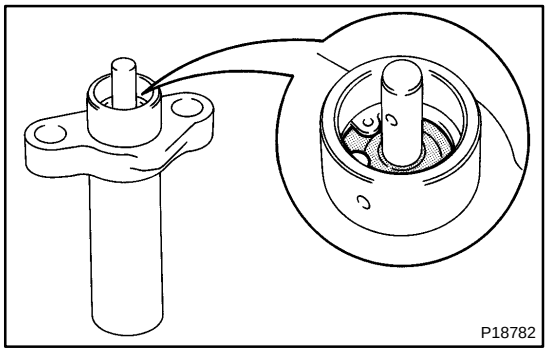
(a) Visually check the seal portion of the idler pulley for oil leakage.

If leakage is found, replace the idler pulley.



(b) Check that the idler pulley turns smoothly.

If necessary, replace the idler pulley.



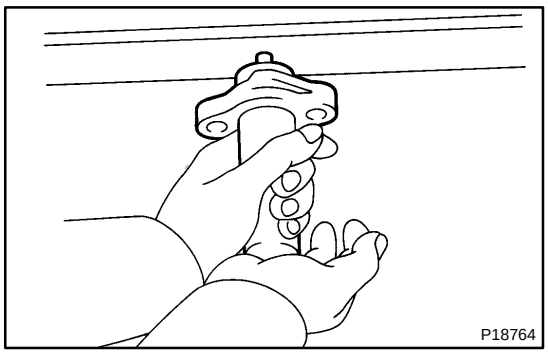
3. INSPECT TIMING BELT TENSIONER

(a) Visually check the seal portion of the tensioner for oil leakage.

HINT:

If there is only the faintest trace of oil on the seal on the push rod side, the tensioner is all right.

If leakage is found, replace the tensioner.

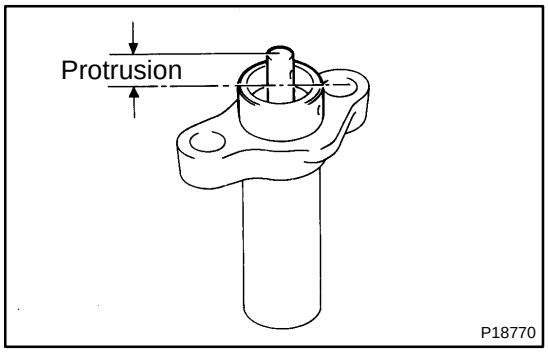


(b) Hold the tensioner with both hands and push the push rod strongly as shown to check that it doesn't move.

If the push rod moves, replace the tensioner.

NOTICE:

Never hold the tensioner push rod facing downward.



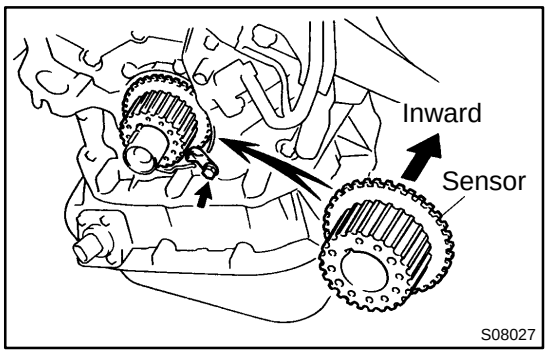
(c) Measure the protrusion of the push rod from the housing end.

Protrusion: 10.0 – 10.8 mm (0.394 – 0.425 in.)

If the protrusion is not as specified, replace the tensioner.

EM041–02

INSTALLATION



1. INSTALL CRANKSHAFT TIMING PULLEY

(a) Align the pulley set key with the key groove of the timing pulley, and slide on the timing pulley.

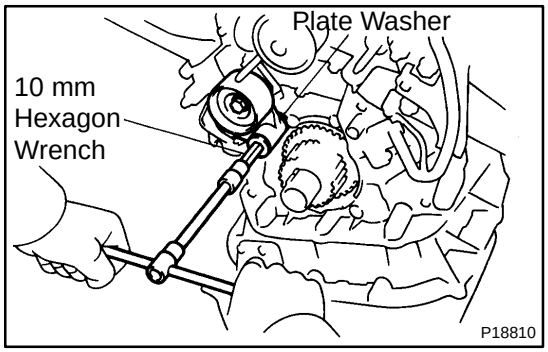
(b) Install the timing pulley, facing the sensor side inward.

NOTICE:

Do not scratch the sensor part of the crankshaft timing pulley.

(c) Install the timing belt plate with the bolt.

Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)



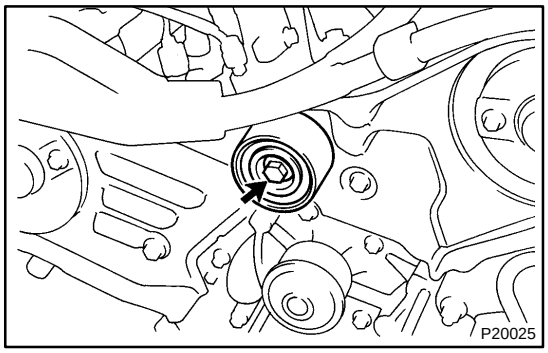
2. INSTALL NO.1 IDLER PULLEY

Adhesive: Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(a) Using a 10 mm hexagon wrench, install the plate washer and idler pulley with the pivot bolt.

Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

(b) Check that the pulley bracket moves smoothly.

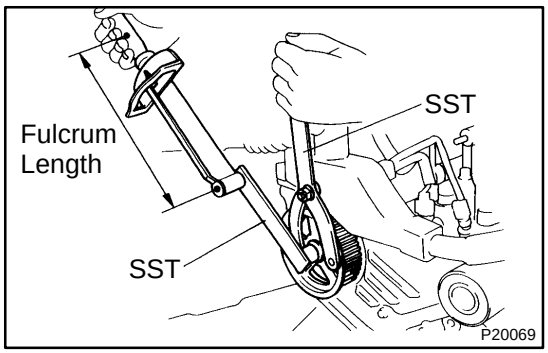


3. INSTALL NO.2 IDLER PULLEY

(a) Install the idler pulley with the bolt.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(b) Check that the idler pulley moves smoothly.



4. INSTALL RH CAMSHAFT TIMING PULLEY

(a) Face the flange side of the timing pulley outward.

(b) Align the knock pin on the camshaft with the knock pin groove of the timing pulley, and slide on the timing pulley.

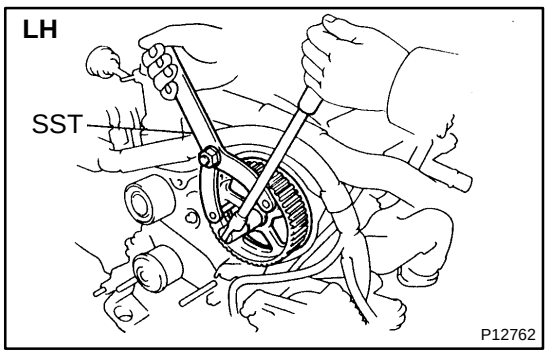
(c) Using SST, install the pulley bolt.

SST 09249–63010, 09960–10010 (09962–01000, 09963–01000)

Torque: 88 N·m (900 kgf·cm, 65 ft·lbf)

HINT:

Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).



5. INSTALL LH CAMSHAFT TIMING PULLEY

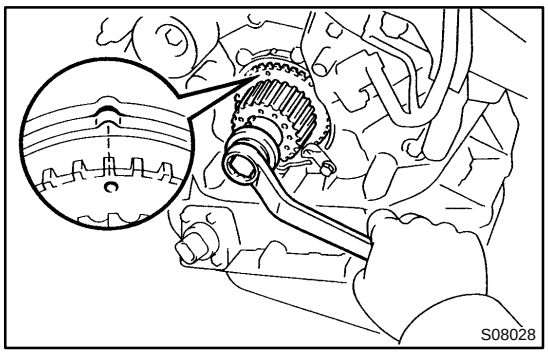
(a) Face the flange side of the timing pulley inward.

(b) Align the knock pin on the camshaft with the knock pin groove of the timing pulley, and slide on the timing pulley.

(c) Using SST, install the pulley bolt.

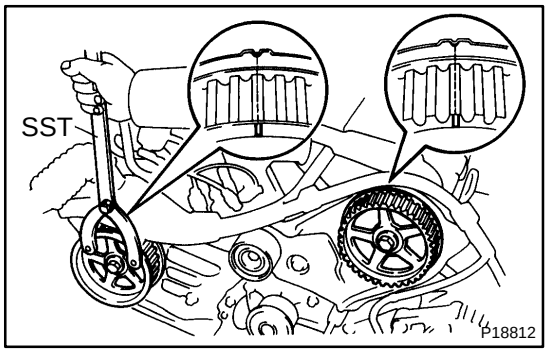
SST 09960–10010 (09962–01000, 09963–01000)

Torque: 125 N·m (1,300 kgf·cm, 94 ft·lbf)

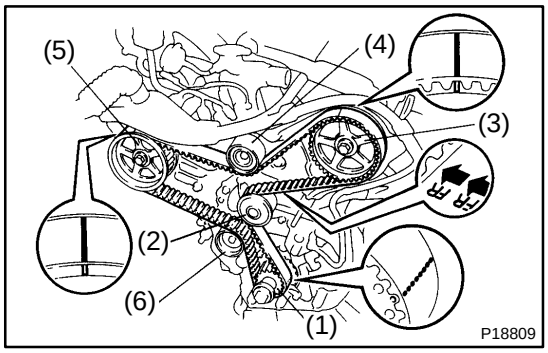


6. SET NO.1 CYLINDER TO TDC/COMPRESSION

(a) Crankshaft Timing Pulley Position:
- Temporarily install the crankshaft pulley bolt to the crankshaft.
- Turn the crankshaft, and align the timing marks of the crankshaft timing pulley and oil pump body.



(b) Camshaft Timing Pulley Positions:
Using SST, turn the camshaft pulley, align the timing marks of the timing pulley and No.3 timing belt cover.
SST 09960–10010 (09962–01000, 09963–01000)



7. INSTALL TIMING BELT

NOTICE:

The engine should be cold.

(a) Remove any oil or water on the pulleys, and keep them clean.

NOTICE:

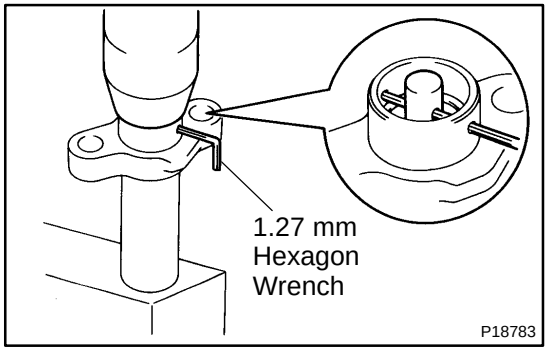
Only wipe the pulleys; do not use any cleansing agent.

(b) Face the front mark on the timing belt forward.

(c) Align the installation mark on the timing belt with the timing mark of the crankshaft timing pulley.

(d) Align the installation marks on the timing belt with the timing marks of the camshaft timing pulleys.

(e) Install the timing belt in this order:
(1) Crankshaft timing pulley
(2) Water pump pulley
(3) LH camshaft timing pulley
(4) No.2 idler pulley
(5) RH camshaft timing pulley
(6) No.1 idler pulley

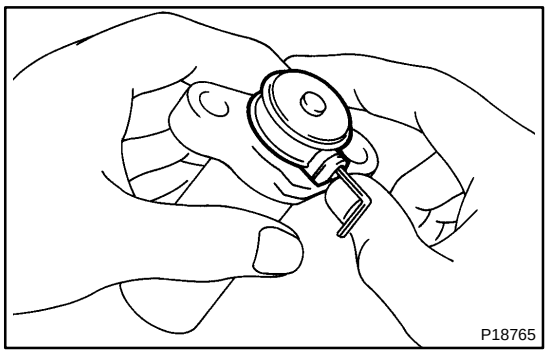


8. SET TIMING BELT TENSIONER

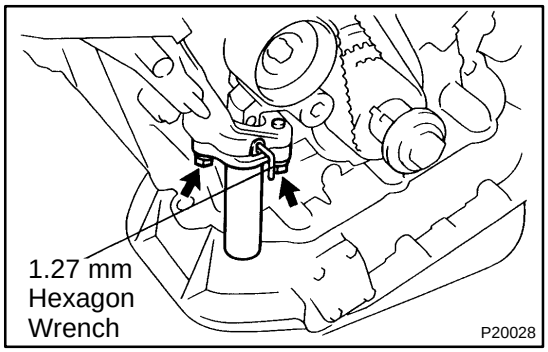
(a) Using a press, slowly press in the push rod using 981 – 9,807 N (100 – 1,000 kgf, 200 – 2,205 lbf) of pressure.

(b) Align the holes of the push rod and housing, pass a 1.27 mm hexagon wrench through the holes to keep the setting position of the push rod.

(c) Release the press.



(d) Install the dust boot to the tensioner.



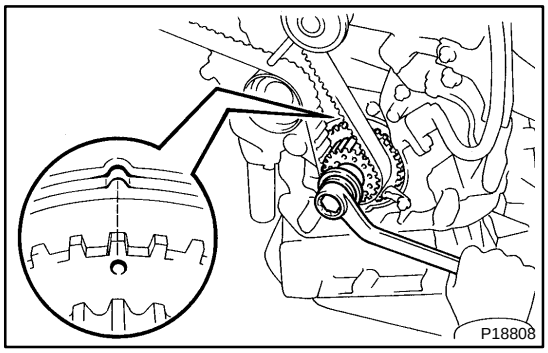
9. INSTALL TIMING BELT TENSIONER

(a) Temporarily install the tensioner with the 2 bolts.

(b) Alternately tighten the 2 bolts.

Torque: 27 N·m (280 kgf·cm, 20 ft·lbf)

(c) Remove the 1.27 mm hexagon wrench from the tensioner.

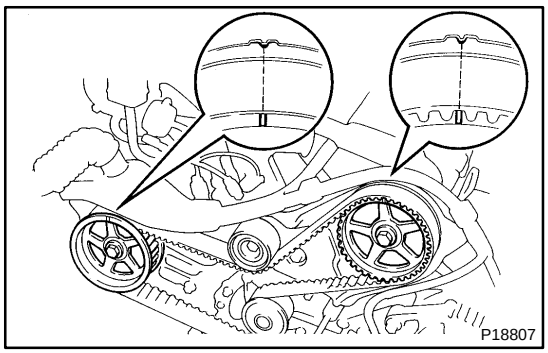


10. CHECK VALVE TIMING

(a) Slowly turn the crankshaft 2 revolution, and align the timing marks of the crankshaft timing pulley and oil pump body.

NOTICE:

Always turn the crankshaft clockwise.



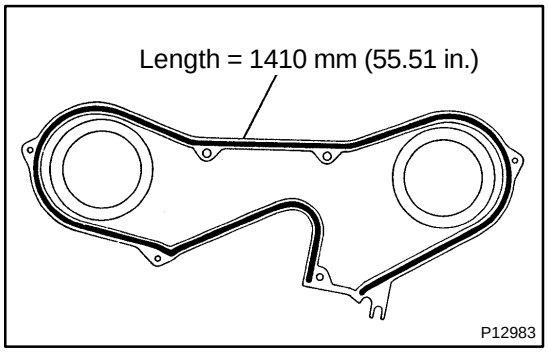
(b) Check that the timing marks of the RH and LH timing pulleys with the timing marks of the No.3 timing belt cover as shown in the illustration.

If the marks do not align, remove the timing belt and reinstall it.

(c) Remove the crankshaft pulley bolt.

11. INSTALL RH ENGINE MOUNTING BRACKET

Torque: 28 N·m (290 kgf·cm, 21 ft·lbf)



12. INSTALL NO.2 TIMING BELT COVER

(a) Check that the timing belt cover gasket has no cracks or peeling, etc.

If the gasket has cracks or peeling, etc., replace it using these steps:

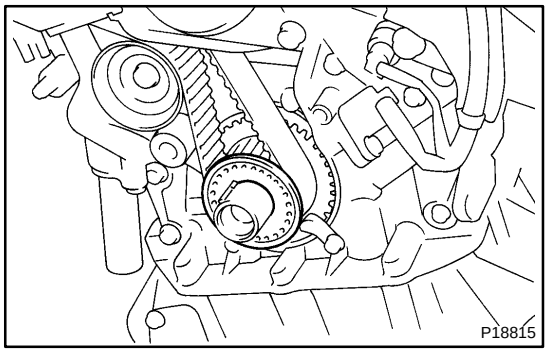
- Using a screwdriver and gasket scraper, remove all the old gasket material.
- Thoroughly clean all components to remove all the loose material.

- Remove the backing paper from a new gasket and install the gasket evenly to the part of the timing belt cover shaded black in the illustration.
- After installing the gasket, press down on it so that the adhesive firmly sticks to the timing belt cover.

(b) Install the timing belt cover with the 5 bolts.
Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)

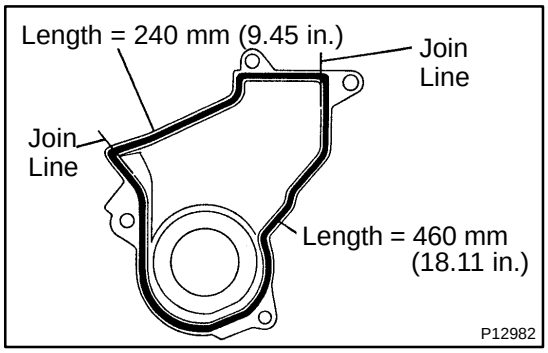
(c) Install the engine wire protector clamp to the No.3 timing belt cover.

(d) Install the engine wire protector to the No.3 timing belt cover with the bolt.



13. INSTALL TIMING BELT GUIDE

Install the timing belt guide, facing the cup side outward.



14. INSTALL NO.1 TIMING BELT COVER

(a) Check that the timing belt cover gaskets have cracks or peeling, etc.

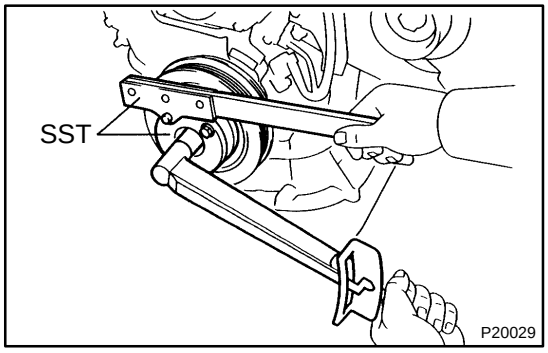
If the gasket has cracks or peeling, etc., replace it using these steps:

- Using a screwdriver and gasket scraper, remove all the old gasket material.
- Thoroughly clean all components to remove all the loose material.
- Remove the backing paper from a new gasket and install the gasket evenly to the part of the timing belt cover shaded black in the illustration.

NOTICE:
When joining 2 gaskets, do not leave a gap between them. Cut off any excess gasket.

- After installing the gasket, press down on it so that the adhesive firmly sticks to the timing belt cover.

(b) Install the timing belt cover with the 4 bolts.
Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)



15. INSTALL CRANKSHAFT PULLEY

(a) Align the pulley set key with the key groove of the pulley, and slide on the pulley.

(b) Using SST, install the pulley bolt.
SST 09213–54015 (91651–60855), 09330–00021
Torque: 215 N·m (2,200 kgf·cm, 159 ft·lbf)

16. INSTALL NO.2 GENERATOR BRACKET

Install the generator bracket with the pivot bolt and nut. Do not tighten the bolt yet.

Torque: (Nut): 28 N·m (290 kgf·cm, 21 ft·lbf)

17. INSTALL NO.2 RH ENGINE MOUNTING BRACKET, ENGINE MOVING CONTROL ROD AND RH ENGINE MOUNTING STAY (See page EM–71)

18. CONNECT GROUND STRAP CONNECTORS

19. CONNECT ENGINE COOLANT RESERVOIR HOSE TO WATER OUTLET

20. INSTALL PS PUMP DRIVE BELT

21. INSTALL GENERATOR DRIVE BELT

22. INSTALL RH FENDER APRON SEAL

23. INSTALL RH FRONT WHEEL

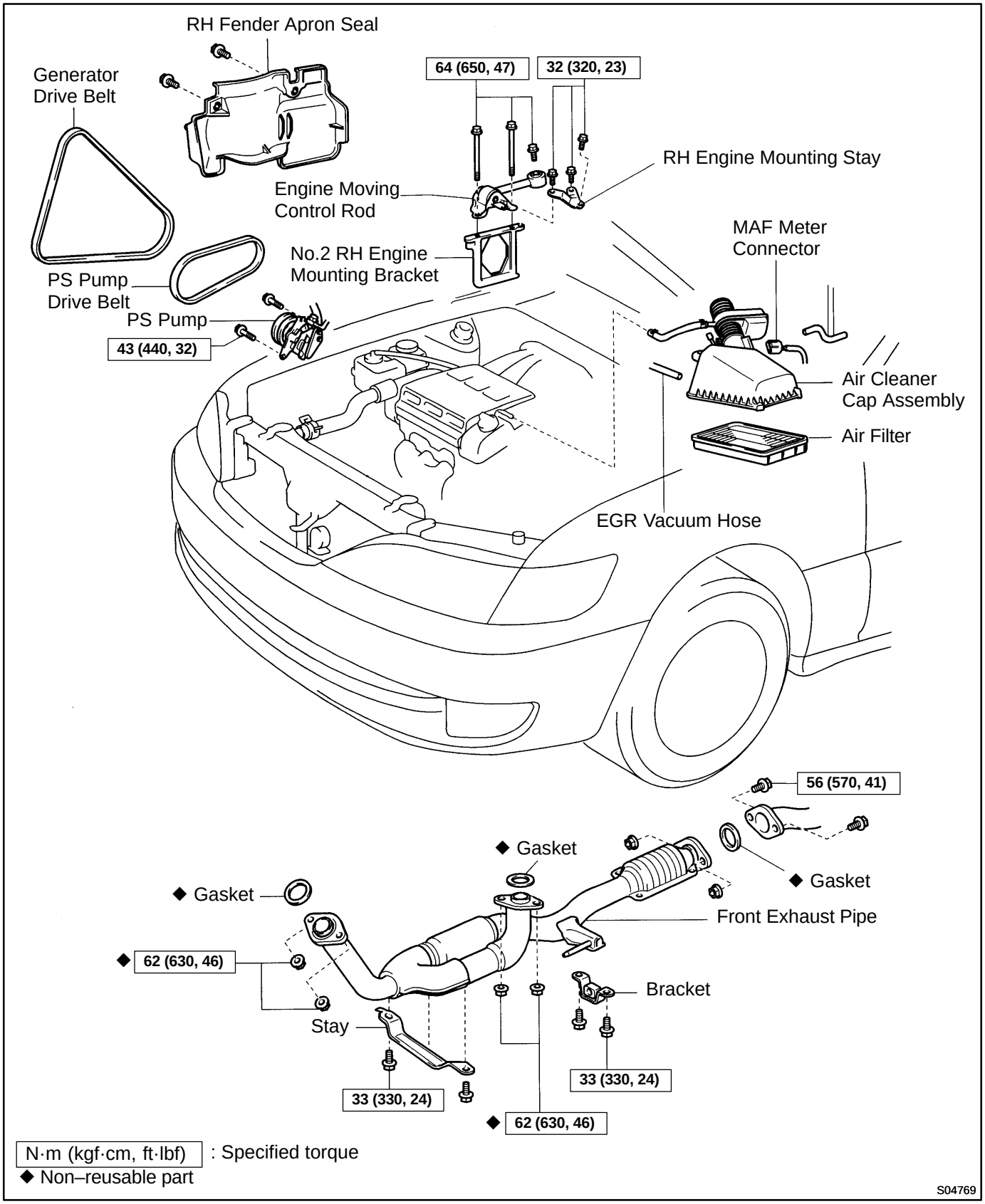
24. VEHICLE ROAD TEST

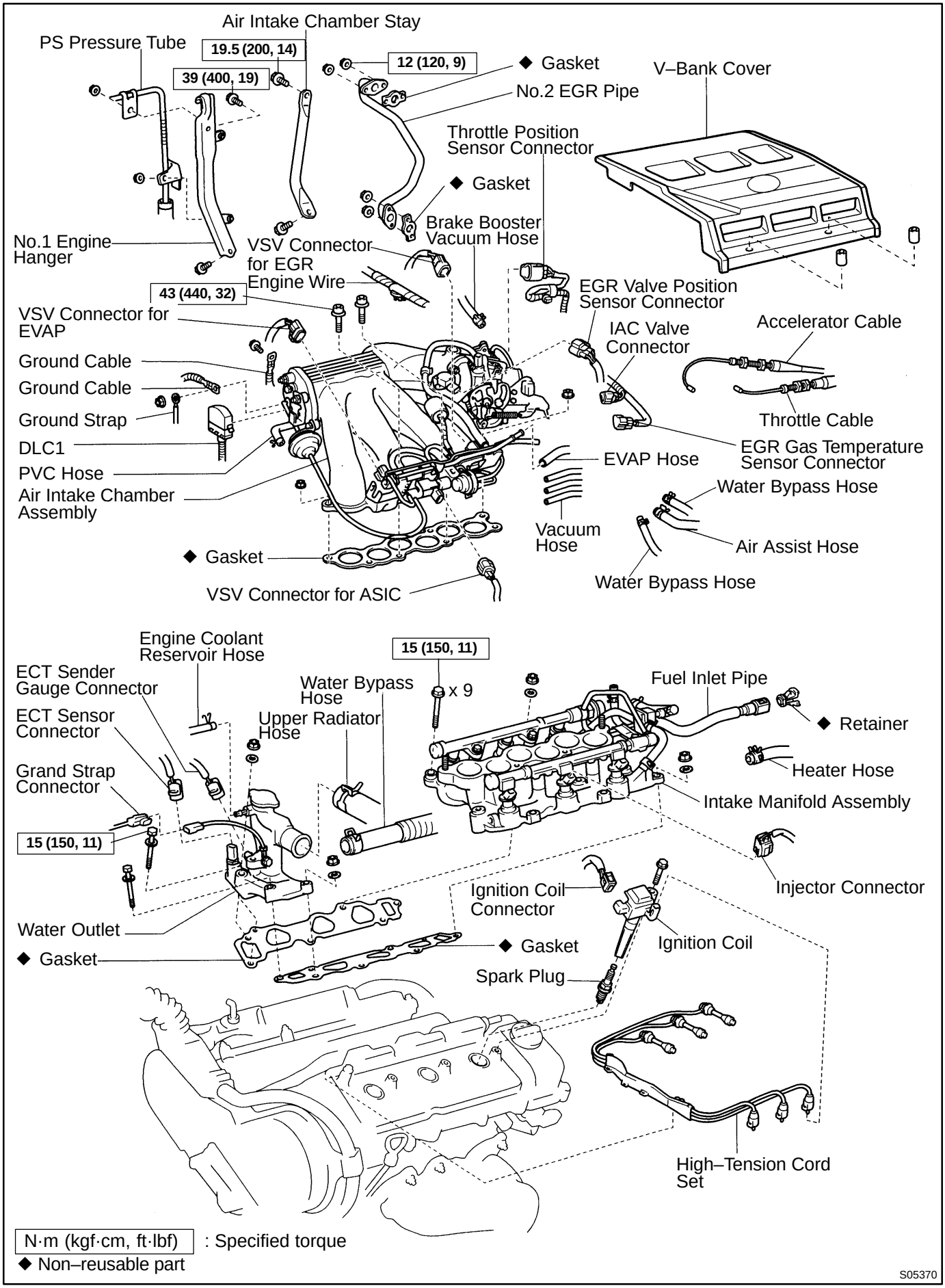
Check for abnormal noise, shock, slippage, correct shift points and smoothly operation.

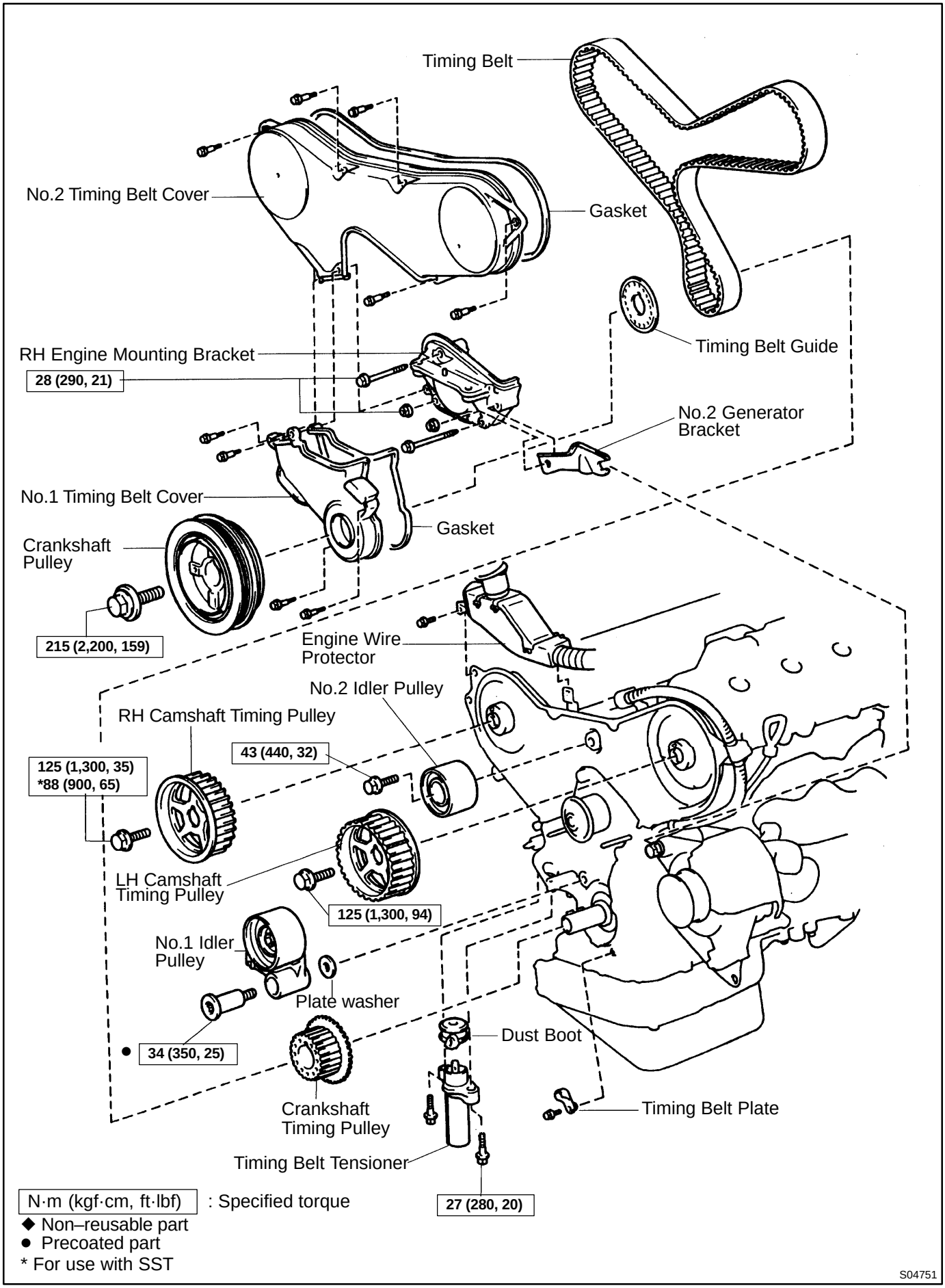
CYLINDER HEAD

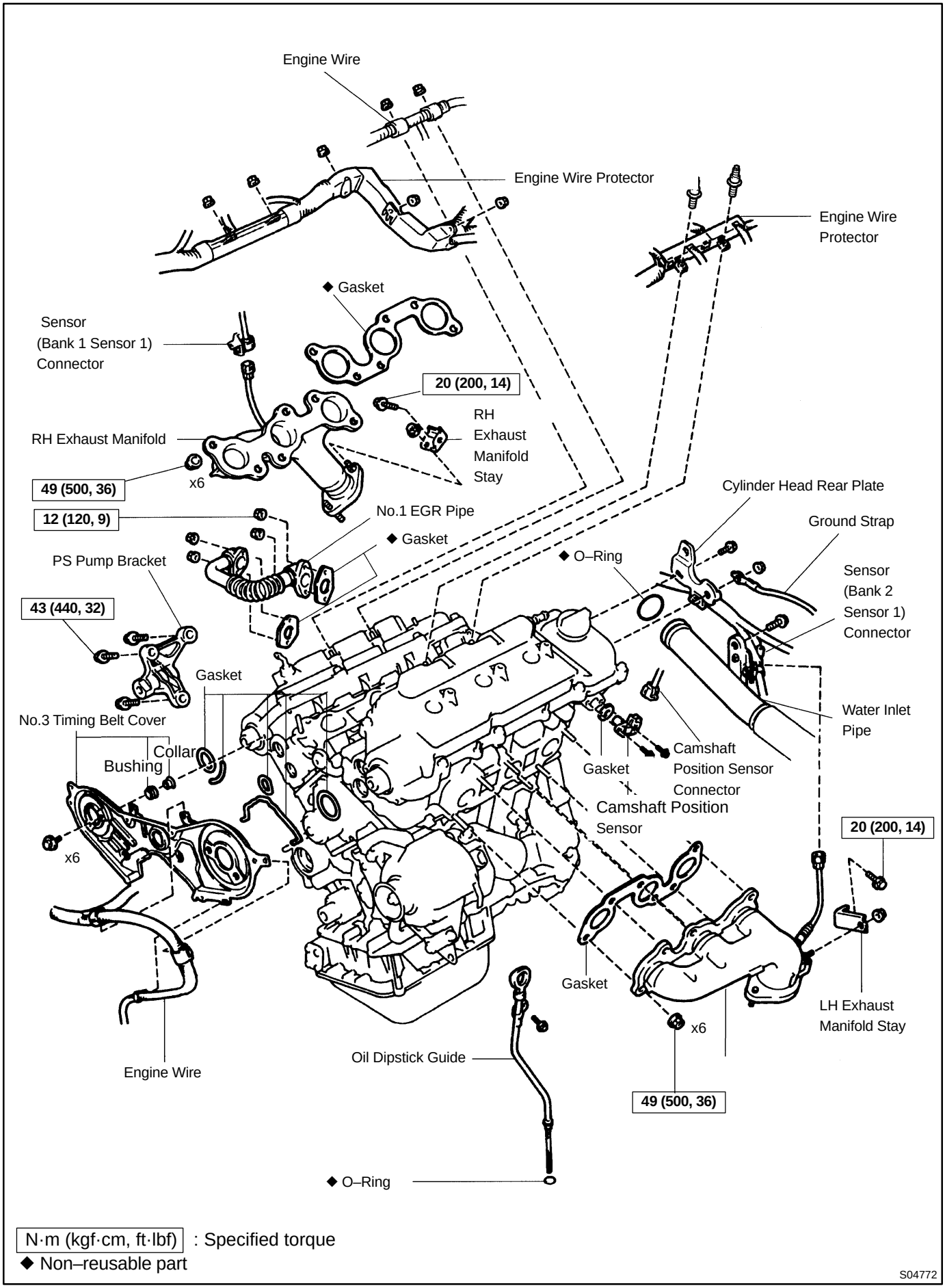
COMPONENTS

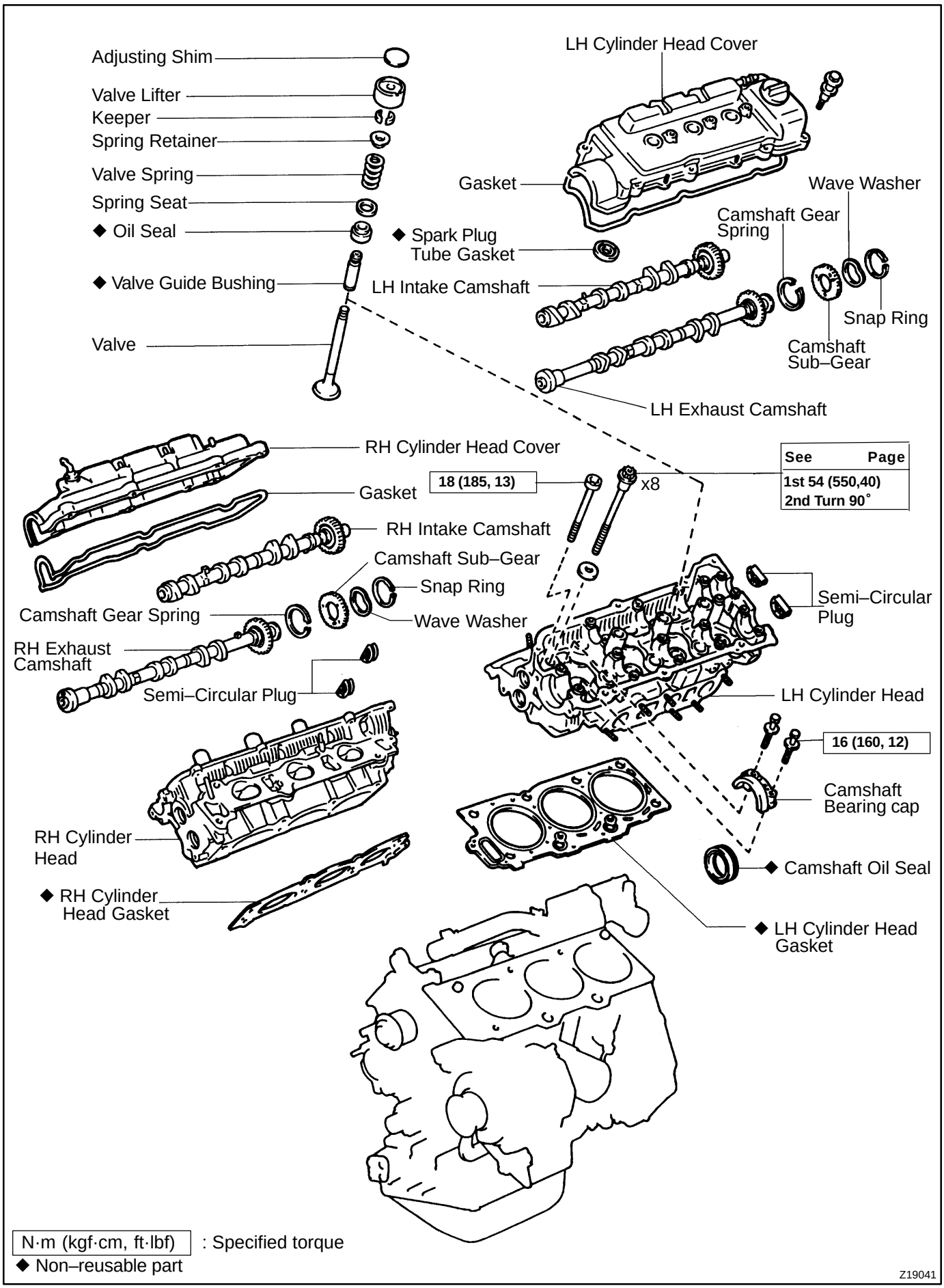
EM042–04




Air Intake Chamber Stay
PS Pressure Tube
19.5 (200, 14)
39 (400, 19)
12 (120, 9)
◆ Gasket
No.2 EGR Pipe
V–Bank Cover
Throttle Position Sensor Connector
◆ Gasket
Brake Booster Vacuum Hose
No.1 Engine Hanger
VSV Connector for EGR Engine Wire
43 (440, 32)
EGR Valve Position Sensor Connector
VSV Connector for EVAP
IAC Valve Connector
Accelerator Cable
Ground Cable
Ground Cable
Ground Strap
DLC1
PVC Hose
Air Intake Chamber Assembly
Throttle Cable
EGR Gas Temperature Sensor Connector
EVAP Hose
Water Bypass Hose
Vacuum Hose
Air Assist Hose
◆ Gasket
VSV Connector for ASIC
Water Bypass Hose
Engine Coolant Reservoir Hose
15 (150, 11)
ECT Sender Gauge Connector
Water Bypass Hose
x 9
Fuel Inlet Pipe
ECT Sensor Connector
Upper Radiator Hose
◆ Retainer
Grand Strap Connector
Heater Hose
Intake Manifold Assembly
15 (150, 11)
Injector Connector
Ignition Coil Connector
Water Outlet
◆ Gasket
◆ Gasket
Ignition Coil
Spark Plug
High–Tension Cord Set
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
S05370


Timing Belt
No.2 Timing Belt Cover
Gasket
Timing Belt Guide
RH Engine Mounting Bracket
28 (290, 21)
No.2 Generator Bracket
No.1 Timing Belt Cover
Gasket
Crankshaft Pulley
215 (2,200, 159)
Engine Wire Protector
No.2 Idler Pulley
RH Camshaft Timing Pulley
43 (440, 32)
125 (1,300, 35)
*88 (900, 65)
LH Camshaft Timing Pulley
125 (1,300, 94)
No.1 Idler Pulley
Plate washer
● 34 (350, 25)
Dust Boot
Crankshaft Timing Pulley
Timing Belt Plate
Timing Belt Tensioner
27 (280, 20)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
● Precoated part
* For use with SST
S04751


Engine Wire
Engine Wire Protector
Engine Wire Protector
◆ Gasket
Sensor
(Bank 1 Sensor 1)
Connector
20 (200, 14)
RH
Exhaust
Manifold
Stay
RH Exhaust Manifold
49 (500, 36)
x6
12 (120, 9)
No.1 EGR Pipe
◆ Gasket
Cylinder Head Rear Plate
Ground Strap
PS Pump Bracket
◆ O–Ring
Sensor
(Bank 2
Sensor 1)
Connector
43 (440, 32)
Gasket
No.3 Timing Belt Cover
Collar
Bushing
Water Inlet
Pipe
Gasket
Camshaft
Position Sensor
Connector
Camshaft Position
Sensor
20 (200, 14)
x6
Gasket
LH Exhaust
Manifold Stay
x6
Oil Dipstick Guide
Engine Wire
49 (500, 36)
◆ O–Ring
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
S04772


Adjusting Shim
Valve Lifter
Keeper
Spring Retainer
Valve Spring
Spring Seat
◆ Oil Seal
◆ Valve Guide Bushing
Valve
LH Cylinder Head Cover
Gasket
Wave Washer
Camshaft Gear Spring
◆ Spark Plug Tube Gasket
LH Intake Camshaft
Snap Ring
Camshaft Sub–Gear
LH Exhaust Camshaft
RH Cylinder Head Cover
Gasket
18 (185, 13)
x8
See Page
1st 54 (550,40)
2nd Turn 90°
RH Intake Camshaft
Camshaft Sub–Gear
Snap Ring
Wave Washer
Camshaft Gear Spring
RH Exhaust Camshaft
Semi–Circular Plug
Semi–Circular Plug
LH Cylinder Head
16 (160, 12)
Camshaft Bearing cap
RH Cylinder Head
◆ Camshaft Oil Seal
◆ RH Cylinder Head Gasket
◆ LH Cylinder Head Gasket
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Z19041

EM043–02

REMOVAL

1. REMOVE ENGINE RH FENDER APRON SEAL

2. DRAIN ENGINE COOLANT

3. REMOVE AIR CLEANER CAP ASSEMBLY AND AIR FILTER

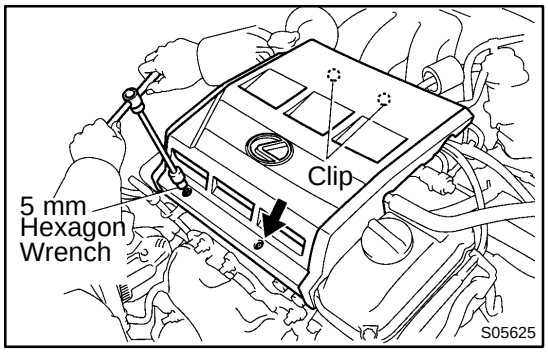
4. REMOVE FRONT EXHAUST PIPE
(See page EM–66)

5. REMOVE RH ENGINE MOUNTING STAY

6. REMOVE V–BANK COVER

(a) Using a 5 mm hexagon wrench, remove the 2 nuts.

(b) Disconnect the 2 clips, and remove the cover.



7. REMOVE HIGH–TENSION CORD SET
(See page IG–1)

8. REMOVE AIR INTAKE CHAMBER ASSEMBLY

(a) Disconnect these cables and connectors:

- Accelerator cable
- A/T throttle cable
- Throttle position sensor connector
- IAC valve connector
- EGR gas temperature sensor connector
- EGR valve position sensor connector
- VSV connector for ACIS
- VSV connector for EVAP
- VSV connector for EGR
- DLC1 from bracket on intake air control valve

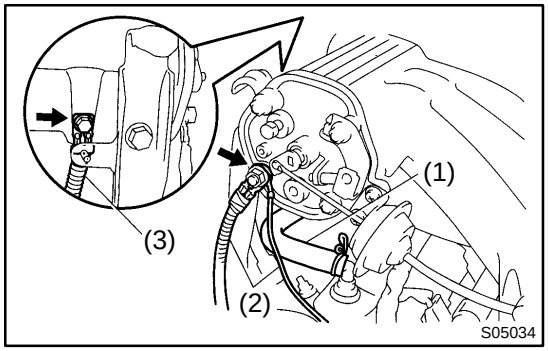
(b) Remove the 2 nuts, and disconnect the PS pressure tube from the No.1 engine hanger.

(c) Disconnect the hoses, cables, strap and clamp:

(1) PCV hose from PCV valve on RH cylinder head

(2) Ground strap and cable from intake air control valve for ACIS

(3) Ground cable from air intake chamber



(4) Brake booster vacuum hose from air intake chamber

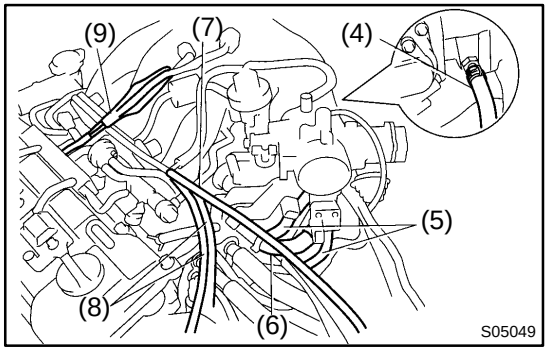
(5) 2 water bypass hoses from throttle body

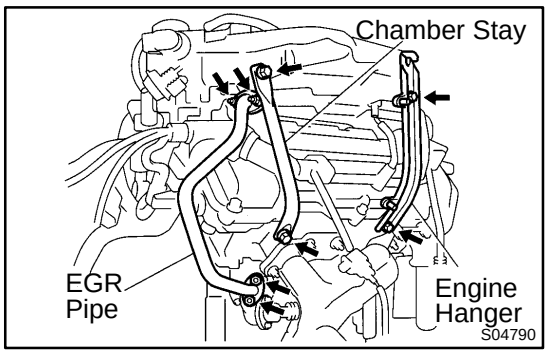
(6) Air assist hose from throttle body

(7) EVAP hose from pipe on emission control valve set

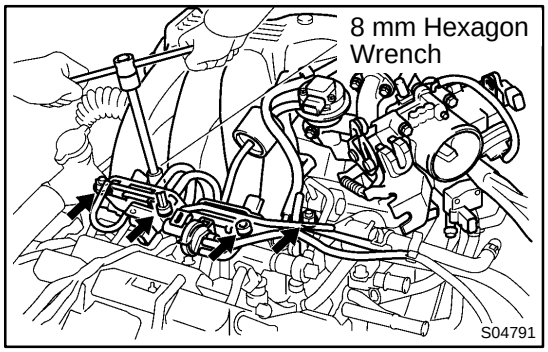
(8) 2 vacuum hoses from vacuum tank for ACIS

(9) Engine wire clamp from emission control valve set

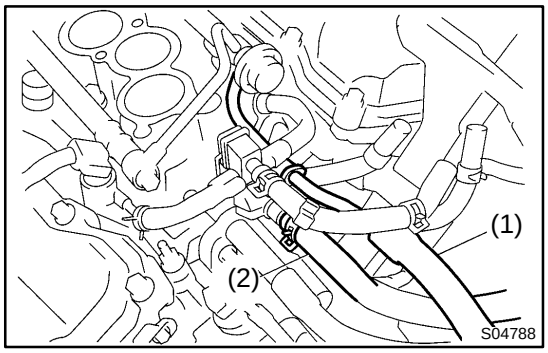




(d) Remove the 2 bolts and No.1 engine hanger.
(e) Remove the 2 bolts and air intake chamber stay.
(f) Remove the 4 nuts, No.2 EGR pipe and 2 gaskets.



(g) Using an 8 mm hexagon wrench, remove the 2 bolts, 2 nuts, the air intake chamber assembly and gasket.

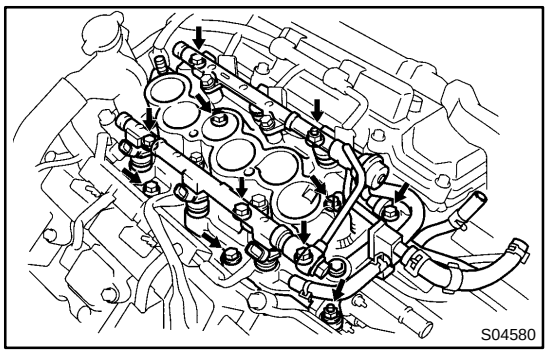


9. REMOVE INTAKE MANIFOLD ASSEMBLY

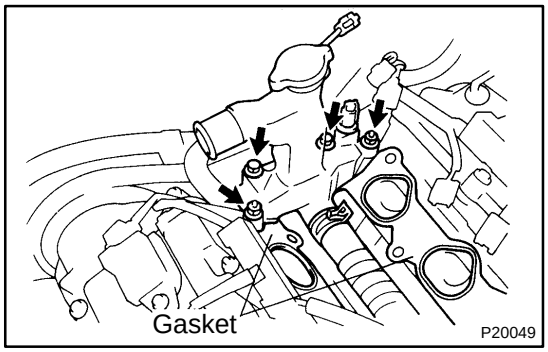
(a) Disconnect the 6 injector connectors.
(b) Disconnect these hoses:
  (1) Fuel inlet hose from fuel filter

CAUTION:
Perform disconnecting operations of the fuel tube connector (quick type) after observing the precaution.
(See page SF–1)

  (2) Heater hose from intake manifold



(c) Remove the 9 bolts, 2 nuts, 2 plate washers, the intake manifold, delivery pipes and injectors assembly.



10. REMOVE WATER OUTLET

(a) Disconnect these connectors, (strap) and hoses:
- ECT sender gauge connector
- ECT sensor connector
- Ground strap (connector)
- Radiator hose
- Engine coolant reservoir hose

(b) Remove the 2 bolts, 2 nuts and 2 plate washers.

(c) Disconnect the water bypass hose, and remove the water outlet.
(d) Remove the 2 gaskets.

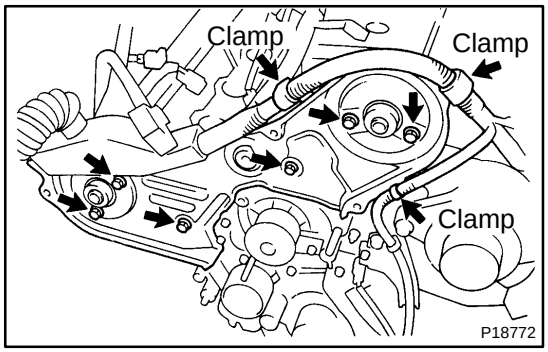
11. REMOVE GENERATOR DRIVE BELT
(See page CH–6)

12. REMOVE PS PUMP
(See page SR–20)

13. REMOVE IGNITION COILS

14. REMOVE SPARK PLUGS

15. REMOVE TIMING BELT
(See page EM–14)

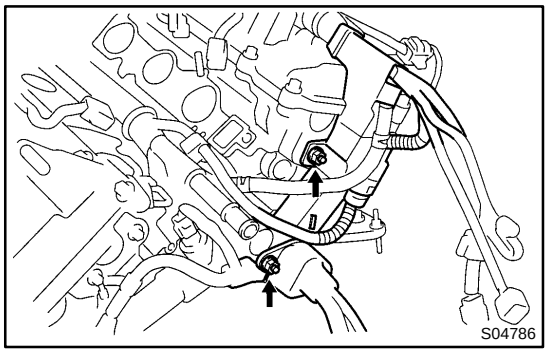


16. REMOVE CAMSHAFT TIMING PULLEYS
(See page EM–14)

17. REMOVE NO.2 IDLER PULLEY
(See page EM–14)

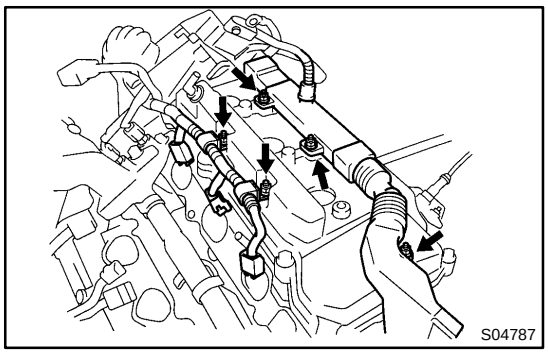
18. REMOVE NO.3 TIMING BELT COVER

(a) Disconnect the 3 engine wire clamps from the timing belt cover.
(b) Remove the 6 bolts and timing belt cover.



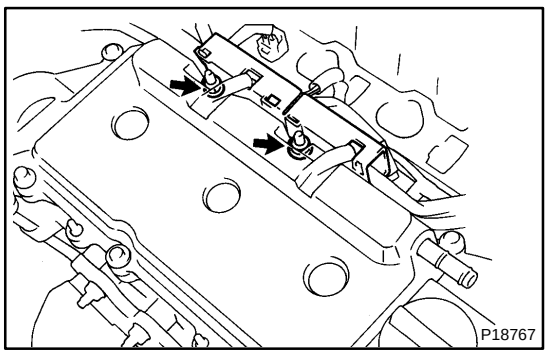
19. DISCONNECT ENGINE WIRE PROTECTOR FROM REAR SIDE

Remove the 2 nuts, and disconnect the engine wire protector from the RH cylinder head and water inlet.



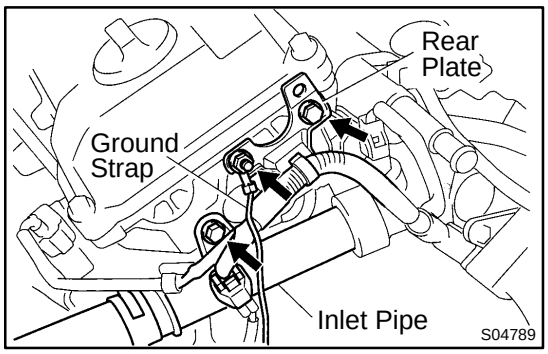
20. DISCONNECT ENGINE WIRE AND PROTECTOR FROM RH SIDE

Remove the 5 nuts, and disconnect the engine wire and protector from the RH cylinder head cover.



21. DISCONNECT ENGINE WIRE PROTECTOR FROM LH SIDE

Remove the 2 bolts, and disconnect the engine wire protector from the LH cylinder head cover.

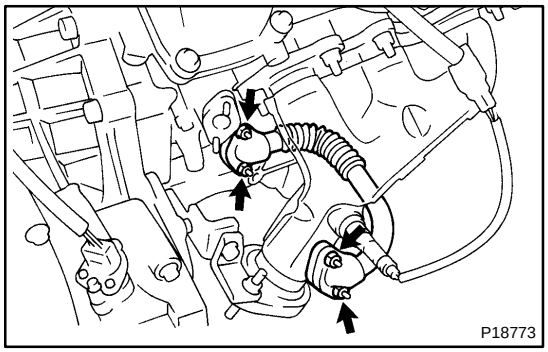


22. DISCONNECT CYLINDER HEAD REAR PLATE FROM LH CYLINDER HEAD

(a) Remove the nut, and disconnect the ground strap.
(b) Remove the bolt, and disconnect the rear plate.

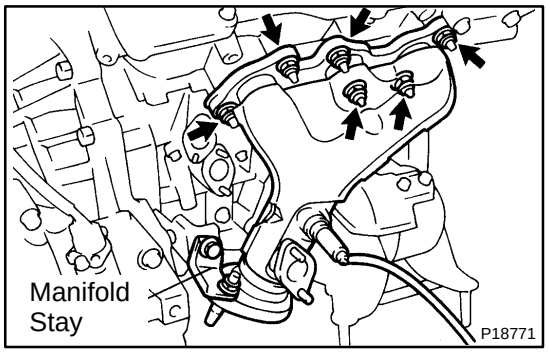
23. DISCONNECT WATER INLET PIPE FROM LH CYLINDER HEAD AND WATER INLET

(a) Remove the bolt, and disconnect the inlet pipe from the water inlet.
(b) Remove the O–ring from the inlet pipe.



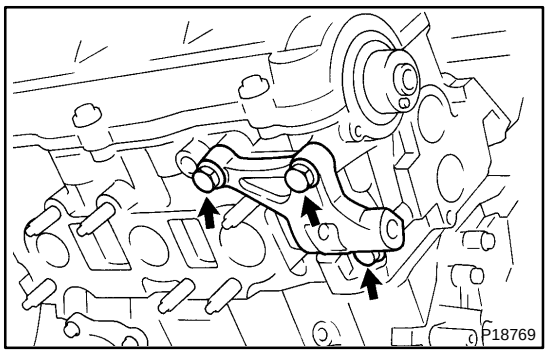
24. REMOVE NO.1 EGR PIPE

Remove the 4 nuts, EGR pipe and 2 gaskets.



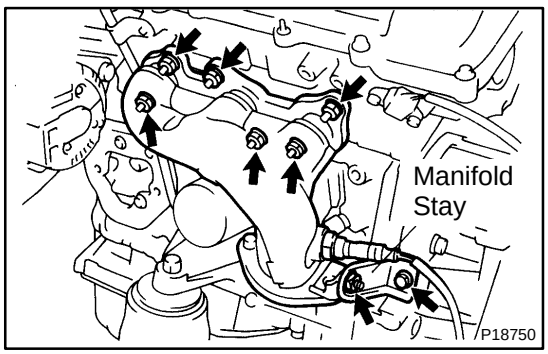
25. REMOVE RH EXHAUST MANIFOLD

(a) Disconnect the oxygen sensor (bank 1 sensor 1) connector.
(b) Remove the bolt, nut and exhaust manifold stay.
(c) Remove the 6 nuts, exhaust manifold and gasket.



26. REMOVE PS PUMP BRACKET

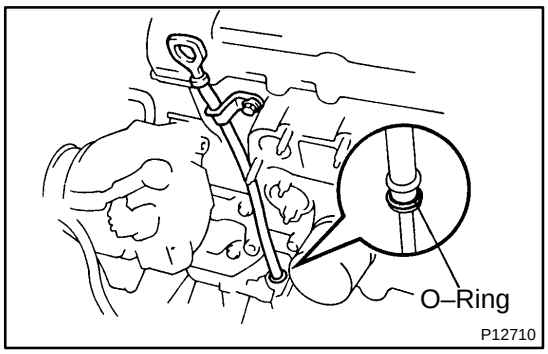
Remove the 3 bolts and pump bracket.



27. REMOVE LH EXHAUST MANIFOLD

(a) Disconnect the heated oxygen sensor connector.
(b) Remove the bolt, nut and exhaust manifold stay.
(c) Remove the 6 nuts, exhaust manifold and gasket.

28. REMOVE CAMSHAFT POSITION SENSOR

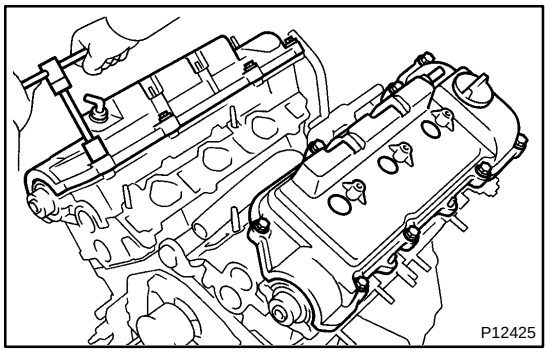


29. REMOVE OIL DIPSTICK AND GUIDE

(a) Remove the bolt holding the dipstick guide to the LH cylinder head.

(b) Pull out the dipstick guide together with the dipstick from the No.1 oil pan.

(c) Remove the O–ring from the dipstick guide.



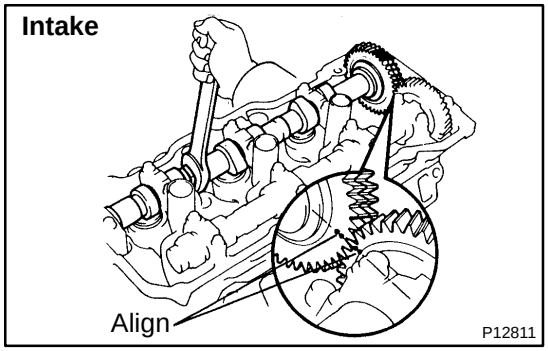
30. REMOVE CYLINDER HEAD COVERS

Remove the 8 bolts, cylinder head cover and gasket. Remove the 2 cylinder head covers.

31. REMOVE CAMSHAFTS OF RH CYLINDER HEAD

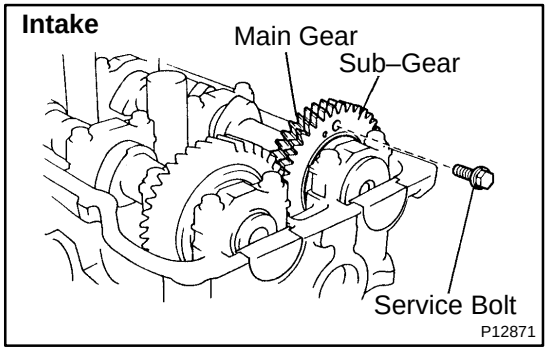
NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be held level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.



(a) Remove the intake camshaft.

(1) Align the timing marks (2 dot marks) of the camshaft drive and driven gears by turning the camshaft with a wrench.

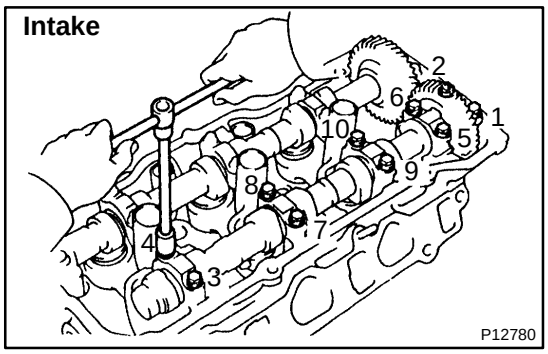


(2) Secure the exhaust camshaft sub–gear to the main gear with a service bolt.

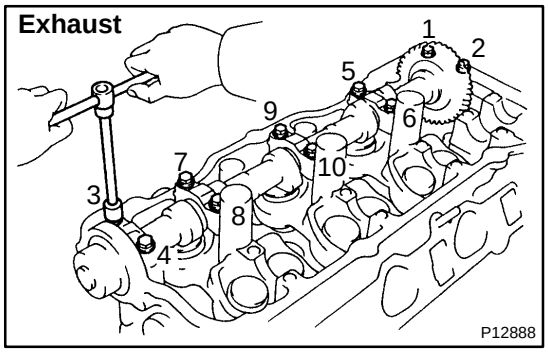
Recommended service bolt:
Thread diameter 6 mm
Thread pitch 1.0 mm
Bolt length 16 – 20 mm

HINT:

When removing the camshaft, mark certain that the torsional spring force of the sub–gear has been eliminated by the above operation.



(3) Uniformly loosen and remove the 10 bearing cap bolts, in several passes, in the sequence shown.
(4) Remove the 5 bearing caps and intake camshaft.

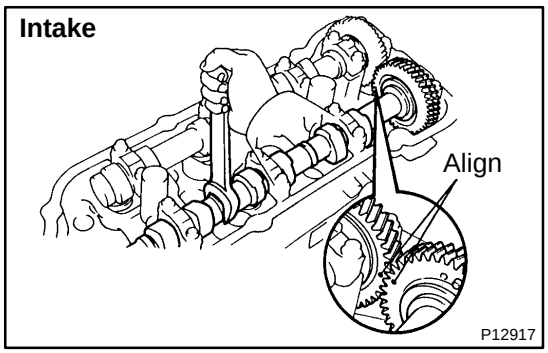


(b) Remove the exhaust camshaft.
(1) Uniformly loosen and remove the 10 bearing cap bolts, in several passes, in the sequence shown.
(2) Remove the 5 bearing caps, oil seal and exhaust camshaft.

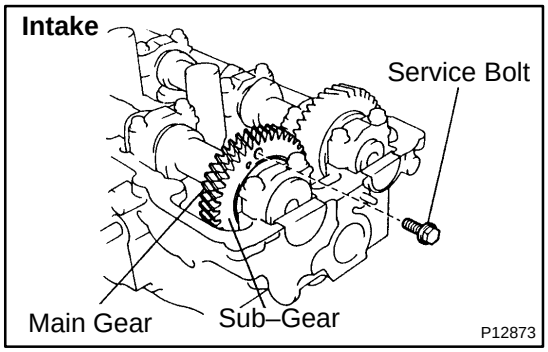
32. REMOVE CAMSHAFTS OF LH CYLINDER HEAD

NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be held level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.



(a) Remove the intake camshaft.
(1) Align the timing marks (1 dot mark) of the camshaft drive and driven gears by turning the camshaft with a wrench.

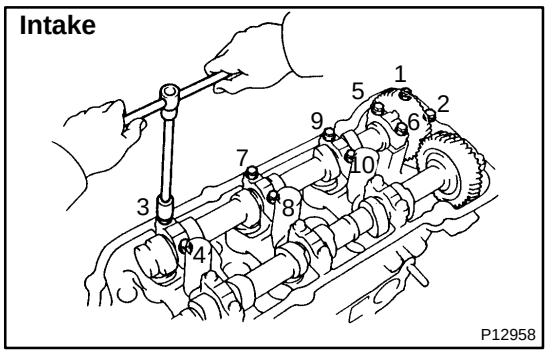


(2) Secure the exhaust camshaft sub–gear to the main gear with a service bolt.

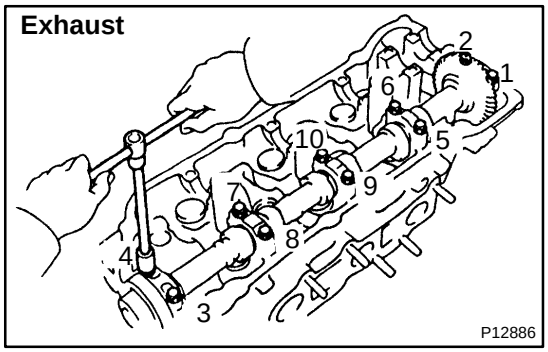
Recommended service bolt:
Thread diameter 6 mm
Thread pitch 1.0 mm
Bolt length 16 – 20 mm

HINT:

When removing the camshaft, make sure that the torsional spring force of the sub–gear has been eliminated by the above operation.

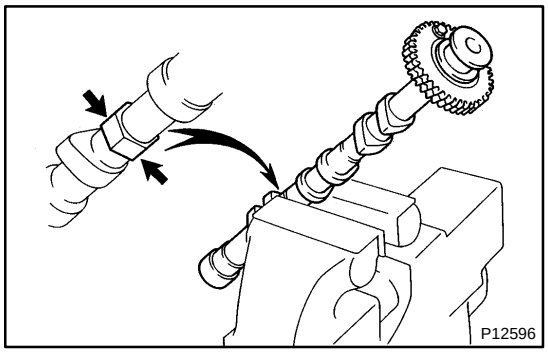


(b) Uniformly loosen and remove the 10 bearing cap bolts, in several passes, in the sequence shown.
(c) Remove the 5 bearing caps and intake camshaft.



(d) Remove the exhaust camshaft
  (1) Uniformly loosen and remove the 10 bearing cap bolts, in several passes, in the sequence shown.
  (2) Remove the 5 bearing caps, oil seal and exhaust camshaft.

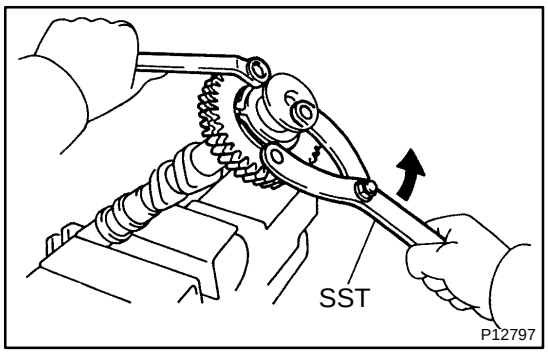
HINT:
- Arrange the camshafts in the correct order.
- Arrange the bearing caps in the correct order.



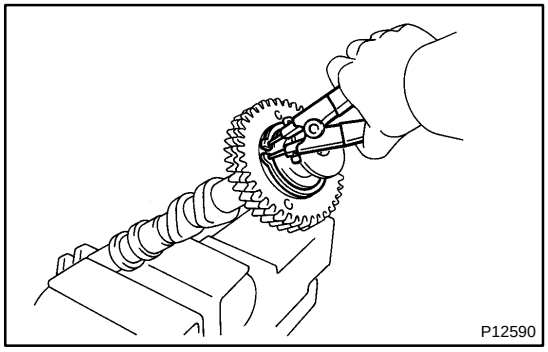
33. DISASSEMBLE EXHAUST CAMSHAFTS

(a) Mount the hexagonal wrench head portion of the camshaft in a vise.

NOTICE:
Be careful not to damage the camshaft.

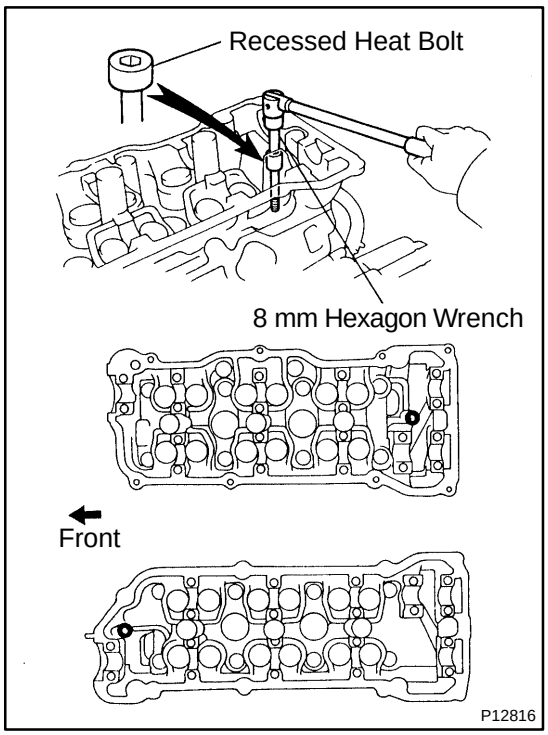


(b) Using SST, turn the sub–gear counterclockwise, and remove the service bolt.
  SST 09960–10010 (09962–01000, 09963–00500)



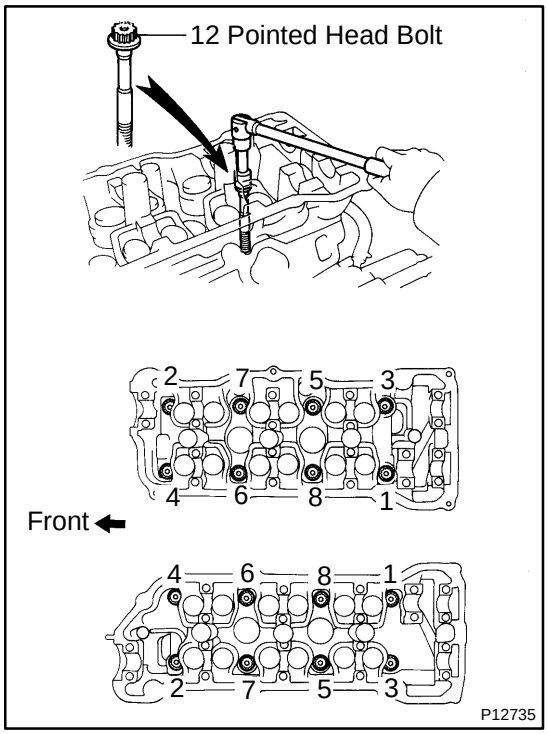
(c) Using snap ring pliers, remove the snap ring.
(d) Remove these parts:
- Wave washer
- Camshaft sub–gear
- Camshaft gear spring

HINT:
Arrange the camshaft sub–gears and gear springs (RH and LH side).



34. REMOVE CYLINDER HEADS

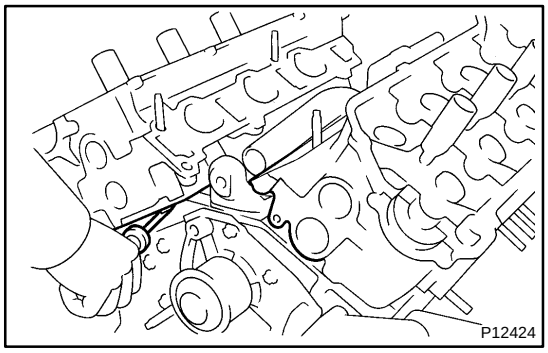
(a) Using an 8 mm hexagon wrench, remove the cylinder head (recessed head) bolt on each cylinder head, then repeat for the other side, as shown.



(b) Uniformly loosen and remove the 8 cylinder head (12 pointed head) bolts on each cylinder head, in several passes, in the sequence shown, then repeat for the other side, as shown. Remove the 16 cylinder head bolts and plate washers.

NOTICE:

Head warpage or cracking could result from removing bolts in an incorrect order.



(c) Lift the cylinder head from the dowels on the cylinder block and place the 2 cylinder heads on wooden blocks on a bench.

HINT:

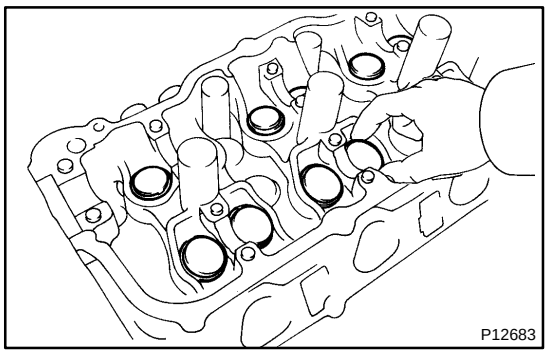
If the cylinder head is difficult to lift off, pry between the cylinder head and cylinder block with a screwdriver.

NOTICE:

Be careful not to damage the contact surfaces of the cylinder head and cylinder block.

EM044–02

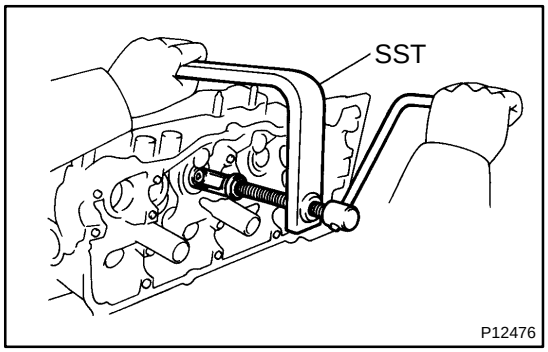
DISASSEMBLY



1. REMOVE VALVE LIFTERS AND SHIMS

HINT:

Arrange the valve lifters and shims in the correct order.



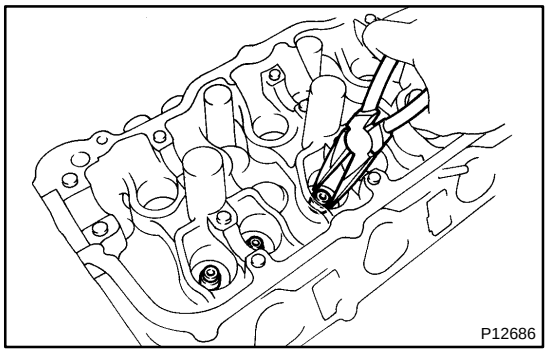
2. REMOVE VALVES

(a) Using SST, compress the valve spring and remove the 2 keepers.

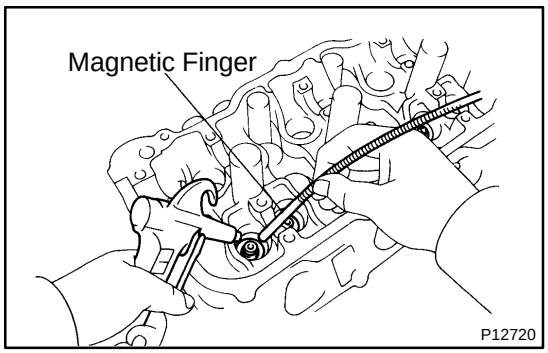
SST 09202–70020 (09202–00010)

(b) Remove these parts:

- Spring retainer
- Valve spring
- Valve



(c) Using needle–nose pliers, remove the oil seal.



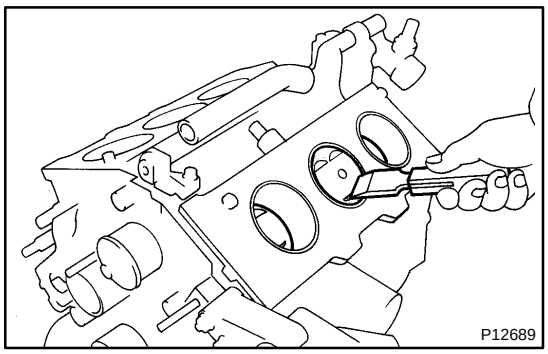
(d) Using compressed air and a magnetic finger, remove the spring seat by blowing air.

HINT:

Arrange the valves, valve springs, spring seats and spring retainers in the correct order.

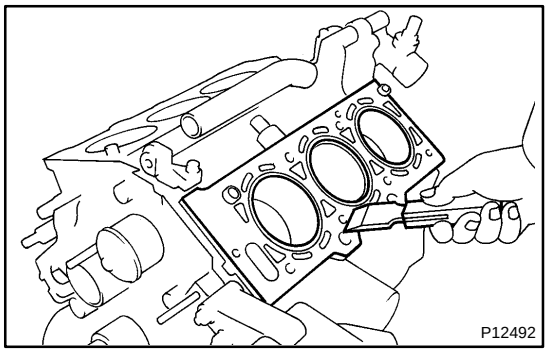
EM045–02

INSPECTION



1. CLEAN TOP SURFACES OF PISTONS AND CYLINDER BLOCK

(a) Turn the crankshaft, and bring each piston to top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surface.

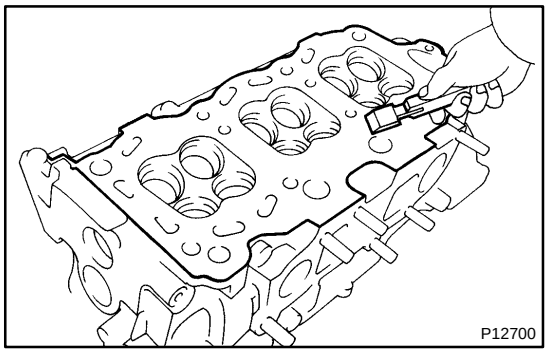


(b) Using a gasket scraper, remove all the gasket material from the cylinder block surface.

(c) Using compressed air, blow carbon and oil from the bolt holes.

CAUTION:

Protect your eyes when using high pressure compressed air.

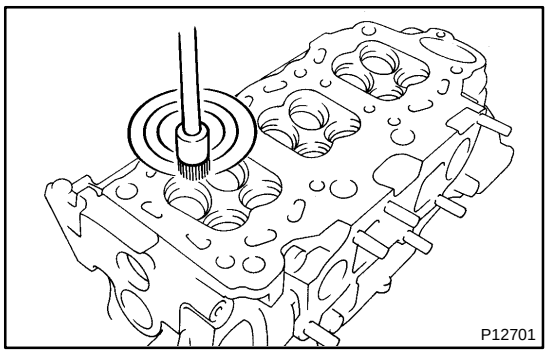


2. REMOVE GASKET MATERIAL

Using a gasket scraper, remove all the gasket material from the cylinder block contact surface.

NOTICE:

Be careful not to scratch the cylinder block contact surface.

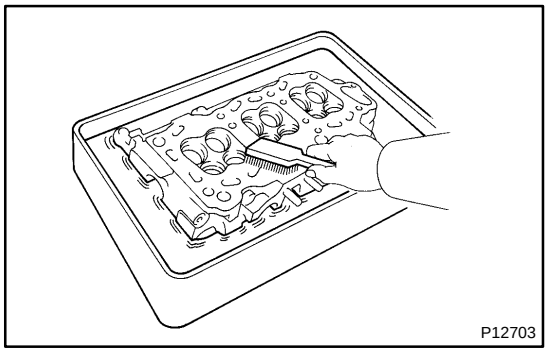


3. CLEAN COMBUSTION CHAMBERS

Using a wire brush, remove all the carbon from the combustion chambers.

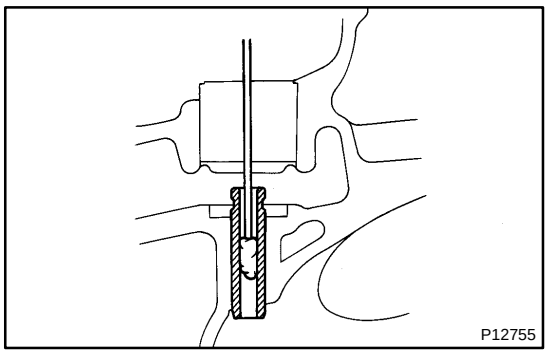
NOTICE:

Be careful not to scratch the cylinder block contact surface.



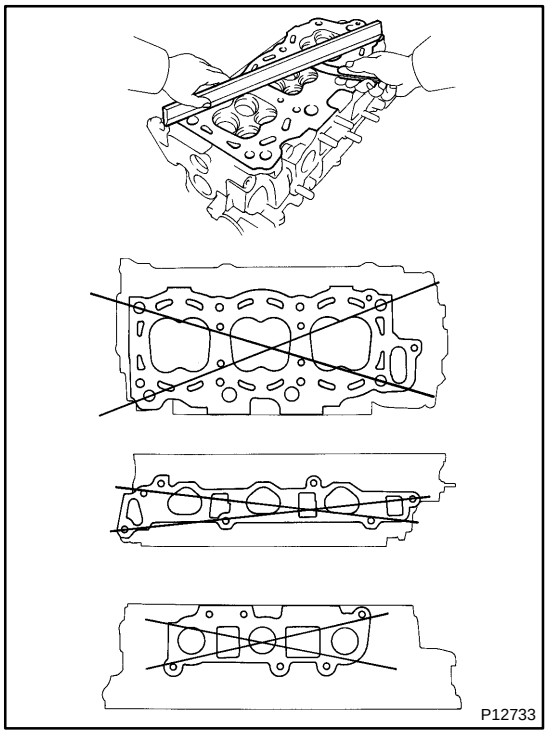
4. CLEAN CYLINDER HEADS

Using a soft brush and solvent, thoroughly clean the cylinder head.



5. CLEAN VALVE GUIDE BUSHINGS

Using a valve guide bushing brush and solvent, clean all the guide bushings.

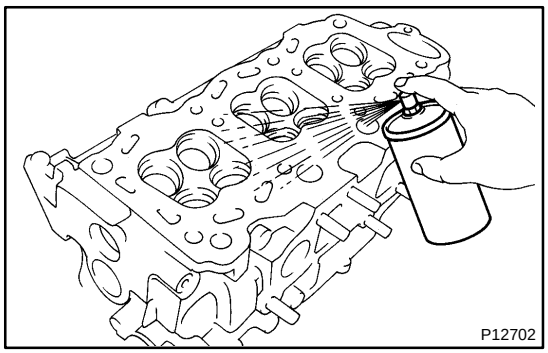


6. INSPECT FOR FLATNESS

Using a precision straight edge and feeler gauge, measure the surfaces contacting the cylinder block and the manifolds for warpage.

Maximum warpage: 0.10 mm (0.0039 in.)

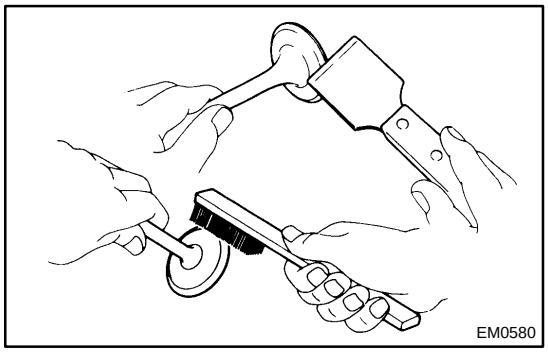
If warpage is greater than maximum, replace the cylinder head.



7. INSPECT FOR CRACKS

Using a dye penetrant, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.

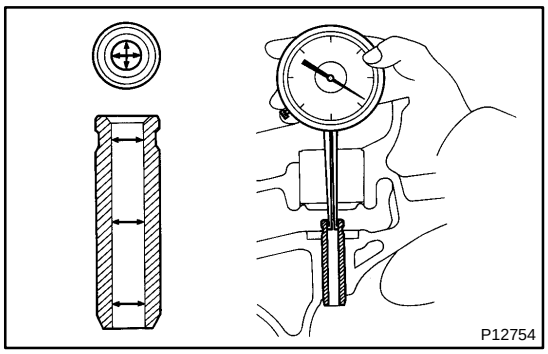
If cracked, replace the cylinder head.



8. CLEAN VALVES

(a) Using a gasket scraper, chip off any carbon from the valve head.

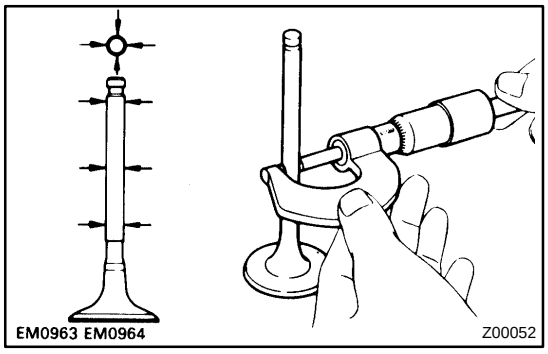
(b) Using a wire brush, thoroughly clean the valve.



9. INSPECT VALVE STEMS AND GUIDE BUSHINGS

(a) Using a caliper gauge, measure the inside diameter of the guide bushing.

Bushing inside diameter:
5.510 – 5.530 mm (0.2169 – 0.2177 in.)



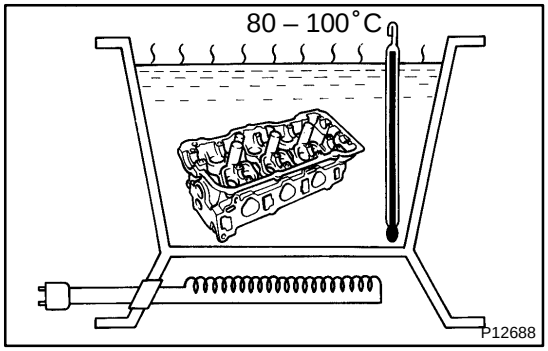
(b) Using a micrometer, measure the diameter of the valve stem.

Valve stem diameter:
Intake: 5.470 – 5.485 mm (0.2154 – 0.2159 in.)
Exhaust: 5.465 – 5.480 mm (0.2152 – 0.2157 in.)

(c) Subtract the valve stem diameter measurement from the guide bushing guide bushing inside diameter measurement.

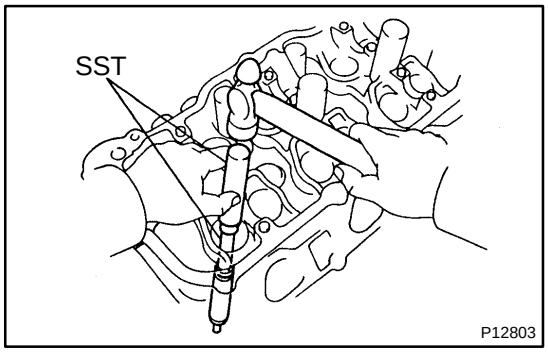
Standard oil clearance:
Intake: 0.025 – 0.060 mm (0.0010 – 0.0024 in.)
Exhaust: 0.030 – 0.065 mm (0.0012 – 0.0026 in.)
Maximum oil clearance:
Intake: 0.08 mm (0.0031 in.)
Exhaust: 0.10 mm (0.0039 in.)

If the clearance is greater than maximum, replace the valve and guide bushing.

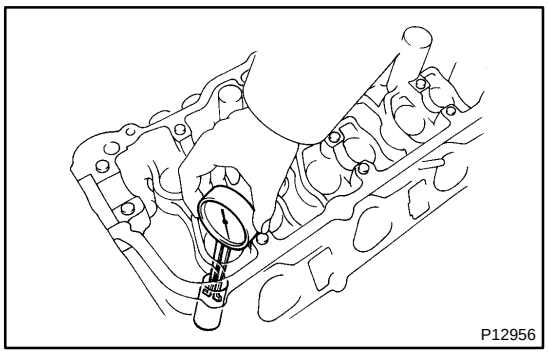


10. IF NECESSARY, REPLACE VALVE GUIDE BUSHINGS

(a) Gradually heat the cylinder head to 80 – 100˚C (176 – 212˚F).



(b) Using SST and a hammer, tap out the guide bushing.
SST 09201–01055, 09950–70010 (09951–07100)



(c) Using a caliper gauge, measure the bushing bore diameter of the cylinder head.

(d) Select a new guide bushing (STD or O/S 0.05).

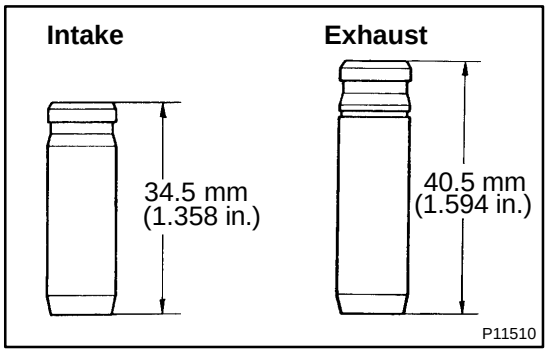
If the bushing bore diameter of the cylinder head is greater than 10.313 mm (0.4060 in.), machine the bushing bore to the following dimension:

10.345 – 10.363 mm (0.4073 – 0.4080 in.)

If the bushing bore diameter of the cylinder head is greater than 10.363 mm (0.4080 in.), replace the cylinder head.

Both intake and exhaust

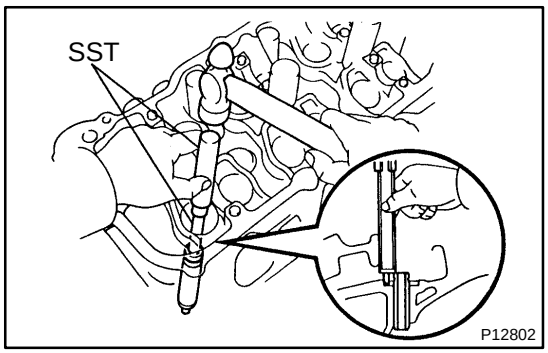
Bushing bore diameter mm (in.)	Bushing size
10.295 – 10.313 (0.4053 – 0.4060)	Use STD
10.345 – 10.363 (0.4073 – 0.4080)	Use O/S 0.05



HINT:

Different bushings are used for the intake and exhaust.

(e) Gradually heat the cylinder head to 80 – 100°C (176 – 212°F).



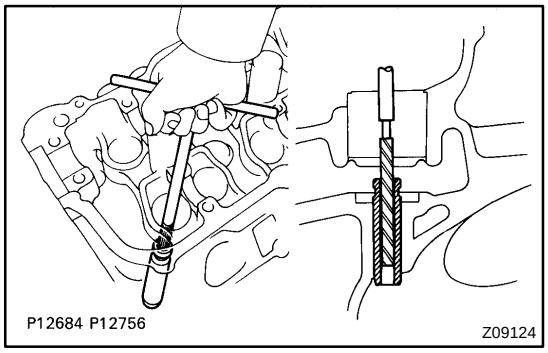
(f) Using SST and a hammer, tap in a new guide bushing to the specified protrusion height.

SST 09201–01055, 09950–70010 (09951–07100)

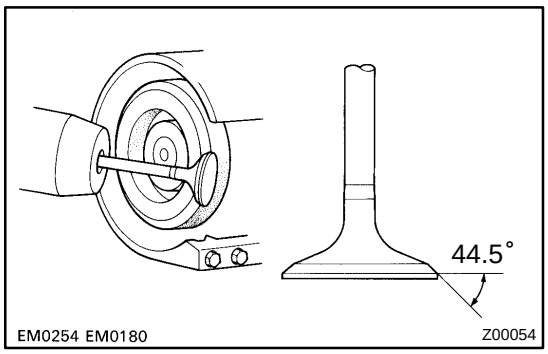
Protrusion height:

Intake: 11.5 – 11.3 mm (0.437 – 0.453 in.)

Exhaust: 8.9 – 9.3 mm (0.350 – 0.366 in.)



(g) Using a sharp 5.5 mm reamer, ream the guide bushing to obtain the standard specified clearance (See step 9 above) between the guide bushing and valve stem.

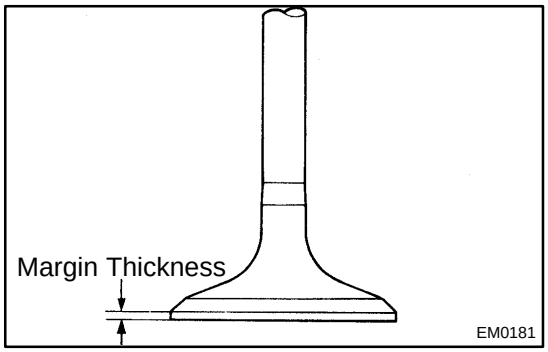


11. INSPECT AND GRIND VALVES

(a) Grind the valve enough to remove pits and carbon.

(b) Check that the valve is ground to the correct valve face angle.

Valve face angle: 44.5°

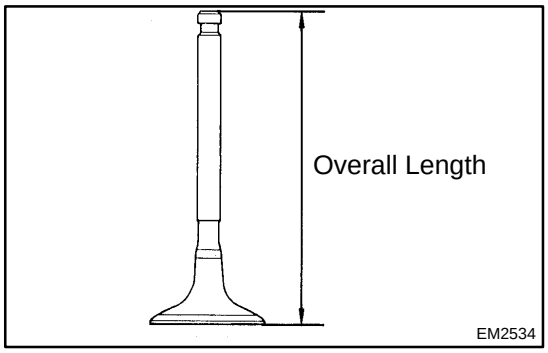


(c) Check the valve head margin thickness.

Standard margin thickness: 1.0 mm (0.039 in.)

Minimum margin thickness: 0.5 mm (0.020 in.)

If the margin thickness is less than minimum, replace the valve.



(d) Check the valve overall length.

Standard overall length:

Intake: 95.45 mm (3.5779 in.)

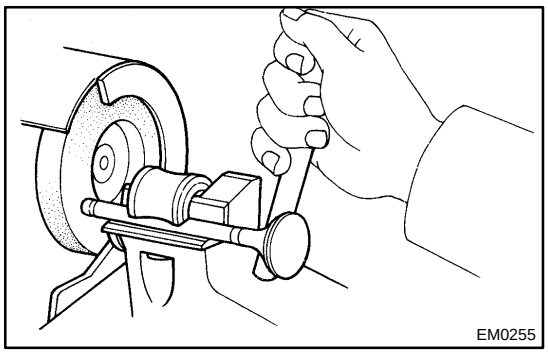
Exhaust: 95.40 mm (3.7559 in.)

Minimum overall length:

Intake: 94.95 mm (3.7382 in.)

Exhaust: 94.90 mm (3.7362 in.)

If the overall length is less than minimum, replace the valve.

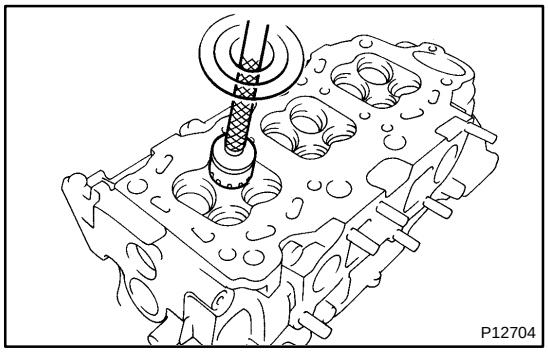


(e) Check the surface of the valve stem tip for wear.

If the valve stem tip is worn, resurface the tip with a grinder or replace the valve.

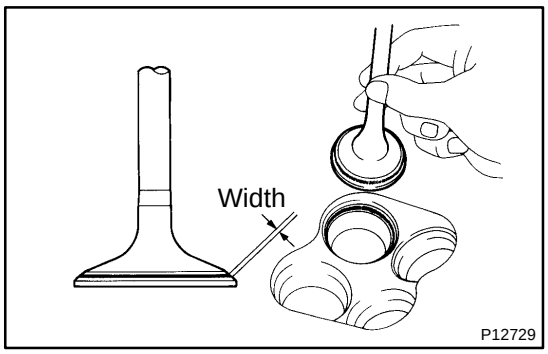
NOTICE:

Do not grind off more than minimum.



12. INSPECT AND CLEAN VALVE SEATS

(a) Using a 45° carbide cutter, resurface the valve seats. Remove only enough metal to clean the seats.

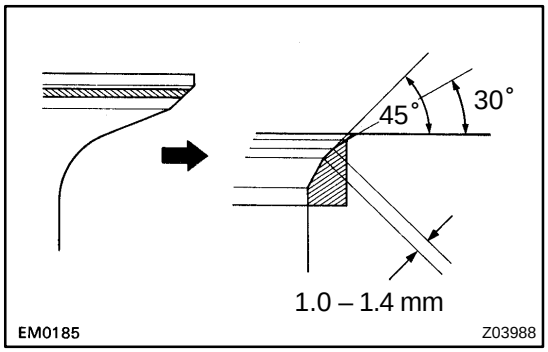


(b) Check the valve seating position.
Apply a light coat of prussian blue (or white lead) to the valve face. Lightly press the valve against the seat. Do not rotate valve.

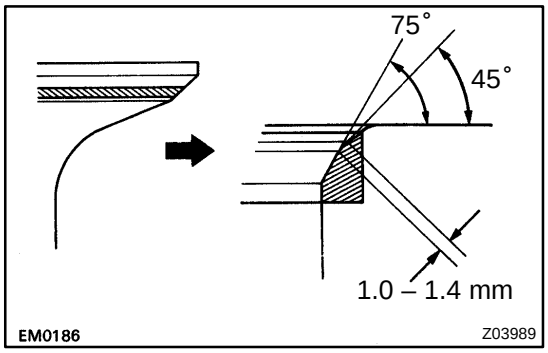
(c) Check the valve face and seat for the following:
- If blue appears 360˚ around the face, the valve is concentric. If not, replace the valve.
- If blue appears 360˚ around the valve seat, the guide and face are concentric. If not, resurface the seat.
- Check that the seat contact is in the middle of the valve face with the following width:

Contacting width: 1.0 – 1.4 mm (0.039 – 0.055 in.)

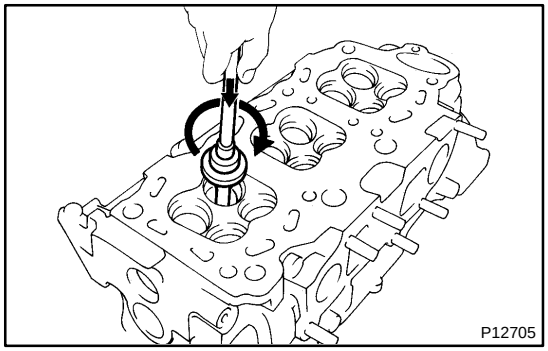
If not, correct the valve seats as follows:



- If the seating is too high on the valve face, use 30˚ and 45˚ cutters to correct the seat.

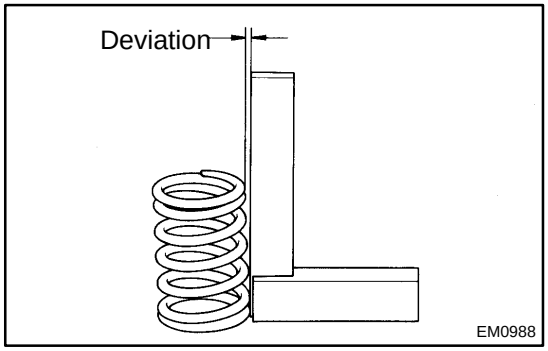


- If the seating is too low on the valve face, use 75˚ and 45˚ cutters to correct the seat.



(d) Hand–lap the valve and valve seat with an abrasive compound.

(e) After hand–lapping, clean the valve and valve seat.

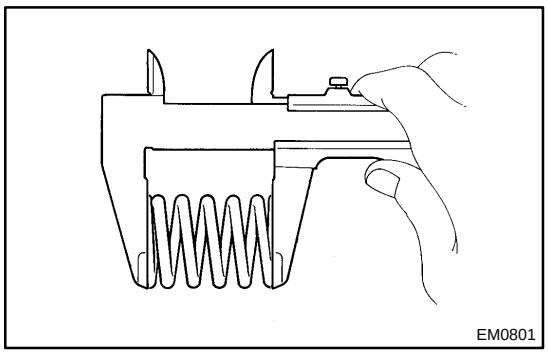


13. INSPECT VALVE SPRINGS

(a) Using a steel square, measure the deviation of the valve spring.

Maximum deviation: 2.0 mm (0.079 in.)

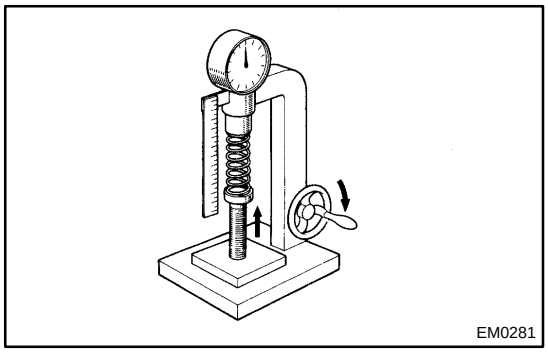
If the deviation is greater than maximum, replace the valve spring.


EM0801

(b) Using vernier calipers, measure the free length of the valve spring.

Free length: 45.50 mm (1.7913 in.)

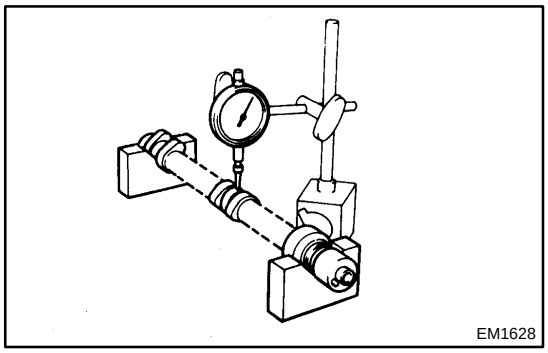
If the free length is not as specified, replace the valve spring.


EM0281

(c) Using a spring tester, measure the tension of the valve spring at the specified installed length.

Installed tension:
186 – 206 N (19.0 – 21.0 kgf, 41.9 – 46.3 lbf)
at 33.8 mm (1.331 in.)

If the installed tension is not as specified, replace the valve spring.


EM1628

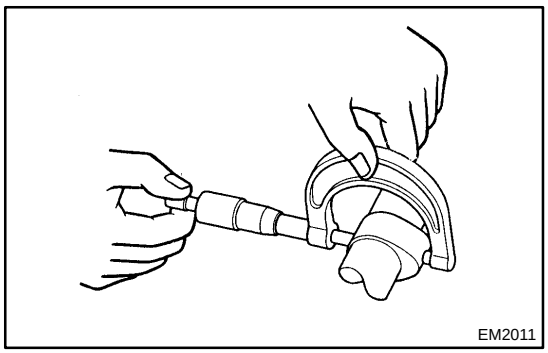
14. INSPECT CAMSHAFT FOR RUNOUT

(a) Place the camshaft on V–blocks.

(b) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout: 0.06 mm (0.0024 in.)

If the circle runout is greater than maximum, replace the camshaft.

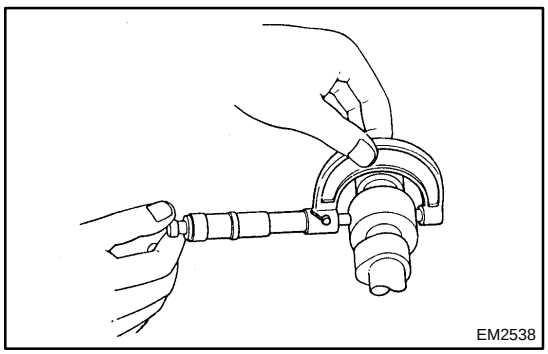

EM2011

15. INSPECT CAM LOBES

Using a micrometer, measure the cam lobe height.

Standard cam lobe height:
Intake: 42.11 – 42.21 mm (1.6579 – 1.6618 in.)
Exhaust: 41.96 – 42.06 mm (1.6520 – 1.6559 in.)
Minimum cam lobe height:
Intake: 41.96 mm (1.6520 in.)
Exhaust: 41.81 mm (1.6461 in.)

If the cam lobe height is less than minimum, replace the camshaft.

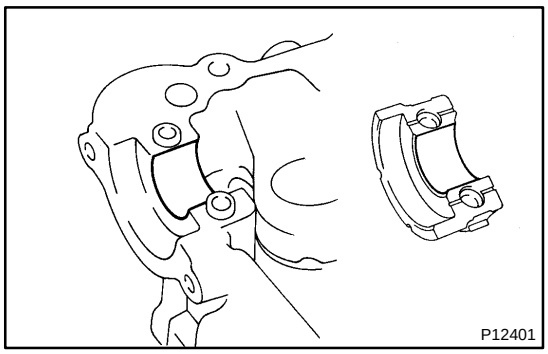

EM2538

16. INSPECT CAMSHAFT JOURNALS

Using a micrometer, measure the journal diameter.

Journal diameter:
Intake: 26.949 – 26.965 mm (1.0610 – 1.0616 in.)
Exhaust: 26.959 – 26.975 mm (1.0613 – 1.0620 in.)

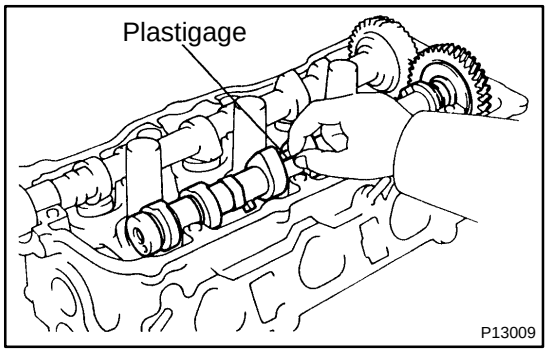
If the journal diameter is not as specified, check the oil clearance.



17. INSPECT CAMSHAFT BEARINGS

Check that bearings for flaking and scoring.

If the bearings are damaged, replace the bearing caps and cylinder head as a set.

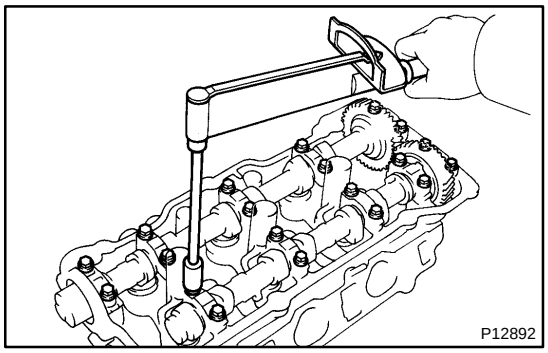


18. INSPECT CAMSHAFT JOURNAL OIL CLEARANCE

(a) Clean the bearing caps and camshaft journals.

(b) Place the camshafts on the cylinder head.

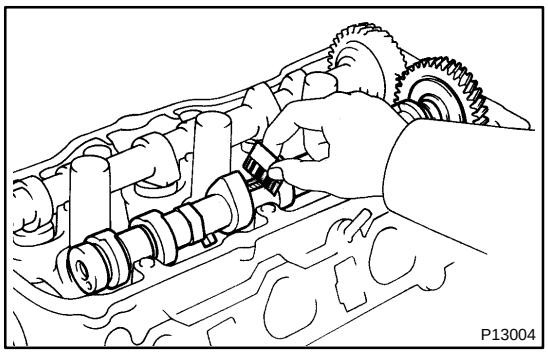
(c) Lay a strip of Plastigage across each of the camshaft journal.



(d) Install the bearing caps. (See page EM–52)
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

NOTICE:
Do not turn the camshaft.

(e) Remove the bearing caps.

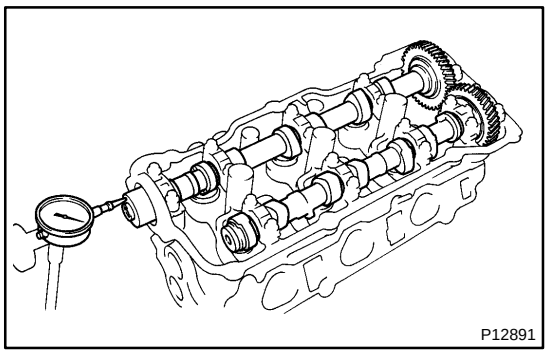


(f) Measure the Plastigage at its widest point.
Standard oil clearance:
Intake: 0.035 – 0.072 mm (0.0014 – 0.0028 in.)
Exhaust: 0.025 – 0.062 mm (0.0010 – 0.0024 in.)
Maximum oil clearance:
Intake: 0.10 mm (0.0039 in.)
Exhaust: 0.09 mm (0.0035 in.)

If the oil clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

(g) Completely remove the Plastigage.

(h) Remove the camshafts.



19. INSPECT CAMSHAFT THRUST CLEARANCE

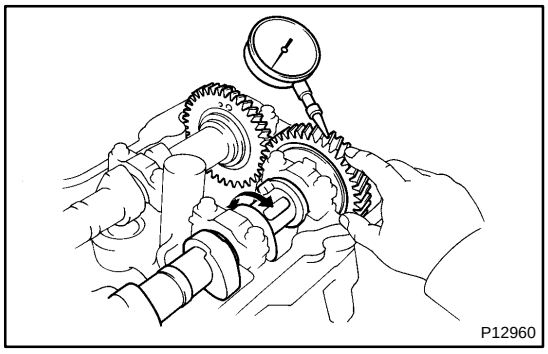
(a) Install the camshafts. (See page EM–52)

(b) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.

Standard thrust clearance:
0.040 – 0.090 mm (0.0016 – 0.0035 in.)
Maximum thrust clearance: 0.12 mm (0.0047 in.)

If the thrust clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

(c) Remove the camshafts.



20. INSPECT CAMSHAFT GEAR BACKLASH

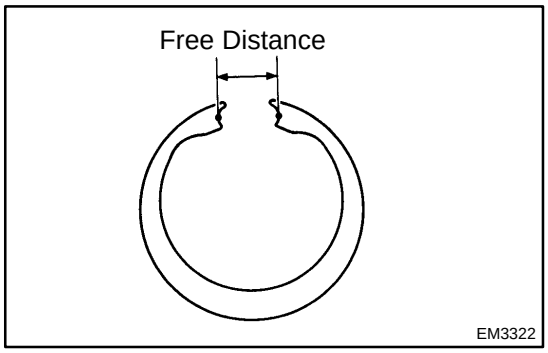
(a) Install the camshafts without installing the exhaust camshaft sub–gear. (See page EM–52)

(b) Using a dial indicator, measure the backlash.

Standard backlash:
0.020 – 0.200 mm (0.0008 – 0.0079 in.)
Maximum backlash: 0.30 mm (0.0188 in.)

If the backlash is greater then maximum, replace the camshafts.

(c) Remove the camshafts.

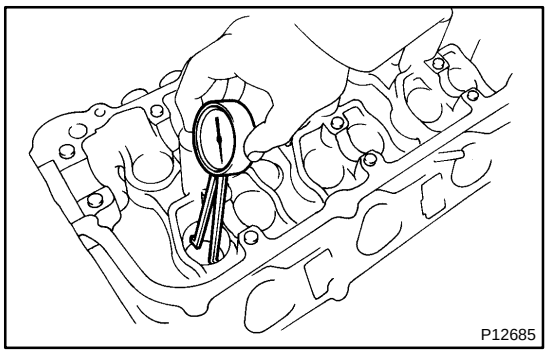


21. INSPECT CAMSHAFT GEAR SPRING

Using vernier calipers, measure the free distance between the spring ends.

Free distance: 18.2 – 18.8 mm (0.712 – 0.740 in.)

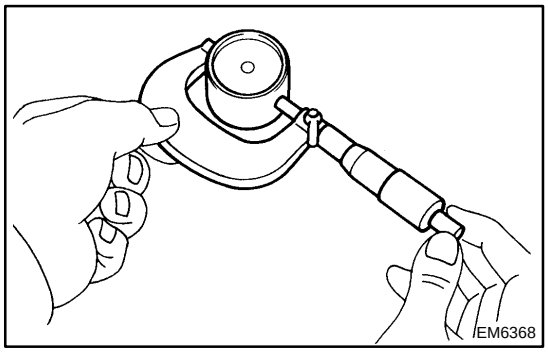
If the free distance is not as specified, replace the gear spring.



22. INSPECT VALVE LIFTERS AND LIFTER BORES

(a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.

Lifter bore diameter:
31.000 – 31.018 mm (1.2205 – 1.2212 in.)



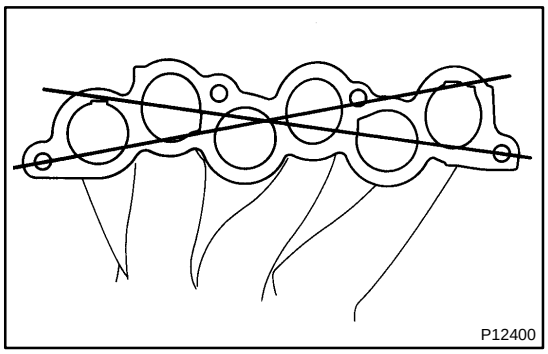
(b) Using a micrometer, measure the lifter diameter.

Lifter diameter:
30.966 – 30.976 mm (1.2191 – 1.2195 in.)

(c) Subtract the lifter diameter measurement from the lifter bore diameter measurement.

Standard oil clearance:
0.024 – 0.050 mm (0.0009 – 0.0020 in.)
Maximum oil clearance: 0.07 mm (0.0028 in.)

If the oil clearance is greater than maximum, replace the lifter. If necessary, replace the cylinder head.

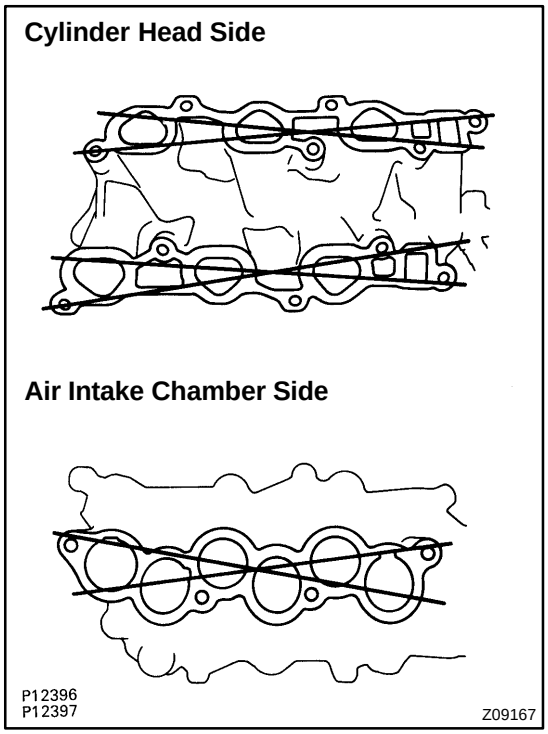


23. INSPECT AIR INTAKE CHAMBER

Using a precision straight edge and feeler gauge, measure the surface contacting the intake manifold for warpage.

Maximum warpage: 0.10 mm (0.0039 in.)

If warpage is greater than maximum, replace the chamber.

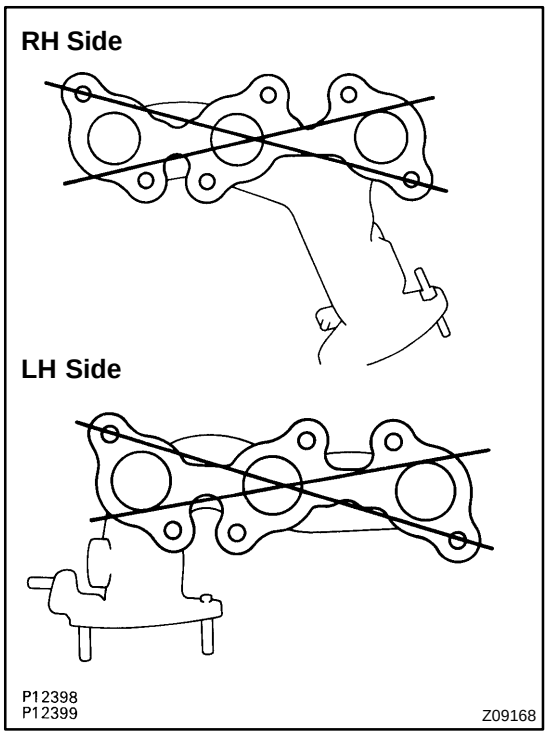


24. INSPECT INTAKE MANIFOLD

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head and air intake chamber for warpage.

Maximum warpage:
Air intake chamber side: 0.15 mm (0.0059 in.)
Cylinder head side: 0.08 mm (0.0031 in.)

If warpage is greater than maximum, replace the manifold.

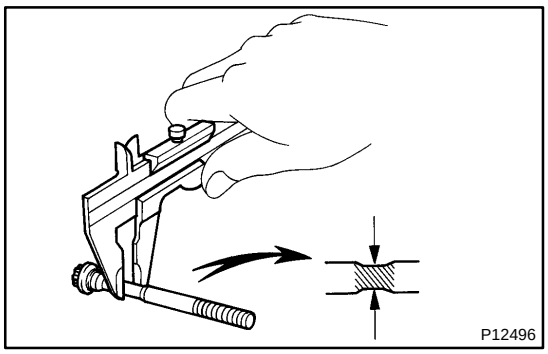


25. INSPECT EXHAUST MANIFOLDS

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head for warpage.

Maximum warpage: 0.50 mm (0.0196 in.)

If warpage is greater than maximum, replace the manifold.

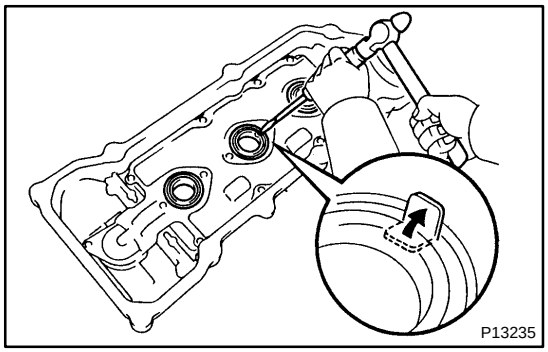


26. INSPECT 12 POINTED HEAD CYLINDER HEAD BOLTS

Using vernier calipers, measure the tension portion diameter of the bolt.

Standard outside diameter:
8.95 – 9.05 mm (0.3524 – 0.3563 in.)
Minimum outside diameter: 8.75 mm (0.3445 in.)

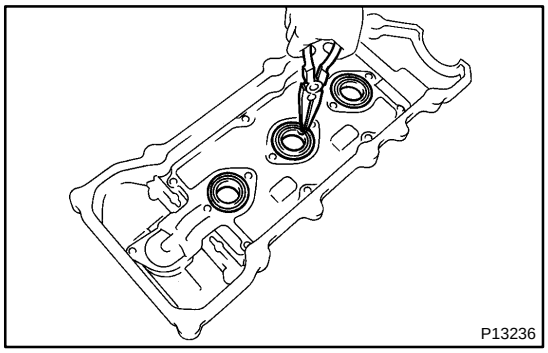
If the diameter is less than minimum, replace the bolt.



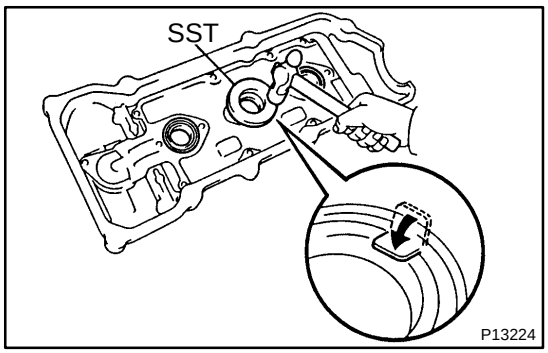
27. IF NECESSARY, REPLACE SPARK PLUG TUBE GASKETS

(a) Bend up the tab on the ventilation baffle plate which prevents the gasket from the slipping out.

(b) Using a screwdriver and hammer, tap out the gasket.



(c) Using needle–nose pliers, pry out the gasket.



(d) Using SST and a hammer, tap in a new gasket until its surface is flush with the upper edge of the cylinder head cover.

SST 09608–03071

(e) Apply a light coat of MP grease to the gasket lip.

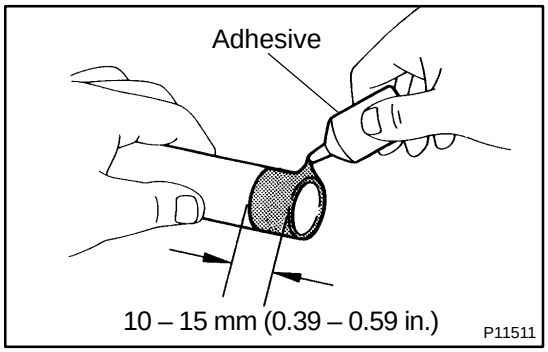
(f) Return the ventilation plate tab to its original position.

EM046–02

REASSEMBLY

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- Replace all gaskets and oil seals with new ones.

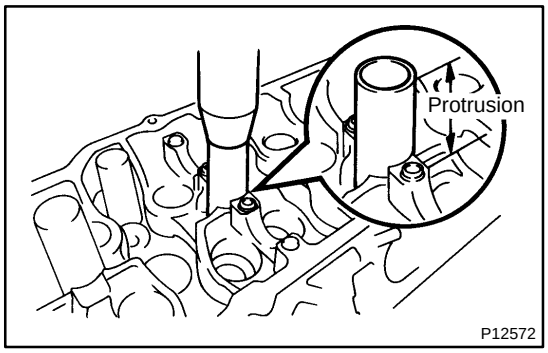


1. INSTALL SPARK PLUG TUBES

HINT:

When using a new cylinder head, spark plug tubes must be installed.

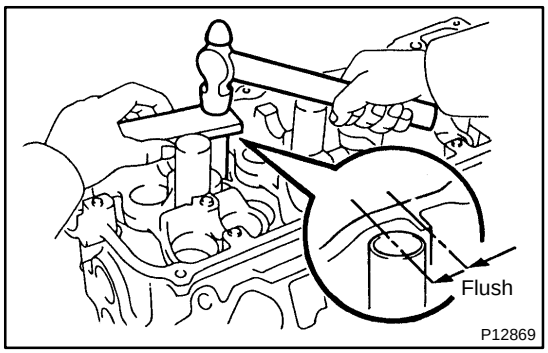
(a) Apply adhesive to the end of the spark plug tube.
Adhesive: Part No. 08833–00070, THREE BOND 1324 or equivalent



(b) Using a press, press in a new spark plug tube until there is 42.4 – 43.4 mm (1.669 – 1.709 in.) protruding from the camshaft bearing cap installation surface of the cylinder head.

NOTICE:

Avoid pressing a new spark plug tube in too far by measuring the amount of the protrusion while pressing.



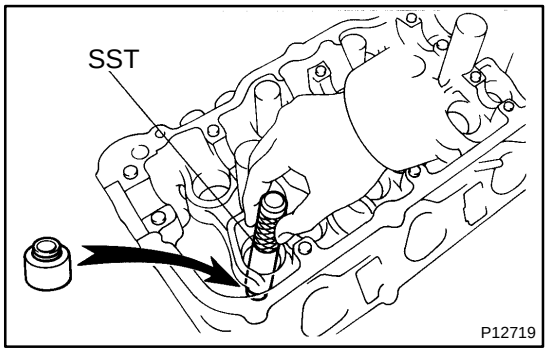
2. INSTALL PCV PIPES

HINT:

When using a new cylinder head, PCV pipe must be installed.
Using a wooden block and hammer, tap in a new PCV pipe until its top side is flush with the cylinder head edge.

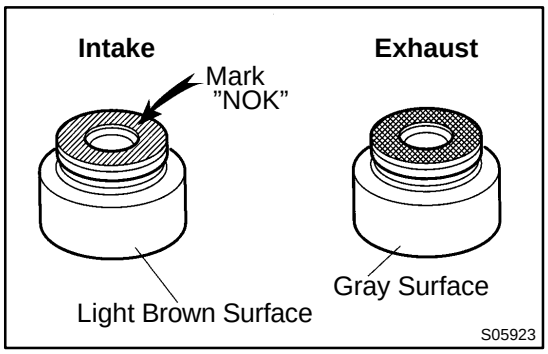
NOTICE:

Be careful not to damage the cylinder head edge.



3. INSTALL VALVES

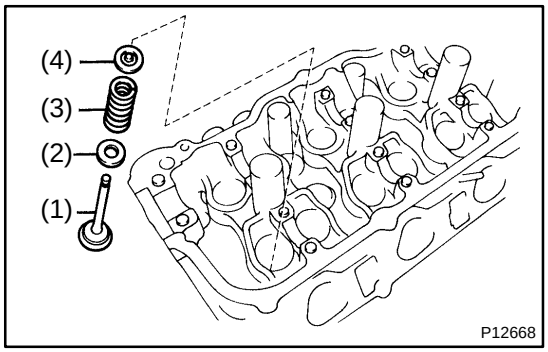
(a) Using SST, push in a new oil seal.
SST 09201–41020



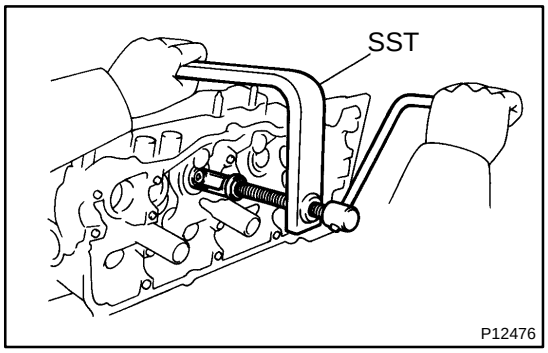
HINT:
The intake valve oil seal is light brown and the exhaust valve oil seal is gray.

NOTICE:

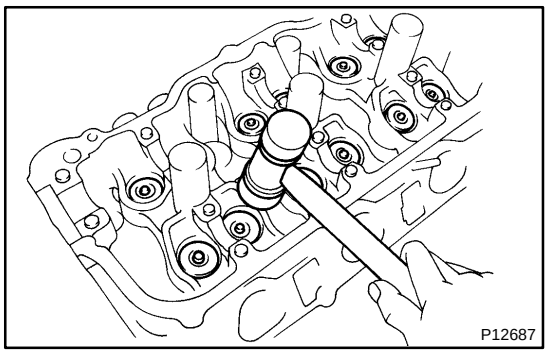
Pay much attention when assembling the oil seal for intake and exhaust. Assembling the wrong one may cause a failure.



(b) Install these parts:
(1) Valve
(2) Spring seat
(3) Valve spring
(4) Spring retainer



(c) Using SST, compress the valve spring and place the 2 keepers around the valve stem.
SST 09202–70020 (09202–00010)



(d) Using a plastic–faced hammer, lightly tap the valve stem tip to ensure a proper fit.

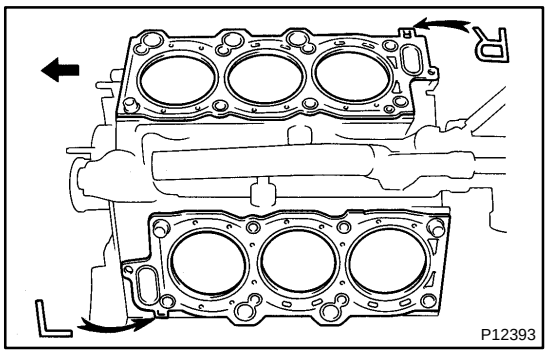
4. INSTALL VALVE LIFTERS AND SHIMS

(a) Install the valve lifter and shim.

(b) Check that the valve lifter rotates smoothly by hand.

EM047–02

INSTALLATION



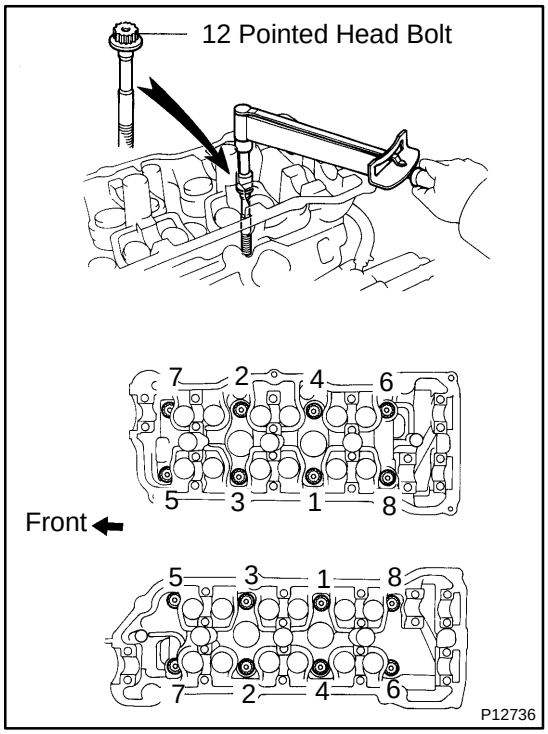
1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

(a) Place 2 new cylinder head gaskets in position on the cylinder block.

NOTICE:

Be careful of the installation direction.

(b) Place the 2 cylinder heads in position on the cylinder head gaskets.



2. INSTALL 12 POINTED HEAD CYLINDER HEAD BOLTS

HINT:

- The cylinder head bolts are tightened in 2 progressive steps (steps (c) and (e)).
- If any bolt is broken or deformed, replace it.

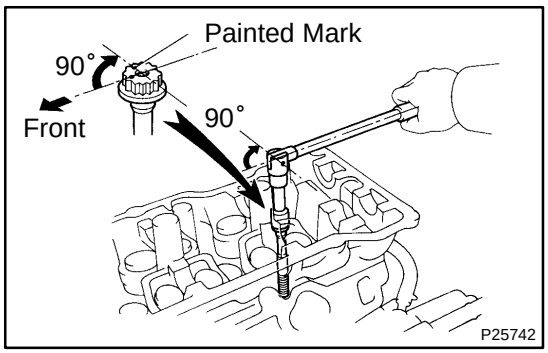
(a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.

(b) Install the plate washer to the cylinder head bolt.

(c) Install and uniformly tighten the cylinder head bolts on each cylinder head, in several passes, in the sequence shown, then repeat for the other side, as shown.

Torque: 54 N·m (550 kgf·cm, 40 ft·lbf)

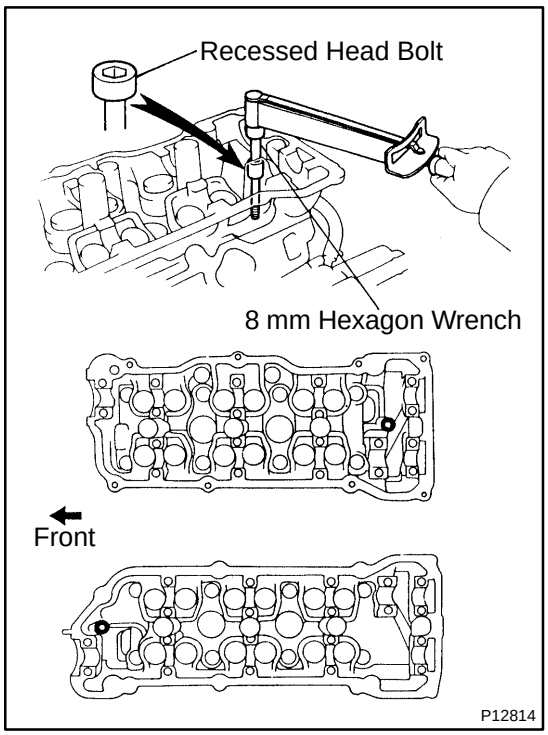
If any of the cylinder head bolts does not meet the torque specification, replace the cylinder head bolt.



(d) Mark the front of the cylinder head bolt head with paint.

(e) Retighten the cylinder head bolts by 90˚ in the numerical order shown.

(f) Check that the painted mark is now at a 90˚ angle to the front.

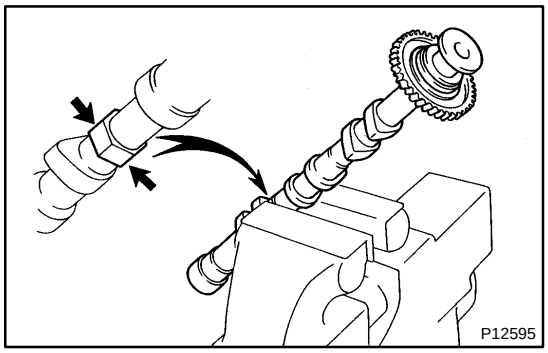


3. INSTALL RECESSED HEAD CYLINDER HEAD BOLTS

(a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.

(b) Using an 8 mm hexagon wrench, install the cylinder head bolt on each cylinder head, then repeat for the other side, as shown.

Torque: 18.5 N·m (185 kgf·cm, 13 ft·lbf)

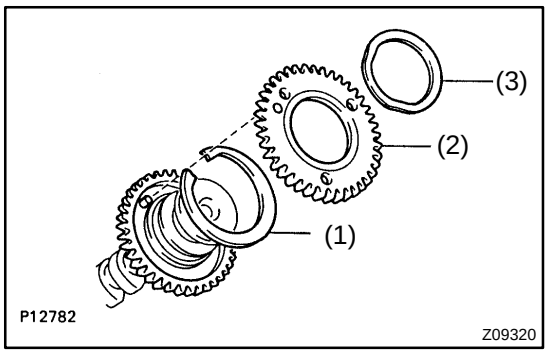


4. ASSEMBLE EXHAUST CAMSHAFTS

(a) Mount the hexagonal wrench head portion of the camshaft in a vise.

NOTICE:

Be careful not to damage the camshaft.



(b) Install these parts:

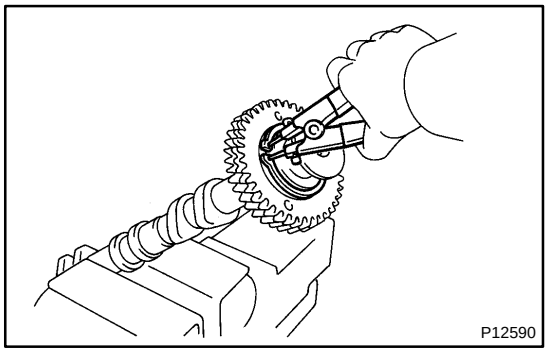
(1) Camshaft gear spring

(2) Camshaft sub–gear

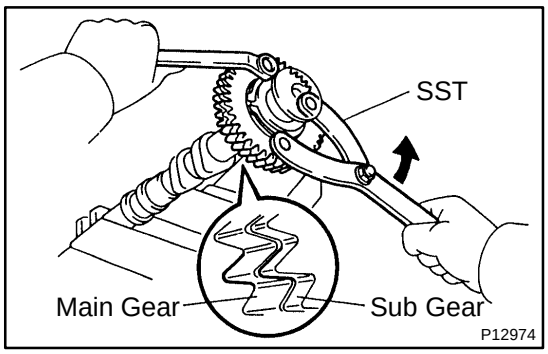
HINT:

Attach the pins on the gears to the gear spring ends.

(3) Wave washer



(c) Using snap ring pliers, install the snap ring.



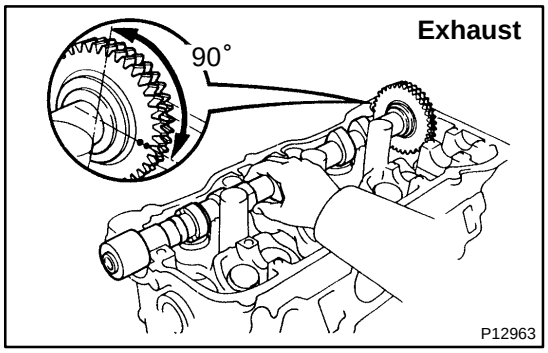
(d) Using SST, align the holes of the camshaft main gear and sub–gear by turning camshaft sub–gear counterclockwise, and temporarily install a service bolt.
SST 09960–10010 (09962–01000, 09963–00500)

(e) Align the gear teeth of the main gear and sub–gear, and tighten the service bolt.

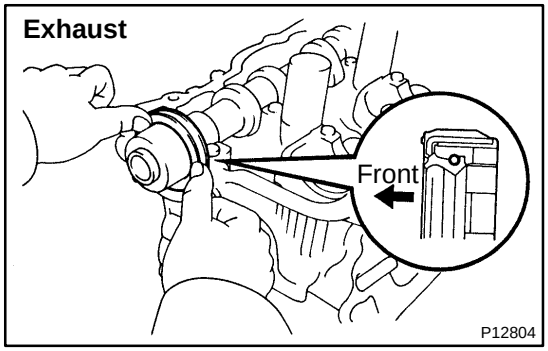
5. INSTALL CAMSHAFTS OF RH CYLINDER HEAD

NOTICE:

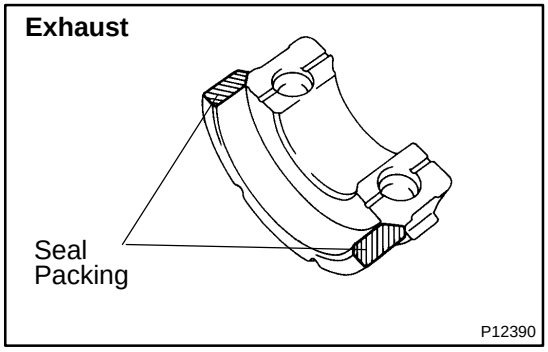
Since the thrust clearance of the camshaft is small, the camshaft must be held level while it is being installed. If the camshaft is not level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.



(a) Install the exhaust camshaft.
(1) Apply new engine oil to the thrust portion and journal of the camshaft.
(2) Place the exhaust camshaft at 90° angle of timing mark (2 dot marks) on the cylinder head.
(3) Apply MP grease to a new oil seal lip.

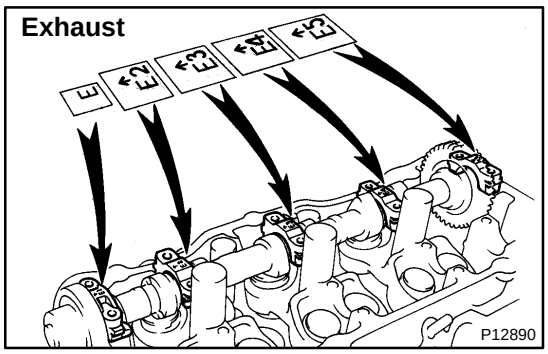


(4) Install the oil seal to the camshaft.

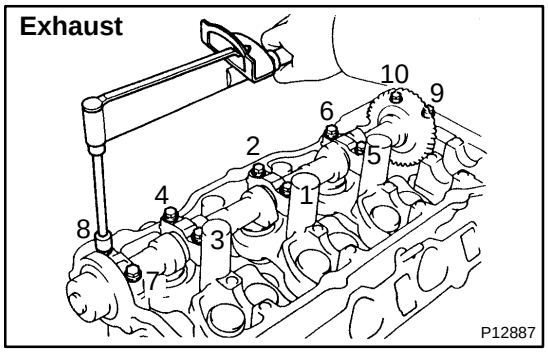


(5) Remove any old packing (FIPG) material.
(6) Apply seal packing to the No.1 bearing cap as shown.

Seal packing: Part No. 08826–00080 or equivalent

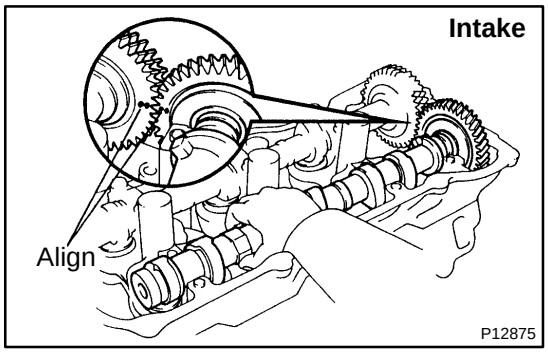


(7) Install the 5 bearing caps in their proper locations.

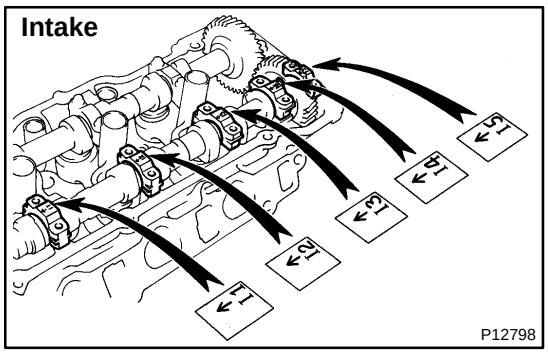


(8) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
(9) Install and uniformly tighten the 10 bearing cap bolts, in several passes, in the sequence shown.

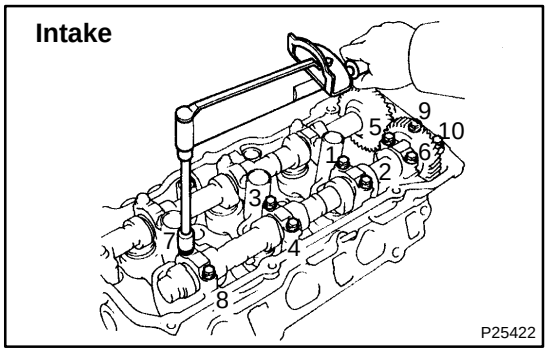
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)



(b) Install the intake camshaft.
(1) Apply new engine oil to the thrust portion and journal of the camshaft.
(2) Align the timing marks (2 dot marks) of the camshaft drive and driven gears.
(3) Place the intake camshaft on the cylinder head.

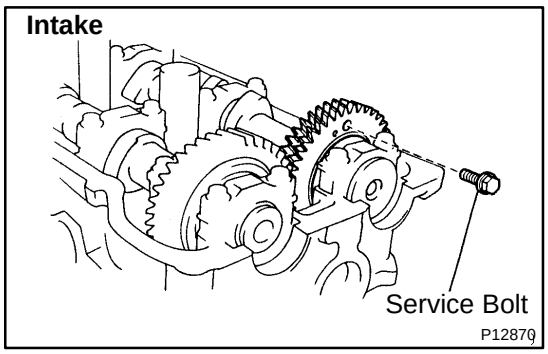


(4) Install the 5 bearing caps in their proper locations.



(5) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
(6) Install and uniformly tighten the 10 bearing cap bolts, in several passes, in the sequence shown.

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

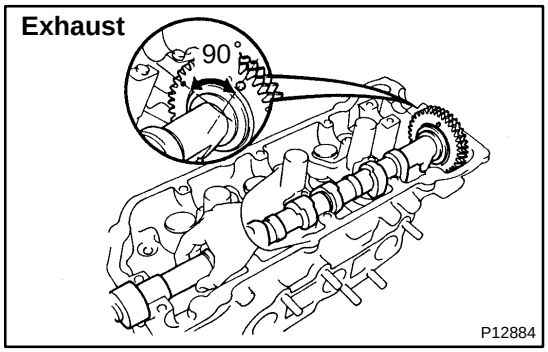


(7) Remove the service bolt.

6. INSTALL CAMSHAFTS OF LH CYLINDER HEAD

NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be held level while it is being installed. If the camshaft is not level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.

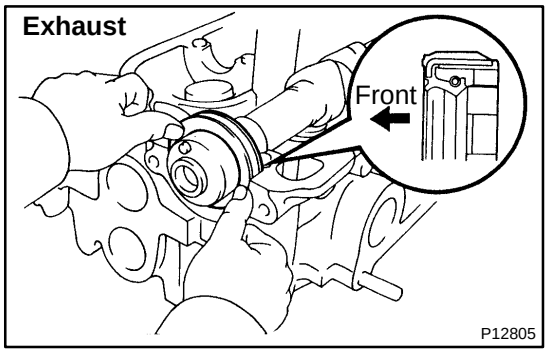


(a) Install the exhaust camshaft.

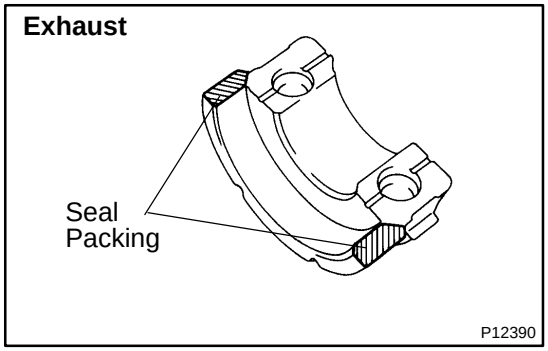
(1) Apply new engine oil to the thrust portion and journal of the camshaft.

(2) Place the exhaust camshaft at 90° angle of timing mark (1 dot mark) on the cylinder head.

(3) Apply MP grease to a new oil seal lip.



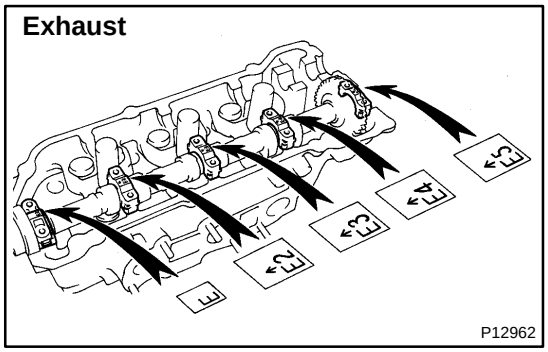
(4) Install the oil seal to the camshaft.



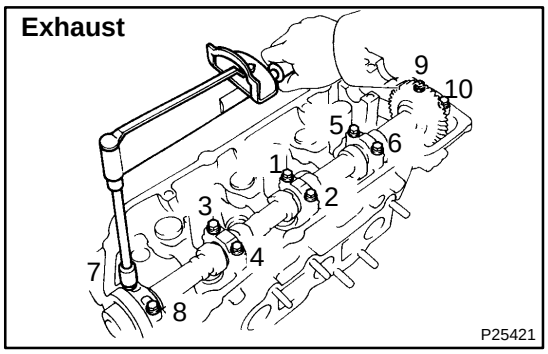
(5) Remove any old packing (FIPG) material.

(6) Apply seal packing to the No.1 bearing cap as shown.

Seal packing: Part No. 08826–00080 or equivalent



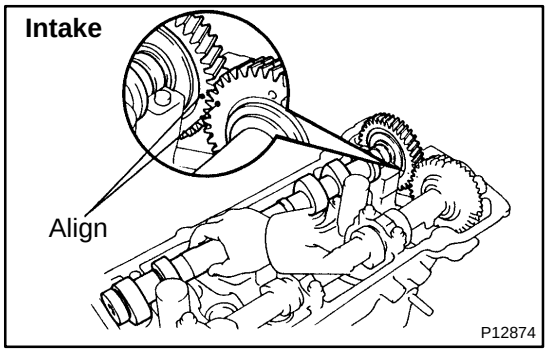
(7) Install the 5 bearing caps in their proper locations.



(8) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.

(9) Install and uniformly tighten the 10 bearing cap bolts, in several passes, in the sequence shown.

Torque: 1 6 N·m (160 kgf·cm, 12 ft·lbf)

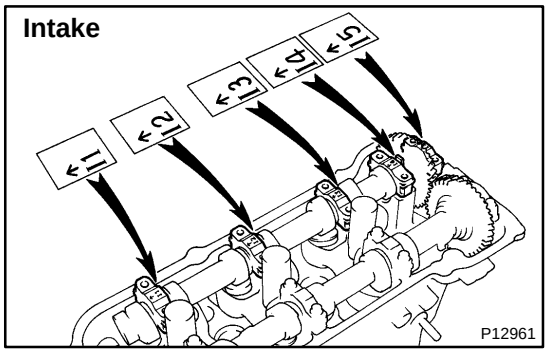


(b) Install the intake camshaft.

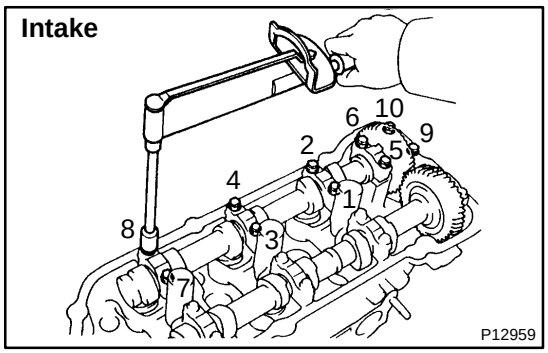
(1) Apply new engine oil to the thrust portion and journal of the camshaft.

(2) Align the timing marks (1 dot mark) of the camshaft drive and driven gears.

(3) Place the intake camshaft on the cylinder head.



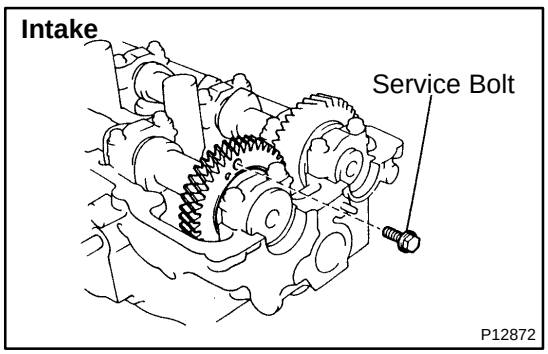
(4) Install the 5 bearing caps in their proper locations.



(5) Apply a light coat of engine oil on the threads and under the heads of bearing cap bolts.

(6) Install and uniformly tighten the 10 bearing cap bolts, in several passes, in the sequence shown.

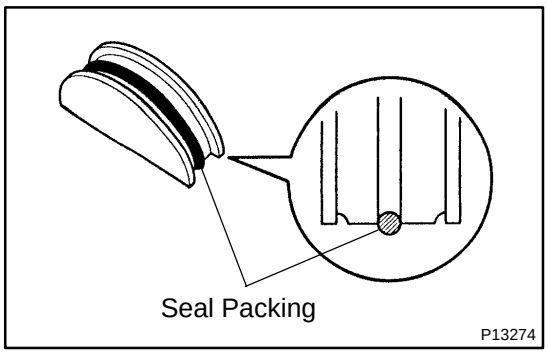
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)



(7) Remove the service bolt.

7. CHECK AND ADJUST VALVE CLEARANCE
(See page EM–4)

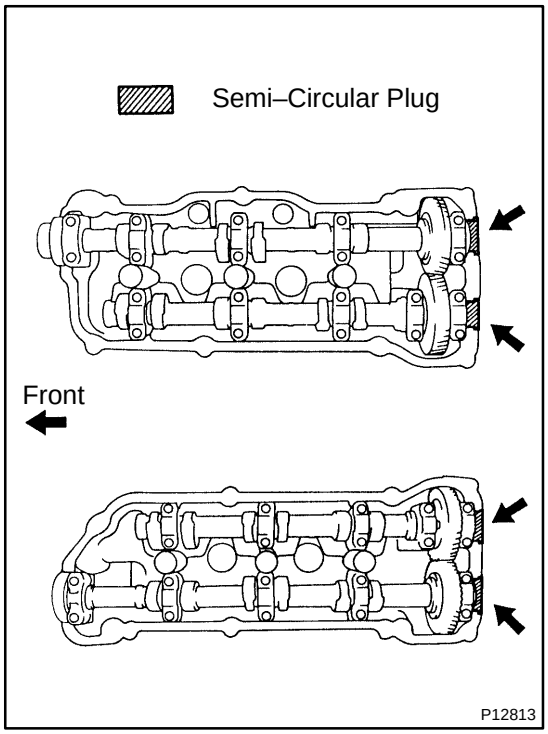
Turn the camshaft and position the cam lobe upward, and check and adjust the valve clearance.



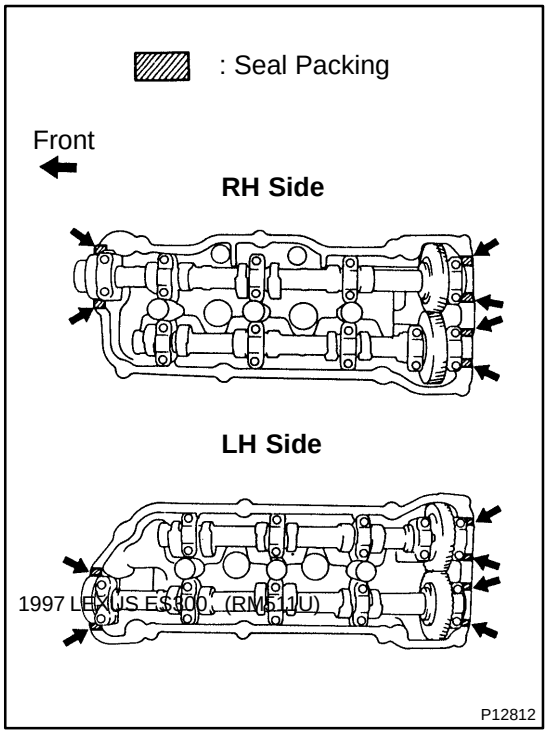
8. INSTALL SEMI–CIRCULAR PLUGS

(a) Remove any old packing (FIPG) material.

(b) Apply seal packing to the semi–circular plug grooves.
Seal packing: Part No. 08826–00080 or equivalent



(c) Install the 4 semi–circular plugs to the cylinder heads.

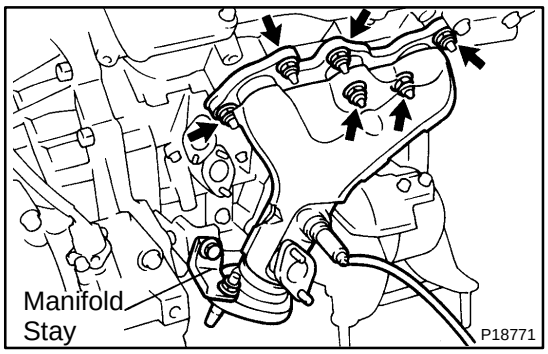


9. INSTALL CYLINDER HEAD COVERS

(a) Apply seal packing to the cylinder heads as shown in the illustration.
Seal packing: Part No. 08826–00080 or equivalent

(b) Install the gasket to the cylinder head cover.

(c) Install the cylinder head cover with the 8 bolts. Uniformly tighten the bolts in several passes. Install the 2 cylinder head covers.
Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

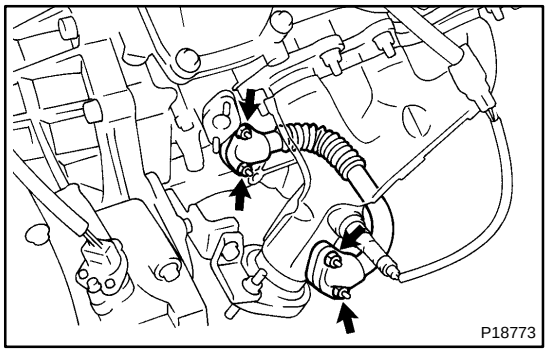


10. INSTALL RH EXHAUST MANIFOLD

(a) Install a new gasket and the exhaust manifold with the 6 nuts. Uniformly tighten the nuts in several passes.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

(b) Install the exhaust manifold stay with the bolt and nut. Alternately tighten the bolt and nut.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

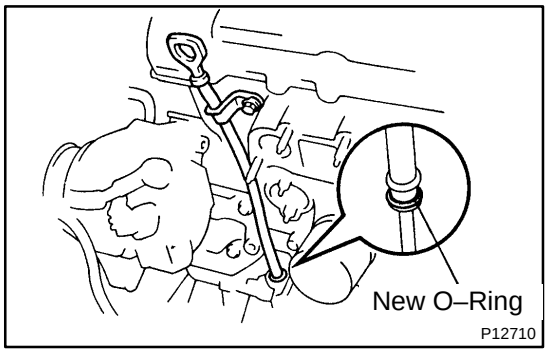
(c) Connect the oxygen sensor (bank 1 sensor 1) connector.



11. INSTALL NO.1 EGR PIPE

Install 2 new gaskets and the EGR pipe with the 4 nuts.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

12. INSTALL PS PUMP BRACKET
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



13. INSTALL OIL DIPSTICK AND GUIDE

(a) Install a new O–ring to the dipstick guide.

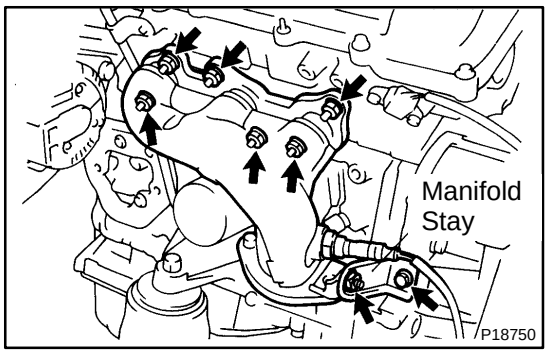
(b) Apply soapy water to the O–ring.

(c) Push in the dipstick guide end into the guide hole of the No.1 oil pan.

(d) Install the dipstick guide with the bolt.
Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

(e) Install the dipstick.

14. INSTALL CAMSHAFT POSITION SENSOR

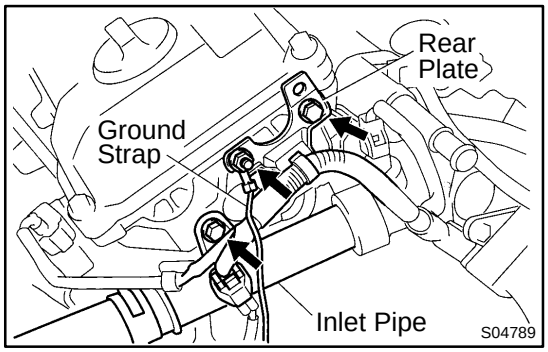


15. INSTALL LH EXHAUST MANIFOLD

(a) Install a new gasket and the exhaust manifold with the 6 nuts. Uniformly tighten the nuts in several passes.
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

(b) Install the exhaust manifold stay with the bolt and nut. Alternately tighten the bolt and nut.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

(c) Connect the oxygen sensor (bank 1 sensor 1) connector.



16. INSTALL WATER INLET PIPE

(a) Install a new O–ring to the water inlet pipe.

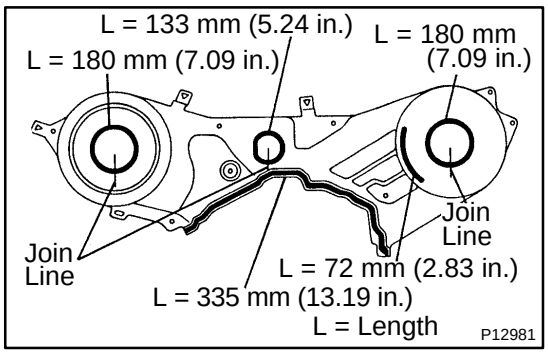
(b) Apply soapy water to the O–ring.

(c) Connect the water inlet pipe to the water inlet.

(d) Install the bolt holding the water inlet pipe to the cylinder head.
Torque: 19.5 N·m (200 kgf·cm, 14 ft·lbf)

17. INSTALL CYLINDER HEAD REAR PLATE
Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

18. INSTALL ENGINE WIRE PROTECTOR



19. INSTALL NO.3 TIMING BELT COVER

(a) Check that the timing belt cover gaskets have no cracks or peeling, etc.

If the gaskets have cracks or peeling etc., replace them using these steps:

- Using a screwdriver and gasket scraper, remove all the old gasket material.
- Thoroughly clean all components to remove all the loose material.
- Remove the backing paper from a new gasket and install the gasket evenly to the part of the timing belt cover shaded black in the illustration.

NOTICE:

When joining 2 gaskets, do not leave a gap between them. Cut off any excess gasket.

- After installing the gasket, press down on it so that the adhesive firmly sticks to the timing belt cover.

(b) Install the timing belt cover with the 6 bolts.

Torque: 8.5 N·m (85 kgf·cm, 74 in.·lbf)

(c) Install the 3 engine wire clamps to the timing belt cover.

20. INSTALL NO.2 IDLER PULLEY

(See page EM–20)

21. INSTALL CAMSHAFT TIMING PULLEYS

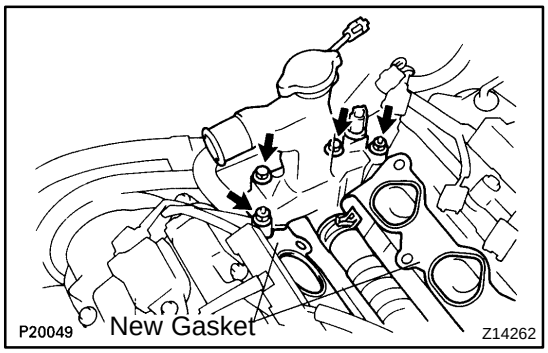
(See page EM–20)

22. INSTALL TIMING BELT

(See page EM–20)

23. INSTALL SPARK PLUGS

24. INSTALL IGNITION COILS



25. INSTALL PS PUMP DRIVE BELT

26. INSTALL GENERATOR DRIVE BELT

27. INSTALL WATER OUTLET

(a) Install 2 new gaskets.

(b) Connect the water outlet to the bypass hose.

(c) Install the water outlet with the 2 bolts, 2 nuts and 2 plate washers. Alternately tighten the bolts and nuts.

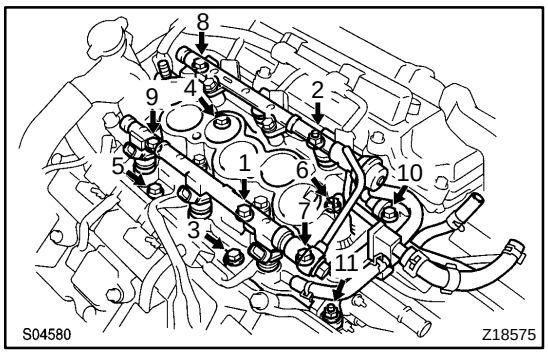
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

NOTICE:

Do not scratch the seal surface of the water outlet with the stud bolt.

(d) Connect these connectors, (strap) and hoses:

- ECT sender gauge connector
- ECT sensor connector
- Ground strap (connector)
- Radiator hose
- Engine coolant reservoir hose



28. INSTALL INTAKE MANIFOLD ASSEMBLY

(a) Install the intake manifold, delivery pipe and injectors assembly with the 9 bolts, 2 plate washers and 2 nuts. Uniformly tighten the bolts and nuts, in several passes, in the sequence shown.

Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

(b) Connect these hoses:

- Fuel inlet hose to fuel filter

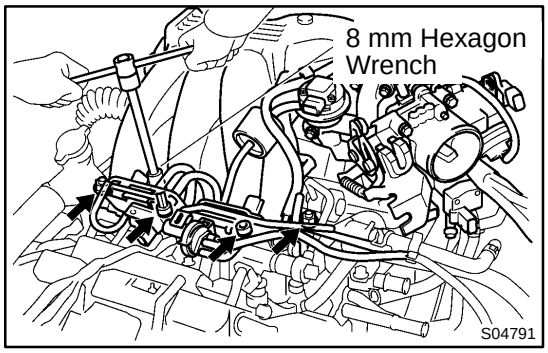
CAUTION:
Perform connecting operations of the fuel tube connector (quick type) after observing the precautions.
(See page SF–1)

- Heater hose to intake manifold

29. RETIGHTEN WATER OUTLET MOUNTING BOLTS AND NUTS

Tighten the 2 bolts and 2 nuts.

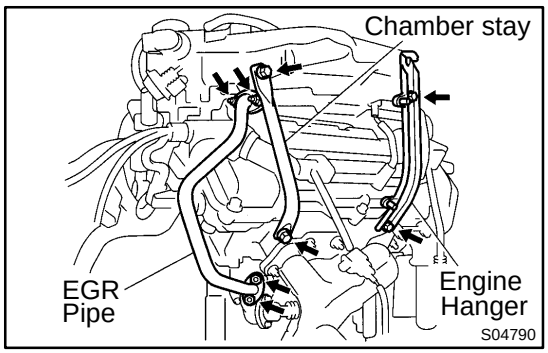
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)



30. INSTALL AIR INTAKE CHAMBER ASSEMBLY

(a) Using an 8 mm hexagon wrench, install a new gasket and the air intake chamber assembly with the 2 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



(b) Install 2 new gaskets and No.2 EGR pipe with the 4 nuts.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

(c) Install the No.1 engine hanger with the 2 bolts.

Torque: 39 N·m (400 kgf·cm, 19 ft·lbf)

(d) Install the air intake chamber stay with the 2 bolts.

Torque: 19.5 N·m (200 kgf·cm, 14 ft·lbf)

(e) Connect the hoses, cables, strap and clamp:

- PCV hose to PCV valve on RH cylinder head
- Ground strap and cable to intake air control valve for ACIS
  Connect the ground cable and strap with the nut.

Torque: 14.5 N·m (145 kgf·cm, 10 ft·lbf)

- Ground cable to air intake chamber
- Brake booster vacuum hose to air intake chamber
- 2 water bypass hoses to throttle body
- Air assist hose to throttle body
- EVAP hose to pipe on emission control valve set
- 2 vacuum hoses to vacuum tank for ACIS
- Engine wire clamp to emission control valve set

(f) Install the PS pressure tube with the 2 nuts.

(g) Connect these connectors and cables:

- Throttle position sensor connector
- IAC valve connector
- EGR gas temperature sensor connector
- EGR valve position sensor connector
- VSV connector for ACIS
- VSV connecter for EVAP
- VSV connector for EGR
- DLC1 to bracket on intake air control valve
- Accelerator cable
- A/T throttle cable

31. INSTALL HIGH–TENSION CORD SET

32. INSTALL V–BANK COVER

33. INSTALL RH ENGINE MOUNTING STAY
(See page EM–71)

34. INSTALL FRONT EXHAUST PIPE
(See page EM–71)

35. INSTALL AIR FILTER AND AIR CLEANER CAP ASSEMBLY

36. FILL WITH ENGINE COOLANT

37. START ENGINE AND CHECK FOR LEAKS

38. VEHICLE ROAD TEST

Check for abnormal noise, shock, slippage, correct shift points and smoothly operation.

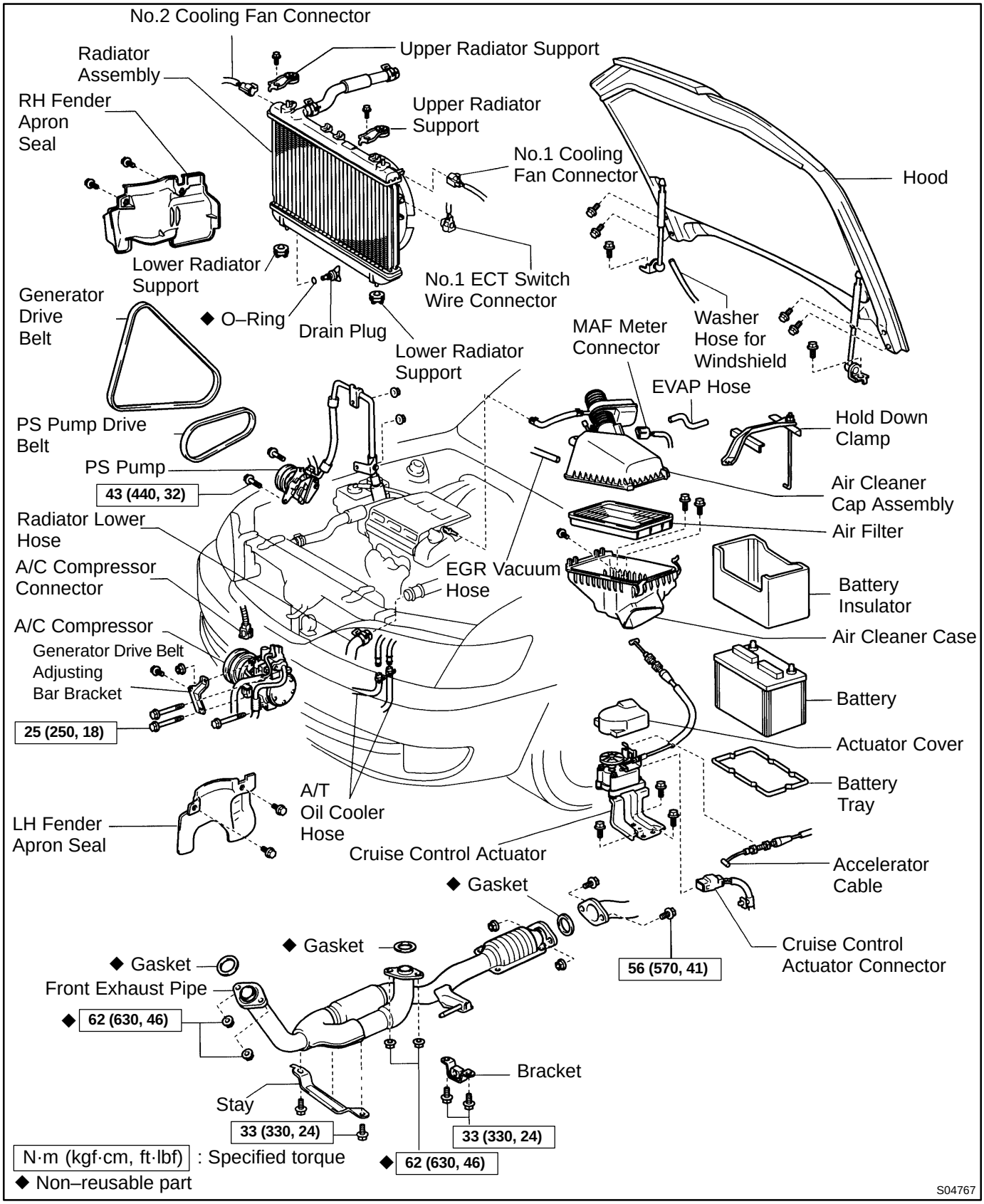
39. RECHECK ENGINE COOLANT LEVEL

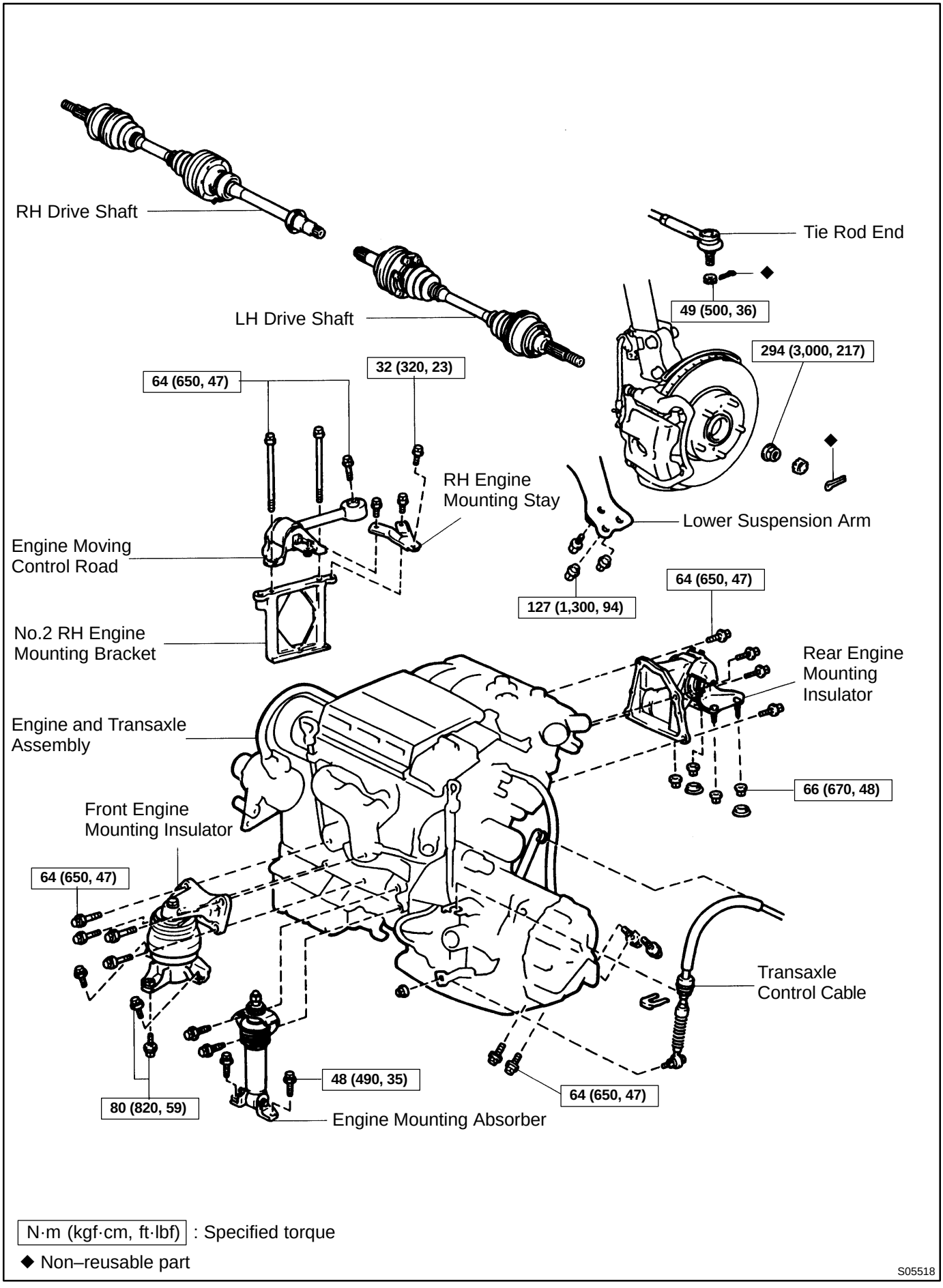
40. INSTALL RH FENDER APRON SEAL

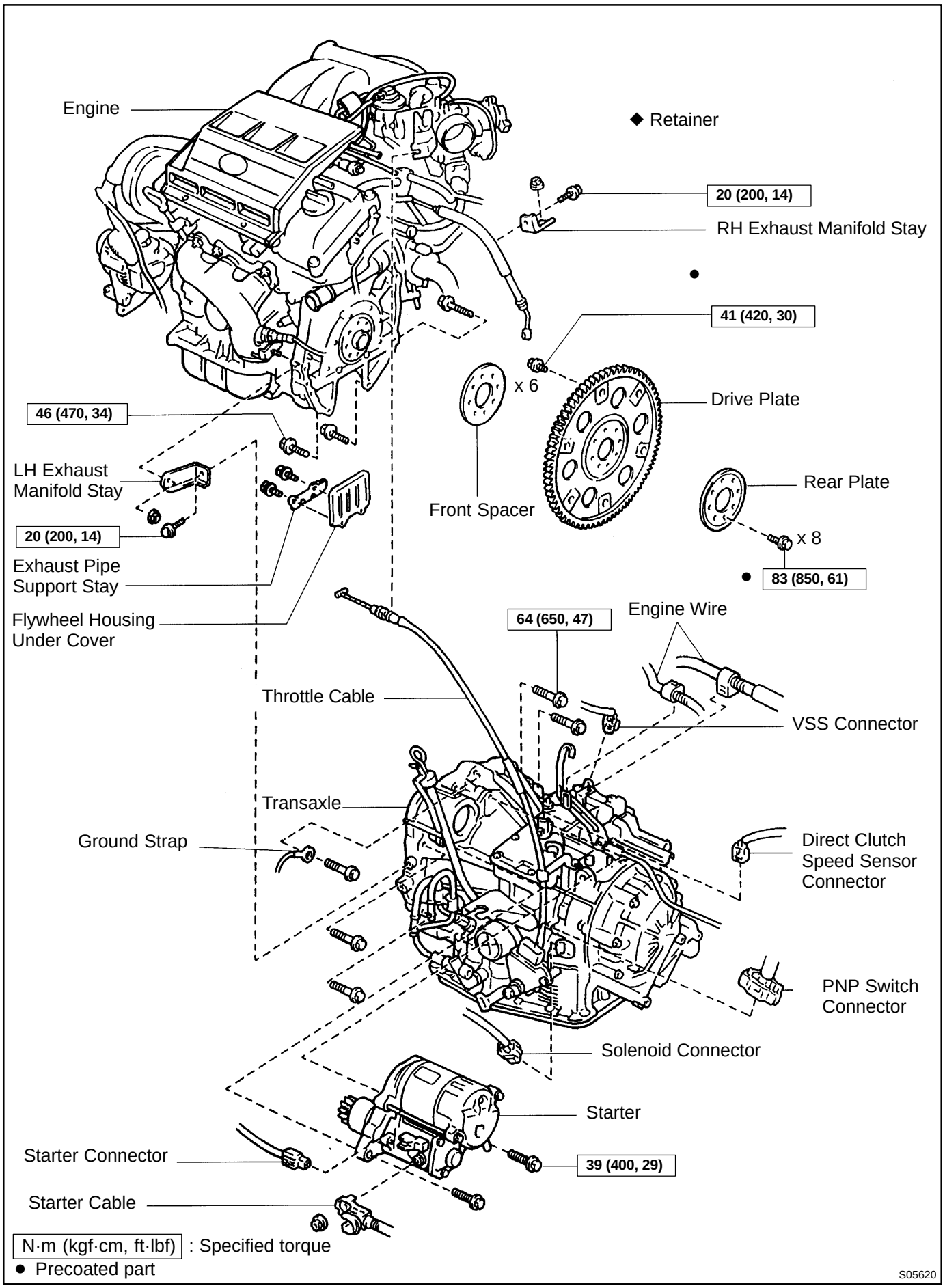
ENGINE UNIT

COMPONENTS

EM048–02



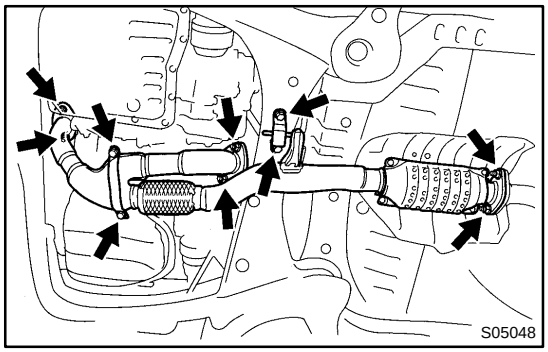

RH Drive Shaft
LH Drive Shaft
Tie Rod End
49 (500, 36)
294 (3,000, 217)
64 (650, 47)
32 (320, 23)
RH Engine Mounting Stay
Lower Suspension Arm
Engine Moving Control Road
127 (1,300, 94)
64 (650, 47)
No.2 RH Engine Mounting Bracket
Rear Engine Mounting Insulator
Engine and Transaxle Assembly
66 (670, 48)
Front Engine Mounting Insulator
64 (650, 47)
Transaxle Control Cable
48 (490, 35)
64 (650, 47)
80 (820, 59)
Engine Mounting Absorber
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
S05518


Engine
◆ Retainer
20 (200, 14)
RH Exhaust Manifold Stay
●
41 (420, 30)
x 6
Drive Plate
Front Spacer
Rear Plate
x 8
● 83 (850, 61)
46 (470, 34)
LH Exhaust Manifold Stay
20 (200, 14)
Exhaust Pipe Support Stay
Flywheel Housing Under Cover
64 (650, 47)
Engine Wire
Throttle Cable
VSS Connector
Transaxle
Ground Strap
Direct Clutch Speed Sensor Connector
PNP Switch Connector
Solenoid Connector
Starter
Starter Connector
39 (400, 29)
Starter Cable
N·m (kgf·cm, ft·lbf) : Specified torque
● Precoated part
S05620

EM049–02

REMOVAL

1. REMOVE BATTERY AND TRAY
2. REMOVE HOOD
3. REMOVE ENGINE FENDER APRON SEALS
4. DRAIN ENGINE COOLANT
5. DRAIN ENGINE OIL
6. DISCONNECT ACCELERATOR CABLE
7. REMOVE AIR CLEANER CAP ASSEMBLY AND AIR CLEANER CASE
8. REMOVE CHARCOAL CANISTER
9. REMOVE CRUISE CONTROL ACTUATOR
10. REMOVE RADIATOR (See page CO–17)
11. REMOVE FRONT EXHAUST PIPE



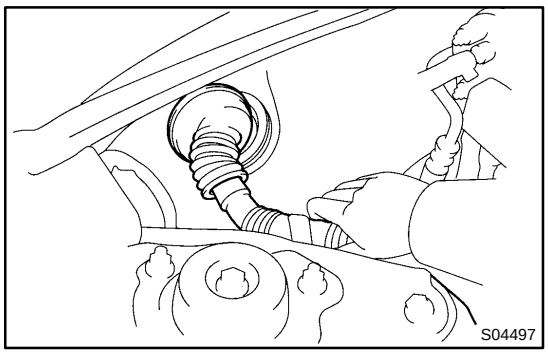
(a) Remove the 2 bolts holding the support stay to the support bracket.
(b) Remove the 2 bolts holding the support bracket to the front frame.
(c) Remove the 2 bolts and 2 nuts holding the front exhaust pipe to the center exhaust pipe.
(d) Remove the 4 nuts holding the front exhaust pipe to the exhaust manifolds.
(e) Remove the front exhaust pipe and 3 gaskets.

12. DISCONNECT CONNECTORS, CABLE, CLAMPS AND HOSES

- Igniter connector on LH fender apron
- Noise filter connector on LH fender apron
- VSV connector for vapor pressure sensor
- Vapor pressure sensor connector and clamp
- Generator wire and connector
- Starter wire and connector
- 2 ground strap connectors from RH fender apron
- 2 ground strap connectors from LH fender apron
- Ground cable from battery body bracket
- Engine wire protector clamp from battery body bracket
- Engine wire clamp from bracket on RH fender apron
- Engine wire clamp from bracket on fuel filter
- Brake booster vacuum hose from air intake chamber
- Engine coolant reservoir hose from water outlet
- Heater hose from intake manifold
- Heater hose from water inlet housing
- Fuel inlet hose from fuel filter

CAUTION:
Perform disconnecting operation of the fuel tube connector (quick type) after observing the precautions.
(See page SF–1)

- EVAP hose from pipe on emission control valve set
- 2 vacuum hoses from vacuum tank for ACIS



13. DISCONNECT ENGINE WIRE FROM CABIN

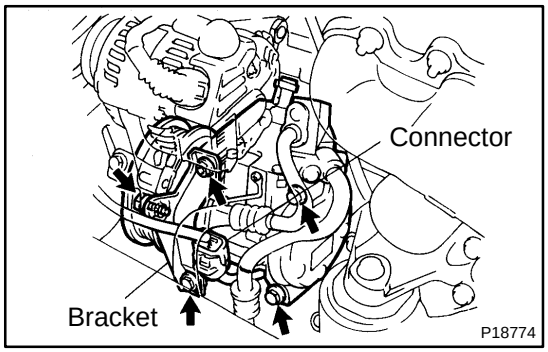
(a) Remove the No.2 instrument lower panel.

(b) Disconnect these connectors:

- 4 ECM connectors
- 3 cowl wire connectors from connectors on bracket

(c) Disconnect the grommet from the cowl panel, and pull out the engine wire.

14. REMOVE DRIVE SHAFTS (See page SA–16)



15. DISCONNECT A/C COMPRESSOR FROM ENGINE

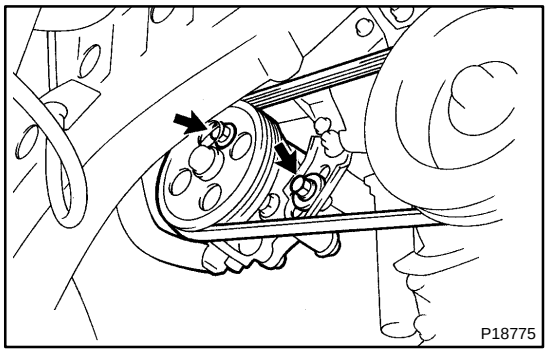
(a) Disconnect the A/C compressor connector.

(b) Remove the drive belt.

(c) Remove the 4 bolts, nut and drive belt adjusting bar bracket.

(d) Disconnect the A/C compressor from the engine.

16. DISCONNECT TRANSAXLE CONTROL CABLE FROM TRANSAXLE

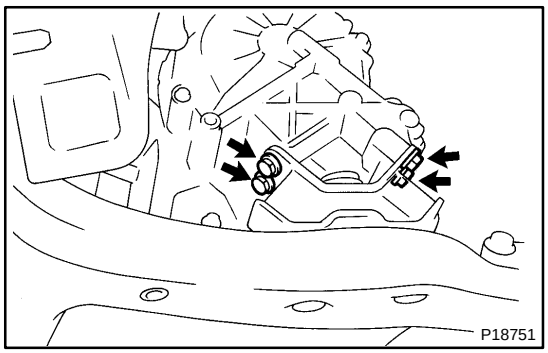


17. DISCONNECT PS PUMP FROM ENGINE

(a) Remove the 2 nuts, and disconnect the PS pressure tube from the No.1 engine hanger.

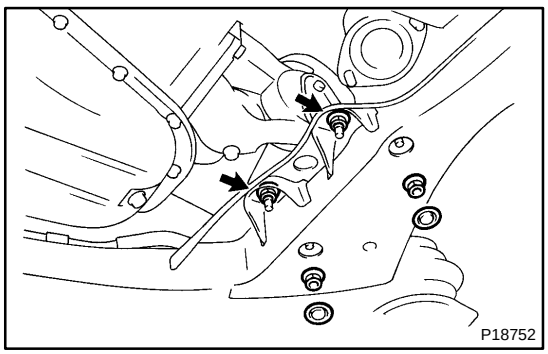
(b) Loosen the 2 bolts, and remove the drive belt.

(c) Remove the 2 bolts, and disconnect the PS pump from the engine.



18. DISCONNECT TRANSAXLE FROM LH ENGINE MOUNTING INSULATOR

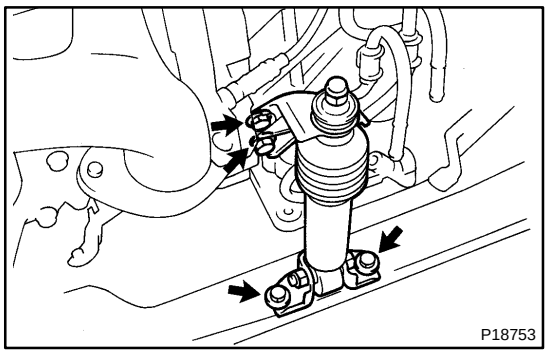
Remove the 4 bolts holding the transaxle to the mounting insulator.



19. DISCONNECT REAR ENGINE MOUNTING BRACKET FROM FRONT FRAME

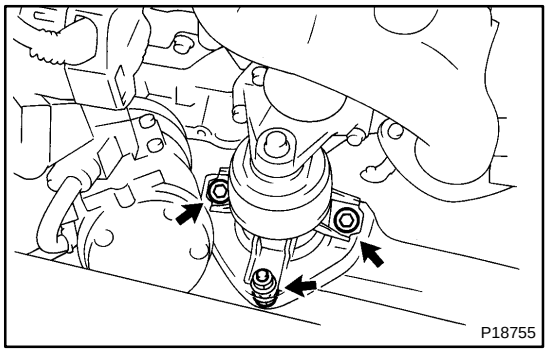
(a) Remove the 2 hole plugs.

(b) Remove the 4 nuts holding the front frame to the mounting bracket.



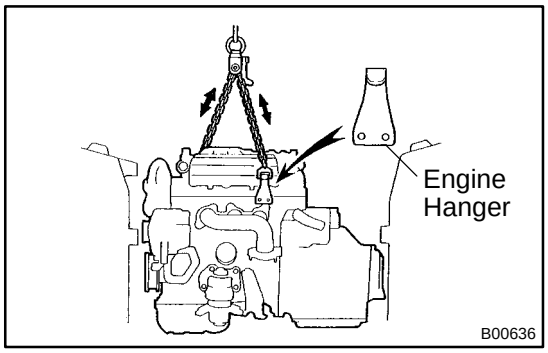
20. REMOVE ENGINE MOUNTING ABSORBER

Remove the 4 bolts and mounting absorber.



21. DISCONNECT FRONT ENGINE MOUNTING INSULATOR FROM FRONT FRAME

Remove the 3 bolts holding the mounting insulator to the front frame.

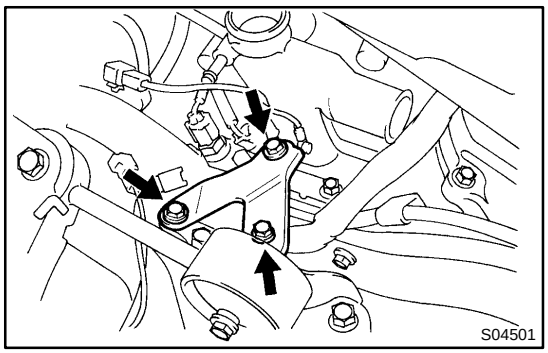


22. ATTACH ENGINE SLING DEVICE TO ENGINE HANGERS

(a) Install the No.2 engine hanger in the correct direction.
Part No.:
No.2 engine hanger 12282–20020
Bolt 91642–80825
Torque: 19.5 N·m (200 kgf·cm, 14 ft·lbf)

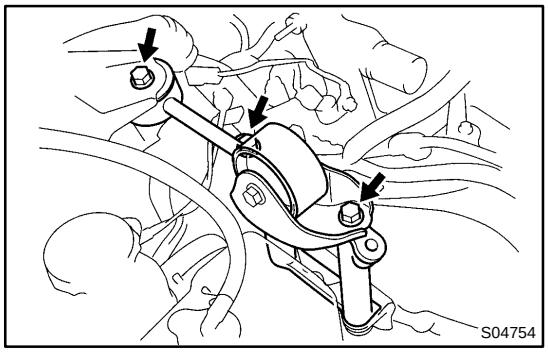
(b) Attach the sling device to the engine hangers.

CAUTION:
Do not attempt to hang the engine by hooking the chain to any other part.



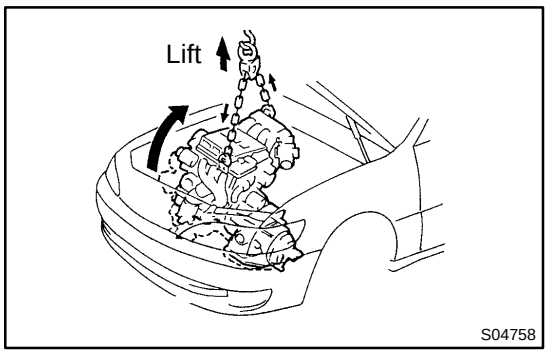
23. REMOVE RH ENGINE MOUNTING STAY

Remove the 3 bolts, ground strap and RH engine mounting stay.



24. REMOVE ENGINE MOVING CONTROL ROD AND NO.2 RH ENGINE MOUNTING BRACKET

Remove the 3 bolts, control rod and mounting bracket.



25. REMOVE ENGINE AND TRANSAXLE ASSEMBLY FROM VEHICLE

(a) Lift the engine out of the vehicle slowly and carefully.

NOTICE:

Be careful not to hit the PNP switch. Make sure the engine is clear of all wiring, hoses and cables.

(b) Place the engine and transaxle assembly onto the stand.

26. REMOVE FRONT ENGINE MOUNTING INSULATOR FROM ENGINE

Remove the 4 bolts and mounting insulator.

27. REMOVE REAR ENGINE MOUNTING INSULATOR AND BRACKET ASSEMBLY FROM ENGINE

Remove the 4 bolts, the mounting insulator and bracket assembly.

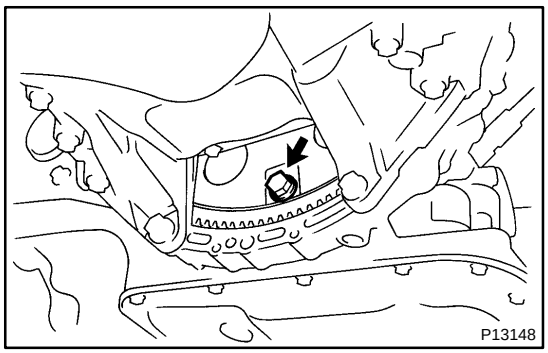
28. DISCONNECT THROTTLE CABLE FROM THROTTLE BODY

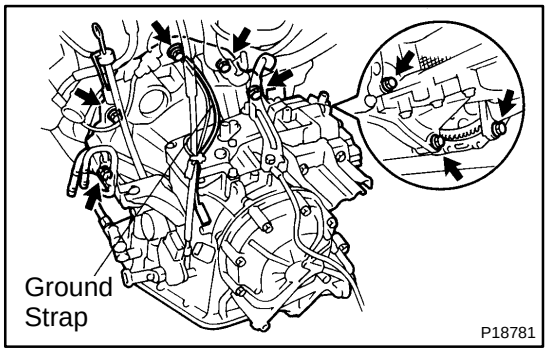
29. REMOVE STARTER (See page ST–4)

30. DISCONNECT ENGINE WIRE FROM TRANSAXLE

Disconnect these connectors and clamps:

- VSS connector
- PNP switch connector
- Solenoid connector
- Direct clutch speed sensor connector
- 2 engine wire clamps from bracket





31. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLTS

(a) Remove the 2 bolts, exhaust pipe support stay and flywheel housing under cover.

(b) Turn the crankshaft pulley bolt to gain access to each bolt.

(c) Hold the crankshaft pulley bolt with a wrench, and remove the 6 bolts.

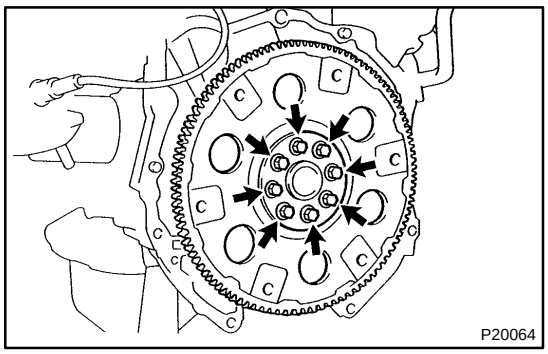
32. REMOVE TRANSAXLE

(a) Remove the bolt, nut and RH exhaust manifold stay.

(b) Remove the bolt, nut and LH exhaust manifold stay.

(c) Remove the 8 bolts and ground strap.

(d) Remove the transaxle together with the torque converter clutch from the engine.

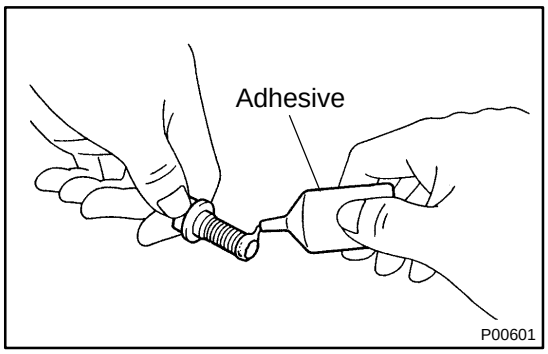


33. REMOVE DRIVE PLATE

Remove the 8 bolts, rear plate, drive plate and front spacer.

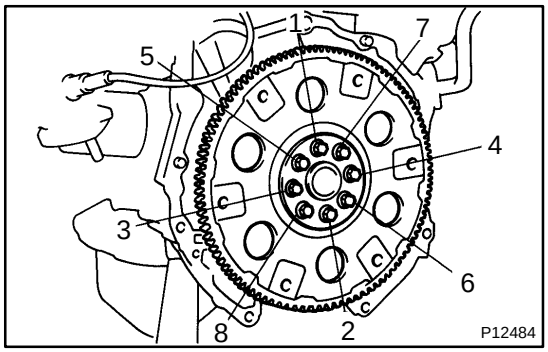
EM04A–02

INSTALLATION



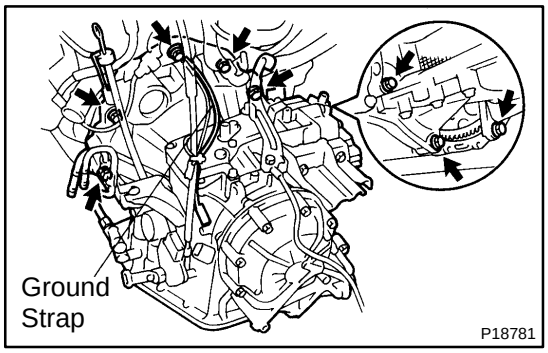
1. INSTALL DRIVE PLATE

(a) Apply adhesive to 2 or 3 threads of the bolt end.
Adhesive: Part No. 08833–00070, THREE BOND 1324 or equivalent



(b) Install the front spacer, drive plate and rear plate on the crankshaft.

(c) Install and uniformly tighten the 8 bolts in several passes, in the sequence shown.
Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)



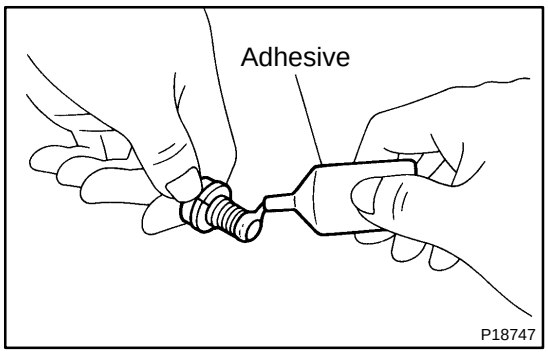
2. INSTALL TRANSAXLE TO ENGINE

(a) Attach the transaxle to the engine.

(b) Install the ground strap and 8 bolts.
Torque:
14 mm head: 46 N·m (470 kgf·cm, 34 ft·lbf)
17 mm head: 64 N·m (650 kgf·cm, 47 ft·lbf)

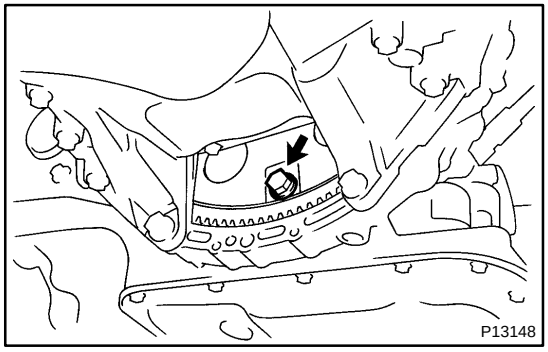
(c) Install the RH exhaust manifold stay with the bolt and nut.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

(d) Install the LH exhaust manifold stay with the bolt and nut.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)



3. INSTALL TORQUE CONVERTER CLUTCH BOLTS

(a) Apply adhesive to 2 or 3 threads of the bolt.
Adhesive: Part No. 08833–00070, THREE BOND 1324 or equivalent



(b) Hold the crankshaft pulley bolt with a wrench, and install the 6 bolts evenly.
Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)

HINT:
First install the dark green colored bolt, then install the other bolts.

(c) Install the flywheel housing under cover and exhaust pipe support stay with the 2 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

4. CONNECT ENGINE WIRE TO TRANSAXLE

Connect these connectors and clamps:

- VSS connector
- PNP switch connector
- Solenoid connector
- Direct clutch speed sensor connector
- 2 wire clamps to bracket

5. INSTALL STARTER

(See page ST–19)

6. CONNECT THROTTLE CABLE TO THROTTLE BODY

7. INSTALL REAR ENGINE MOUNTING INSULATOR

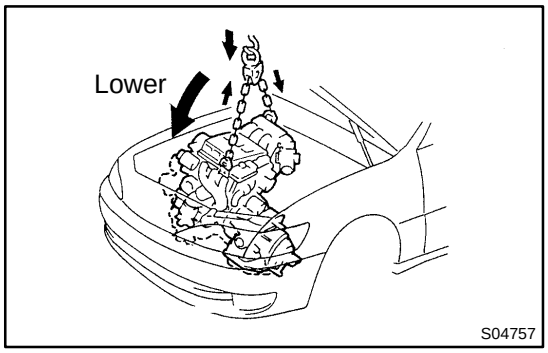
Install the mounting insulator with the 4 bolts.

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

8. INSTALL FRONT ENGINE MOUNTING INSULATOR

Install the mounting insulator with the 4 bolts.

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



9. INSTALL ENGINE AND TRANSAXLE ASSEMBLY IN VEHICLE

(a) Attach the engine sling device to the engine hangers.

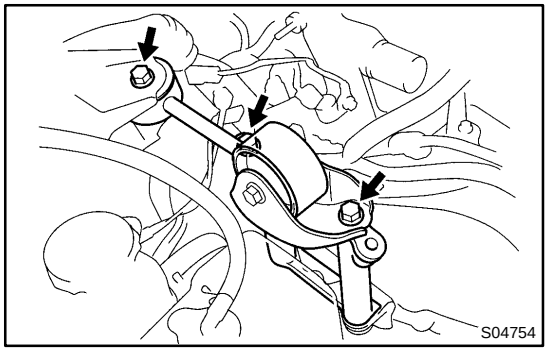
(b) Lower the engine into the engine compartment.

Tilt the transaxle downward, lower the engine and clear the LH mounting.

NOTICE:

Be careful not to hit the park/neutral position switch.

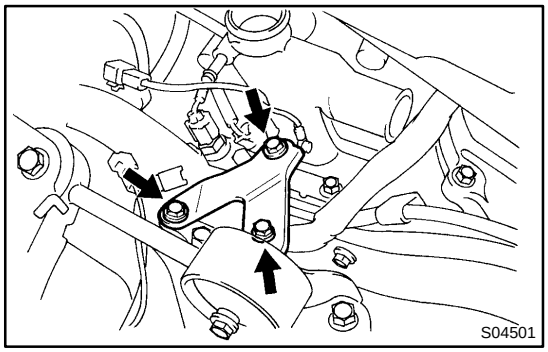
(c) Keep the engine level, and align RH and LH mountings with the body bracket.



10. INSTALL NO.2 ENGINE MOUNTING BRACKET AND ENGINE MOVING CONTROL ROD

Install the mounting moving control rod and No.2 engine mounting bracket with the 3 bolts.

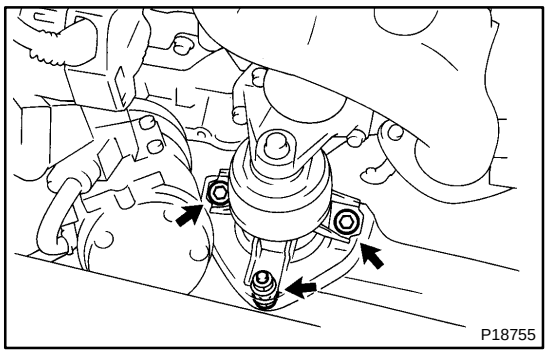
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



11. INSTALL RH ENGINE MOUNTING STAY

Install the RH mounting stay with the 3 bolts.

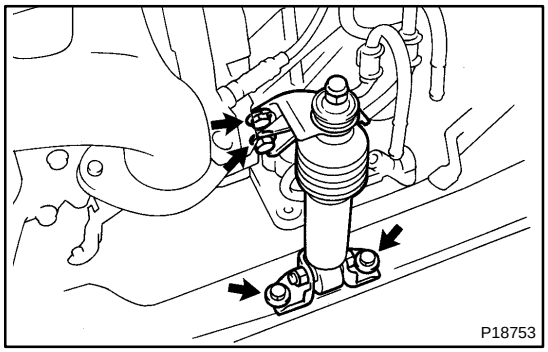
Torque: 32 N·m (320 kgf·cm, 23 ft·lbf)



12. CONNECT FRONT ENGINE MOUNTING INSULATOR

Connect the mounting insulator with the 3 bolts.

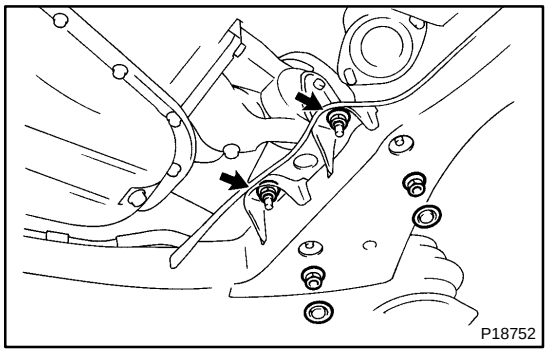
Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)



13. INSTALL ENGINE MOUNTING ABSORBER

Install the engine mounting absorber with the 4 bolts.

Torque: 48 N·m (490 kgf·cm, 35 ft·lbf)

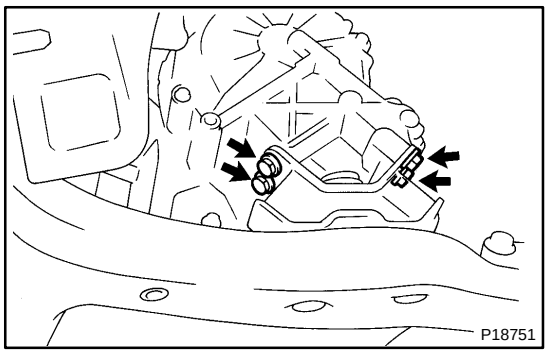


14. CONNECT REAR ENGINE MOUNTING INSULATOR

(a) Connect the mounting insulator with the 4 nuts.

Torque: 66 N·m (670 kgf·cm, 48 ft·lbf)

(b) Install the 2 hole plugs.



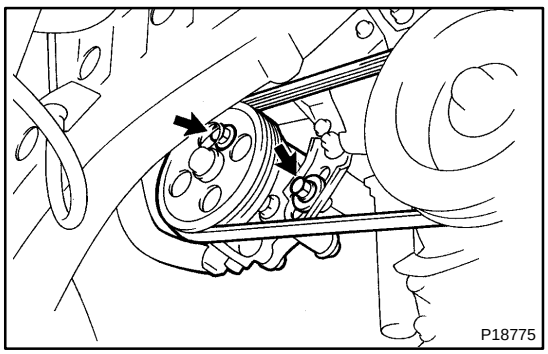
15. CONNECT LH ENGINE MOUNTING INSULATOR

Connect the mounting insulator with the 4 bolts.

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

16. REMOVE ENGINE SLING DEVICE

17. CONNECT TRANSAXLE CONTROL CABLE TO TRANSAXLE



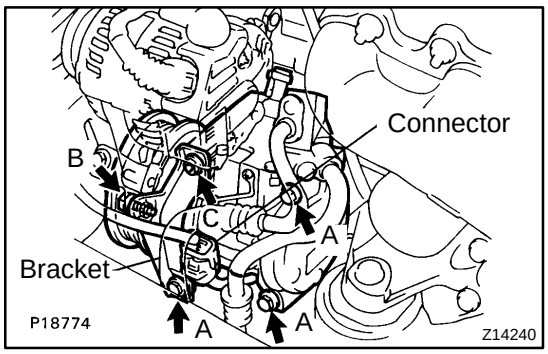
18. INSTALL PS PUMP

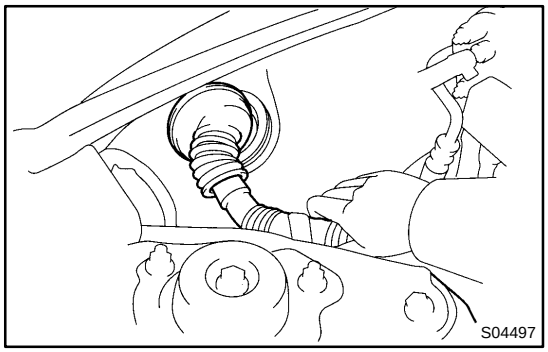
(a) Install the PS pump with the 2 bolts.

Torque: 43 N·m (440 kgf·cm, 31 ft·lbf)

(b) Install the drive belt.

(c) Connect the PS pressure tube with the 2 nuts.





19. INSTALL A/C COMPRESSOR

(a) Install the A/C compressor and drive belt adjusting bar bracket with the 4 bolts and nut.

Torque:
Bolt A: 25 N·m (250 kgf·cm, 18 ft·lbf)
Bolt B: 18 N·m (185 kgf·cm, 13 ft·lbf)
Nut C: 25 N·m (250 kgf·cm, 18 ft·lbf)

(b) Install the drive belt.

(c) Connect the A/C compressor connector.

20. INSTALL DRIVE SHAFTS (See page SA–23)

21. CONNECT ENGINE WIRE TO CABIN

(a) Push in the engine wire through the cowl panel. Install the grommet.

(b) Connect these connectors.

- 4 engine ECM connectors
- 3 cowl wire connectors to connectors on bracket

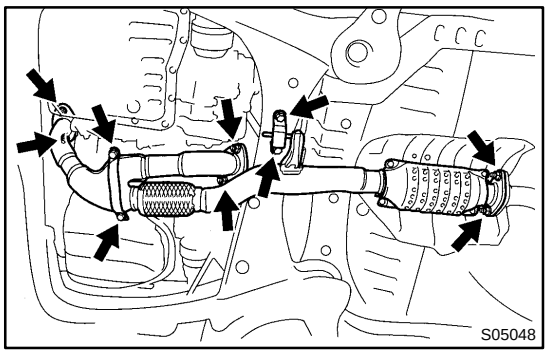
(c) Install the No.2 instrument lower panel.

22. CONNECT CONNECTORS, CABLE, CLAMPS AND HOSES

- Igniter connector on LH fender apron
- Noise filter connector on LH fender apron
- VSV connector for vapor pressure sensor
- Vapor pressure sensor connector and clamp
- Generator connector and wire
- Starter connector and wire
- 2 ground strap connectors to RH fender apron
- 2 ground strap connectors to LH fender apron
- Ground cable to battery body bracket
- Engine wire protector clamp to battery body bracket
- Engine wire clamp to bracket on RH fender apron
- Engine wire clamp to bracket on fuel filter
- Brake booster vacuum hose to air intake chamber
- Engine coolant reservoir hose to water outlet
- Heater hose to intake manifold
- Heater hose to water inlet housing
- Fuel inlet hose to fuel filter

CAUTION:
Perform connecting operations of the fuel tube connector (quick type) after observing the precautions.
(See page SF–1)

- EVAP hose to pipe on emission control valve set
- 2 vacuum hoses to vacuum tank for ACIS



23. INSTALL FRONT EXHAUST PIPE

(a) Temporarily install 3 new gaskets and the front exhaust pipe with the 2 bolts and 6 nuts.

(b) Tighten the 4 nuts holding the exhaust manifolds to the front exhaust pipe.
Torque: 62 N·m (630 kgf·cm, 46 ft·lbf)

(c) Tighten the 2 bolts and 2 nuts holding the front exhaust pipe to the center exhaust pipe.
Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

(d) Install the bracket with the 2 bolts.
Torque: 33 N·m (330 kgf·cm, 24 ft·lbf)

(e) Install the support stay with the 2 bolts.
Torque: 33 N·m (330 kgf·cm, 24 ft·lbf)

24. INSTALL RADIATOR (See page CO–22)

25. INSTALL CRUISE CONTROL ACTUATOR

26. INSTALL CHARCOAL CANISTER

27. INSTALL AIR CLEANER CAP ASSEMBLY AND AIR CLEANER CASE

28. CONNECT ACCELERATOR CABLE

29. INSTALL ENGINE FENDER APRON SEALS

30. INSTALL BATTERY TRAY AND BATTERY

31. INSTALL HOOD

32. FILL ENGINE WITH OIL

33. FILL WITH ENGINE COOLANT

34. START ENGINE AND CHECK FOR LEAKS

35. PERFORM ROAD TEST

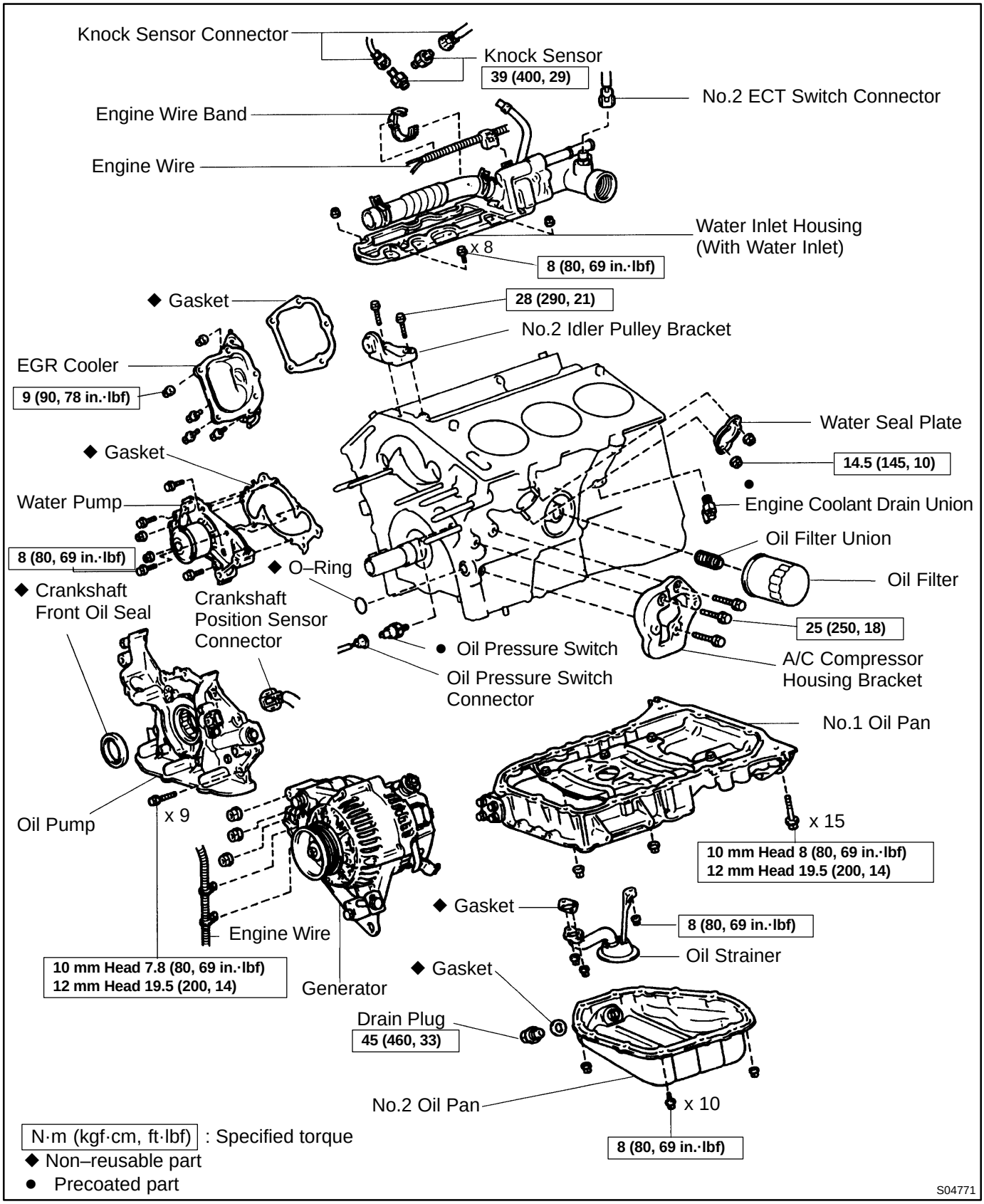
Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

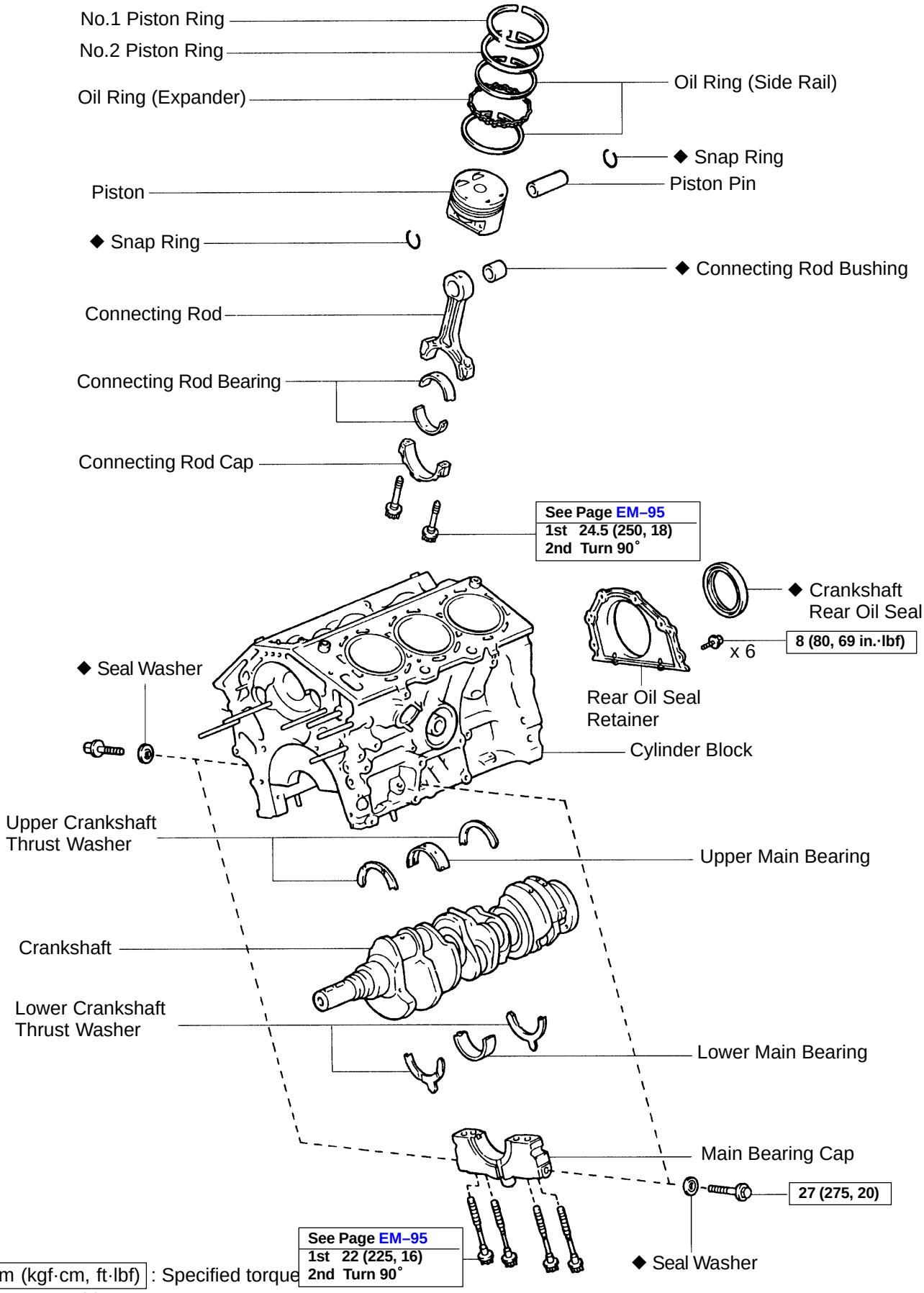
36. RECHECK ENGINE COOLANT AND OIL LEVELS

CYLINDER BLOCK

COMPONENTS

EM1B6–01

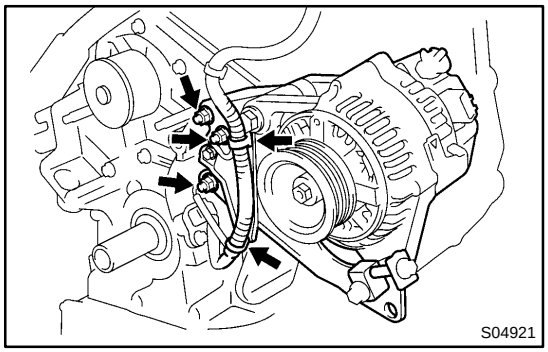



No.1 Piston Ring
No.2 Piston Ring
Oil Ring (Expander)
Oil Ring (Side Rail)
◆ Snap Ring
Piston
Piston Pin
◆ Snap Ring
◆ Connecting Rod Bushing
Connecting Rod
Connecting Rod Bearing
Connecting Rod Cap
See Page EM–95
1st 24.5 (250, 18)
2nd Turn 90°
◆ Crankshaft Rear Oil Seal
8 (80, 69 in.·lbf)
x 6
◆ Seal Washer
Rear Oil Seal Retainer
Cylinder Block
Upper Crankshaft Thrust Washer
Upper Main Bearing
Crankshaft
Lower Crankshaft Thrust Washer
Lower Main Bearing
Main Bearing Cap
27 (275, 20)
See Page EM–95
1st 22 (225, 16)
2nd Turn 90°
◆ Seal Washer
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Z18551

EM04C–02

DISASSEMBLY

1. **INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY**
2. **REMOVE TIMING BELT AND PULLEYS**
   (See page EM–14)
3. **REMOVE CYLINDER HEAD**
   (See page EM–30)

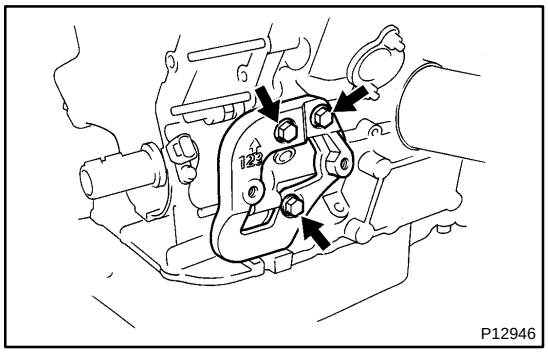


4. **REMOVE GENERATOR, ADJUSTING BAR AND BRACKET ASSEMBLY**

(a) Disconnect the 2 wire clamps from the wire brackets.

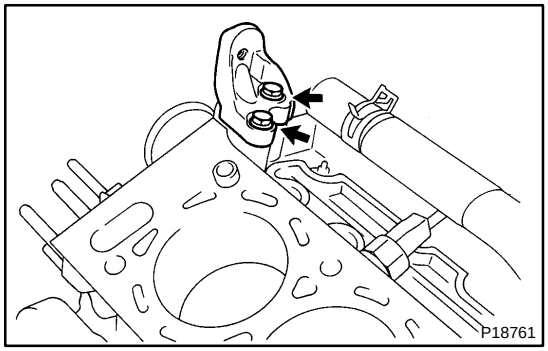
(b) Remove the 3 nuts, the generator, adjusting bar and bracket assembly.

5. **REMOVE OIL PRESSURE SWITCH**
   (See page LU–1)



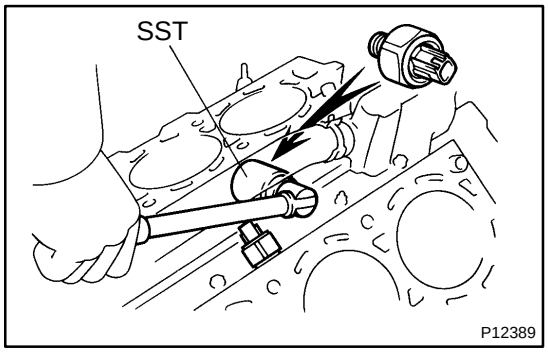
6. **REMOVE A/C COMPRESSOR HOUSING BRACKET**

Remove the 3 bolts and compressor housing bracket.



7. **REMOVE NO.2 IDLER PULLEY BRACKET**

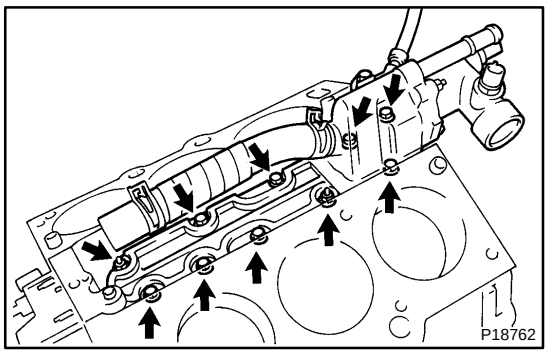
Remove the 2 bolts and idler pulley bracket.



8. **REMOVE KNOCK SENSORS**

(a) Disconnect the 2 knock sensor connectors.

(b) Using SST, remove the 2 knock sensors.
SST 09816–30010



9. REMOVE WATER INLET HOUSING

(a) Remove the engine wire band.

(b) Disconnect the engine wire clamp from the bracket.

(c) Remove the 8 bolts, 2 nuts and water inlet housing.

10. REMOVE WATER PUMP
(See page CO–6)

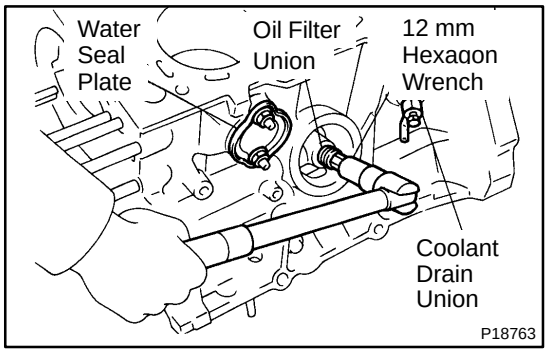
11. REMOVE NO.2 OIL PAN
(See page LU–9)

12. REMOVE OIL STRAINER
(See page LU–9)

13. REMOVE NO.1 OIL PAN
(See page LU–9)

14. REMOVE OIL PUMP
(See page LU–9)

15. REMOVE OIL FILTER
(See page LU–3)



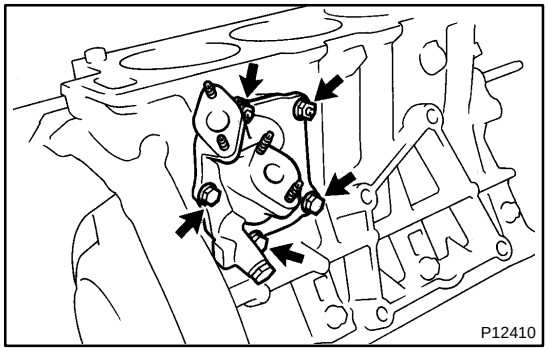
16. REMOVE OIL FILTER UNION

Using a 12 mm hexagon wrench, remove the oil filter union.

17. REMOVE WATER SEAL PLATE

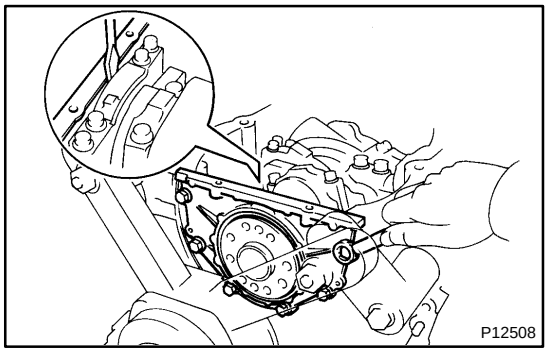
Remove the 2 nuts and seal plate.

18. REMOVE ENGINE COOLANT DRAIN UNION



19. REMOVE EGR COOLER

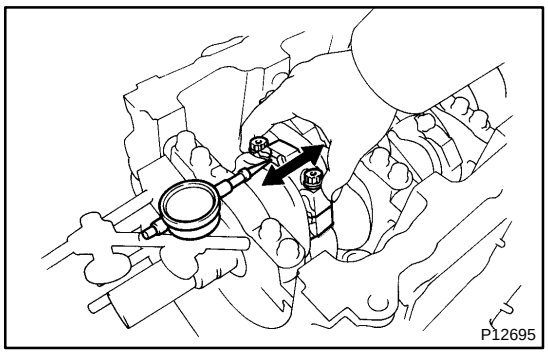
Remove the 3 bolts, 2 nuts, EGR cooler and gasket.



20. REMOVE REAR OIL SEAL RETAINER

(a) Remove the 6 bolts.

(b) Using a screwdriver, remove the oil seal retainer by prying the portions between the oil seal retainer and main bearing cap.



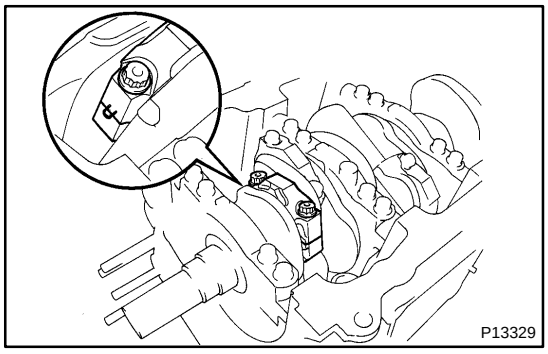
21. CHECK CONNECTING ROD THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

Standard thrust clearance:
0.15 – 0.30 mm (0.0059 – 0.0118 in.)
Maximum thrust clearance: 0.35 mm (0.0138 in.)

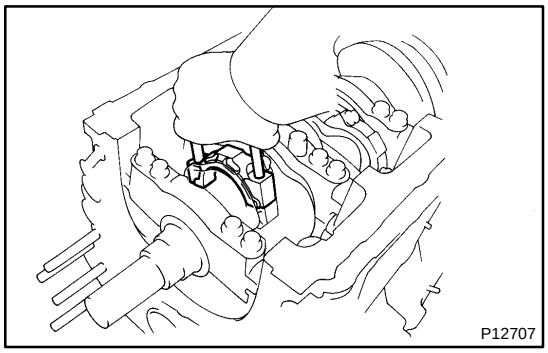
If the thrust clearance is greater than maximum, replace the connecting rod assembly(s). If necessary, replace the crankshaft.

Connecting rod thickness:
20.80 – 20.85 mm (0.8189 – 0.8209 in.)



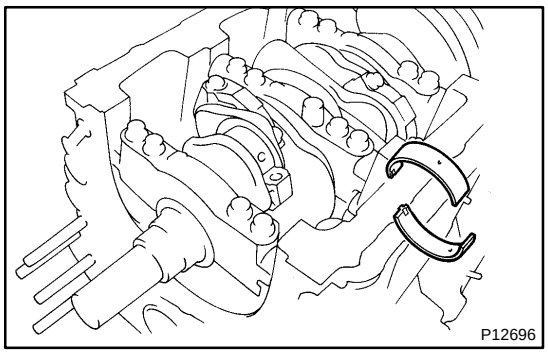
22. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

(a) Check the matchmarks on the connecting rod and cap are aligned to ensure correct reassembly.
(b) Remove the 2 connecting rod cap bolts.



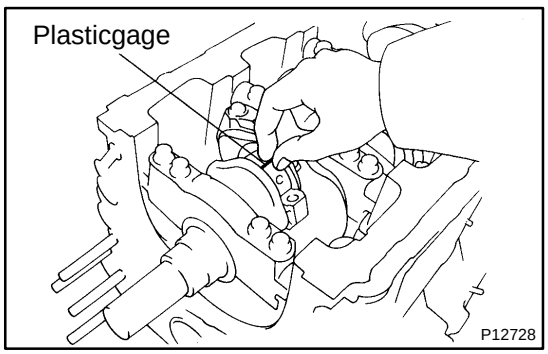
(c) Using the 2 removed connecting rod cap bolts, remove the connecting rod cap and lower bearing by wiggling the connecting rod cap right and left.

HINT:
Keep the lower bearing inserted with the connecting rod cap.

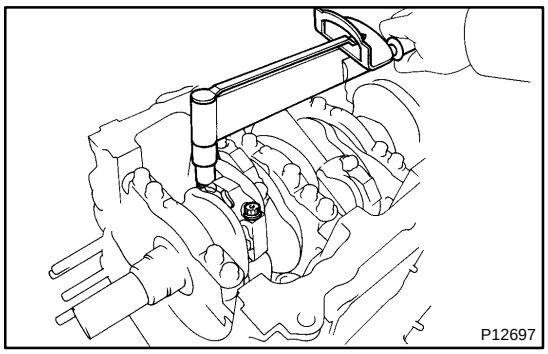


(d) Clean the crank pin and bearing.
(e) Check the crank pin and bearing for pitting and scratches.

If the crank pin or bearing is damaged, replace the bearings. If necessary, replace the crankshaft.



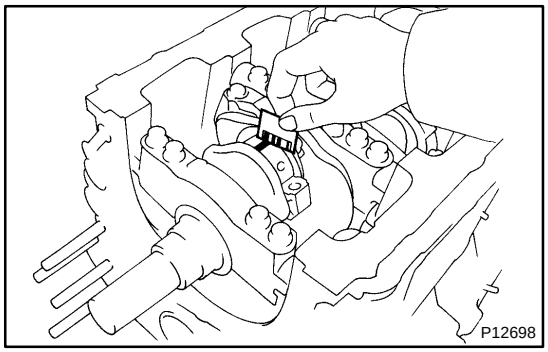
(f) Lay a strip of Plasticgage across the crank pin.



(g) Install the connecting rod cap with the 2 bolts.
(See page EM–95)
Torque:
1st: 24.5 N·m (250 kgf·cm, 18 ft·lbf)
2nd: Turn extra 90°

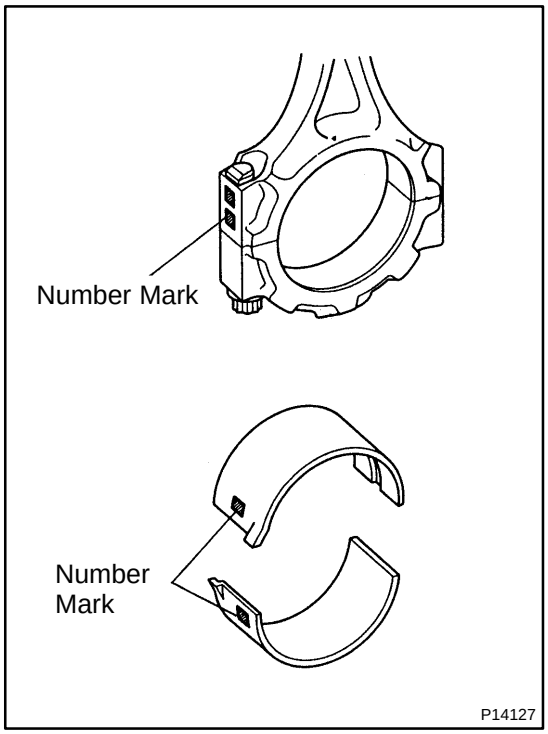
NOTICE:
Do not turn the crankshaft.

(h) Remove the 2 bolts, connecting rod cap and lower bearing. (See procedure (b) and (c) above)



(i) Measure the Plastigage at its widest point.
Standard oil clearance:
0.038 – 0.064 mm (0.0015 – 0.0025 in.)
Maximum oil clearance:
0.08 mm (0.0031 in.)

If the oil clearance is greater than maximum, replace the bearings. If necessary, grind or replace the crankshaft.

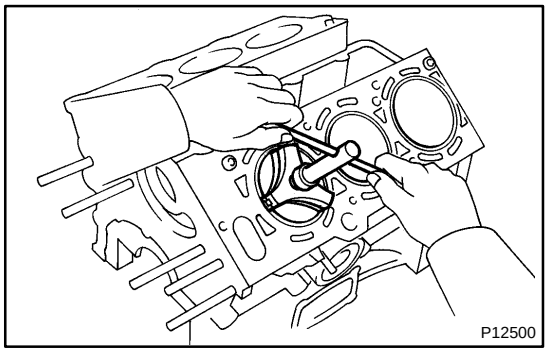


HINT:
If replacing a bearing, replace it with one having the same number as marked on the connecting rod. There are 4 sizes of standard bearings, marked ”1”, ”2”, ”3” and ”4” accordingly.

Reference:
Standard bearing center wall thickness:

Mark	mm (in.)
”1”	1.484 – 1.487 (0.0584 – 0.0585)
”2”	1.487 – 1.490 (0.0585 – 0.0587)
”3”	1.490 – 1.493 (0.0587 – 0.0588)
”4”	1.493 – 1.496 (0.0588 – 0.0589)

(j) Completely remove the Plastigage.



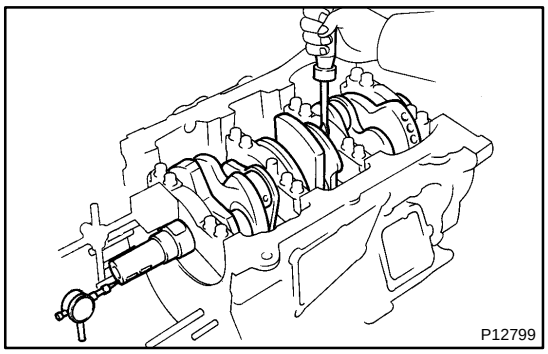
23. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES

(a) Using a ridge reamer, remove all the carbon from the top of the cylinder.

(b) Push the piston, connecting rod assembly and upper bearing through the top of the cylinder block.

HINT:

- Keep the bearings, connecting rod and cap together.
- Arrange the piston and connecting rod assemblies in the correct order.


P12799

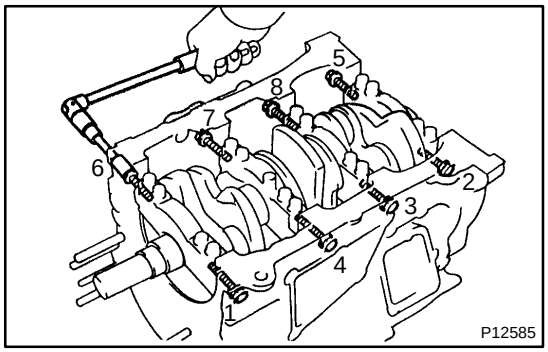
24. CHECK CRANKSHAFT THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard thrust clearance:
0.04 – 0.24 mm (0.0016 – 0.0095 in.)
Maximum thrust clearance: 0.30 mm (0.0118 in.)

If the thrust clearance is greater than maximum, replace the thrust washers as a set.

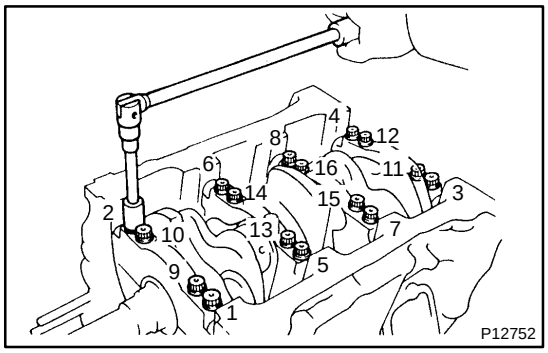
Thrust washer thickness:
1.930 – 1.980 mm (0.0760 – 0.0780 in.)



P12585

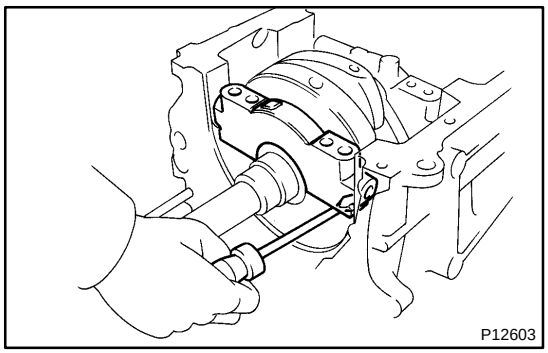
25. REMOVE MAIN BEARING CAPS AND CHECK OIL CLEARANCE

(a) Uniformly loosen and remove the 8 main bearing cap bolts and seal washers in the several passes, in the sequence shown.

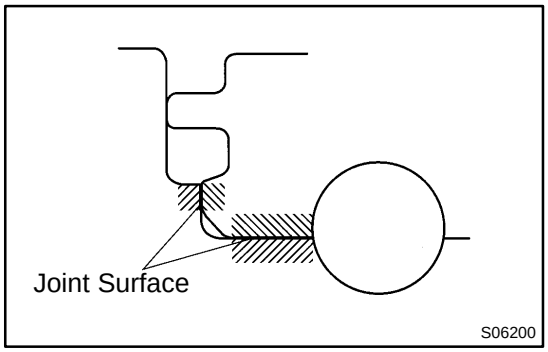


P12752

(b) Uniformly loosen and remove the 16 main bearing cap bolts in several passes, in the sequence shown.


P12603

(c) Using a screwdriver, pry out main bearing caps. Remove the 4 main bearing caps, lower bearings and (No.2 main bearing cap only) 2 lower thrust washers.



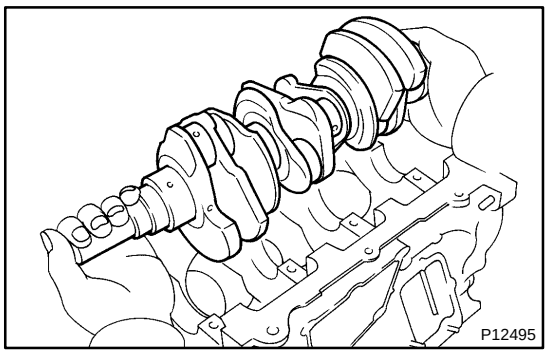
S06200

NOTICE:

Pull up the main bearing cap little by little to the right and the left by turns and pay attention not to damage the joint surface of the cylinder block and the main bearing cap.

HINT:

- Keep the lower bearing and main bearing cap together.
- Arrange the main bearing caps and lower thrust washers in correct order.



(d) Lift out the crankshaft.

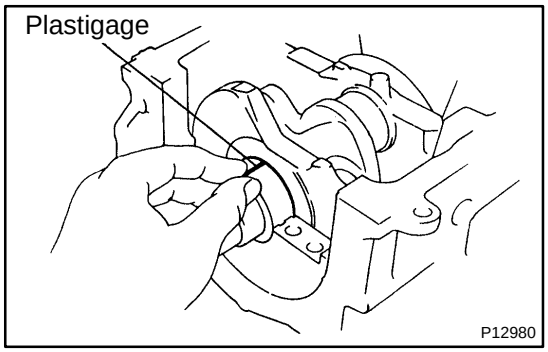
HINT:

Keep the upper bearings together with the cylinder block.

(e) Clean each main journal and bearing.

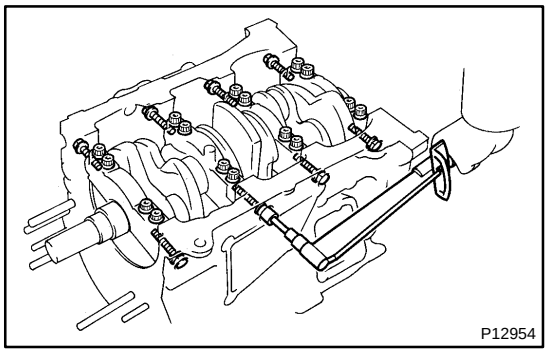
(f) Check each main journal and bearing for pitting and scratches.

If the journal or bearing is damaged, replace the bearings. If necessary, replace the crankshaft.



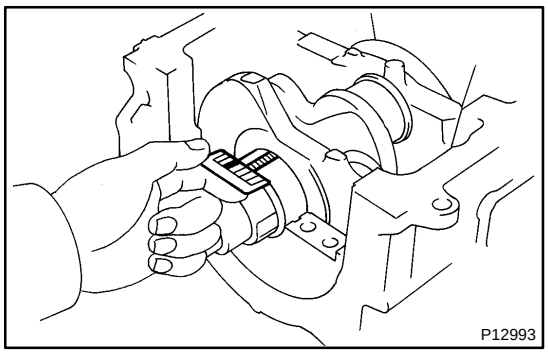
(g) Place the crankshaft on the cylinder block.

(h) Lay a strip of Plastigage across each journal.



(i) Install the 4 main bearing caps.
(See page EM–95)
Torque:
12 pointed head bolts:
1st: 22 N·m (225 kgf·cm, 16 ft·lbf)
2nd: Turn extra 90°
Hexagon head bolts:
27 N·m (275 kgf·cm, 20 ft·lbf)

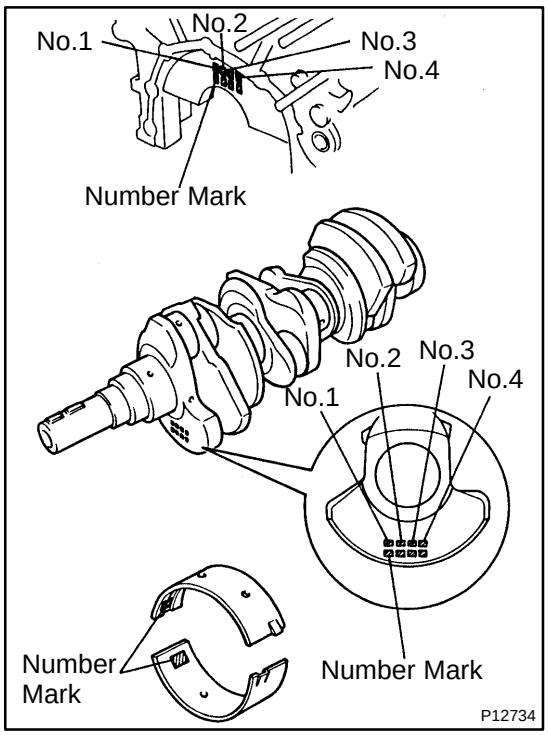
NOTICE:
Do not turn the crankshaft.



(j) Remove the main bearing caps.
(See procedures (a) to (c) above)

(k) Measure the Plastigage at its widest point.
Standard oil clearance:
No.1 and No.4 journals:
0.014 – 0.034 mm (0.0006 – 0.0013 in.)
No.2 and No.3 journals:
0.026 – 0.046 mm (0.0010 – 0.0018 in.)
Maximum clearance:
No.1 and No.4 journals: 0.05 mm (0.0020 in.)
No.2 and No.3 journals: 0.06 mm (0.0024 in.)

If the oil clearance is greater than maximum, replace the bearings. If necessary, replace the crankshaft.



HINT:
If using a bearing, replace it with one having the same number. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the cylinder block and crankshaft, then refer to the table below for the appropriate bearing number. The No.1 and No.4 journal bearings have 5 standard bearing sizes, marked ”3”, ”4”, ”5”, ”6” and ”7” accordingly. The No.2 and No.3 journal bearings have 5 standard bearing sizes, marked ”1”, ”2”, ”3”, ”4” and ”5” accordingly.

No.1 and No.4 journal bearings

	Total number				” ”: Number Mark
Cylinder block (A) + Crankshaft (B) =	0 – 5	6 – 11	12 – 17	18 – 23	24 – 28
Use Bearing	”3”	”4”	”5”	”6”	”7”

EXAMPLE: Cylinder block ”06” (A)
+ Crankshaft ”08” (B)
= Total number 14 (Use bearing ”5”)

No.1 and No.4 journal standard bearings selection chart

Crankshaft number mark	Cylinder block number mark																
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
00	3	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5
01	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5	5
02	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5	5	6
03	3	3	3	4	4	4	4	4	4	5	5	5	5	5	5	6	6
04	3	3	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6
05	3	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6
06	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	6
07	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6
08	4	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6	7
09	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6	7	7
10	4	4	5	5	5	5	5	5	6	6	6	6	6	6	7	7	7
11	4	5	5	5	5	5	5	6	6	6	6	6	6	7	7	7	7
12	5	5	5	5	5	5	6	6	6	6	6	6	7	7	7	7	7

EXAMPLE: Cylinder block ”06”, Crankshaft ”08”
= Use bearing ”5”

V08071

No.2 and No.3 journal bearings

	Total number				” ”: Number Mark
Cylinder block (A) + Crankshaft (B) =	0 – 5	6 – 11	12 – 17	18 – 23	24 – 28
Use Bearing	”1”	”2”	”3”	”4”	”5”

EXAMPLE: Cylinder block ”06” (A)
+ Crankshaft ”08” (B)
= Total number 14 (Use bearing ”3”)

No.2 and No.3 journal standard bearings selection chart

Crankshaft number mark	Cylinder block number mark																
	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
00	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3
01	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3
02	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4
03	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4
04	1	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4
05	1	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4
06	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4
07	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4
08	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	5
09	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	5	5
10	2	2	3	3	3	3	3	3	4	4	4	4	4	4	5	5	5
11	2	3	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5
12	3	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5

EXAMPLE: Cylinder block ”06”, Crankshaft ”08”
= Use bearing ”3”

V08070

Reference:

Item	Mark	mm (in.)
Cylinder block main journal bore diameter (A)	”00”	66.000 (2.5984)
	”01”	66.001 (2.5985)
	”02”	66.002 (2.5985)
	”03”	66.003 (2.5985)
	”04”	66.004 (2.5986)
	”05”	66.005 (2.5986)
	”06”	66.006 (2.5987)
	”07”	66.007 (2.5987)
	”08”	66.008 (2.5987)
	”09”	66.009 (2.5988)
	”10”	66.010 (2.5988)
	”11”	66.011 (2.5989)
	”12”	66.012 (2.5989)
	”13”	66.013 (2.5989)
	”14”	66.014 (2.5990)
	”15”	66.015 (2.5990)
	”16”	66.016 (2.5990)
Crankshaft main journal diameter (B)	”00”	61.000 (2.4016)
	”01”	60.999 (2.4015)
	”02”	60.998 (2.4015)
	”03”	60.997 (2.4015)
	”04”	60.996 (2.4014)
	”05”	60.995 (2.4014)
	”06”	60.994 (2.4013)
	”07”	60.993 (2.4012)
	”08”	60.992 (2.4012)
	”09”	60.991 (2.4012)
	”10”	60.990 (2.4012)
	”11”	60.989 (2.4011)
	”12”	60.988 (2.4011)
Standard bearing center wall thickness	”1”	2.486 – 2.489 (0.0979 – 0.0980)
	”2”	2.489 – 2.492 (0.0980 – 0.0981)
	”3”	2.492 – 2.495 (0.0981 – 0.0982)
	”4”	2.495 – 2.498 (0.0982 – 0.0983)
	”5”	2.498 – 2.501 (0.0983 – 0.0985)
	”6”	2.501 – 2.504 (0.0985 – 0.0986)
	”7”	2.504 – 2.507 (0.0986 – 0.0987)

(l) Completely remove the Plasticgage.

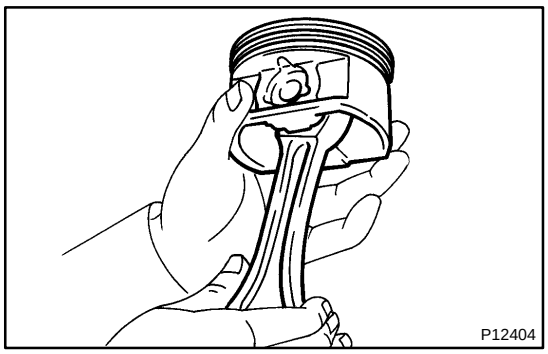
26. REMOVE CRANKSHAFT

(a) Lift out the crankshaft.

(b) Remove the 4 upper main bearings and 2 upper thrust washers from the cylinder block.

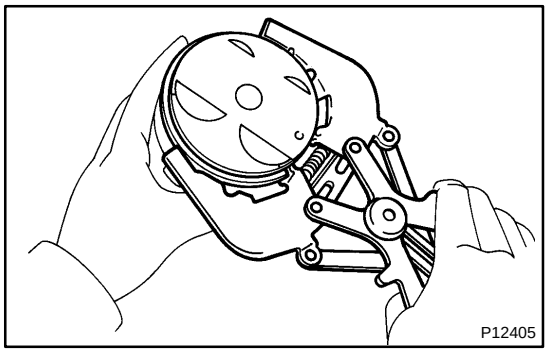
HINT:

Arrange the main bearing caps, bearings and thrust washers in the correct order.



27. CHECK FIT BETWEEN PISTON AND PISTON PIN

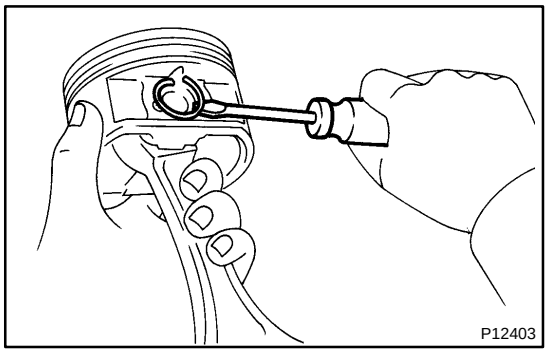
Try to move the piston back and forth on the piston pin.
If any movement is felt, replace the piston and pin as a set.



28. REMOVE PISTON RINGS

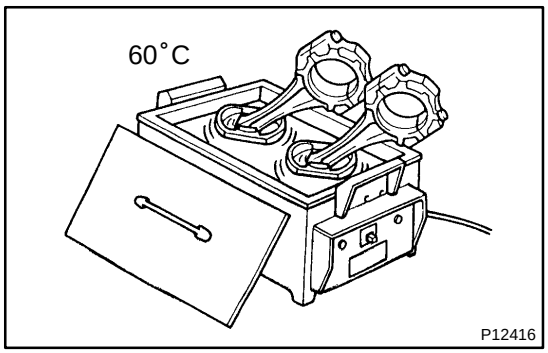
(a) Using a piston ring expander, remove the 2 compression rings.
(b) Remove the 2 side rails and oil ring by hand.

HINT:
Arrange the piston rings in the correct order only.

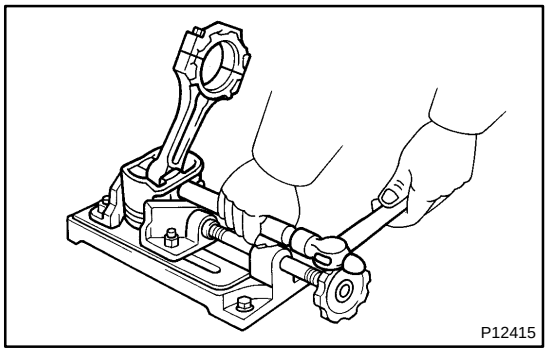


29. DISCONNECT CONNECTING ROD FROM PISTON

(a) Using a small screwdriver, pry out the 2 snap rings.



(b) Gradually heat the piston to approx. 60˚C (140˚F).

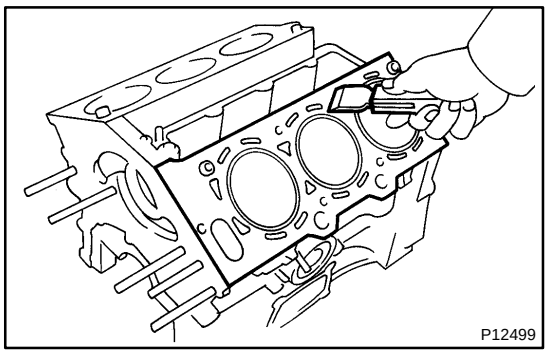


(c) Using a plastic–faced hammer and brass bar, lightly tap out the piston pin and remove the connecting rod.

HINT:

- The piston and pin are a matched set.
- Arrange the pistons, pins, rings, connecting rods and bearings in the correct order.

EM04D–02



INSPECTION

1. REMOVE GASKET MATERIAL

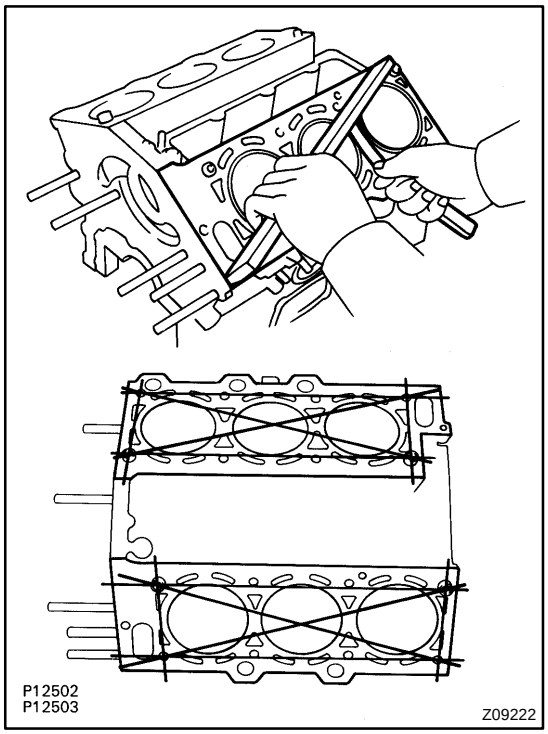
Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.

2. CLEAN CYLINDER BLOCK

Using a soft brush and solvent, thoroughly clean the cylinder block.

NOTICE:

If the cylinder is washed at high temperatures, the cylinder liner sticks out beyond the cylinder block, so always wash the cylinder block at a temperature of 45˚C (113˚F) or less.

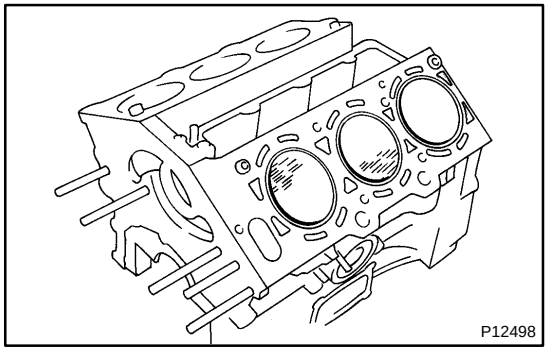


3. INSPECT TOP SURFACE OF CYLINDER BLOCK FOR FLATNESS

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head gasket for warpage.

Maximum warpage: 0.07 mm (0.0028 in.)

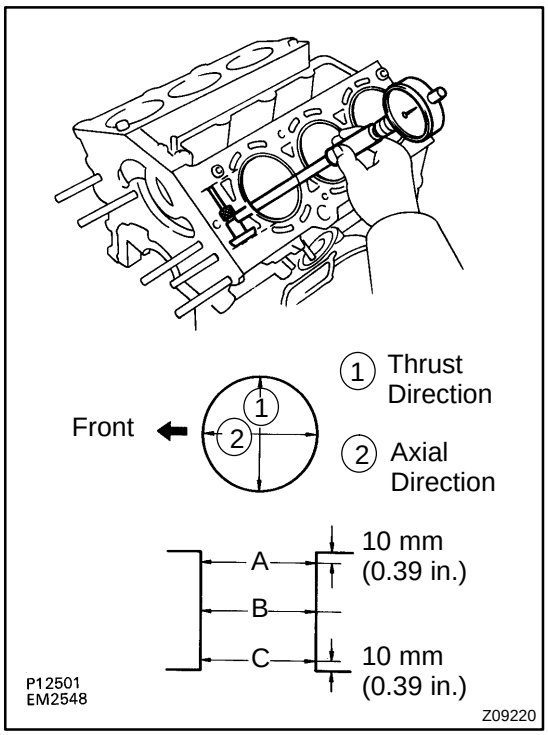
If warpage is greater than maximum, replace the cylinder block.



4. INSPECT CYLINDER FOR VERTICAL SCRATCHES

Visually check the cylinder for vertical scratches.

If deep scratches are present, replace the cylinder block.

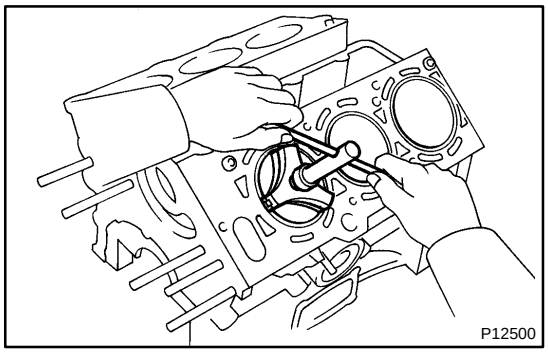


5. INSPECT CYLINDER BORE DIAMETER

Using a cylinder gauge, measure the cylinder bore diameter at positions A, B and C in the thrust and axial directions.

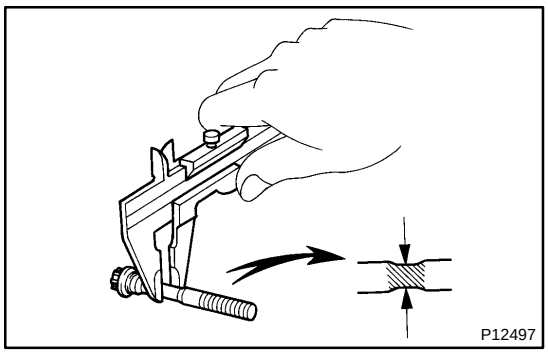
Standard diameter:
87.500 – 87.512 mm (3.4449 – 3.4453 in.)
Maximum diameter: 87.52 mm (3.4457 in.)

If the diameter is greater than maximum, replace the cylinder block.



6. REMOVE CYLINDER RIDGE

If the wear is less than 0.2 mm (0.008 in.), using a ridge reamer, grind the top of the cylinder.

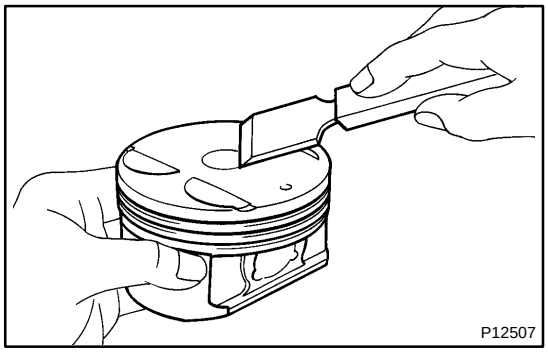


7. INSPECT 12 POINTED HEAD MAIN BEARING CAP BOLTS

Using vernier calipers, measure the tension portion diameter of the bolt.

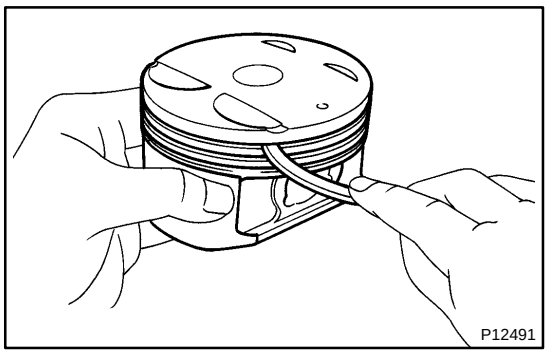
Standard diameter:
7.500 – 7.600 mm (0.2953 – 0.2992 in.)
Minimum diameter: 7.20 mm (0.2835 in.)

If the diameter is less than minimum, replace the bolt.

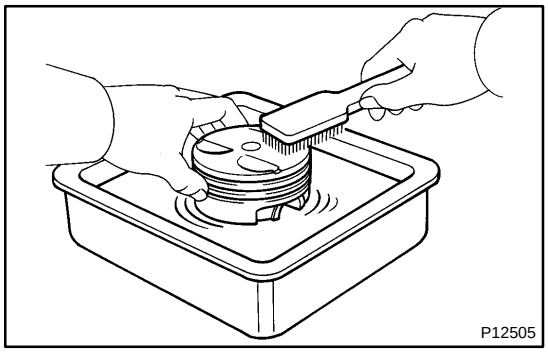


8. CLEAN PISTON

(a) Using a gasket scraper, remove the carbon from the piston top.



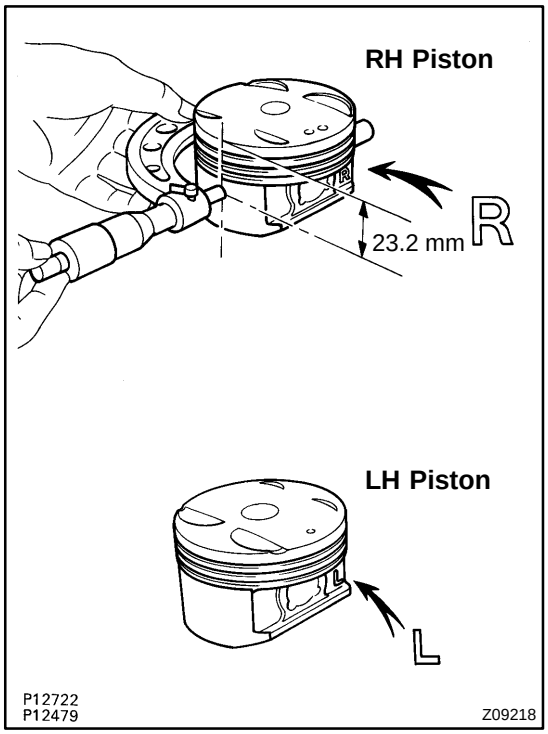
(b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



(c) Using solvent and a brush, thoroughly clean the piston.

NOTICE:

Do not use a wire brush.



9. INSPECT PISTON OIL CLEARANCE

(a) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 23.2 mm (0.913 in.) from the piston head.

Piston diameter:

87.406 – 87.416 mm (3.4412 – 3.4416 in.)

(b) Measure the cylinder bore diameter in the thrust directions. (See step 5.)

(c) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Standard oil clearance:

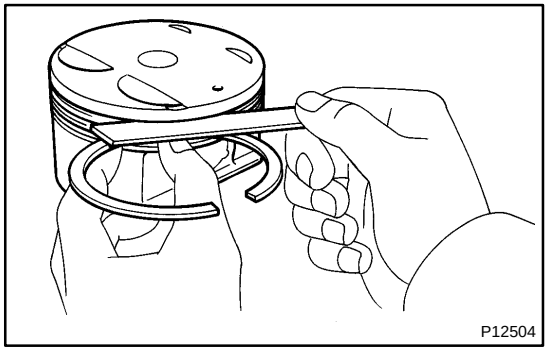
0.084 – 0.106 mm (0.0033 – 0.0042 in.)

Maximum oil clearance: 0.13 mm (0.0051 in.)

If the oil clearance is greater than maximum, replace all the 6 pistons. If necessary, replace the cylinder block.

HINT:

The shape of the piston varies for the RH and LH banks. The RH piston is marked with ”R”, the LH piston with ”L”.



10. INSPECT PISTON RING GROOVE CLEARANCE

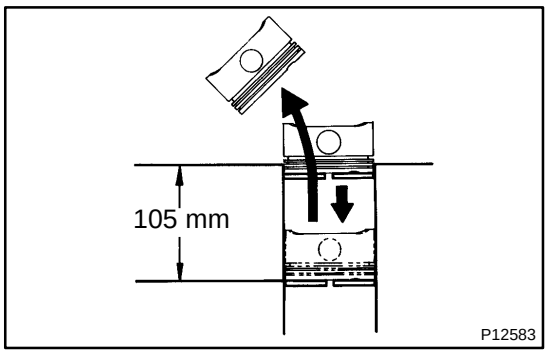
Using a feeler gauge, measure the clearance between new piston right and the wall of the ring groove.

Ring groove clearance:

No.1: 0.020 – 0.070 mm (0.0008 – 0.0028 in.)

No.2: 0.020 – 0.060 mm (0.0008 – 0.0024 in.)

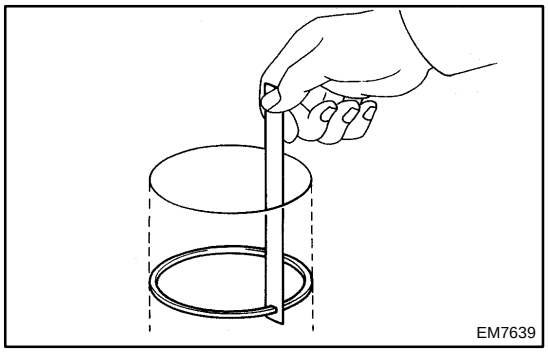
If the clearance is not as specified, replace the piston.



11. INSPECT PISTON RING END GAP

(a) Insert the piston ring into the cylinder bore.

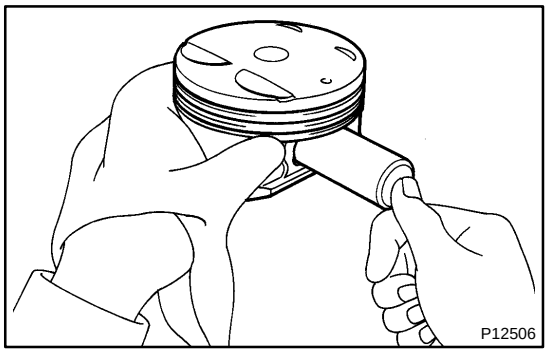
(b) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 105 mm (4.13 in.) from the top of the cylinder block.



(c) Using a feeler gauge, measure the end gap.

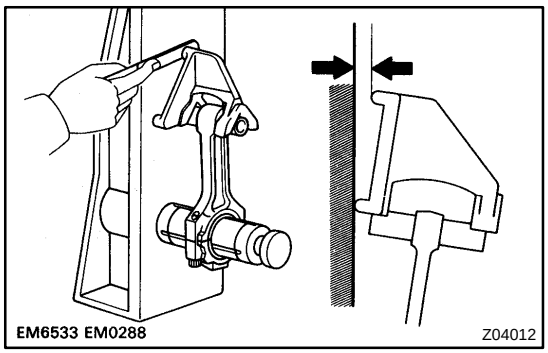
Standard end gap:
No.1: 0.25 – 0.35 mm (0.0098 – 0.0138 in.)
No.2: 0.35 – 0.45 mm (0.0138 – 0.0177 in.)
Oil (Side rail): 0.15 – 0.40 mm (0.0059 – 0.0157 in.)
Maximum end gap:
No.1: 0.95 mm (0.0374 in.)
No.2: 1.05 mm (0.0413 in.)
Oil (Side rail): 1.00 mm (0.0394 in.)

If the end gap is greater than maximum, replace the piston ring.
If the end gap is greater than maximum, even with a new piston ring, replace the cylinder block.



12. INSPECT PISTON PIN FIT

At 60˚C (140˚F), you should be able to push the piston pin into the piston pin hole with your thumb.



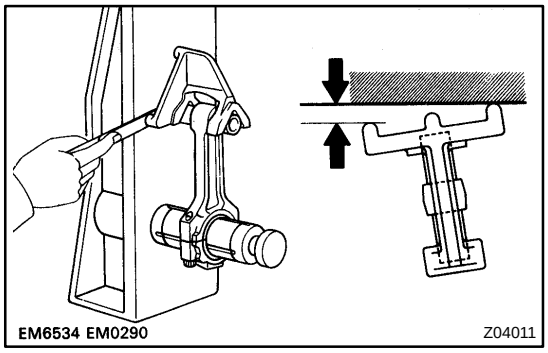
13. INSPECT CONNECTING ROD ALIGNMENT

Using a rod aligner and feeler gauge, check the connecting rod alignment.

- Check for out–of–alignment.

Maximum out–of–alignment:
0.05 mm (0.0020 in.) per 100 mm (3.94 in.)

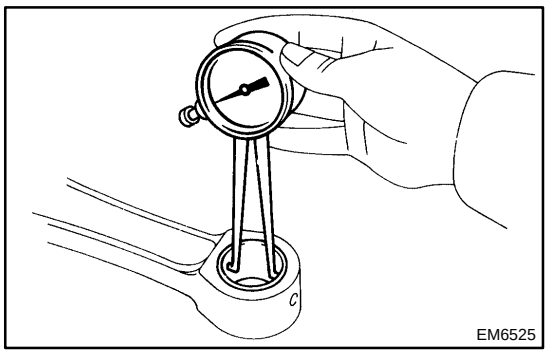
If out–of–alignment is greater than maximum, replace the connecting rod assembly.



- Check for twist

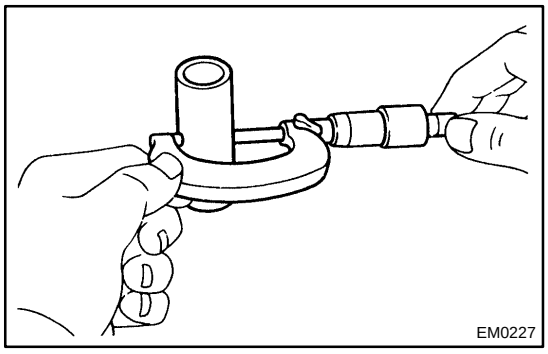
Maximum twist:
0.15 mm (0.0059 in.) per 100 mm (3.94 in.)

If twist is greater than maximum, replace the connecting rod assembly.



14. INSPECT PISTON PIN OIL CLEARANCE

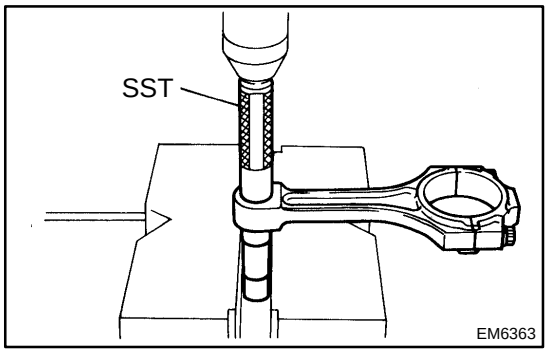
(a) Using a caliper gauge, measure the inside diameter of the connecting rod bushing.
Bushing inside diameter:
22.005 – 22.014 mm (0.8663 – 0.8667 in.)



(b) Using a micrometer, measure the piston pin diameter.
Piston pin diameter:
21.997 – 22.006 mm (0.8660 – 0.8664 in.)

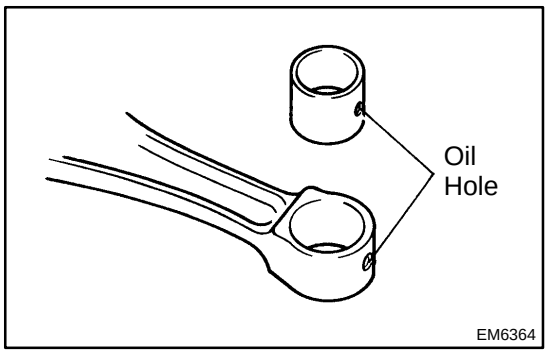
(c) Subtract the piston pin diameter measurement from the bushing inside diameter measurement.
Standard oil clearance:
0.005 – 0.011 mm (0.0002 – 0.0004 in.)
Maximum oil clearance: 0.05 mm (0.0020 in.)

If the oil clearance is greater than maximum, replace the bushing. If necessary, replace the piston and piston pin as a set.



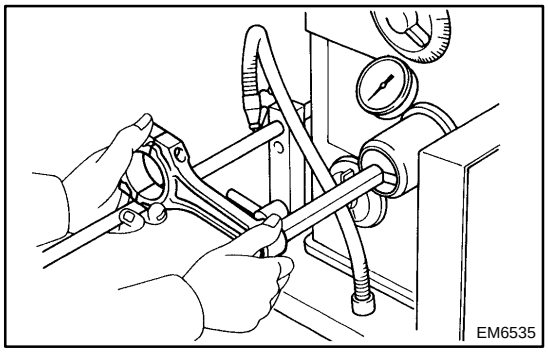
15. IF NECESSARY, REPLACE CONNECTING ROD BUSHING

(a) Using SST and a press, press out the bushing.
SST 09222–30010

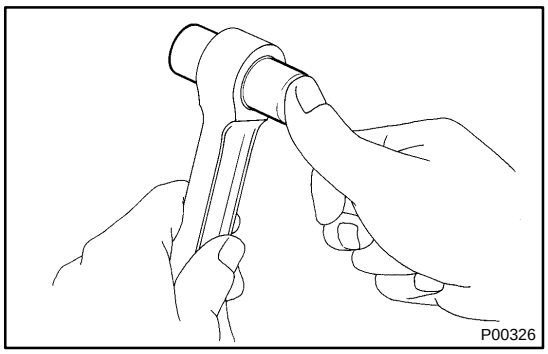


(b) Align the oil holes of a new bushing and the connecting rod.

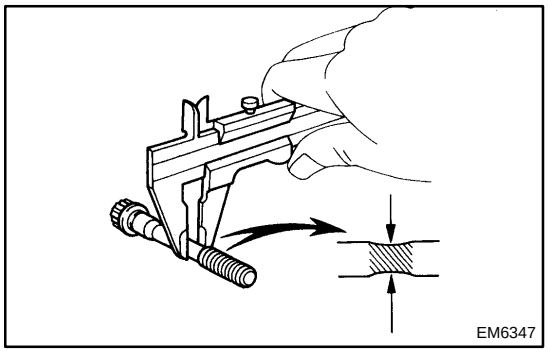
(c) Using SST and a press, press in the bushing.
SST 09222–30010



(d) Using a pin hole grinder, hone the bushing to obtain the standard specified clearance (see step 14 above) between the bushing and piston pin.



(e) Check the piston pin fit at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with your thumb.

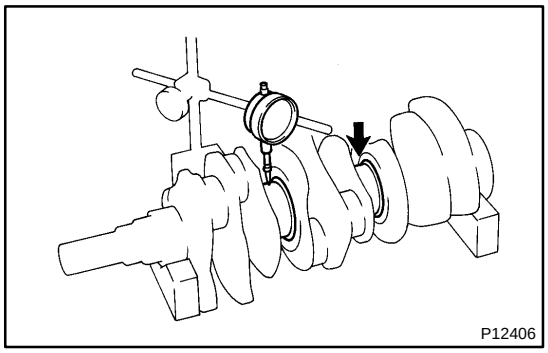


16. INSPECT CONNECTING ROD BOLTS

Using vernier calipers, measure the tension portion diameter of the bolt.

Standard diameter: 7.2 – 7.3 mm (0.284 – 0.287 in.)
Minimum diameter: 7.0 mm (0.276 in.)

If the diameter is less than minimum, replace the bolt.



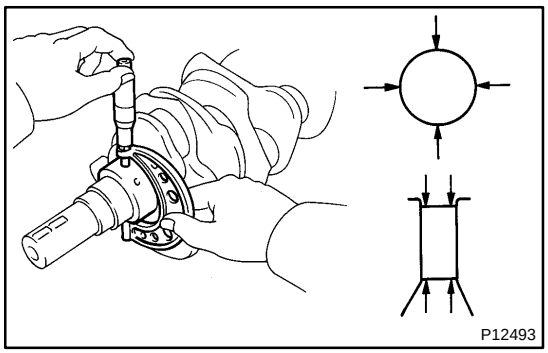
17. INSPECT CRANKSHAFT FOR CIRCLE RUNOUT

(a) Place the crankshaft on V–blocks.

(b) Using a dial indicator, measure the circle runout, as shown in the illustration.

Maximum circle runout: 0.06 mm (0.0024 in.)

If the circle runout is greater than maximum, replace the crankshaft.



18. INSPECT MAIN JOURNALS AND CRANK PINS

(a) Using a micrometer, measure the diameter of each main journal and crank pin.

Main journal diameter:
60.988 – 61.000 mm (2.4011 – 2.4016 in.)
Crank pin diameter:
52.992 – 53.000 mm (2.0862 – 2.0866 in.)

If the diameter is not as specified, check the oil clearance. (See disassembly in cylinder block)

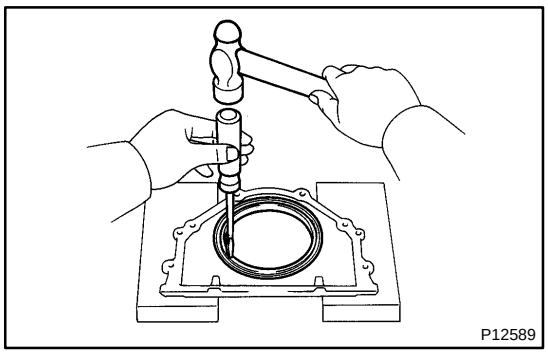
If necessary, replace the crankshaft.

(b) Check each main journal and crank pin for taper and out–of–round as shown.

Maximum taper and out–of–round:
0.02 mm (0.0008 in.)

If the taper and out–of–round is greater than maximum, replace the crankshaft.

19. REPLACE CRANKSHAFT FRONT OIL SEAL
(See page LU–13)


P12589

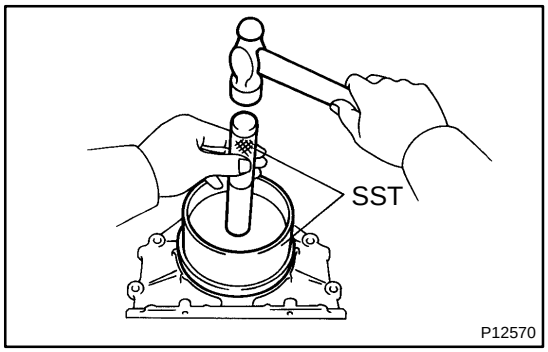
20. REPLACE CRANKSHAFT REAR OIL SEAL

HINT:

There are 2 methods ((a) and (b)) to replace the oil seal which are as follows:

(a) If the rear oil seal retainer is removed from the cylinder block.

(1) Using a screwdriver and hammer, tap out the oil seal.

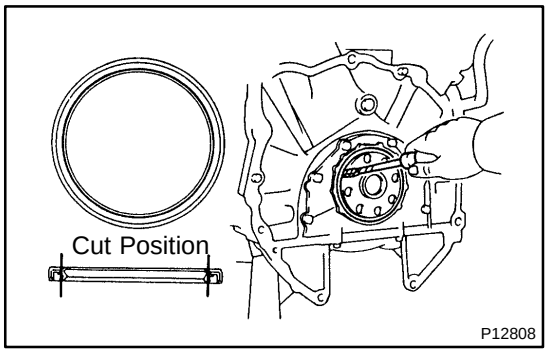


P12570

(2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the rear oil seal retainer edge.

SST 09223–15030, 09950–70010 (09951–07100)

(3) Apply MP grease to the oil seal lip.



P12808

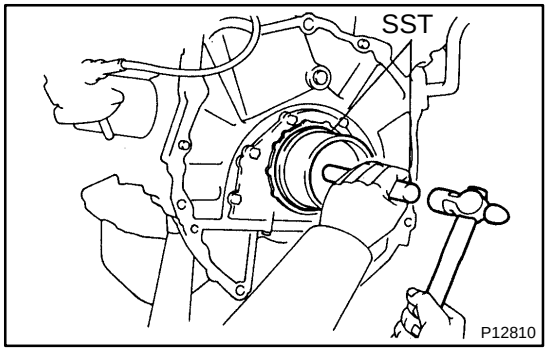
(b) If the rear oil seal retainer is installed to the cylinder block.

(1) Using a knife, cut off the oil seal lip.

(2) Using a screwdriver, pry out the oil seal.

NOTICE:

Be careful not to damage the crankshaft. Tape the screwdriver tip.



P12810

(3) Apply MP grease to a new oil seal lip.

(4) Using SST and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.

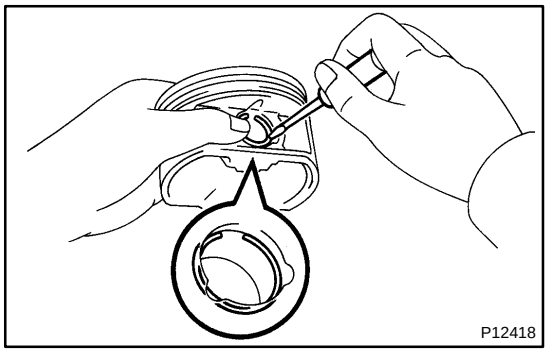
SST 09223–15030, 09950–70010 (09951–07100)

EM04E–02

REASSEMBLY

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- Replace all gaskets, O–rings and oil seals with new parts.

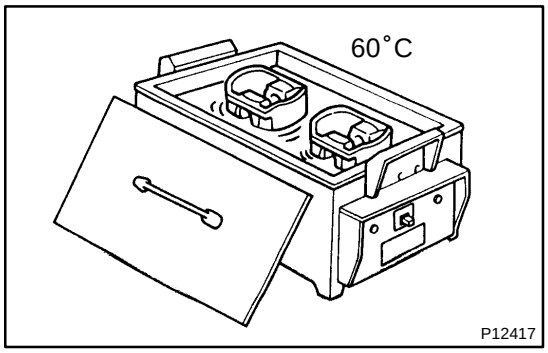


1. ASSEMBLE PISTON AND CONNECTING ROD

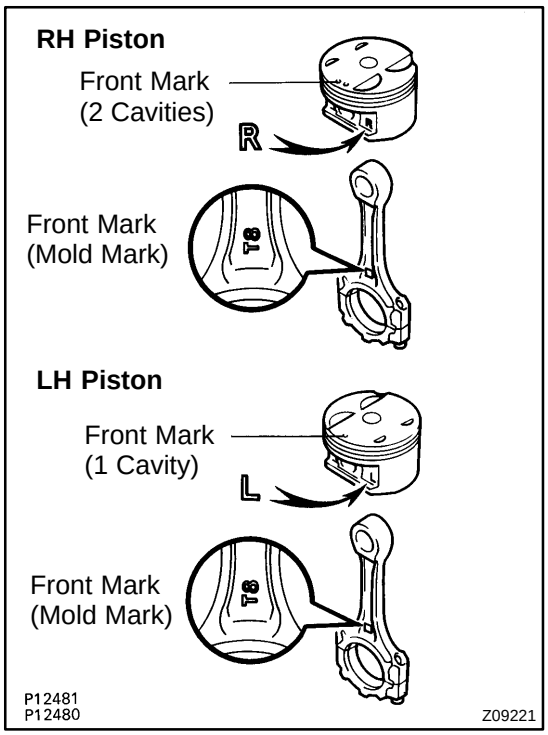
(a) Using a small screwdriver, install a new snap ring at one end of the piston pin hole.

HINT:

Be sure that end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.



(b) Gradually heat the piston to about 60˚C (140˚F).



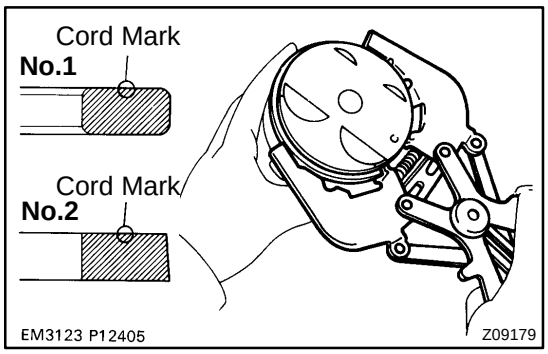
(c) Coat the piston pin with engine oil.

(d) Align the front marks of the piston and connecting rod, and push in the piston pin with your thumb.

(e) Using a small screwdriver, install a new snap ring on the other end of the piston pin hole.

HINT:

Be sure that end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.

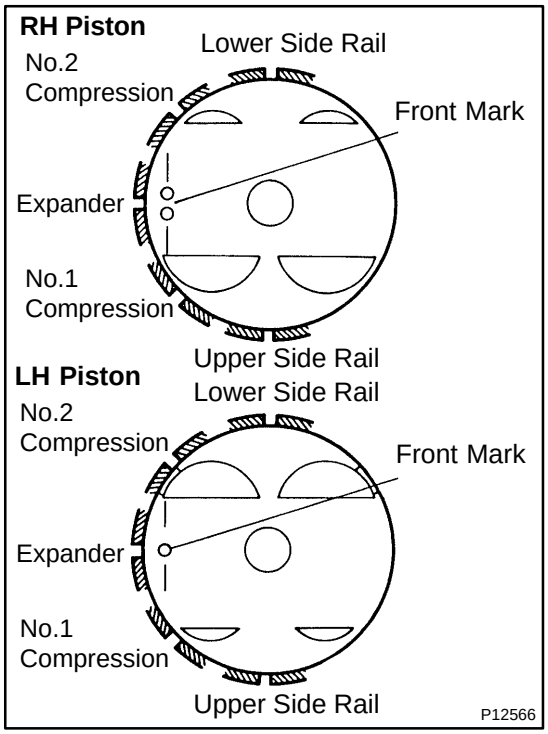


2. INSTALL PISTON RINGS

(a) Install the oil ring expander and 2 side rails by hand.

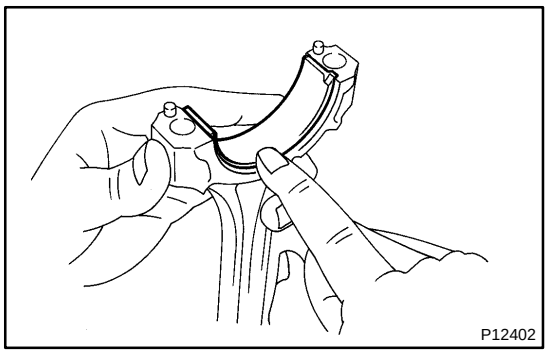
(b) Using a piston ring expander, install the 2 compression rings with the code mark facing upward.

Code mark:
No.1: 1R or T
No.2: 2R or 2T



(c) Position the piston rings so that the ring ends are as shown.

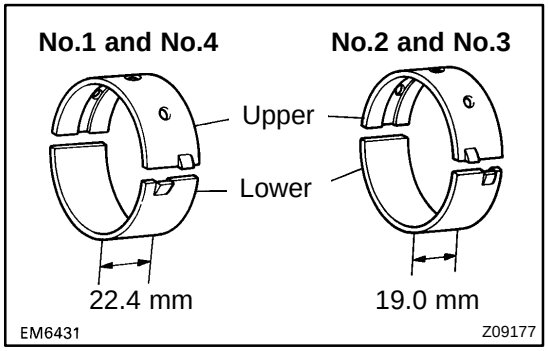
NOTICE:
Do not align the ring ends.



3. INSTALL CONNECTING ROD BEARINGS

(a) Align the bearing claw with the groove of the connecting rod or connecting cap.

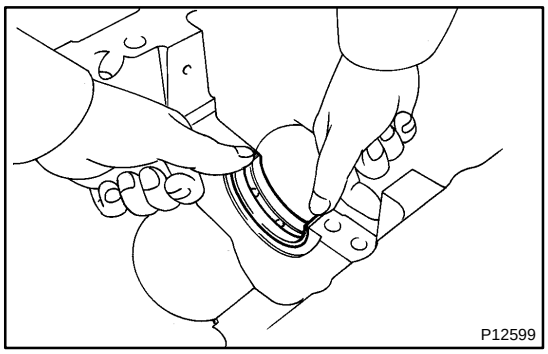
(b) Install the bearings in the connecting rod and connecting rod cap.



4. INSTALL MAIN BEARINGS

HINT:

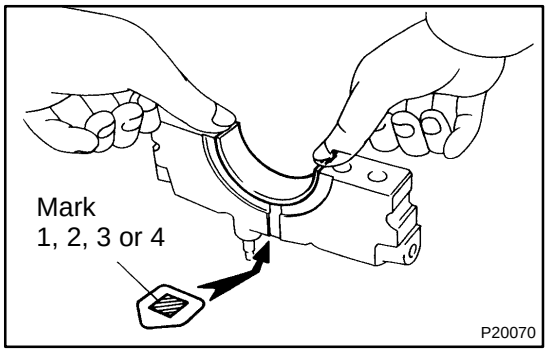
- Main bearings come in widths of 19.0 mm (0.748 in.) and 22.4 mm (0.882 in.). Install the 22.4 mm (0.882 in.) bearings in the No.1 and No.4 cylinder block journal positions with the main bearing cap. Install the 19.0 mm (0.748 in.) bearings in the No.2 and No.3 positions.
- Upper bearings have an oil groove and oil holes; lower bearings do not.



(a) Align the bearing claw with the claw groove of the cylinder block, and push in the 4 upper bearings.

NOTICE:

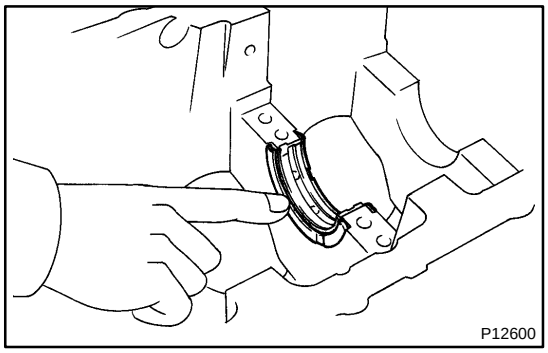
Install the bearing with the oil hole in the cylinder block.



(b) Align the bearing claw with the claw groove of the main bearing cap, and push in the 4 lower bearings.

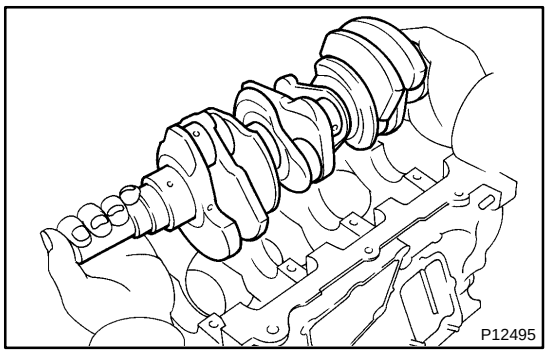
HINT:

A number is marked on each main bearing cap to indicate the installation position.

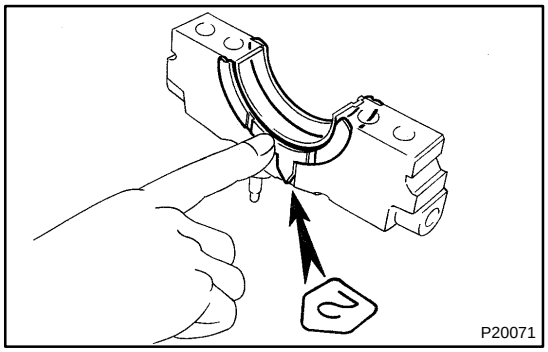


5. INSTALL UPPER THRUST WASHERS

Install the 2 thrust washers under the No.2 journal position of the cylinder block with the oil grooves facing outward.

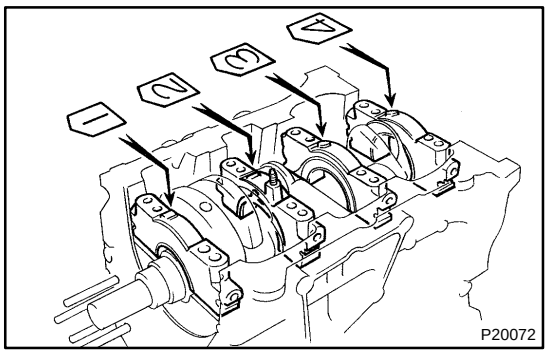


6. PLACE CRANKSHAFT ON CYLINDER BLOCK

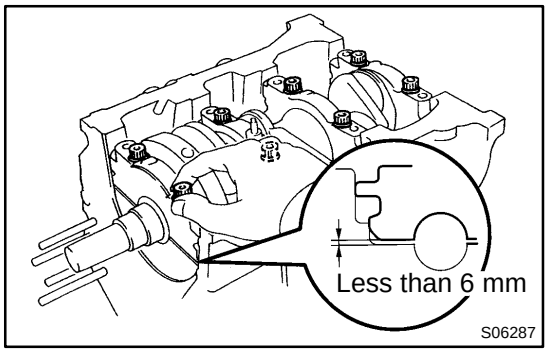


7. PLACE MAIN BEARING CAPS AND LOWER THRUST WASHERS ON CYLINDER BLOCK

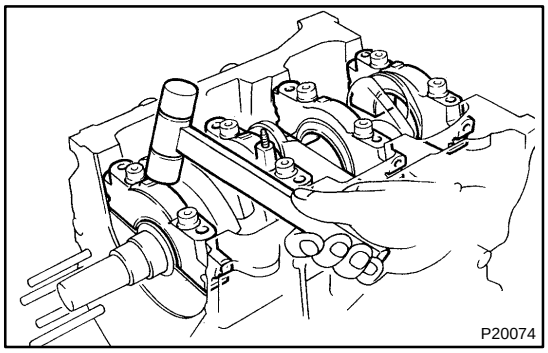
(a) Install the 2 thrust washers on the No.2 bearing cap with the grooves facing outward.



(b) Temporarily place the 4 main bearing caps level and let them in their proper locations.



(c) Apply a light coat of engine oil on the threads and under the main bearing cap bolts for the 12 pointed head.
(d) Temporarily install the 8 main bearing cap bolts to the inside positions.
(e) Insert the main bearing cap with your hand until the clearance between the main bearing cap and the cylinder block will become less than 6 mm (0.23 in.) by making the 2 internal main bearing cap bolts as a guide.

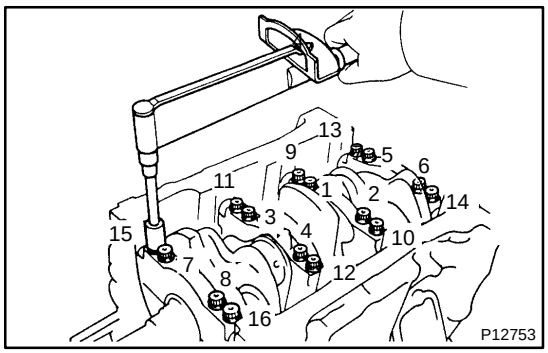


(f) Using a plastic–faced hammer, lightly tap the bearing cap to ensure a proper fit.

8. INSTALL 12 POINTED HEAD MAIN BEARING CAP BOLTS

HINT:

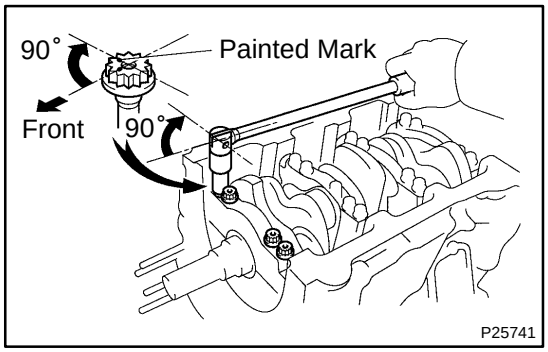
- The main bearing cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any of the main bearing cap bolts is broken or deformed, replace it.



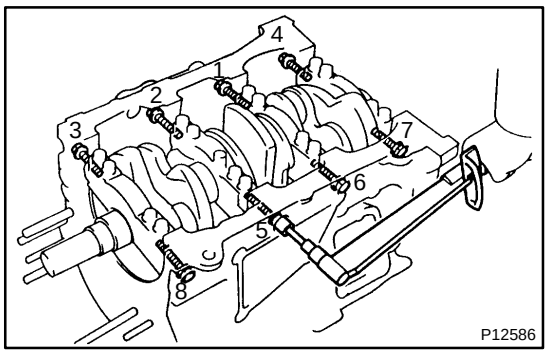
(a) Apply a light coat of engine oil on the threads and under the main bearing cap bolts.
(b) Install and uniformly tighten the 16 main bearing cap bolts in several passes, in the sequence shown.

Torque: 22 N·m (225 kgf·cm, 16 ft·lbf)

If any of the main bearing cap bolts does not meet the torque specification, replace the main bearing cap bolt.



(c) Mark the front of the main bearing cap bolts with paint.
(d) Retighten the main bearing cap bolts by 90˚ in the numerical order shown.
(e) Check that the painted mark is now at a 90˚ angle to the front.



9. INSTALL HEXAGON HEAD MAIN BEARING CAP BOLTS

(a) Install a new seal washer to the main bearing cap bolt.

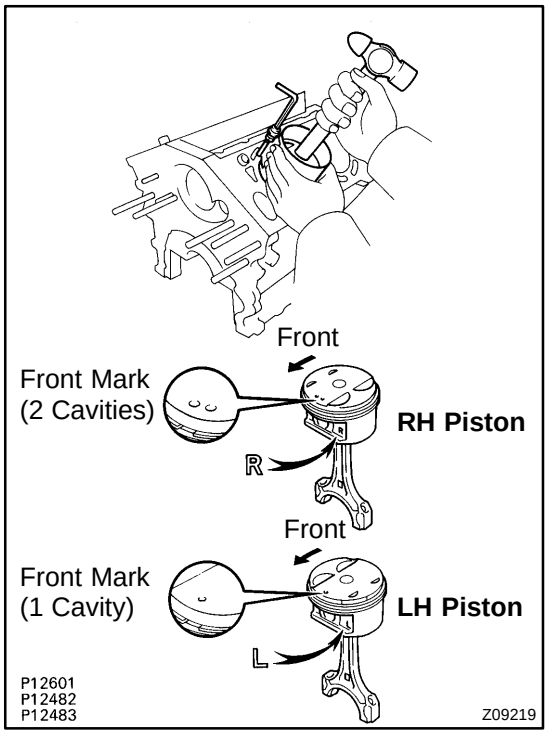
(b) Install and uniformly tighten the 8 main bearing cap bolts in several passes, in the sequence shown.

Torque: 27 N·m (275 kgf·cm, 20 ft·lbf)

(c) Check that the crankshaft turns smoothly.

10. CHECK CRANKSHAFT THRUST CLEARANCE

(See page EM–78)

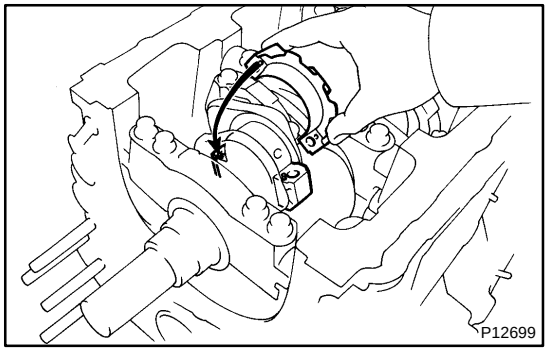


11. INSTALL PISTON AND CONNECTING ROD ASSEMBLES

Using a piston ring compressor, push the correctly numbered piston and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.

HINT:

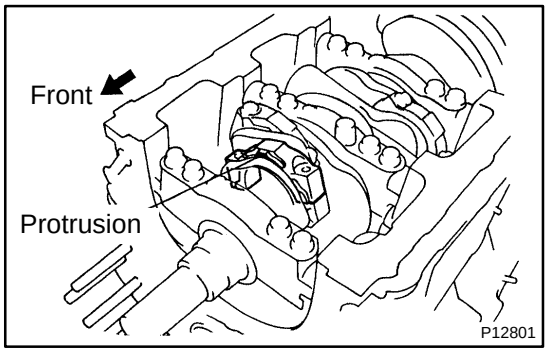
The shape of the piston varies for the RH and LH banks. The RH piston is marked with ”R”, the LH piston with ”L”.



12. PLACE CONNECTING ROD CAP ON CONNECTING ROD

(a) Match the numbered connecting rod cap with the connecting rod.

(b) Align the pin dowels of the connecting rod cap with the pins of the connecting rod, and install the connecting rod.

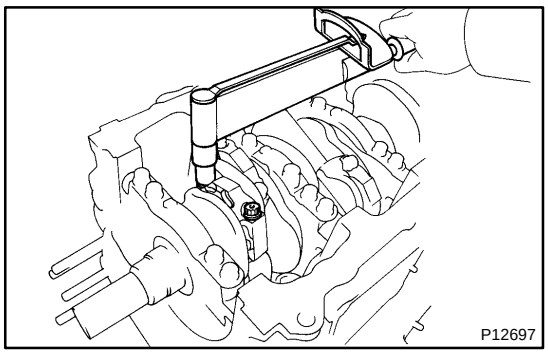


(c) Check that the protrusion of the connecting rod cap is facing in the correct direction.

13. INSTALL CONNECTING ROD CAP BOLTS

HINT:

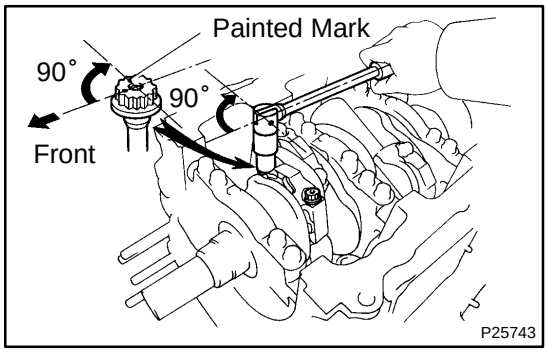
- The connecting rod cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any of the connecting rod cap bolts is broken or deformed, replace it.



(a) Apply a light coat of engine oil on the threads and under the heads of the connecting rod cap bolts.
(b) Install and alternately tighten the 2 connecting rod cap bolts in several passes.

Torque: 24.5 N·m (250 kgf·cm, 18 ft·lbf)

If any of the connecting rod cap bolts does not meet the torque specification, replace the connecting rod cap bolts.

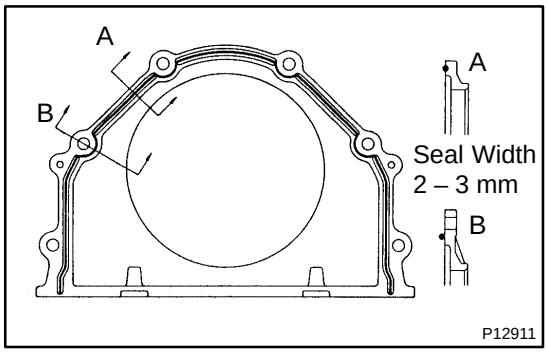


(c) Mark the front of the connecting cap bolts with paint.
(d) Retighten the cap bolts by 90° as shown.
(e) Check that the painted mark is now at a 90° angle to the front.
(f) Check that the crankshaft turns smoothly.

14. CHECK CONNECTING ROD THRUST CLEARANCE (See page EM–78)

15. INSTALL REAR OIL SEAL RETAINER

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil seal retainer and cylinder block.
- Using a razor blade and gasket scraper, remove all the oil packing (FIPG) material from the gasket surfaces and sealing grooves.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.



(b) Apply seal packing to the oil seal retainer as shown in the illustration.

Seal packing: Part No. 08826–00080 or equivalent
- Install a nozzle that has been cut to a 2 – 3 mm (0.08 – 0.12 in.) opening.
- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

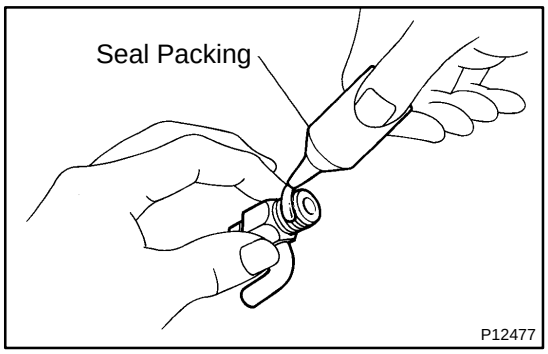
(c) Install the oil seal retainer with the 6 bolts Uniformly tighten the bolt in several passes, in the sequence shown.

Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

16. INSTALL EGR COOLER

Install a new gasket and the EGR cooler with the 3 bolts and 2 nuts.

Torque: 9 N·m (90 kgf·cm, 78 in.·lbf)



17. INSTALL ENGINE COOLANT DRAIN UNION

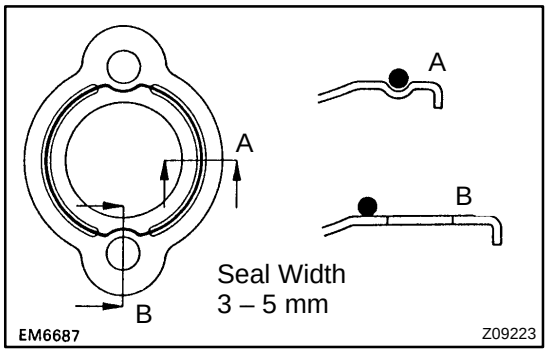
(a) Apply seal packing to 2 or 3 threads.
Seal packing: Part No. 08826–00100 or equivalent

(b) Install the drain union.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

HINT:
After applying the specified torque, rotate the drain union clockwise until its drain port is facing downward.

18. INSTALL WATER SEAL PLATE

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the seal plate and cylinder block.
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.



(b) Apply seal packing to the seal plate as shown in the illustration.
Seal packing: Part No. 08826–00100 or equivalent
- Install a nozzle that has been cut to a 3 – 5 mm (0.12 – 0.20 in.) opening.
- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

(c) Install the seal plate with the 2 nuts.
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

19. INSTALL OIL FILTER UNION
Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)

20. INSTALL OIL FILTER
(See page LU–3)

21. INSTALL OIL PUMP
(See page LU–15)

22. INSTALL NO.1 OIL PAN
(See page LU–15)

23. INSTALL OIL STRAINER
(See page LU–15)

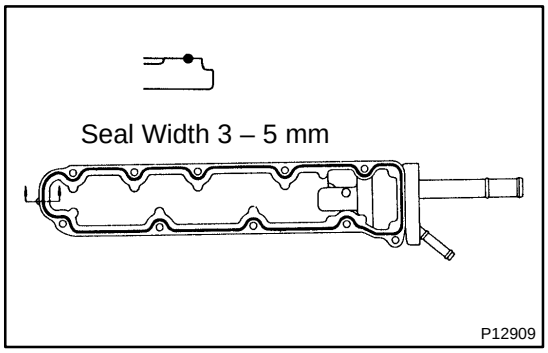
24. INSTALL NO.2 OIL PAN
(See page LU–15)

25. INSTALL WATER PUMP
(See page CO–8)

26. INSTALL WATER INLET HOUSING

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the water inlet housing and cylinder block.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- Thoroughly clean all components to remove all the loose material.
- Using a non–residue solvent, clean both sealing surfaces.



(b) Apply seal packing to the water inlet housing as shown in the illustration.

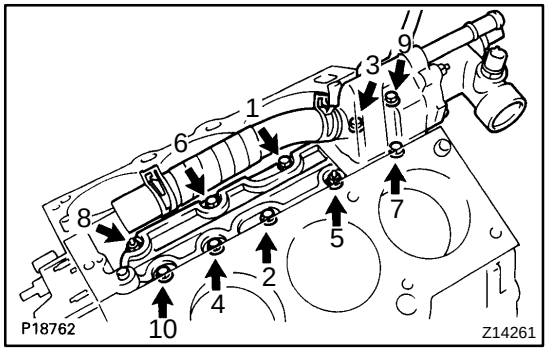
Seal packing: Part No. 08826–00100 or equivalent

- Install a nozzle that has been cut to a 3 – 5 mm (0.12 – 0.20 in.) opening.

HINT:

Avoid applying an excessive amount to the surface.

- Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

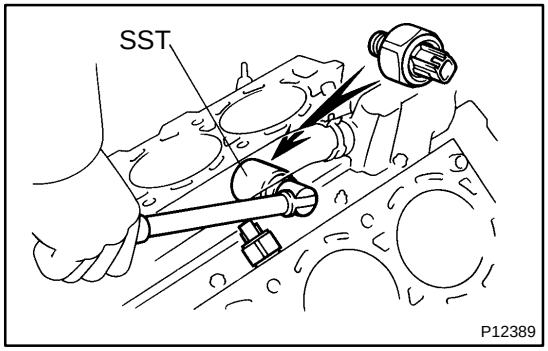


(c) Install the water inlet housing with the 8 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes, in the sequence shown.

Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

(d) Install the engine wire band.

(e) Install the engine wire clamp.



27. INSTALL KNOCK SENSORS

(a) Using SST, install the 2 knock sensors.

SST 09816–30010

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Connect the 2 knock sensor connectors.

28. INSTALL NO.2 IDLER PULLEY BRACKET

Torque: 28 N·m (290 kgf·cm, 21 ft·lbf)

29. INSTALL A/C COMPRESSOR HOUSING BRACKET

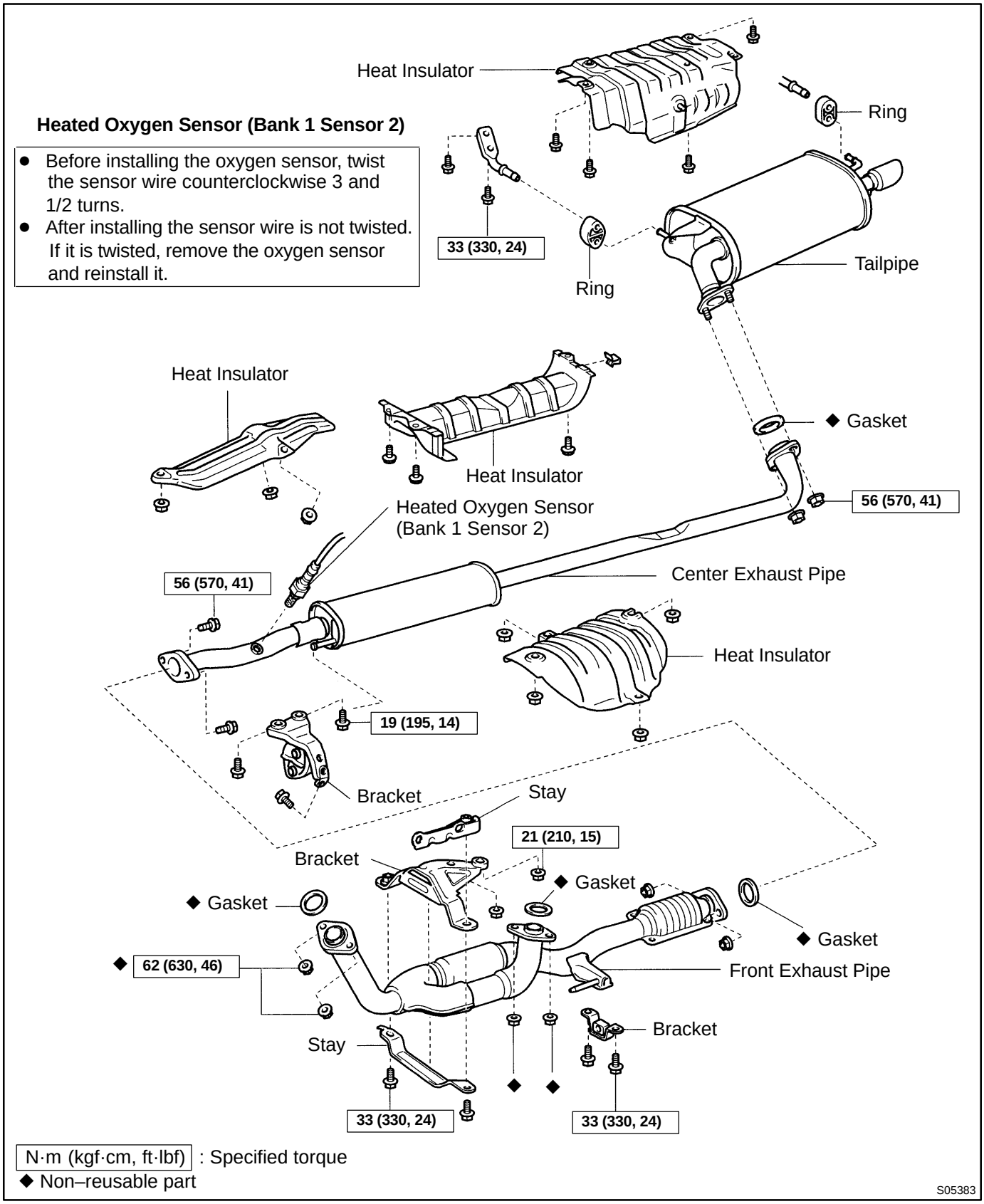
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

30. **INSTALL OIL PRESSURE SWITCH**
(See page LU–1)
31. **INSTALL GENERATOR, BRACKET AND ADJUSTING BAR ASSEMBLY**
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
32. **INSTALL CYLINDER HEAD**
(See page EM–52)
33. **INSTALL TIMING PULLEYS AND BELT**
(See page EM–20)
34. **REMOVE ENGINE STAND**

EXHAUST SYSTEM

COMPONENTS

EM1B7–01



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

S05383

IGNITION SYSTEM

IG023–02

ON–VEHICLE INSPECTION

NOTICE:

"Cold" and "Hot" in these sentences express the temperature of the coils themselves. "Cold" is from –10˚C (14˚F) to 50˚C (122˚F) and "Hot" is from 50˚C (122˚F) to 100˚C (212˚F).

1. INSPECT IGNITER SPARK TEST

Check that the spark occurs.

(1) Remove the ignition coil.
(2) Remove the spark plug.
(3) Install the spark plug to the ignition coil, and connect the ignition coil connector.
(4) Ground the spark plug.
(5) Check if spark occurs while engine is being cranked.

NOTICE:

To prevent excess fuel being injected from the injectors during this test, do not crank the engine for more 5 – 10 seconds at a time.

If the spark does not occur, do the test as follows:

SPARK TEST

↓ NO

CHECK CONNECTION OF IGNITION COIL AND IGNITER CONNECTORS → BAD → Connect securely.

↓ OK

CHECK RESISTANCE OF HIGH–TENSION CORD
Maximum resistance: 25 kΩ per cord → BAD → Replace the cord(s).

↓ OK

CHECK POWER SUPPLY OF HIGH–TENSION COIL AND IGNITER
1. Turn ignition switch to ON.
2. Check that there is battery voltage at ignition coil positive (+) terminal.

→ BAD → Check wiring between ignition switch to ignition coil and igniter.

↓ OK

CHECK RESISTANCE OF IGNITION COIL

Resistance:	Cold	Hot
Primary	0.70 – 0.94 Ω	0.85 – 1.10 Ω
Secondary	10.8 – 14.9 kΩ	13.1 – 17.5 kΩ

→ BAD → Replace the ignition coil (s).

↓ OK

CHECK RESISTANCE OF CAMSHAFT POSITION SENSOR

Resistance:	Cold	Hot
	835 – 1,400 Ω	1,060 – 1,645 Ω

→ BAD → Replace the camshaft position sensor.

↓ OK

CHECK RESISTANCE OF CRANKSHAFT POSITION SENSOR

Resistance:	Cold	Hot
	1,630 – 2,740 Ω	2,065 – 3,225 Ω

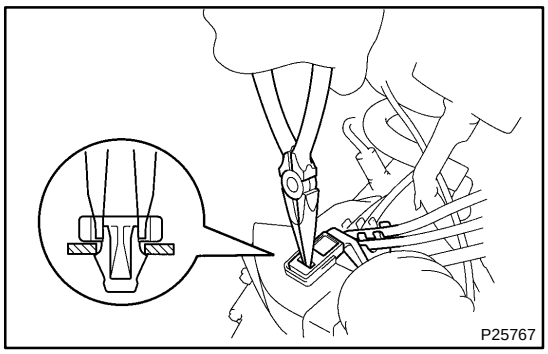
→ BAD → Replace the crankshaft position sensor.

↓ OK

CHECK IGT SIGNAL FROM ECM → BAD → Check wiring between ECM and igniter, and then try another ECM.

↓ OK

TRY ANOTHER IGNITER

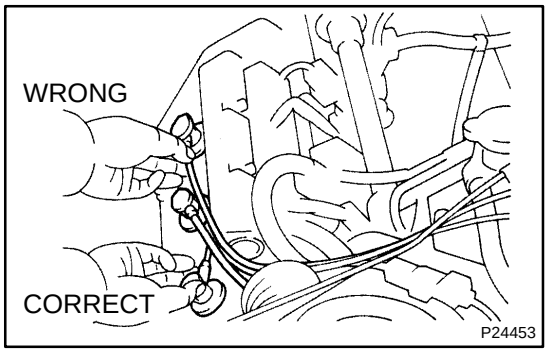


2. INSPECT HIGH–TENSION CORDS

(a) Remove the V–bank cover.

(b) Disconnect the high–tension cords from the spark plugs.

(1) Using needle–nose pliers, disconnect the cord clamp from the engine wire protector.

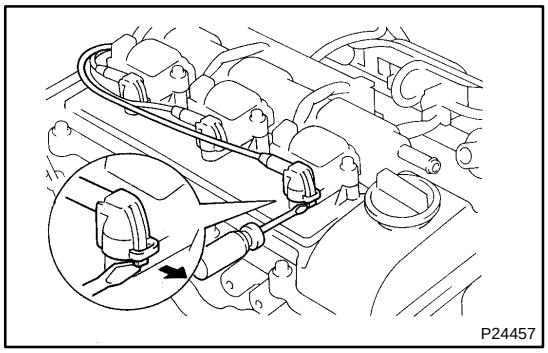


(2) Disconnect the high–tension cords from the spark plugs.

NOTICE:

Pulling on or bending the cords may damage the conductor inside.

(3) Disconnect the high–tension cords from the clamp.



(c) Disconnect the high–tension cords from the ignition coils.

(1) Using a screwdriver, lift up the lock claw and disconnect the holder from the ignition coils.

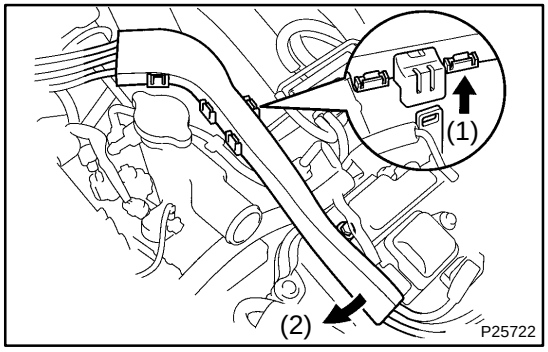
(2) Disconnect the high–tension cord at the grommet.

HINT:

Do not pull on the cord.

NOTICE:

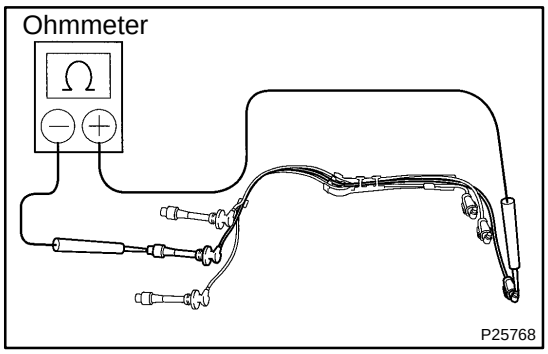
- **Pulling on or bending the cords may damage the conductor inside.**
- **Do not wipe any of the oil from the grommet after the high–tension cord is disconnected.**



(d) Remove the high–tension cords set.

(1) Disconnect the clamp from the emission control valve set.

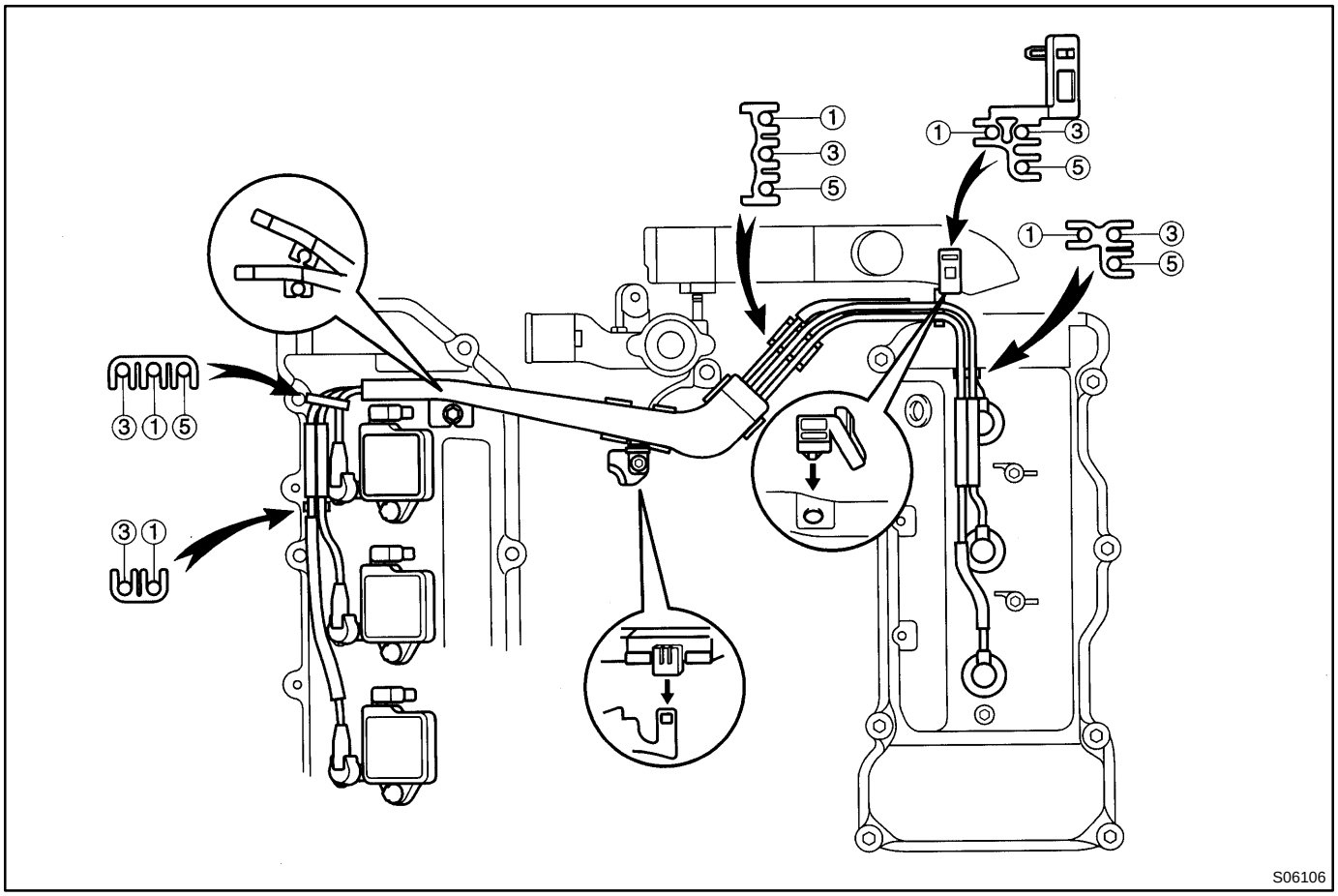
(2) Remove the high–tension cords set in indicated direction.

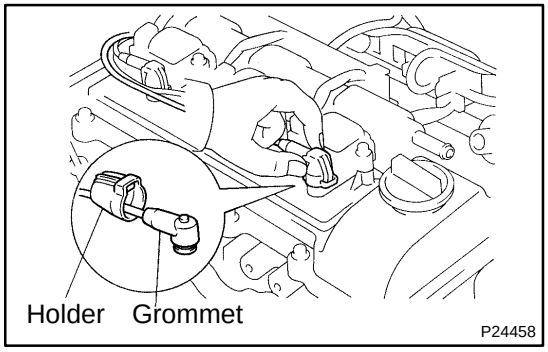


(e) Using an ohmmeter, measure the resistance.
Maximum resistance: 25 kΩ per cord

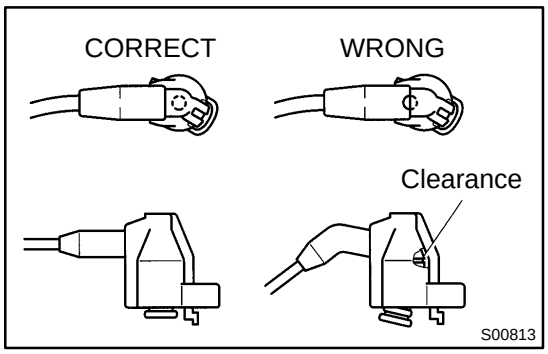
If the resistance is greater than maximum, check the terminals. If necessary, replace the high–tension cord.

(f) Install the high–tension cords set.





(g) Connect the high–tension cords to the ignition coils.
(1) Assemble the holder and grommet.
(2) Align the spline of the ignition coil with the spline of the holder, and push in the cord.



NOTICE:

Check that the holder is correctly installed to the grommet and ignition coil as shown in the illustration.

(3) Check that the lock claw of the holder is engaged by lightly pulling the holder.

(h) Connect the high–tension cords to the spark plugs.

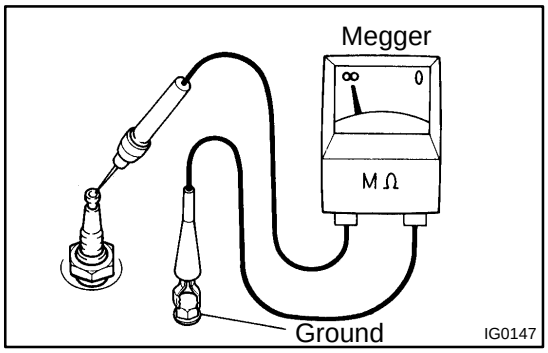
(i) Install the V–bank cover.

3. INSPECT SPARK PLUGS

NOTICE:

- **Never use a wire brush for cleaning.**
- **Never attempt to adjust the electrode gap on a used spark plug.**
- **Spark plugs should be replaced every 100,000 km (60,000 miles).**

(a) Remove the ignition coil.



(b) Inspect the electrode.

Using a megger (insulation resistance meter), measure the insulation resistance.

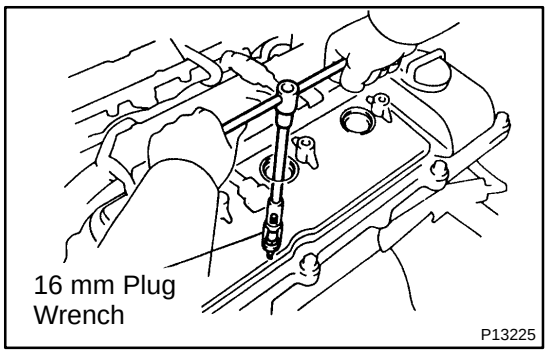
Standard correct insulation resistance:

10 MΩ or more

If the resistance is less than specified, proceed to step (e).

HINT:

If a megger is not available, the following simple method of inspection provides fairly accurate results.



(c) Simple Method:

(1) Quickly race the engine to 4,000 rpm 5 times.

(2) Remove the spark plug. (See step (d))

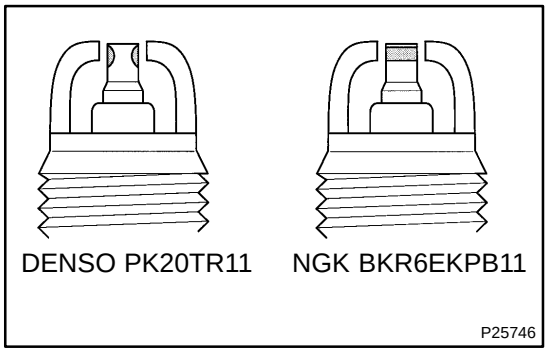
(3) Visually check the spark plug.

If the electrode is dry ... OK

If the electrode is wet ... Proceed to step (e)

(4) Install the spark plug. (See step (h))

(d) Using a 16 mm plug wrench, remove the 6 spark plugs from the RH and LH cylinder heads.

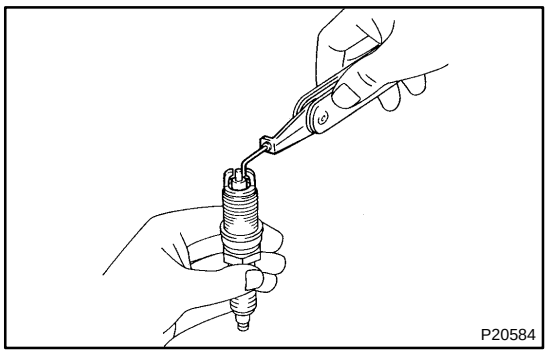


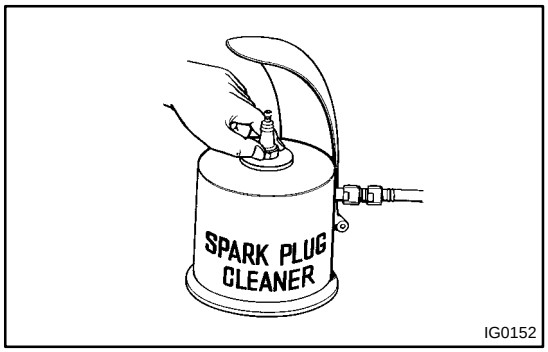
(e) Check the spark plug for thread damage and insulator damage.

If abnormal, replace the spark plug.

Recommended spark plug:

DENSO	PK20TR11
NGK	BKR6EKPB11


P20584



IG0152

(f) Inspect the electrode gaps.
Maximum electrode gap for used spark plug:
1.3 mm (0.051 in.)
If the gap is greater than maximum, replace the spark plug.
Correct electrode gap for new spark plug:
1.1 mm (0.043 in.)

NOTICE:
If adjusting the gap of a new spark plug, bend only the base of the ground electrode. Do not touch the tip. Never attempt to adjust the gap on the used plug.

(g) Clean the spark plugs.
If the electrode has traces of wet carbon, allow it to dry and then clean with a spark plug cleaner.
Air pressure: Below 588 kPa (6 kgf/cm^2, 85 psi)
Duration: 20 seconds or less
HINT:
If there are traces of oil, remove it with gasoline before using the spark plug cleaner.

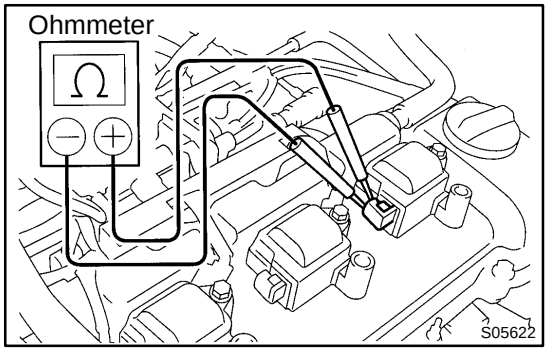
(h) Using a 16 mm plug wrench, install the 6 spark plugs to the RH and LH cylinder heads.
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

(i) Install the ignition coils.

4. INSPECT IGNITION COILS

(a) Disconnect the high–tension cords from the ignition coils.

(b) Disconnect the ignition coil connectors.

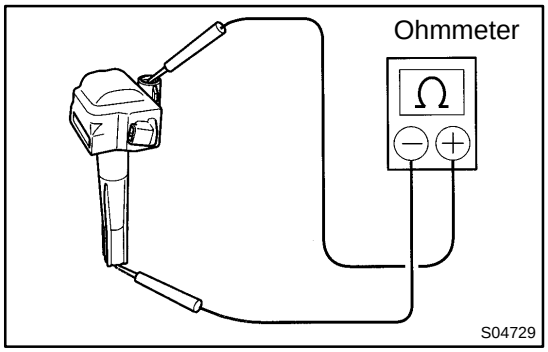


S05622

(c) Using an ohmmeter, measure the primary coil resistance between the positive (+) and negative (–) terminals.
Primary coil resistance:

Cold	0.70 – 0.94 Ω
Hot	0.85 – 1.10 Ω

If the resistance is not as specified, replace the ignition coil.



S04729

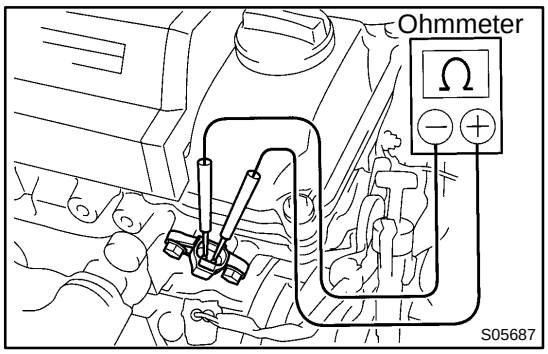
(d) Using an ohmmeter, measure the secondary coil resistance between the positive (+) and high–tension terminal.
Secondary coil resistance:

Cold	10.8 – 14.9 kΩ
Hot	13.1 – 17.5 kΩ

If the resistance is not as specified, replace the ignition coil.

(e) Connect the ignition coil connectors.

(f) Connect the high–tension cords to the ignition coils.



5. INSPECT CAMSHAFT POSITION SENSOR

(a) Disconnect the camshaft position sensor connector.

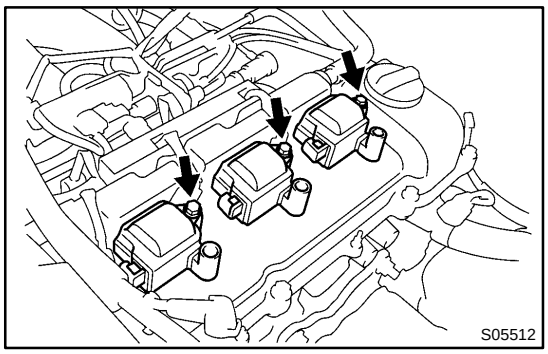
(b) Using an ohmmeter, measure the resistance between terminals.

Resistance:

Cold	835 – 1,400 Ω
Hot	1,060 – 1,645 Ω

If the resistance is not as specified, replace the camshaft position sensor.

(c) Connect the camshaft position sensor connector.



IGNITION COIL

IG024–01

REMOVAL

1. DISCONNECT HIGH–TENSION CORDS FROM IGNITION COILS (See page IG–1)

2. REMOVE IGNITION COILS

(a) Disconnect the 3 connectors from the ignition coil.

(b) Remove the 3 bolts and 3 ignition coils from the LH cylinder head.

Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

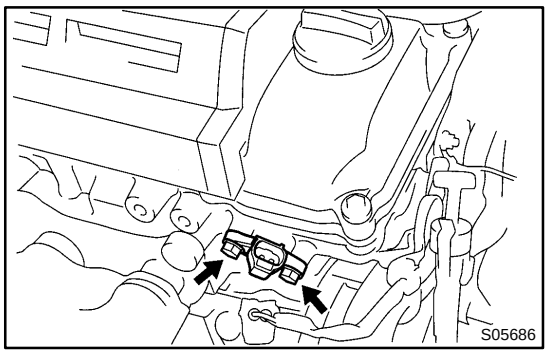
HINT:

Arrange the ignition coils in correct order.

IG025–01

INSTALLATION

Installation is in the reverse order of removal (See page IG–7).



CAMSHAFT POSITION SENSOR

IG026–01

REMOVAL

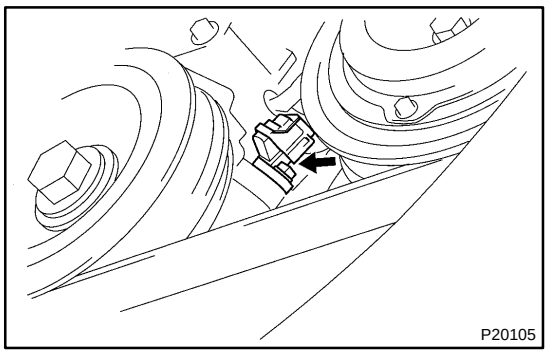
REMOVE CAMSHAFT POSITION SENSOR

(a) Disconnect the camshaft position sensor connector.
(b) Remove the 2 bolts and camshaft position sensor.
Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

IG027–01

INSTALLATION

Installation is in the reverse order of removal (See page IG–9).



CRANKSHAFT POSITION SENSOR

IG028–01

REMOVAL

1. REMOVE RH FENDER APRON SEAL

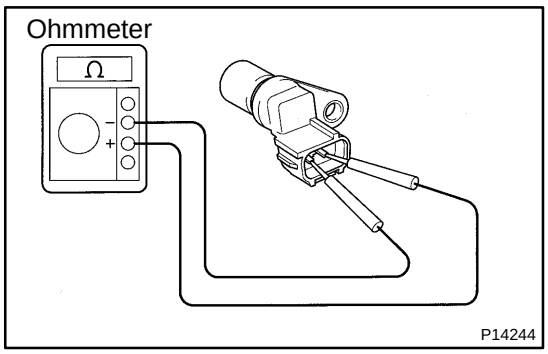
2. REMOVE CRANKSHAFT POSITION SENSOR

(a) Remove the bolt and disconnect the crankshaft position sensor.

Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

(b) Disconnect the crankshaft position sensor connector.

IG029–01



INSPECTION

NOTICE:

"Cold" and "Hot" in these sentences express the temperature of the sensor itself. "Cold" is from –10˚C (14˚F) to 50˚C (122˚F) and "Hot" is from 50˚C (122˚F) to 100˚C (212˚F).

INSPECT CRANKSHAFT POSITION SENSOR RESISTANCE

Using an ohmmeter, measure the resistance between terminals.

Resistance:

Cold	1,630 – 2,740 Ω
Hot	2,065 – 3,225 Ω

If the resistance is not as specified, replace the crankshaft position sensor.

IG02A–01

INSTALLATION

Installation is in the reverse order of removal (See page IG–11).

HOW TO USE THIS MANUAL

IN01Z–01

GENERAL INFORMATION

1. INDEX

An INDEX is provided on the first page of each section to guide you to the item to be repaired. To assist you in finding your way through the manual, the Section Title and major heading are given at the top of every page.

2. GENERAL DESCRIPTION

At the beginning of each section, a General Description is given that pertains to all repair operations contained in that section.

Read these precautions before starting any repair task.

3. TROUBLESHOOTING

TROUBLESHOOTING tables are included for each system to help you diagnose the problem and find the cause. The fundamentals of how to proceed with troubleshooting are described on page IN–16.

Be sure to read this before performing troubleshooting.

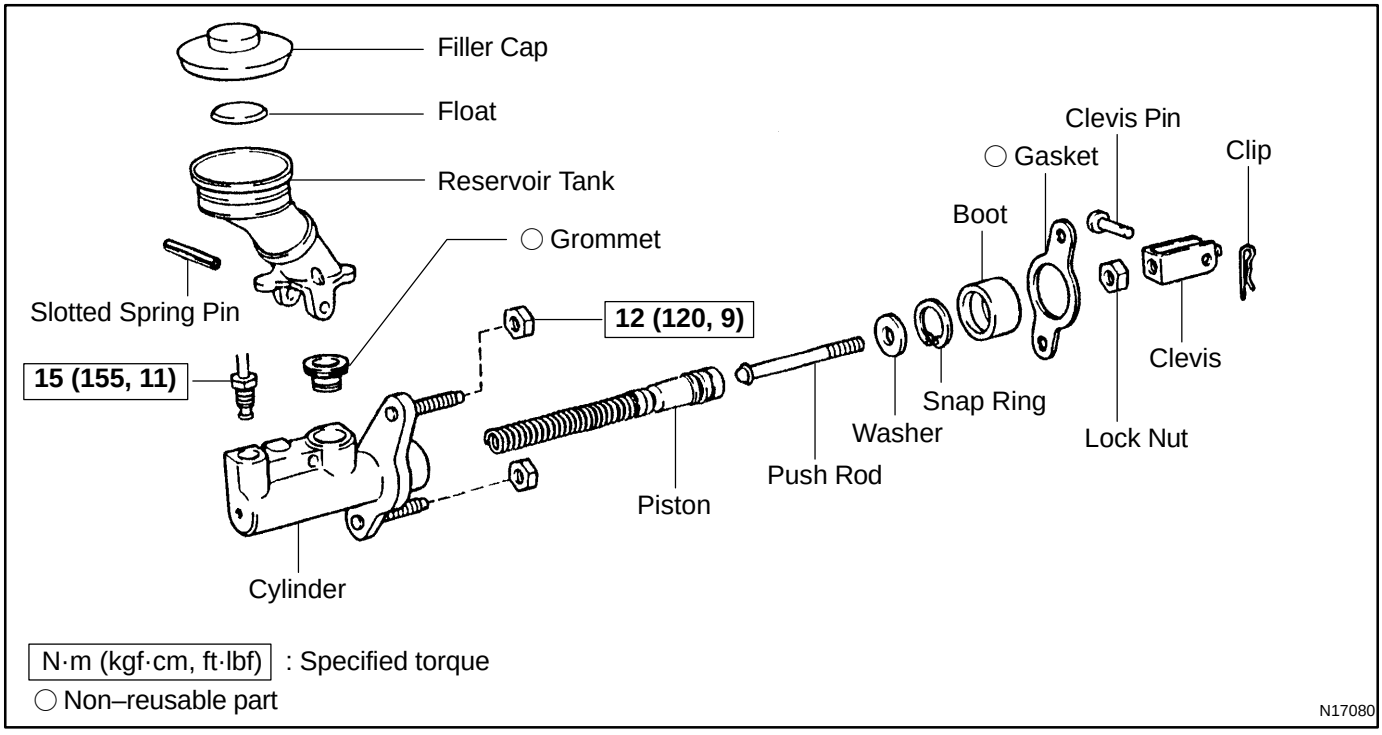
4. PREPARATION

Preparation lists the SST (Special Service Tools), recommended tools, equipment, lubricant and SSM (Special Service Materials) which should be prepared before beginning the operation and explains the purpose of each one.

5. REPAIR PROCEDURES

Most repair operations begin with an overview illustration. It identifies the components and shows how the parts fit together.

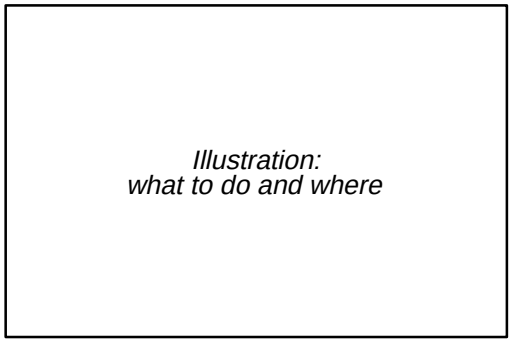
Example:



The procedures are presented in a step–by–step format:

- The illustration shows what to do and where to do it.
- The task heading tells what to do.
- The detailed text tells how to perform the task and gives other information such as specifications and warnings.

Example:



Task heading : what to do

21. CHECK PISTON STROKE OF OVERDRIVE BRAKE

(a) Place SST and a dial indicator onto the overdrive brake piston as shown in the illustration.

SST 09350–30020 (09350–06120)

Set part No. *Component part No.*

Detailed text : how to do task

(b) Measure the stroke applying and releasing the compressed air (392 — 785 kPa, 4 — 8 kgf/cm^2 or 57 ⍰ 114 psi) as shown in the illustration

Piston stroke: 1.40 — 1.70 mm (0.0551 — 0.0669 in.)

Specification

This format provides the experienced technician with a FAST TRACK to the information needed. The upper case task heading can be read at a glance when necessary, and the text below it provides detailed information. Important specifications and warnings always stand out in bold type.

6. REFERENCES

References have been kept to a minimum. However, when they are required you are given the page to refer to.

7. SPECIFICATIONS

Specifications are presented in bold type throughout the text where needed. You never have to leave the procedure to look up your specifications. They are also found in Service Specifications section, for quick reference.

8. CAUTIONS, NOTICES, HINTS:

- CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- HINTS are separated from the text but do not appear in bold. They provide additional information to help you perform the repair efficiently.

9. SI UNIT

The UNITS given in this manual are primarily expressed according to the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the English System.

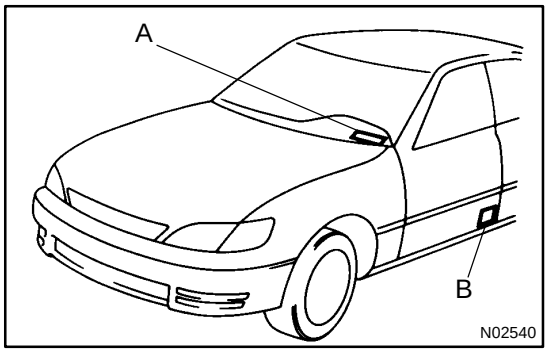
Example:

Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)

IDENTIFICATION INFORMATION

IN021–01

VEHICLE IDENTIFICATION AND ENGINE SERIAL NUMBER



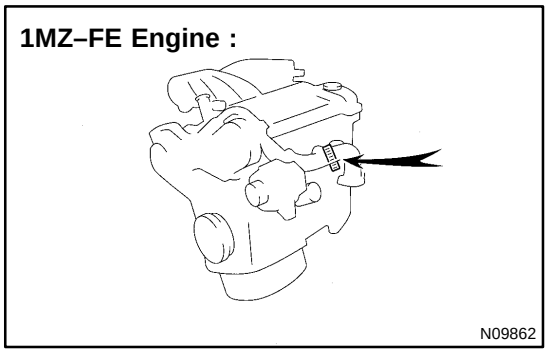
1. VEHICLE IDENTIFICATION NUMBER

The vehicle identification number is stamped on the vehicle identification number plate and certification label.

A: Vehicle Identification Number Plate

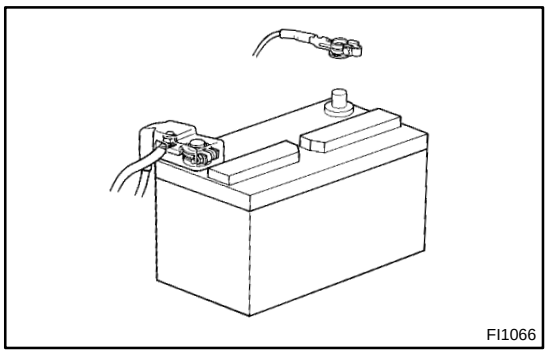
B: Certification Label

1MZ–FE Engine :



2. ENGINE SERIAL NUMBER

The engine serial number is stamped on the engine block, as shown in the illustration.


FI1066

REPAIR INSTRUCTIONS

IN0GD–01

GENERAL INFORMATION

1. BASIC REPAIR HINT

(a) Use fender, seat and floor covers to keep the vehicle clean and prevent damage.

(b) During disassembly, keep parts in the appropriate order to facilitate reassembly.

(c) Observe the following operations:

(1) Before performing electrical work, disconnect the negative (–) terminal cable from the battery.

(2) If it is necessary to disconnect the battery for inspection or repair, always disconnect the negative (–) terminal cable which is grounded to the vehicle body.

(3) To prevent damage to the battery terminal, loosen the cable nut and raise the cable straight up without twisting or prying it.

(4) Clean the battery terminals and cable ends with a clean shop rag. Do not scrape them with a file or other abrasive objects.

(5) Install the cable ends to the battery terminals with the nut loose, and tighten the nut after installation. Do not use a hammer to tap the cable ends onto the terminals.

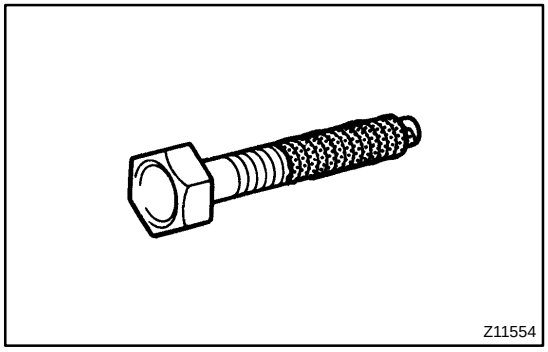
(6) Be sure the cover for the positive (+) terminal is properly in place.

(d) Check hose and wiring connectors to make sure that they are secure and correct.

(e) Non–reusable parts

(1) Always replace cotter pins, gaskets, O–rings and oil seals etc. with new ones.

(2) Non–reusable parts are indicated in the component illustrations by the ” ” symbol.


Z11554

(f) Precoated parts

Precoated parts are bolts and nuts, etc. that are coated with a seal lock adhesive at the factory.

(1) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.

(2) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.

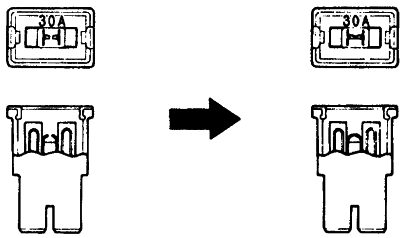
(3) Precoated parts are indicated in the component illustrations by the "● " symbol.

(g) When necessary, use a sealer on gaskets to prevent leaks.

(h) Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.

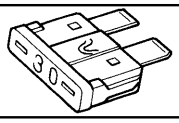
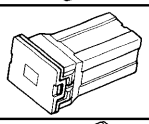
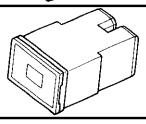
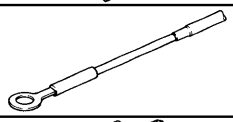
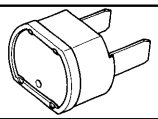
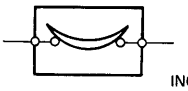
(i) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found in the preparation part at the front of each section in this manual.

Medium Current Fuse and High Current Fuse Equal Amperage Rating



BE1367

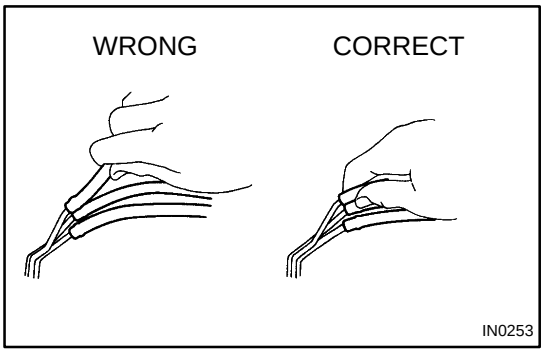
(j) When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.

Illustration	Symbol	Part Name	Abbreviation
 BE5594	IN0365	FUSE	FUSE
 BE5595	IN0366	MEDIUM CURRENT FUSE	M–FUSE
 BE5596	IN0367	HIGH CURRENT FUSE	H–FUSE
 BE5597	IN0367	FUSIBLE LINK	FL
 BE5598	 IN0368	CIRCUIT BREAKER	CB

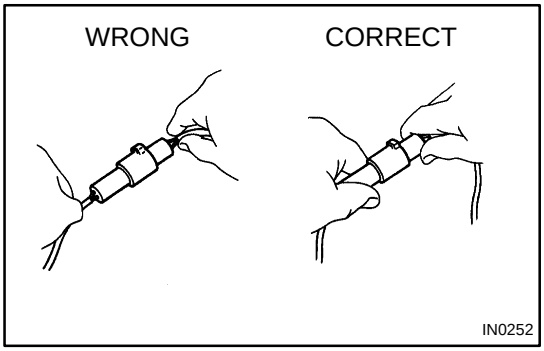
V00076

(k) Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page IN–16).
  (1) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels at the opposite end in order to ensure safety.
  (2) After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.

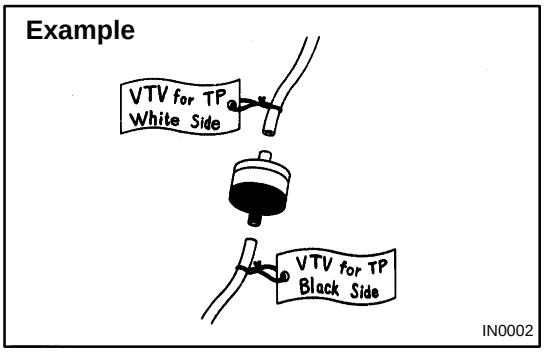
(l) Observe the following precautions to avoid damage to the following parts:
  (1) Do not open the cover or case of the ECU, ECM, PCM or TCM unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)



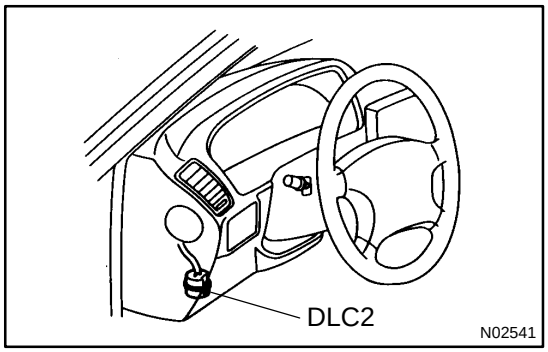
  (2) To disconnect vacuum hoses, pull off the end, not the middle of the hose.
  (3) To pull apart electrical connectors, pull on the connector itself, not the wires.
  (4) Be careful not to drop electrical components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced and not reused.
  (5) When steam cleaning an engine, protect the electronic components, air filter and emission–related components from water.
  (6) Never use an impact wrench to remove or install temperature switches or temperature sensors.
  (7) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.
  (8) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step–down adapter for adjustment. Once the hose has been stretched, it may leak.

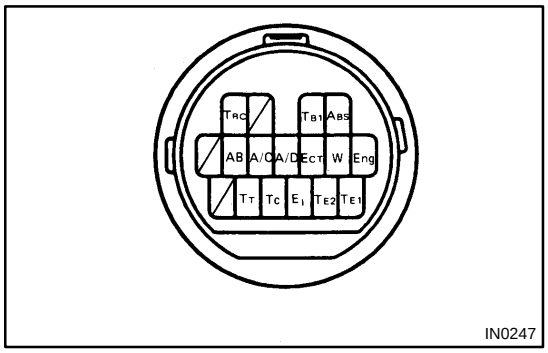


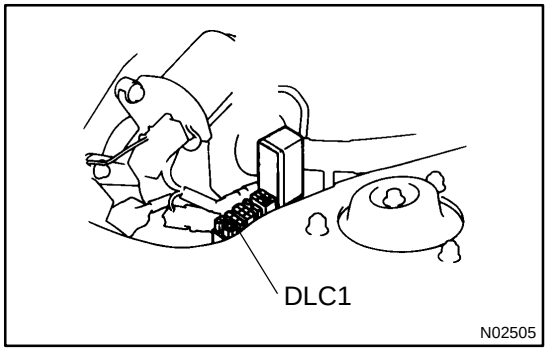
(m) Tag hoses before disconnecting them:
  (1) When disconnecting vacuum hoses, use tags to identify how they should be reconnected.
  (2) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.



(n) Unless otherwise stated, all resistance is measured at an ambient temperature of 20˚C (68˚F). Because the resistance may be outside specifications if measured at high temperatures immediately after the vehicle has been running, measurement should be made when the engine has cooled down.







2. FOR VEHICLES WITH DATA LINK CONNECTOR 2 (DLC2)

○ The DLC2 is provided inside the cabin (located under the left side of instrument panel) as a connector exclusively for diagnosis of data from the engine, automatic transmission, ABS, A/C, Airbag, Traction Control and Cruise Control System to improve serviceability.

○ The DLC1 inside the engine compartment is used for engine adjustment.

○ Connecting the following terminals of the DLC2 to terminal E_1 selects the diagnosis mode shown in the table.

NOTICE:

Pay enough attention to the terminal connection position as this will cause a malfunction.

Terminal	System
T_{E1}	Engine and automatic transmission (Normal mode)
T_{E2} and T_{E1}	Engine and automatic transmission (Test mode)
T_C	ABS, A/C, Airbag, Traction Control and Cruise Control System
T_T	Automatic transmission

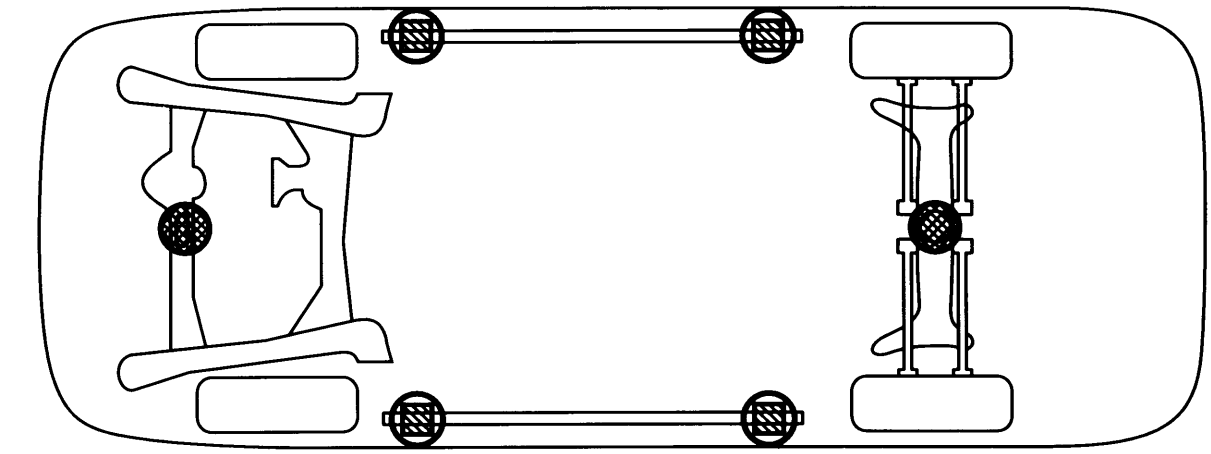
○ Refer to the respective system for the inspection method.

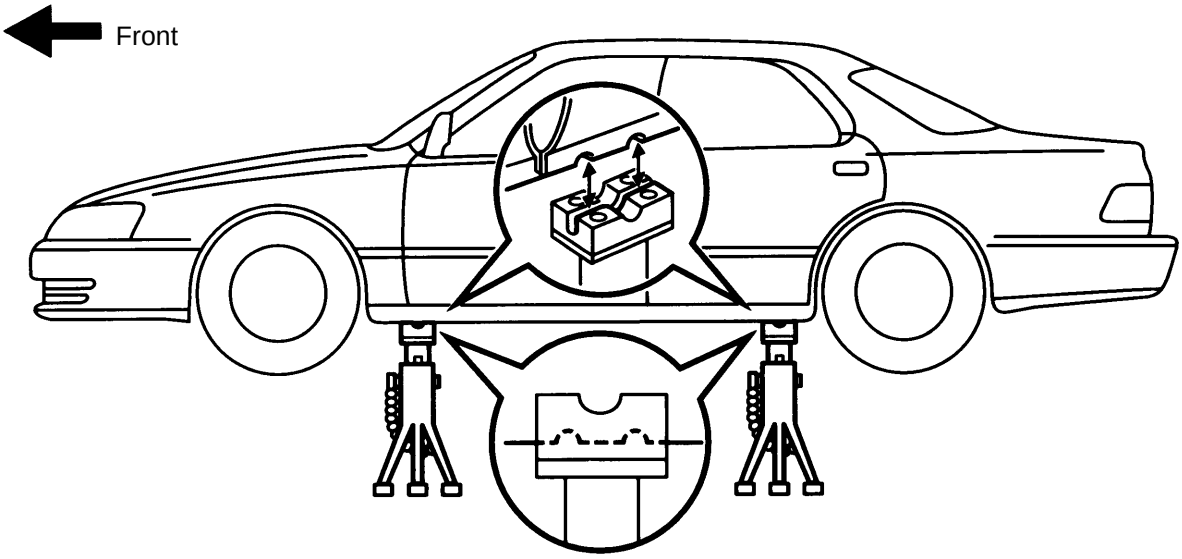
HINT:

By connecting the DLC2 up to a monitor specifically designed for use with the DLC2, the diagnosis result for each system can be read easily.

IN0HC–01

VEHICLE LIFT AND SUPPORT LOCATIONS





JACK POSITION

Front..... Front crossmember
Rear..... Rear axle beam

CAUTION: When jacking–up the front and rear, make sure the car is not carrying any extra weight.

PANTOGRAPH JACK POSITION

SUPPORT POSITION

Safety stand and swing arm type lift .....

N20112

FOR ALL OF VEHICLES

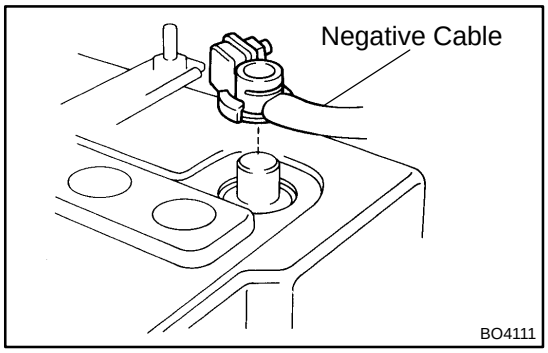
IN0GE–01

PRECAUTION

1. FOR VEHICLES EQUIPPED WITH SRS AIRBAG AND SEAT BELT PRETENTIONER

(a) The LEXUS ES300 is equipped with an SRS (Supplemental Restraint System), such as the driver airbag, front passenger airbag, side airbag and seat belt pretensioner. Failure to carry out service operations in the correct sequence could cause the supplemental restraint system to unexpectedly deploy during servicing, possibly leading to a serious accident.
Further, if a mistake is made in servicing the supplemental restraint system, it is possible the SRS may fail to operate when required. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedure described in this manual.

(b) GENERAL NOTICE

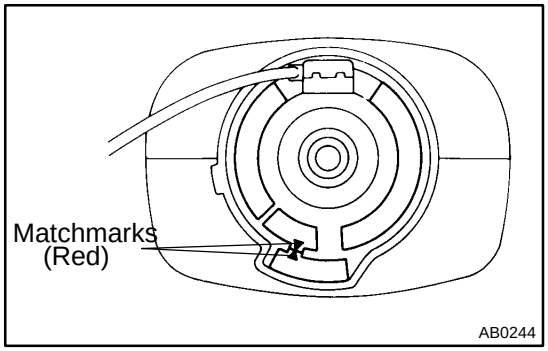


(1) Malfunction symptoms of the supplemental restraint system are difficult to confirm, so the diagnostic trouble codes become the most important source of information when troubleshooting. When troubleshooting the supplemental restraint system, always inspect the diagnostic trouble codes before disconnecting the battery (See page DI–324).

(2) Work must be started after 90 seconds from the time the ignition switch is turned to the ”LOCK” position and the negative (–) terminal cable is disconnected from the battery.
(The supplemental restraint system is equipped with a back–up power source so that if work is started within 90 seconds of disconnecting the negative (–) terminal cable from the battery, the SRS may deploy.)
When the negative (–) terminal cable is disconnected from the battery, memory of the clock and audio systems will be cancelled. So before starting work, make a record of the contents memorized by the each memory system. Then when work is finished, reset the clock and audio systems as before.
To avoid erasing the memory of each memory system, never use a back–up power supply from outside the vehicle.

(3) Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad and passenger's airbag assembly, should be inspected (See page RS–9 and RS–23).
(4) Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
(5) Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
(6) Never disassemble and repair the airbag sensor assembly, steering wheel pad or front passenger airbag in order to reuse them.
(7) If the airbag sensor assembly, steering wheel pad or front passenger airbag have been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
(8) Do not expose the airbag sensor assembly and steering wheel pad directly to hot air or flames.
(9) Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting of the electrical circuit.
(10) Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.
(11) After work on the supplemental restraint system is completed, check the SRS warning light (See page DI–324).

(c) SPIRAL CABLE (in Combination Switch)
The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, otherwise cable disconnection and other troubles may result. Refer to SR–16 of this manual concerning correct steering wheel installation.



(d) STEERING WHEEL PAD (with Airbag)

(1) When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up.
In this case, the twin–lock type connector lock lever should be in the locked state and care should be taken to place it so the connector will not be damaged. In addition do not store a steering wheel pad on top of another one. Storing the pad with its metallic surface facing upward may lead to a serious accident if the airbag inflates for some reason.

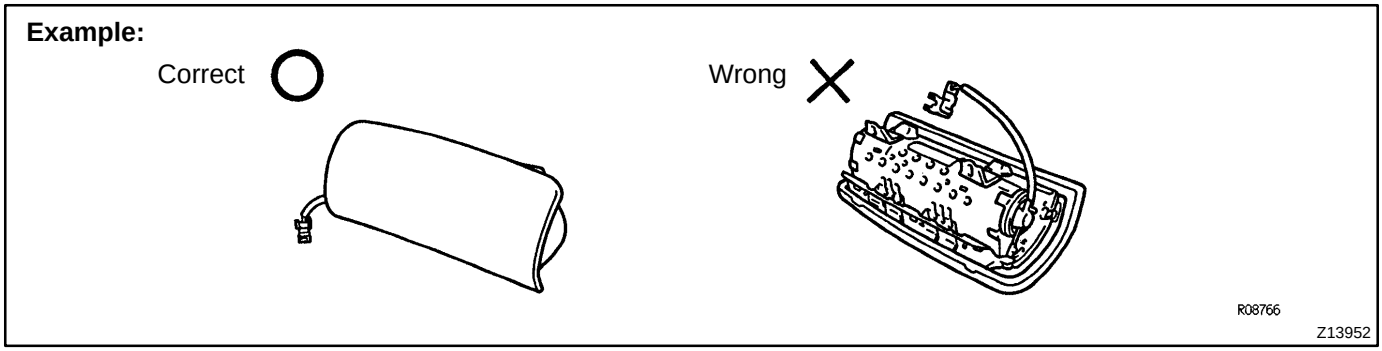
(2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)

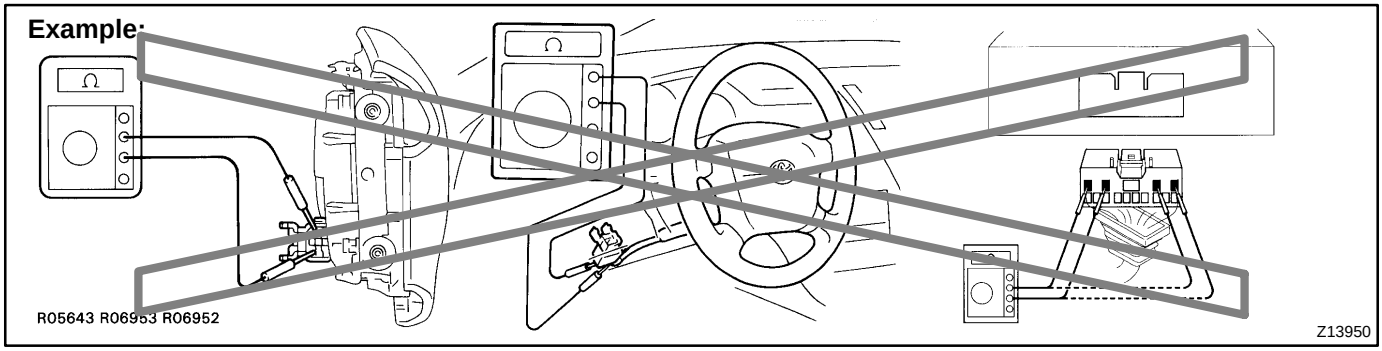
(3) Grease should not be applied to the steering wheel pad and the pad should not be cleaned with detergents of any kind.

(4) Store the steering wheel pad where the ambient temperature remains below 93˚C (200˚F), without high humidity and away from electrical noise.

(5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) under the steering column near the combination switch connector before starting work.

(6) When disposing of a vehicle or the steering wheel pad alone, the airbag should be deployed using an SST before disposal (See page RS–11).
Carry out the operation in a safe place away from electrical noise.





(e) FRONT PASSENGER AIRBAG ASSEMBLY

(1) Always store a removed or new front passenger airbag assembly with the airbag deployment direction facing up.
Storing the airbag assembly with the airbag deployment direction facing down could cause a serious accident if the airbag inflates.

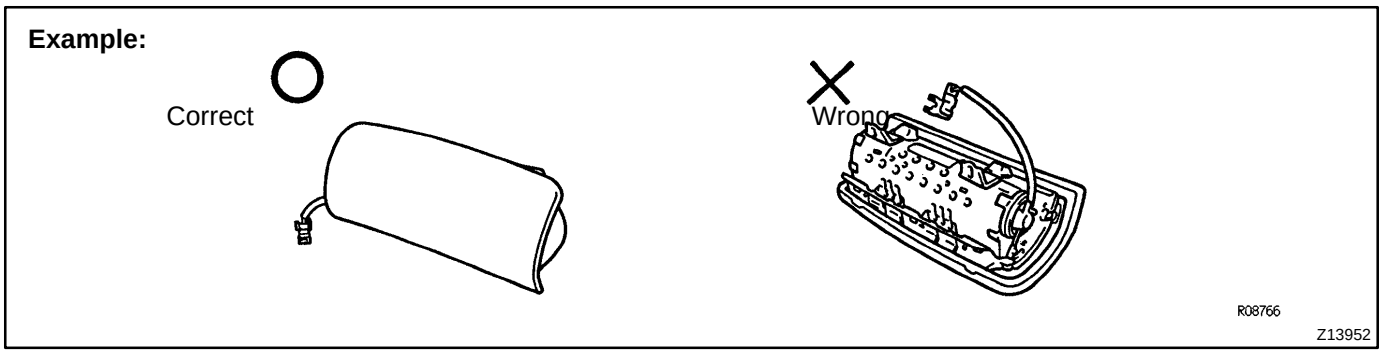
(2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)

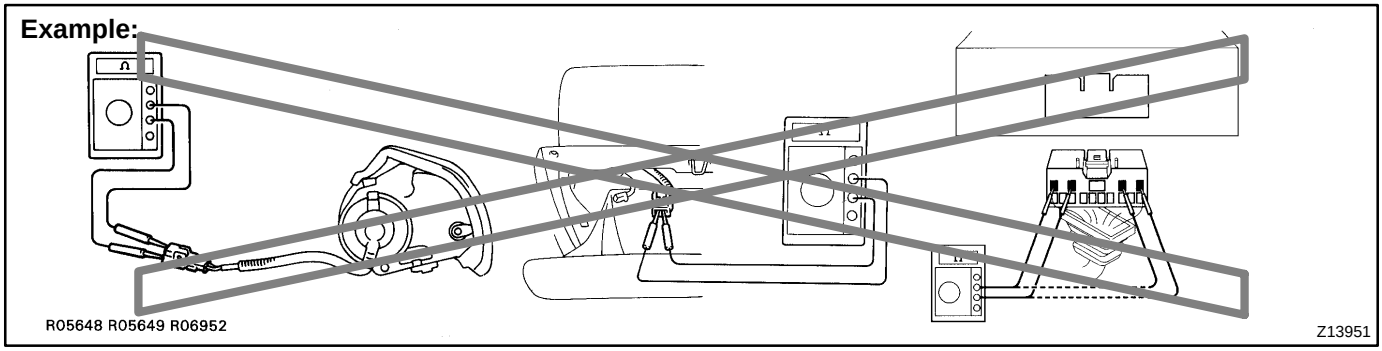
(3) Grease should not be applied to the front passenger airbag assembly and the airbag door should not be cleaned with detergents of any kind.

(4) Store the airbag assembly where the ambient temperature remains below 93˚C (200˚F), without high humidity and away from electrical noise.

(5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) installed on the glove compartment finish plate at the left side of the glove compartment before starting work.

(6) When disposing of a vehicle or the airbag assembly alone, the airbag should be deployed using an SST before disposal (See page RS–25).
Perform the operation in a safe place away from electrical noise.





(f) AIRBAG SENSOR ASSEMBLY

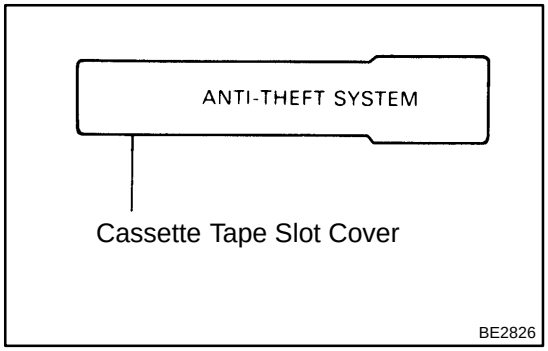
(1) Never reuse the airbag sensor assembly involved in a collision when the SRS has deployed.

(2) The connectors to the airbag sensor assembly should be connected or disconnected with the sensor mounted on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not mounted to the floor, it could cause undesired ignition of the supplemental restraint system.

(3) Work must be started after 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery, even if only loosening the set bolts of the airbag sensor assembly.

(g) WIRE HARNESS AND CONNECTOR

The SRS wire harness is integrated with the cowl wire harness assembly and floor wire harness assembly. The wires for the SRS wire harness are encased in a yellow corrugated tube. All the connectors for the system are also a standard yellow color. If the SRS wire harness becomes disconnected or the connector becomes broken due to an accident, etc., repair or replace it as shown on page RS–39.



2. FOR VEHICLES WITH AN AUDIO SYSTEM WITH BUILT–IN ANTI–THEFT SYSTEM

Audio System displaying the sign "ANTI–THEFT SYSTEM" shown on the left has a built–in anti–theft system which makes the audio system soundless if stolen.

If the power source for the audio system is cut even once, the anti–theft system operates so that even if the power source is reconnected, the audio system will not produce any sound unless the ID number selected by the customer is input again. Accordingly, when performing repairs on vehicles equipped with this system. before disconnecting the battery terminals or removing the audio system the customer should be asked for the ID number so that the technician can input the ID number afterwards, or else a request made to the customer to input the ID number. For the method to input the ID number or cancel the anti–theft system, refer to the Owner's Manual.

3. FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER

CAUTION:

If large amount of unburned gasoline flows into the converter, it may overheat and create a fire hazard. To prevent this, observe the following precautions and explain them to your customer.

(a) Use only unleaded gasoline.

(b) Avoid prolonged idling.
Avoid running the engine at idle speed for more than 20 minutes.

(c) Avoid spark jump test.
(1) Perform spark jump test only when absolutely necessary. Perform this test as rapidly as possible.
(2) While testing, never race the engine.

(d) Avoid prolonged engine compression measurement.
Engine compression tests must be done as rapidly as possible.

(e) Do not run engine when fuel tank is nearly empty.
This may cause the engine to misfire and create an extra load on the converter.

(f) Avoid coasting with ignition turned off and prolonged braking.

(g) Do not dispose of used catalyst along with parts contaminated with gasoline or oil.

4. IF VEHICLE IS EQUIPPED WITH MOBILE COMMUNICATION SYSTEM

For vehicles with mobile communication systems such as two–way radios and cellular telephones, observe the following precautions.

(1) Install the antenna as far as possible away from the ECU and sensors of the vehicle's electronic system.
(2) Install the antenna feeder at least 20 cm (7.87 in.) away from the ECU and sensors of the vehicle's electronic systems. For details about ECU and sensors locations, refer to the section on the applicable component.
(3) Do not wind the antenna feeder together with the other wiring as much as possible, also avoid running the antenna feeder parallel with other wire harnesses.
(4) Check that the antenna and feeder are correctly adjusted.
(5) Do not install powerful mobile communications system.

5. FOR USING OBD II SCAN TOOL OR LEXUS HAND–HELD TESTER

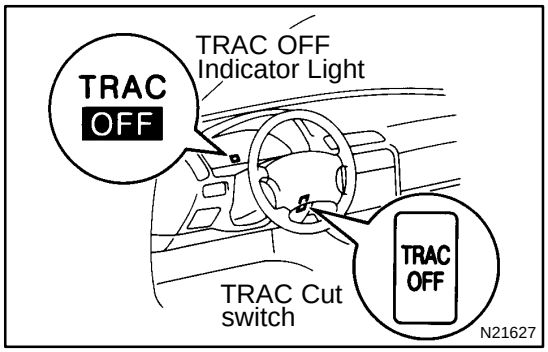
CAUTION:

Observe the following for safety reasons:

- **Before using the OBD II scan tool or LEXUS hand–held tester, the OBD II scan tool's instruction book or LEXUS hand–held tester's operator manual should be read throughly.**
- **Be sure to route all cables securely when driving with the OBD II scan tool or LEXUS hand–held tester connected to the vehicle. (i.e. Keep cables away from feet, pedals, steering wheel and shift lever.)**
- **Two persons are required when test driving with the OBD II scan tool or LEXUS hand–held tester, one person to drive the vehicle and one person to operate the OBD II scan tool or LEXUS hand–held tester.**

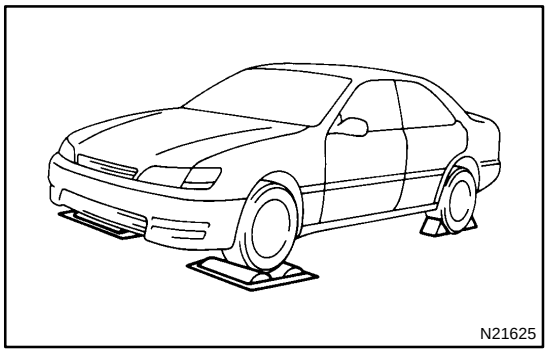
6. FOR VEHICLES EQUIPPED WITH TRACTION CONTROL (TRAC) SYSTEM

When using a 2–wheel drum tester such as a speedometer tester or chassis dynamometer, etc., or jacking up the front wheels and driving the wheels, always push in the TRAC cut ("TRAC OFF") switch and turn the TRAC system OFF.

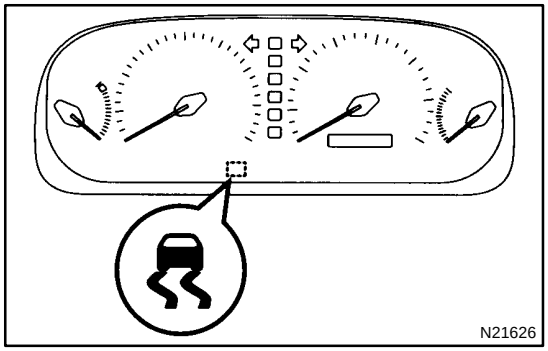


(a) Confirm TRAC system is off
  (1) Press the TRAC cut ("TRAC OFF") switch.
  (2) Check that the TRAC OFF indicator light comes on when the TRAC system is turned off by the TRAC cut switch.

HINT:
The SLIP indicator light should always operate right after the engine is restarted.



  (3) Begin measurements.



  (4) Press the TRAC cut switch to turn the TRAC to the operative mode and check that the TRAC OFF indicator light goes off.

HINT:
The SLIP indicator light blinks when the TRAC system is operative.

HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

IN026–02

GENERAL INFORMATION

A large number of ECU controlled systems are used in the LEXUS ES300. In general, the ECU controlled system is considered to be a very intricate system requiring a high level of technical knowledge and expert skill to troubleshoot. However, the fact is that if you proceed to inspect the circuits one by one, troubleshooting of these systems is not complex. If you have adequate understanding of the system and a basic knowledge of electricity, accurate diagnosis and necessary repair can be performed to locate and fix the problem. This manual is designed through emphasis of the above standpoint to help service technicians perform accurate and effective troubleshooting, and is compiled for the following major ECU controlled systems:

System	Page
1. Engine	DI–1
2. Automatic Transaxle	DI–148
3. Electronic Modulated Suspension	DI–194
4. Anti–Lock Brake System	DI–230
5. ABS & Traction Control System	DI–270
6. Supplemental Restraint System	DI–322
7. Theft Deterrent System	DI–396
8. Wireless Door Lock Control System	DI–441
9. Cruise Control System	DI–476
10. Air Conditioning System	DI–526

The troubleshooting procedure and how to make use of it are described on the following pages.

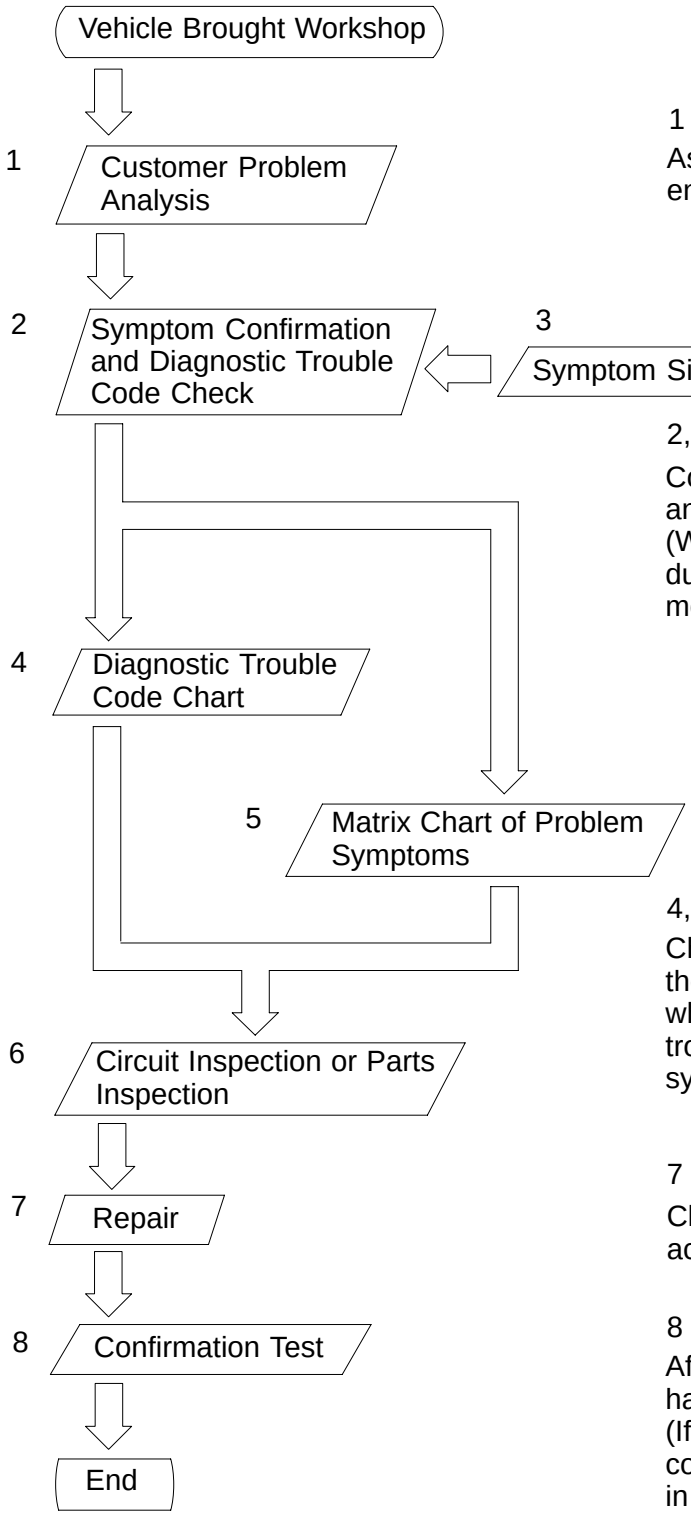
FOR USING OBD¿ SCAN TOOL OR LEXUS HAND–HELD TESTER

- Before using the OBD¿ scan tool or LEXUS hand–held tester, the OBD¿ scan tool's instruction book or LEXUS hand held–tester's operator manual should be read throughly.
- If the OBD¿ scan tool or LEXUS hand–held tester cannot communicate with ECU controlled systems when you have connected the cable of the OBD¿ scan tool or LEXUS hand–held tester to DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.
  (1) If communication is normal when the tool is connected to another vehicle, inspect the diagnosis data link line (Bus⊕line) or ECU power circuit of the vehicle.
  (2) If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself, so perform the Self Test procedures outlined in the Tester Operator's Manual.

IN027–02

HOW TO PROCEED WITH TROUBLESHOOTING

Carry out troubleshooting in accordance with the procedure on the following page. Here, only the basic procedure is shown. Details are provided in each section, showing the most effective methods for each circuit. Confirm the troubleshooting procedures first for the relevant circuit before beginning troubleshooting of that circuit.



1

Ask the customer about the conditions and the environment when the problem occurred.

2, 3

Confirm the symptoms and the problem conditions, and check the diagnostic trouble codes.
(When the problem symptoms do not appear during confirmation, use the symptom simulation method described later on.)

4, 5, 6

Check the results obtained in Step 2, then confirm the inspection procedure for the system or the part which should be checked using the diagnostic trouble code chart or the matrix chart of problem symptoms.

7

Check and repair the affected system or part in accordance with the instructions in Step 6.

8

After completing repairs, confirm that the problem has been eliminated.
(If the problem is not reproduced, perform the confirmation test under the same conditions and in the same environment as when it occurred for the first time.)

1. CUSTOMER PROBLEM ANALYSIS

In troubleshooting, the problem symptoms must be confirmed accurately and all preconceptions must be cleared away in order to give an accurate judgement. To ascertain just what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time it occurred.
Important Point in the Problem Analysis:
The following 5 items are important points in the problem analysis. Past problems which are thought to be unrelated and the repair history, etc. may also help in some cases, so as much information as possible should be gathered and its relationship with the problem symptoms should be correctly ascertained for reference in troubleshooting. A customer problem analysis table is provided in the troubleshooting section for each system for your use.

Important Points in the Customer Problem Analysis

- What ——— Vehicle model, system name
- When ——— Date, time, occurrence frequency
- Where ——— Road conditions
- Under what conditions? ——— Running conditions, driving conditions, weather conditions
- How did it happen? ——— Problem symptoms

(Sample) Engine control system check sheet.

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's Name _____

Customer's Name		**Model and Model Year**	
Driver's Name		**Frame No.**	
Data Vehicle Brought in		**Engine Model**	
License No.		**Odometer Reading**	km miles

Problem Symptoms	☐ **Engine does not Start**	☐ **Engine does not crank** ☐ **No initial combustion** ☐ **No complete combustion**
	☐ **Difficult to Start**	☐ **Engine cranks slowly** ☐ **Other** _____
	☐ **Poor Idling**	☐ **Incorrect first idle** ☐ **Idling rpm is abnormal** ☐ **High (rpm)** ☐ **Low (rpm)** ☐ **Rough idling** ☐ **Other** _____
	☐ **Poor Drive ability**	☐ **Hesitation** ☐ **Back fire** ☐ **Muffler explosion (after–fire)** ☐ **Surging** ☐ **Knocking** ☐ **Other** _____
	☐ **Engine Stall**	☐ **Soon after starting** ☐ **After accelerator pedal depressed** ☐ **After accelerator pedal released** ☐ **During A/C operation** ☐ **Shifting from N to D** ☐ **Other** _____
	☐ **Others**	

☐ **onstant** ☐ **Sometimes (times per day/month)**

2. SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE CHECK

The diagnostic system in the LEXUS ES300 fulfills various functions. The first function is the Diagnostic Trouble Code Check in which a malfunction in the signal circuits to the ECU is stored in code in the ECU memory at the time of occurrence, to be output by the technician during troubleshooting. Another function is the Input Signal Check which checks if the signals from various switches are sent to the ECU correctly. By using these check functions, the problem areas can be narrowed down quickly and troubleshooting can be performed effectively. Diagnostic functions are incorporated in the following systems in the LEXUS ES300.

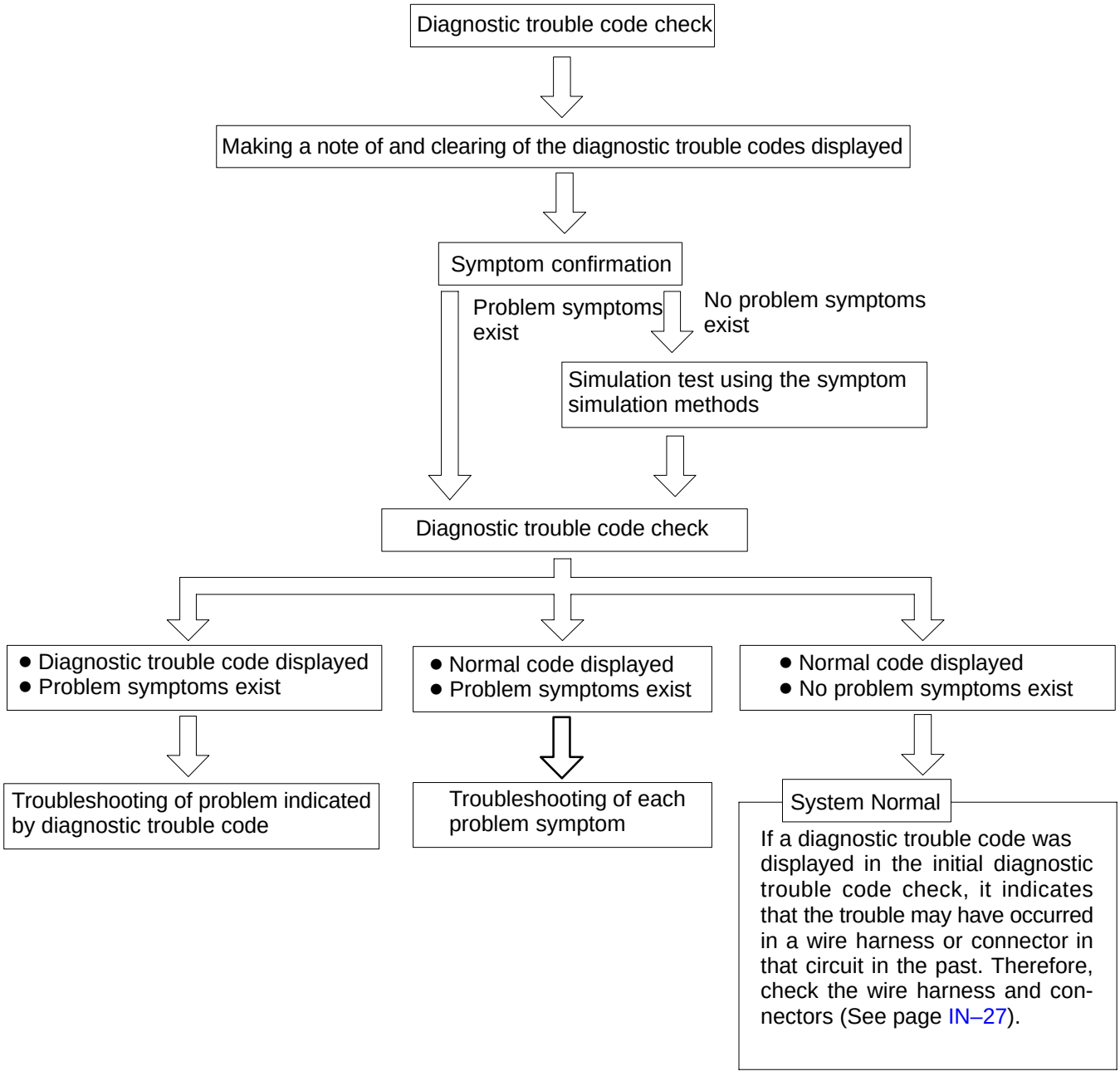
System	Diagnostic Trouble Code Check	Input Signal Check (Sensor Check)	Other Diagnosis Function
Engine	○ (with Test Mode)	○	Diagnostic Test Mode
Automatic Transmission	○ (with Test Mode)	○	Diagnostic Test Mode
Anti–Lock Brake System (& Traction Control)	○	○	
Supplemental Restraint System	○		
Cruise Control	○	○	

In diagnostic trouble code check, it is very important to determine whether the problem indicated by the diagnostic trouble code is still occurring or occurred in the past but returned to normal at present. In addition, it must be checked in the problem symptom check whether the malfunction indicated by the diagnostic trouble code is directly related to the problem symptom or not. For this reason, the diagnostic trouble codes should be checked before and after the symptom confirmation to determine the current conditions, as shown in the table below. If this is not done, it may, depending on the case, result in unnecessary troubleshooting for normally operating systems, thus making it more difficult to locate the problem, or in repairs not pertinent to the problem. Therefore, always follow the procedure in correct order and perform the diagnostic trouble code check.

DIAGNOSTIC TROUBLE CODE CHECK PROCEDURE

Diagnostic Trouble Code Check (Make a note of and then clear)	**Confirmation of Symptoms**	**Diagnostic Trouble Code Check**	**Problem Condition**
Diagnostic Trouble Code Display	Problem symptoms exist	Same diagnostic trouble code is displayed	Problem is still occurring in the diagnostic circuit
⇨		Normal code is displayed	The problem is still occurring in a place other than in the diagnostic circuit (The diagnostic trouble code displayed first is either for a past problem or it is a secondary problem)
⇨	No problem symptoms exist		The problem occurred in the diagnostic circuit in the past
Normal Code Display ⇨	Problem symptoms exist	Normal code is displayed	The problem is still occurring in a place other than in the diagnostic circuit
⇨	No problem symptoms exist	Normal code is displayed	The problem occurred in a place other than in the diagnostic circuit in the past

Taking into account the above points, a flow chart showing how to proceed with troubleshooting using the diagnostic trouble code check is shown below. This flow chart shows how to utilize the diagnostic trouble code check effectively, then by carefully checking the results, indicates how to proceed either to diagnostic trouble code troubleshooting or to troubleshooting of problem symptoms.

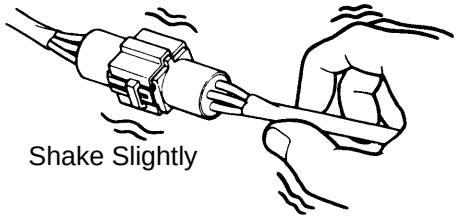
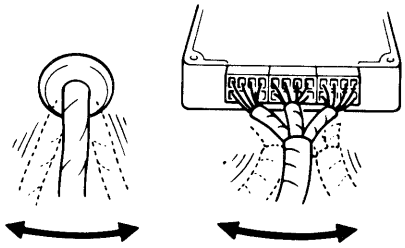
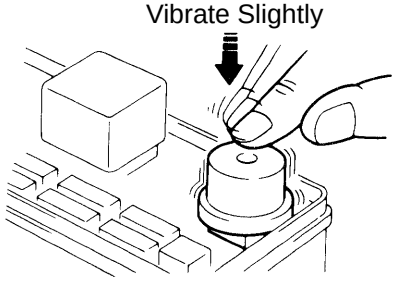


3. SYMPTOM SIMULATION

The most difficult case in troubleshooting is when there are no problem symptoms occurring. In such cases, a thorough customer problem analysis must be carried out, then simulate the same or similar conditions and environment in which the problem occurred in the customer's vehicle. No matter how much experience a technician has, or how skilled he may be, if he proceeds to troubleshoot without confirming the problem symptoms he will tend to overlook something important in the repair operation and make a wrong guess somewhere, which will only lead to a standstill. For example, for a problem which only occurs when the engine is cold, or for a problem which occurs due to vibration caused by the road during driving, etc., the problem can never be determined so long as the symptoms are confirmed with the engine hot condition or the vehicle at a standstill. Since vibration, heat or water penetration (moisture) is likely cause for problem which is difficult to reproduce, the symptom simulation tests introduced here are effective measures in that the external causes are applied to the vehicle in a stopped condition.

Important Points in the Symptom Simulation Test:

In the symptom simulation test, the problem symptoms should of course be confirmed, but the problem area or parts must also be found out. To do this, narrow down the possible problem circuits according to the symptoms before starting this test and connect a tester beforehand. After that, carry out the symptom simulation test, judging whether the circuit being tested is defective or normal and also confirming the problem symptoms at the same time. Refer to the matrix chart of problem symptoms for each system to narrow down the possible causes of the symptom.

1	**VIBRATION METHOD: When vibration seems to be the major cause.**
CONNECTORS Slightly shake the connector vertically and horizontally. **WIRE HARNESS** Slightly shake the wire harness vertically and horizontally. The connector joint, fulcrum of the vibration, and body through portion are the major areas to be checked thoroughly.	  FI2331 FI2332
PARTS AND SENSOR Apply slight vibration with a finger to the part of the sensor considered to be the problem cause and check that the malfunction occurs. HINT: Applying strong vibration to relays may result in open relays.	 FI2330

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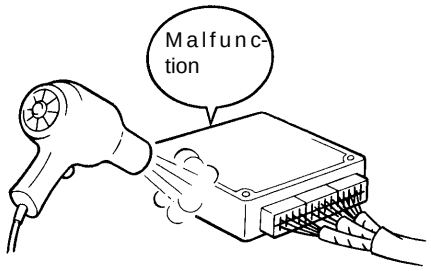
2	**HEAT METHOD: When the problem seems to occur when the suspect area is heated.**

Heat the component that is the likely cause of the malfunction with a hair dryer or similar object. Check to see if the malfunction occurs.

NOTICE:
(1) Do not heat to more than 60 ˚C (140 ˚F). (Temperature is limited not to damage the components.)
(2) Do not apply heat directly to parts in the ECU.



FI2334

3	**WATER SPRINKLING METHOD: When the malfunction seems to occur on a rainy day or in a high–humidity condition.**

Sprinkle water onto the vehicle and check to see if the malfunction occurs.

NOTICE:
(1) Never sprinkle water directly into the engine compartment, but indirectly change the temperature and humidity by applying water spray onto the radiator front surface.
(2) Never apply water directly onto the electronic components.

(Service hint)
If a vehicle is subject to water leakage, the leaked water may contaminate the ECU. When testing a vehicle with a water leakage problem, special caution must be taken.

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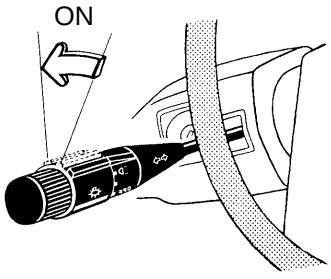
4	**OTHER: When a malfunction seems to occur when electrical load is excessive.**

Turn on all electrical loads including the heater blower, head lights, rear window defogger, etc. and check to see if the malfunction occurs.



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4. DIAGNOSTIC TROUBLE CODE CHART

The inspection procedure is shown in the table below. This table permits efficient and accurate troubleshooting using the diagnostic trouble codes displayed in the diagnostic trouble code check. Proceed with troubleshooting in accordance with the inspection procedure given in the diagnostic chart corresponding to the diagnostic trouble codes displayed. The engine diagnostic trouble code chart is shown below as an example.

- DTC No.
  Indicates the diagnostic trouble code.
- Page or Instructions
  Indicates the page where the inspection procedure for each circuit is to be found, or gives instructions for checking and repairs.

- Trouble Area
  Indicates the suspect area of the problem.

- Detection Item
  Indicates the system of the problem or contents of the problem.

DTC CHART (SAE Controlled)

HINT:
Parameters listed in the chart may not be exactly the same as your reading due to the type of instrument or other factors.

If a malfunction code is displayed during the DTC check mode, check the circuit for that code listed in the table below. For details of each code, turn to the page referred to under the ”See page” for the respective ”DTC No.” in the DTC chart.

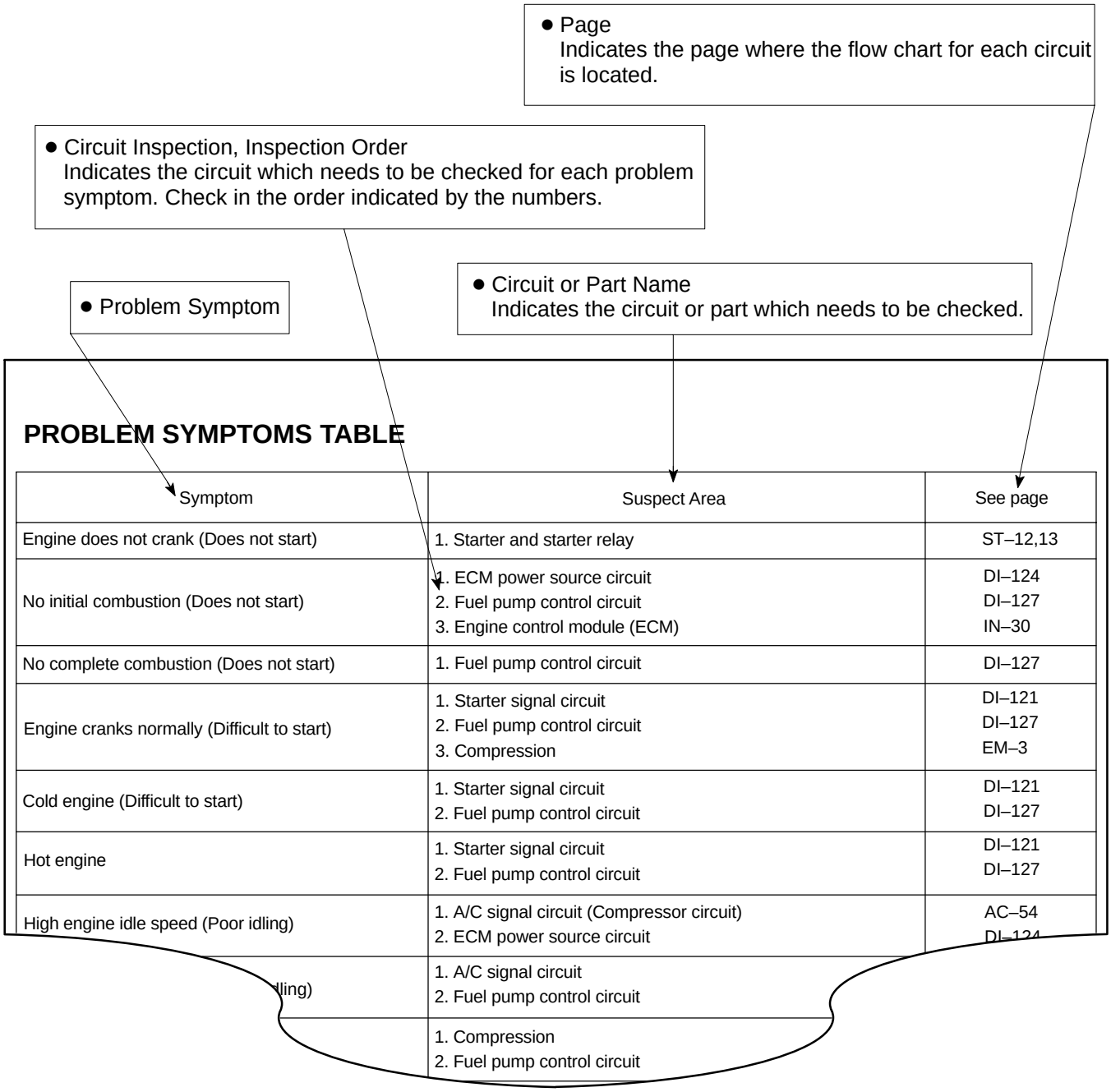
DTC No. (See page)	Detection Item	Trouble Area	MIL*	Memory
P0100 (DI–26)	Mass Air Flow Circuit Malfunction	● Open or short in mass air flow meter circuit ● Mass air flow meter ● ECM	○	○
P0101 (DI–31)	Mass Air Flow Circuit Range/Performance Problem	● Mass air flow meter	○	○
P0110 (DI–32)	Intake Air Temp. Circuit Malfunction	● Open or short in intake air temp. sensor circuit ● Intake air temp. sensor ● ECM	○	○
P0115 (DI–37)	Engine Coolant Temp. Circuit Malfunction	● Open or short in engine coolant temp. sensor circuit ● Engine coolant temp. sensor ● ECM	○	○
P0116 (DI–41)	Engine Coolant Temp. Circuit Range/Performance Problem	● Engine coolant temp. sensor ● Cooling system	○	○
P0120 (DI–43)	Throttle/Pedal Position Sensor/Switch ”A” Circuit Malfunction	● Open or short in throttle position sensor circuit ● Throttle position sensor ● ECM	○	○
	ttle/ Pedal Position Sensor/Switch nge/Performance	● Throttle position sensor		
	nt Temp. for Closed	● Open or short in heated oxygen sensor circ ● Heated oxygen sensor		

5. PROBLEM SYMPTOMS TABLE

The suspect circuits or parts for each problem symptom are shown in the table below. Use this table to troubleshoot the problem when a ”Normal” code is displayed in the diagnostic trouble code check but the problem is still occurring. Numbers in the table indicate the inspection order in which the circuits or parts should be checked.

HINT:

When the problem is not detected by the diagnostic system even though the problem symptom is present, it is considered that the problem is occurring outside the detection range of the diagnostic system, or that the problem is occurring in a system other than the diagnostic system.



PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	1. Starter and starter relay	ST–12,13
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. Engine control module (ECM)	DI–124 DI–127 IN–30
No complete combustion (Does not start)	1. Fuel pump control circuit	DI–127
Engine cranks normally (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	DI–121 DI–127 EM–3
Cold engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI–121 DI–127
Hot engine	1. Starter signal circuit 2. Fuel pump control circuit	DI–121 DI–127
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	AC–54 DI–124
...lling)	1. A/C signal circuit 2. Fuel pump control circuit	
	1. Compression 2. Fuel pump control circuit	

6. CIRCUIT INSPECTION

How to read and use each page is shown below.

● Diagnostic Trouble Code No. and Detection Item

● Circuit Description
The major role and operation, etc. of the circuit and its component parts are explained.

DTC	P0325	Knock Sensor 1 Circuit Malfunction

CIRCUIT DESCRIPTION

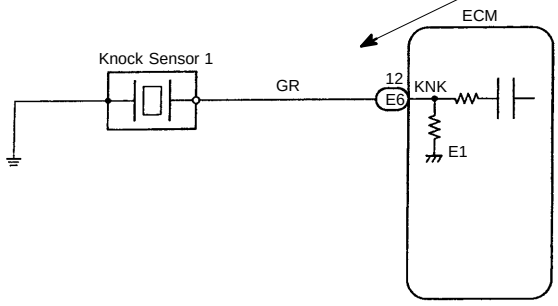
Knock sensor is fitted to the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

DTC No.	DTC Detecting Condition	Trouble Area
P0325	No knock sensor 1 signal to ECM with engine speed, 1,200 rpm or more.	● Open or short in knock sensor1 circuit ● Knock sensor 1 (looseness) ● ECM

If the ECM detects the above diagnosis conditions, it operates the fail safe function in which the corrective retard angle value is set to the maximum value.

● Indicates the diagnostic trouble code, diagnostic trouble code set parameter and suspect area of the problem.

WIRING DIAGRAM



● Wiring Diagram
This shows a wiring diagram of the circuit.
Use this diagram together with ELECTRICAL WIRING DIAGRAM to thoroughly understand the circuit.
Wire colors are indicated by an alphabetical code.
B = Black, L = Blue, R = Red, BR = Brown, LG = Light Green, V = Violet, G = Green, O = Orange, W = White, GR = Gray, P = Pink, Y = Yellow
The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

V08423

● Indicates the position of the ignition switch during the check.

LOCK
Ignition Switch LOCK (OFF)

ON
Ignition Switch ON

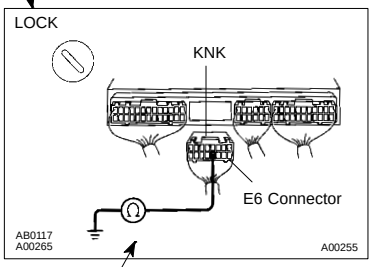
START
Ignition Switch START

ACC
Ignition Switch ACC

● Inspection Procedure
Use the inspection procedure to determine if the circuit is normal or abnormal, and if it is abnormal, use it to determine whether the problem is located in the sensors, actuators, wire harness or ECU.

INSPECTION PROCEDURE

1	**Check continuity between terminal KNK of ECM connector and body ground.**



PREPARATION:
(a) Remove the glove compartment (See page SF–37).
(b) Disconnect the E6 connector of ECM.

CHECK:
Measure resistance between terminal KNK of ECM connector and body ground.

OK:
Resistance: 1 MΩ or higher

OK	**Go to step 3.**

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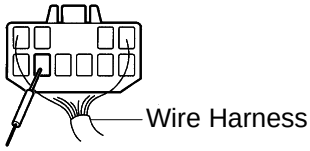
2	**Check knock sensor (See page SF–34).**

OK	**Replace knock sensor.**

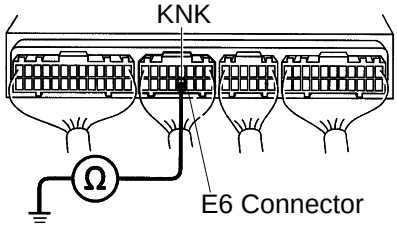
● Indicates the place to check the voltage or resistance.
● Indicates the connector position to be checked, from the front or back side.



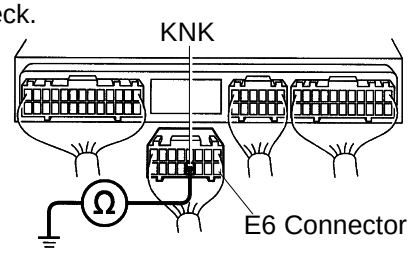
Check from the connector back side. (with harness)

Check from the connector front side. (without harness)
In this case, care must be taken not to bend the terminals.

● Indicates the condition of the connector of ECU during the check.



Connector being checked is connected.



Connector being checked is disconnected.

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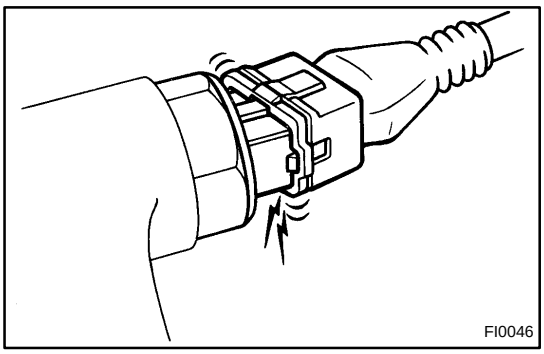
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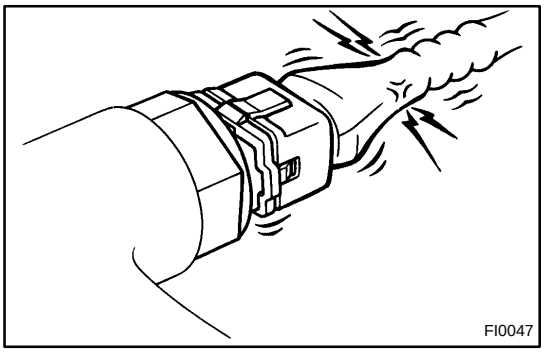
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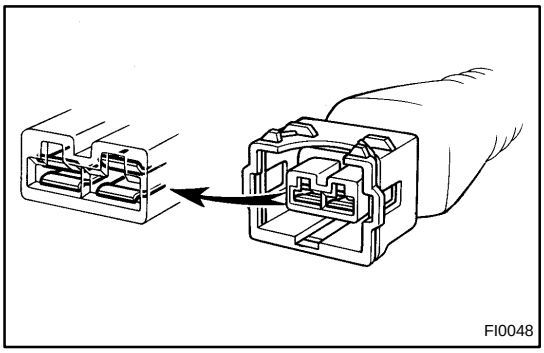

FI0048

HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE

1. CONNECTOR CONNECTION AND TERMINAL INSPECTION

- For troubleshooting, diagnostic trouble code charts or problem symptom charts are provided for each circuit with detailed inspection procedures on the following pages.
- When all the component parts, wire harnesses and connectors of each circuit except the ECU are found to be normal in troubleshooting, then it is determined that the problem is in the ECU. Accordingly, if diagnosis is performed without the problem symptoms occurring, refer to step 8 to replace the ECU, even if the problem is not in the ECU. So always confirm that the problem symptoms are occurring, or proceed with inspection while using the symptom simulation method.
- The instructions ”Check wire harness and connector” and ”Check and replace ECU” which appear in the inspection procedure, are common and applicable to all diagnostic trouble codes. Follow the procedure outlined below whenever these instructions appear.

OPEN CIRCUIT:

This could be due to a disconnected wire harness, faulty contact in the connector, and a connector terminal pulled out, etc.

HINT:

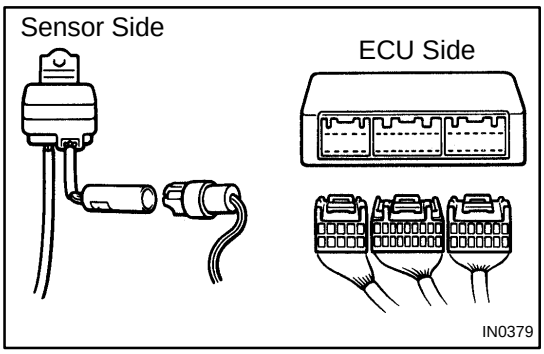
- It is rarely the case that a wire is broken in the middle of it. Most cases occur at the connector. In particular, carefully check the connectors of sensors and actuators.
- Faulty contact could be due to rusting of the connector terminals, to foreign materials entering terminals or a deformation of connector terminals. Simply disconnecting and reconnecting the connectors once changes the condition of the connection and may result in a return to normal operation. Therefore, in troubleshooting, if no abnormality is found in the wire harness and connector check, but the problem disappears after the check, then the cause is considered to be in the wire harness or connectors.

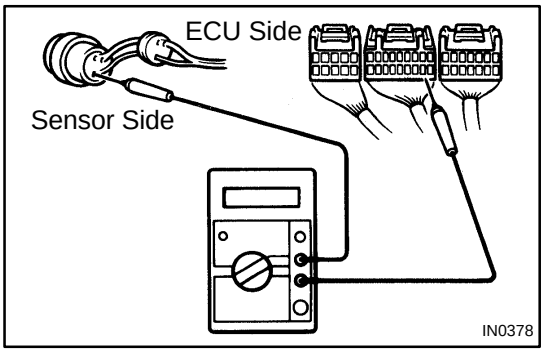
SHORT CIRCUIT:

This could be due to a contact between wire harness and the body ground or to a short circuit occurred inside the switch etc.

HINT:

When there is a short between the wire harness and body ground, check thoroughly whether the wire harness is caught in the body or is clamped properly.





2. CONTINUITY CHECK (OPEN CIRCUIT CHECK)

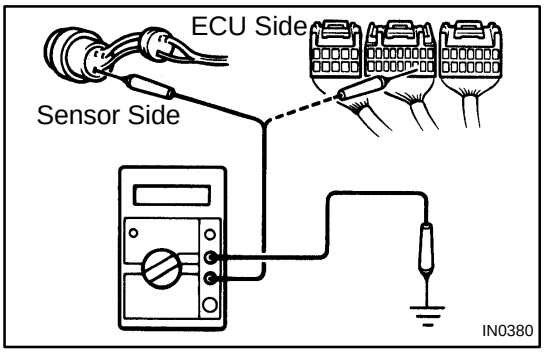
(a) Disconnect the connectors at both ECU and sensor sides.

(b) Measure the resistance between the applicable terminals of the connectors.

Resistance: 1Ω or less

HINT:

- Measure the resistance while lightly shaking the wire harness vertically and horizontally.
- When tester probes are inserted into a connector, insert the probes from the back. For waterproof connectors in which the probes cannot be inserted from the back, be careful not to bend the terminals when inserting the tester probes.



3. RESISTANCE CHECK (SHORT CIRCUIT CHECK)

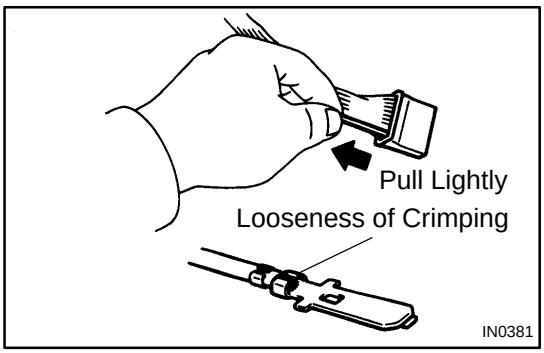
(a) Disconnect the connectors on both ends.

(b) Measure the resistance between the applicable terminals of the connectors and body ground. Be sure to carry out this check on the connectors on both ends.

Resistance: 1 MΩ or higher

HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally.



4. VISUAL CHECK AND CONTACT PRESSURE CHECK

(a) Disconnect the connectors at both ends.

(b) Check for rust or foreign material, etc. in the terminals of the connectors.

(c) Check crimped portions for looseness or damage and check that the terminals are secured in lock portion.

HINT:

The terminals should not come out when pulled lightly.

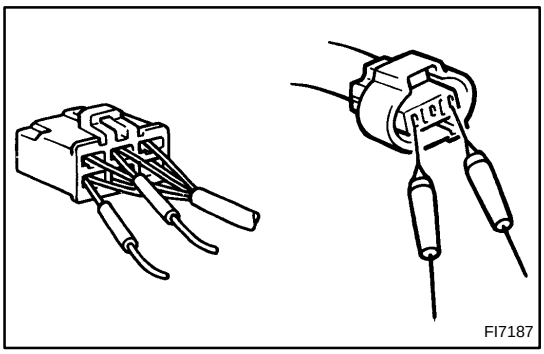
(d) Prepare a test male terminal and insert it in the female terminal, then pull it out.

NOTICE:

When testing a gold–plated female terminal, always use a gold–plated male terminal.

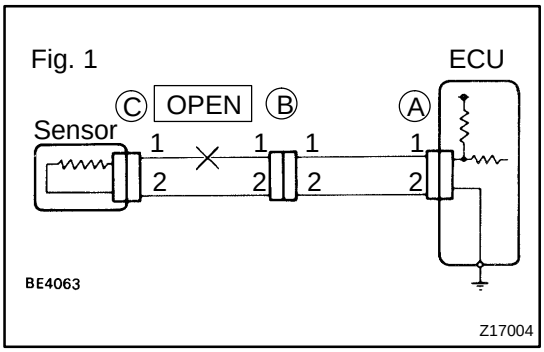
HINT:

When the test terminal is pulled out more easily than others, there may be poor contact in that section.



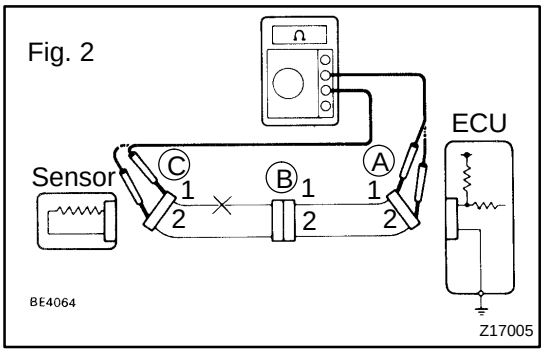
5. CONNECTOR HANDLING

When inserting tester probes into a connector, insert them from the rear of the connector. When necessary, use mini test leads. For water resistant connectors which cannot be accessed from behind, take good care not to deform the connector terminals.



6. CHECK OPEN CIRCUIT

For the open circuit in the wire harness in Fig. 1, perform "(a) Continuity Check" or "(b) Voltage Check" to locate the section.



(a) Check the continuity.

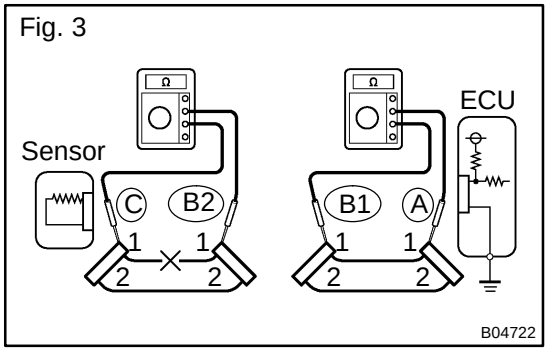
(1) Disconnect connectors "A" and "C" and measure the resistance between them.

In the case of Fig. 2,

Between terminal 1 of connector "A" and terminal 1 of connector "C" → No continuity (open)

Between terminal 2 of connector "A" and terminal 2 of connector "C" → Continuity

Therefore, it is found out that there is an open circuit between terminal 1 of connector "A" and terminal 1 of connector "C".



(2) Disconnect connector "B" and measure the resistance between the connectors.

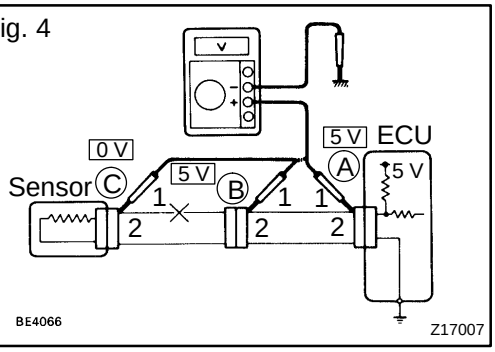
In the case of Fig. 3,

Between terminal 1 of connector "A" and terminal 1 of connector "B1" → Continuity

Between terminal 1 of connector "B2" and terminal 1 of connector "C" → No continuity (open)

Therefore, it is found out that there is an open circuit between terminal 1 of connector "B2" and terminal 1 of connector "C".

Fig. 4



(b) Check the voltage.

In a circuit in which voltage is applied (to the ECU connector terminal), an open circuit can be checked for by conducting a voltage check.

As shown in Fig. 4, with each connector still connected, measure the voltage between body ground and terminal 1 of connector ”A” at the ECU 5V output terminal, terminal 1 of connector ”B”, and terminal 1 of connector ”C”, in that order.

If the results are:

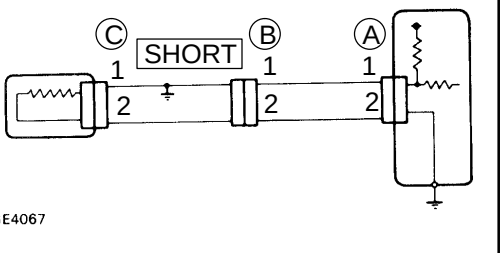
5V: Between Terminal 1 of connector ”A” and Body Ground

5V: Between Terminal 1 of connector ”B” and Body Ground

0V: Between Terminal 1 of connector ”C” and Body Ground

Then it is found out that there is an open circuit in the wire harness between terminal 1 of ”B” and terminal 1 of ”C”.

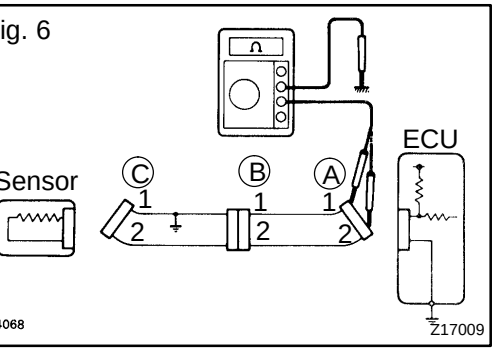
Fig. 5



7. CHECK SHORT CIRCUIT

If the wire harness is ground shorted as in Fig. 5, locate the section by conducting a ”continuity check with ground”.

Fig. 6



Check the continuity with ground.

(1) Disconnect connectors ”A” and ”C” and measure the resistance between terminal 1 and 2 of connector ”A” and body ground.

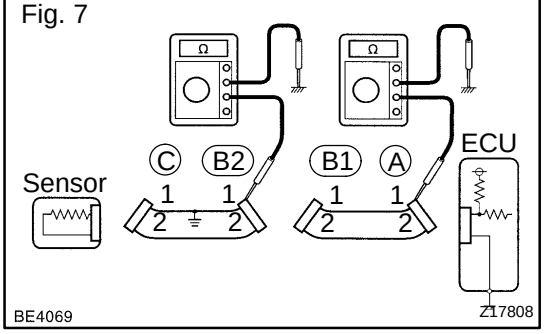
In the case of Fig. 6

Between terminal 1 of connector ”A” and body ground → Continuity (short)

Between terminal 2 of connector ”A” and body ground → No continuity

Therefore, it is found out that there is a short circuit between terminal 1 of connector ”A” and terminal 1 of connector ”C”.

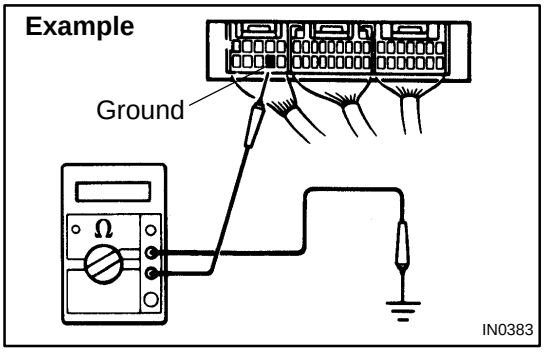
Fig. 7



(2) Disconnect connector ”B” and measure the resistance between terminal 1 of connector ”A” and body ground, and terminal 1 of connector ”B2” and body ground.
Between terminal 1 of connector ”A” and body ground → No continuity
Between terminal 1 of connector ”B2” and body ground → Continuity (short)
Therefore, it is found out that there is a short circuit between terminal 1 of connector ”B2” and terminal 1 of connector ”C”.

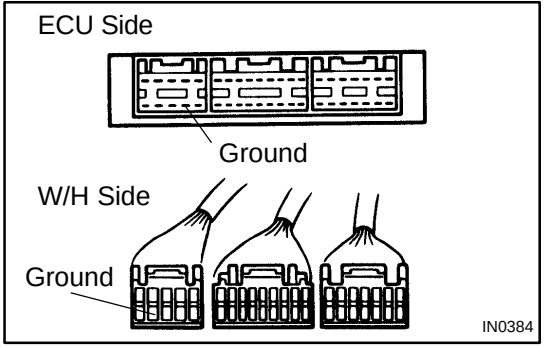
8. CHECK AND REPLACE ECU

First check the ECU ground circuit. If it is faulty, repair it. If it is normal, the ECU could be faulty, so replace the ECU with a normal functioning one and check that the symptoms appear.



(1) Measure the resistance between the ECU ground terminal and the body ground.

Resistance: 1 Ω or less



(2) Disconnect the ECU connector, check the ground terminals on the ECU side and the wire harness side for bend and check the contact pressure.

TERMS

IN029–01

ABBREVIATIONS USED IN THIS MANUAL

Abbreviations	Meaning
ABS	Anti–Lock Brake System
ALT	Automatic Locking Retractor
A/T	Automatic Transmission
ATF	Automatic Transmission Fluid
BDC	Bottom Dead Center
BTDC	Before Top Dead Center
CALIF.	California
CB	Circuit Breaker
CRS	Child Restraint System
DOHC	Double Over Head Cam
DP	Dash Pot
ECU	Electronic Control Unit
ELR	Emergency Locking Retractor
EPR	Evaporator Pressure Regulator
ESA	Electronic Spark Advance
FIPG	Formed in Place Gasket
FL	Fusible Link
FPU	Fuel Pressure Up
FR, Fr	Front
HAC	High Altitude Compensation
IG	Ignition
IN	Intake (Manifold, Valve)
INT	Intermittent
J/B	Junction Block
LED	Light Emitting Diode
LH	Left–Hand
LHD	Left–Hand Drive
LLC	Long Life Coolant (Year Around Coolant)
Max.	Maximum
Min.	Minimum
MP	Multipurpose
M/T	Manual Transmission
O/D, OD	Overdrive
O/S	Oversize
P & BV	Proportioning and Bypass Valve
PCV	Positive Crankcase Ventilation
PKB	Parking Brake
PS	Power Steering
RH	Right–Hand
RR, Rr	Rear
SRS	Supplemental Restraint System
SSM	Special Service Materials

SST	Special Service Tools
STD	Standard
SW	Switch
TDC	Top Dead Center
U/S	Undersize
VCV	Vacuum Control Valve
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
w/	With
w/o	Without

IN02A–01

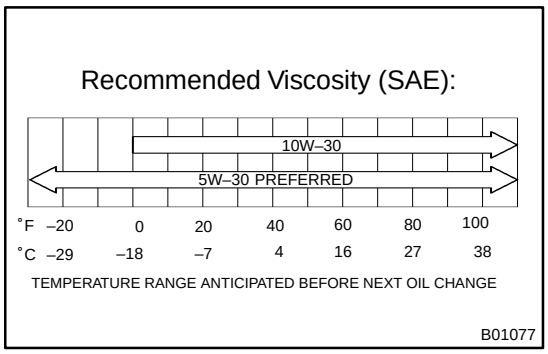
GLOSSARY OF SAE AND LEXUS TERMS

This glossary lists all SAE–J1930 terms and abbreviations used in this manual in compliance with SAE recommendations, as well as their Lexus equivalents.

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )—ABBREVIATIONS
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	–
B+	Battery Positive Voltage	+B, Battery Voltage
BARO	Barometric Pressure	–
CAC	Charge Air Cooler	Intercooler
CARB	Carburetor	Carburetor
CFI	Continuous Fuel Injection	–
CKP	Crankshaft Position	Crank Angle
CL	Closed Loop	Closed Loop
CMP	Camshaft Position	Cam Angle
CPP	Clutch Pedal Position	–
CTOX	Continuous Trap Oxidizer	–
CTP	Closed Throttle Position	–
DFI	Direct Fuel Injection (Diesel)	Direct Injection (DI)
DI	Distributor Ignition	–
DLC1 DLC2 DLC3	Data Link Connector 1 Data Link Connector 2 Data Link Connector 3	1: Check Connector 2: Total Diagnosis Comunication Link (TDCL) 3: OBD II Diagnostic Connector
DTC	Diagnostic Trouble Code	Diagnostic Code
DTM	Diagnostic Test Mode	–
ECL	Engine Control Level	–
ECM	Engine Control Module	Engine ECU (Electronic Control Unit)
ECT	Engine Coolant Temperature	Coolant Temperature, Water Temperature (THW)
EEPROM	Electrically Erasable Programmable Read Only Memory	Electrically Erasable Programmable Read Only Memory (EEPROM), Erasable Programmable Read Only Memory (EPROM)
EFE	Early Fuel Evaporation	Cold Mixture Heater (CMH), Heat Control Valve (HCV)
EGR	Exhaust Gas Recirculation	Exhaust Gas Recirculation (EGR)
EI	Electronic Ignition	Distributorless Ignition (DI)
EM	Engine Modification	Engine Modification (EM)
EPROM	Erasable Programmable Read Only Memory	Programmable Read Only Memory (PROM)
EVAP	Evaporative Emission	Evaporative Emission Control (EVAP)
FC	Fan Control	–
FEEPROM	Flash Electrically Erasable Programmable Read Only Memory	–
FEPROM	Flash Erasable Programmable Read Only Memory	–
FF	Flexible Fuel	–
FP	Fuel Pump	Fuel Pump
GEN	Generator	Alternator
GND	Ground	Ground (GND)

HO2S	Heated Oxygen Sensor	Heated Oxygen Sensor (HO2S)
IAC	Idle Air Control	Idle Speed Control (ISC)
IAT	Intake Air Temperature	Intake or Inlet Air Temperature
ICM	Ignition Control Module	–
IFI	Indirect Fuel Injection	Indirect Injection
IFS	Inertia Fuel–Shutoff	–
ISC	Idle Speed Control	–
KS	Knock Sensor	Knock Sensor
MAF	Mass Air Flow	Air Flow Meter
MAP	Manifold Absolute Pressure	Manifold Pressure Intake Vacuum
MC	Mixture Control	Electric Bleed Air Control Valve (EBCV) Mixture Control Valve (MCV) Electric Air Control Valve (EACV)
MDP	Manifold Differential Pressure	–
MFI	Multiport Fuel Injection	Electronic Fuel Injection (EFI)
MIL	Malfunction Indicator Lamp	Check Engine Light
MST	Manifold Surface Temperature	–
MVZ	Manifold Vacuum Zone	–
NVRAM	Non–Volatile Random Access Memory	–
O2S	Oxygen Sensor	Oxygen Sensor, O_2 Sensor (O_2S)
OBD	On–Board Diagnostic	On–Board Diagnostic (OBD)
OC	Oxidation Catalytic Converter	Oxidation Catalyst Converter (OC), CCo
OP	Open Loop	Open Loop
PAIR	Pulsed Secondary Air Injection	Air Suction (AS)
PCM	Powertrain Control Module	–
PNP	Park/Neutral Position	–
PROM	Programmable Read Only Memory	–
PSP	Power Steering Pressure	–
PTOX	Periodic Trap Oxidizer	Diesel Particulate Filter (DPF) Diesel Particulate Trap (DPT)
RAM	Random Access Memory	Random Access Memory (RAM)
RM	Relay Module	–
ROM	Read Only Memory	Read Only Memory (ROM)
RPM	Engine Speed	Engine Speed
SC	Supercharger	Supercharger
SCB	Supercharger Bypass	–
SFI	Sequential Multiport Fuel Injection	Electronic Fuel Injection (EFI), Sequential Injection
SPL	Smoke Puff Limiter	–
SRI	Service Reminder Indicator	–
SRT	System Readiness Test	–
ST	Scan Tool	–
TB	Throttle Body	Throttle Body
TBI	Throttle Body Fuel Injection	Single Point Injection Central Fuel Injection (Ci)
TC	Turbocharger	Turbocharger
TCC	Torque Converter Clutch	Torque Converter

TCM	Transmission Control Module	Transmission ECU (Electronic Control Unit)
TP	Throttle Position	Throttle Position
TR	Transmission Range	–
TVV	Thermal Vacuum Valve	Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three–Way Catalytic Converter	Three–Way Catalytic (TWC) CC_{RO}
TWC+OC	Three–Way + Oxidation Catalytic Converter	CC_R + CCo
VAF	Volume Air Flow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor (Read Switch Type)
WOT	Wide Open Throttle	Full Throttle
WU–OC	Warm Up Oxidation Catalytic Converter	–
WU–TWC	Warm Up Three–Way Catalytic Converter	Manifold Converter
3GR	Third Gear	–
4GR	Fourth Gear	–



OIL AND FILTER

LU01P–01

INSPECTION

1. CHECK ENGINE OIL QUALITY

Check the oil for deterioration, entry of water, discoloring or thinning.

If the quality is visibly poor, replace the oil.

Oil grade:

API grade SH, Energy–Conserving II or SJ, Energy–Conserving or ILSAC multigrade engine oil.

SAE 5W–30 is the best choice for your vehicle, for good fuel economy, and good starting in cold weather.

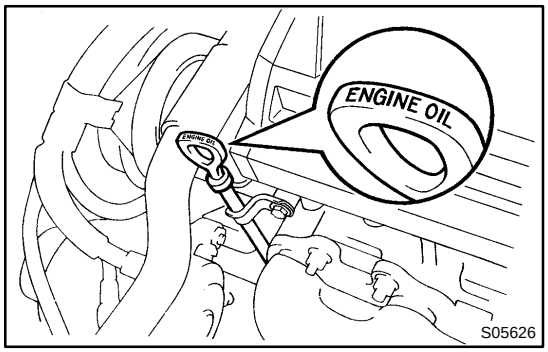
2. CHECK ENGINE OIL LEVEL

After warm up the engine and then 5 minutes after the engine stop, oil level should be between the ”L” and ”F” of the dipstick. If low, check for leakage and add oil up to the ”F” mark.

NOTICE:

★ **Do not fill with engine oil above the ”F” mark.**

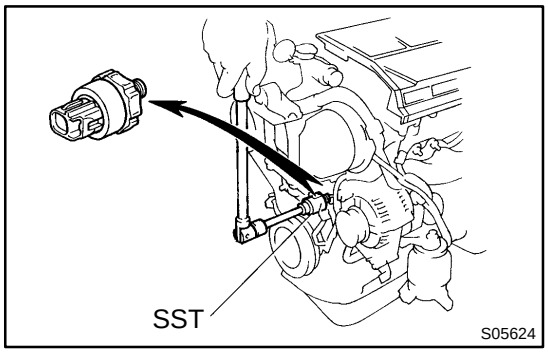
★ **Install the oil dipstick facing the direction shown in the illustration.**

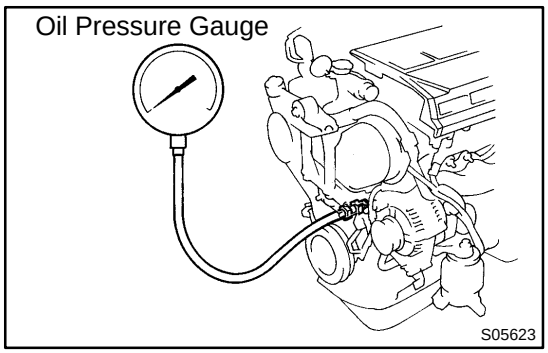


3. REMOVE OIL PRESSURE SWITCH, AND INSTALL OIL PRESSURE GAUGE

(a) Using SST, remove the oil pressure switch.

SST 09816–30010





(b) Install the oil pressure gauge.

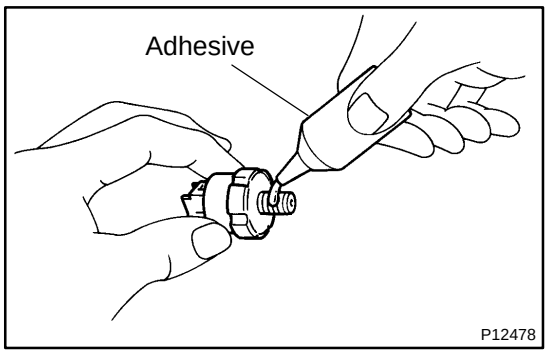
4. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

5. CHECK OIL PRESSURE

Oil pressure:

At idle	29 kPa (0.3 kgf/cm^2, 4.3 psi) or more
At 3,000 rpm	294 – 539 kPa (3.0 – 5.5 kgf/cm^2, 43 – 78 psi)



6. REMOVE OIL PRESSURE GAUGE AND REINSTALL OIL PRESSURE SWITCH

(a) Remove the oil pressure gauge.

(b) Apply adhesive to 2 or 3 threads of the oil pressure switch.
Adhesive: Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(c) Using SST, install the oil pressure switch.
SST 09816–30010
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

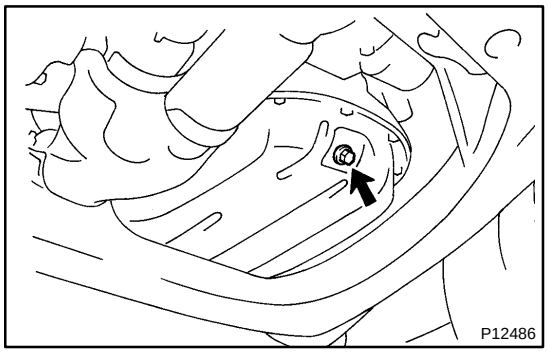
7. START ENGINE AND CHECK FOR LEAKS

LU01Q–04

REPLACEMENT

CAUTION:

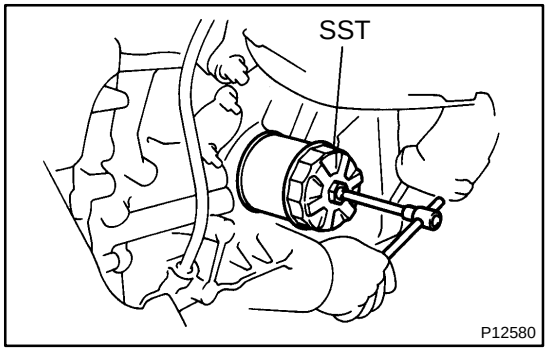
- ★ **Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.**
- ★ **Exercise caution in order to minimize the length and frequency of contact of your skin to used oil. Wear protective clothing and gloves. Wash your skin thoroughly with soap and water, or use water–less hand cleaner, to remove any used engine oil. Do not use gasoline, thinners, or solvents.**
- ★ **In order to preserve the environment, used oil and used oil filter must be disposed of only at designated disposal sites.**



1. DRAIN ENGINE OIL

(a) Remove the oil filler cap.

(b) Remove the oil drain plug, and drain the oil into a container.

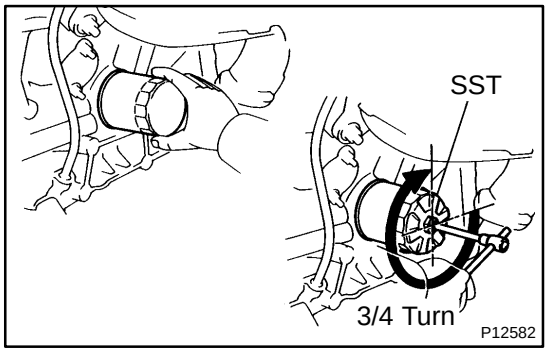


2. REPLACE OIL FILTER

(a) Using SST, remove the oil filter.
SST 09228–07501

(b) Check and clean the oil filter installation surface.

(c) Apply clean engine oil to the gasket of a new oil filter.



(d) Lightly screw the oil filter into place, and tighten it until the gasket contacts the seat.

(e) Using SST, tighten it an additional 3/4 turn.
SST 09228–07501

3. REFILL WITH ENGINE OIL

(a) Clean and install the oil drain plug with a new gasket.
Torque: 45 N·m (460 kgf·cm, 33 ft·lbf)

(b) Fill with fresh engine oil.
Capacity:

Drain and refill	
W/ Oil filter change	4.7 liters (5.0 US qts, 4.1 Imp. qts)
W/o Oil filter change	4.5 liters (4.8 US qts, 4.0 Imp. qts)
Dry fill	5.2 liters (5.5 US qts, 4.6 Imp. qts)

(c) Install the oil filler cap.

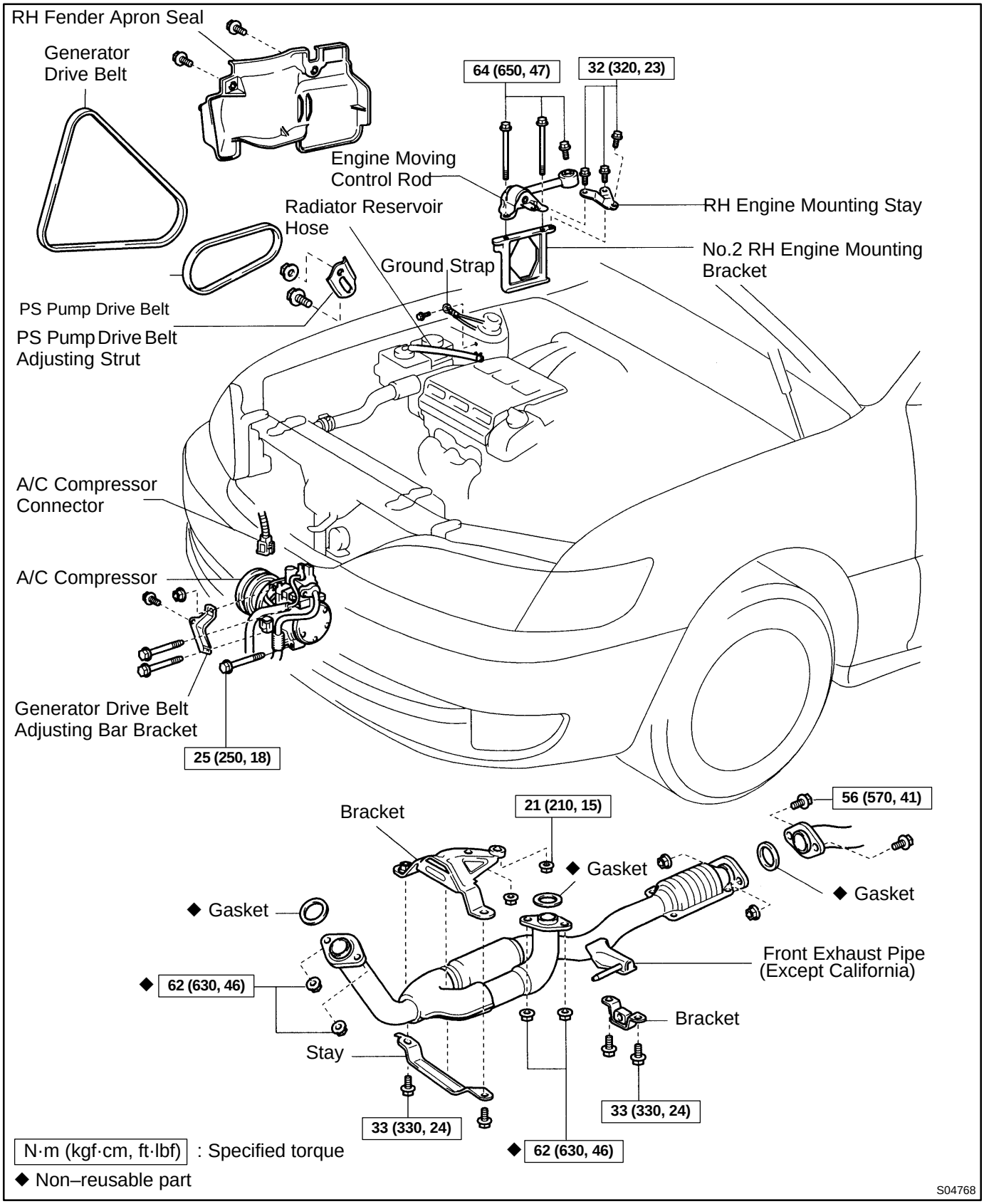
4. START ENGINE AND CHECK FOR OIL LEAKS

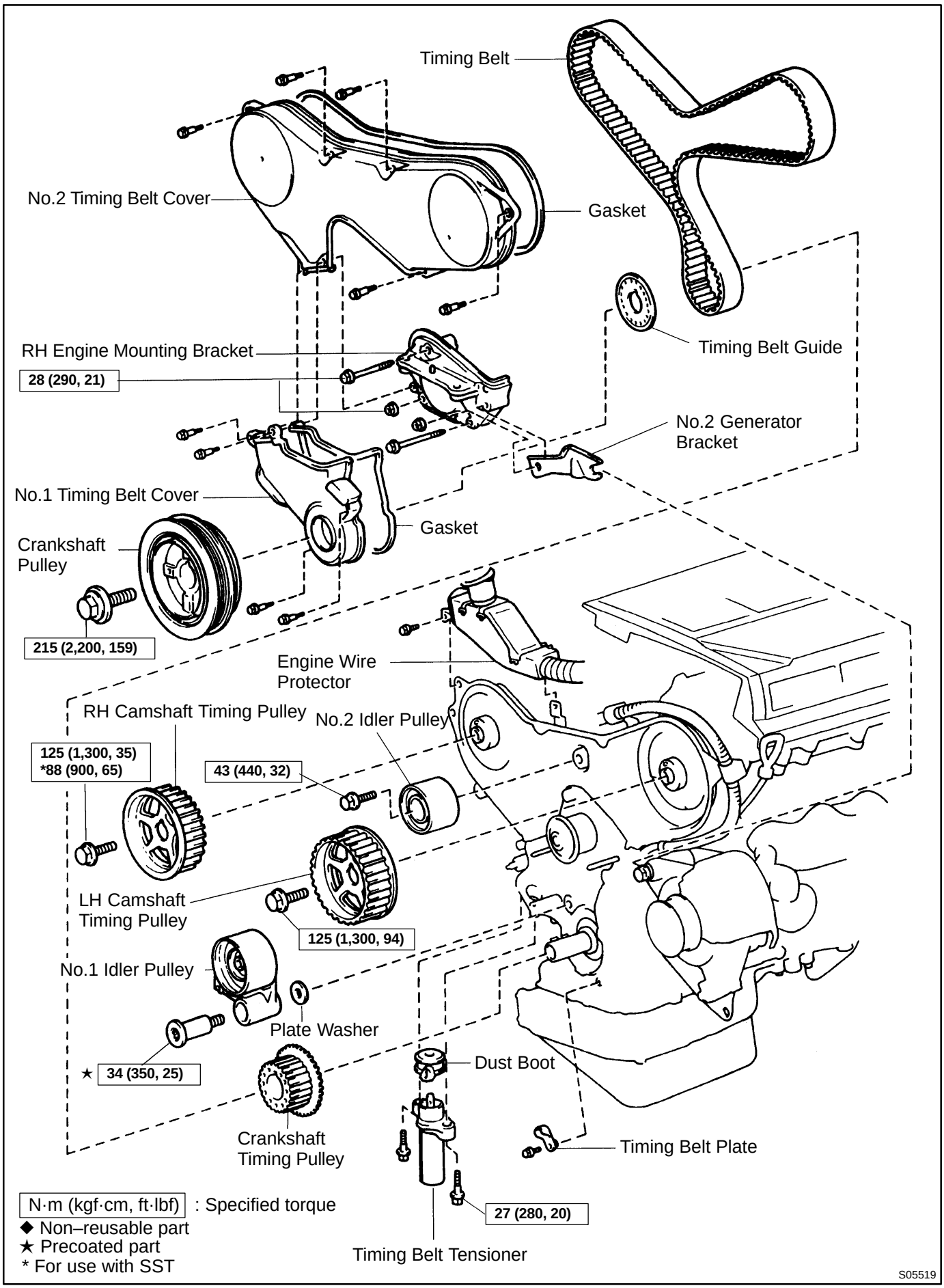
5. RECHECK ENGINE OIL LEVEL

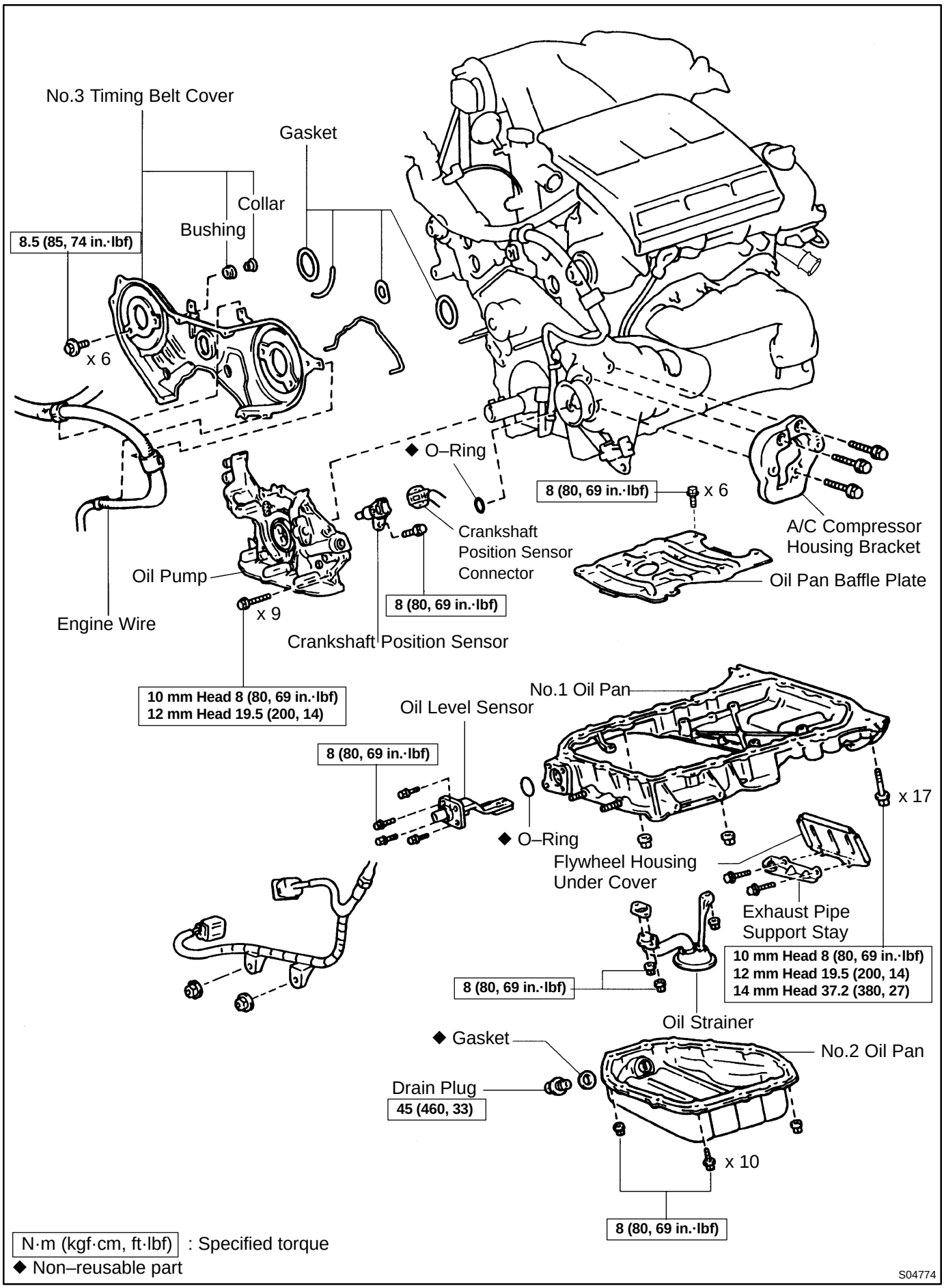
OIL PUMP

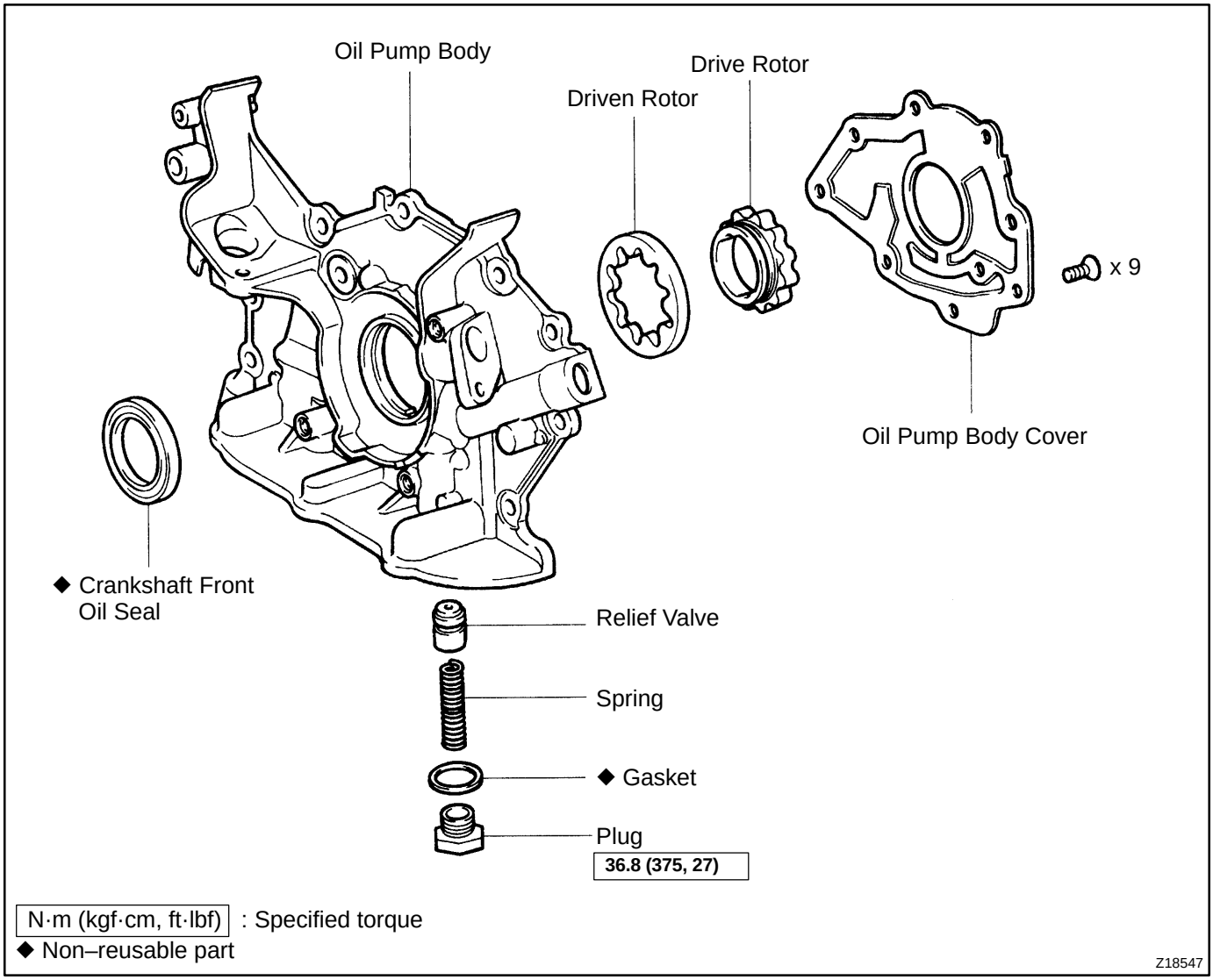
COMPONENTS

LU01R–05




Timing Belt
No.2 Timing Belt Cover
Gasket
Timing Belt Guide
RH Engine Mounting Bracket
28 (290, 21)
No.2 Generator Bracket
No.1 Timing Belt Cover
Gasket
Crankshaft Pulley
215 (2,200, 159)
Engine Wire Protector
RH Camshaft Timing Pulley
No.2 Idler Pulley
125 (1,300, 35)
*88 (900, 65)
43 (440, 32)
LH Camshaft Timing Pulley
125 (1,300, 94)
No.1 Idler Pulley
Plate Washer
★ 34 (350, 25)
Dust Boot
Crankshaft Timing Pulley
Timing Belt Plate
27 (280, 20)
Timing Belt Tensioner
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
★ Precoated part
* For use with SST
S05519


No.3 Timing Belt Cover
Gasket
Collar
Bushing
8.5 (85, 74 in.·lbf)
x 6
◆ O–Ring
8 (80, 69 in.·lbf)
x 6
A/C Compressor Housing Bracket
Crankshaft Position Sensor Connector
Oil Pump
x 9
Oil Pan Baffle Plate
8 (80, 69 in.·lbf)
Engine Wire
Crankshaft Position Sensor
10 mm Head 8 (80, 69 in.·lbf)
12 mm Head 19.5 (200, 14)
No.1 Oil Pan
Oil Level Sensor
8 (80, 69 in.·lbf)
x 17
◆ O–Ring
Flywheel Housing Under Cover
Exhaust Pipe Support Stay
10 mm Head 8 (80, 69 in.·lbf)
12 mm Head 19.5 (200, 14)
14 mm Head 37.2 (380, 27)
8 (80, 69 in.·lbf)
Oil Strainer
◆ Gasket
No.2 Oil Pan
Drain Plug
45 (460, 33)
x 10
8 (80, 69 in.·lbf)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
S04774


Oil Pump Body
Drive Rotor
Driven Rotor
x 9
Oil Pump Body Cover
◆ Crankshaft Front Oil Seal
Relief Valve
Spring
◆ Gasket
Plug
36.8 (375, 27)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
Z18547

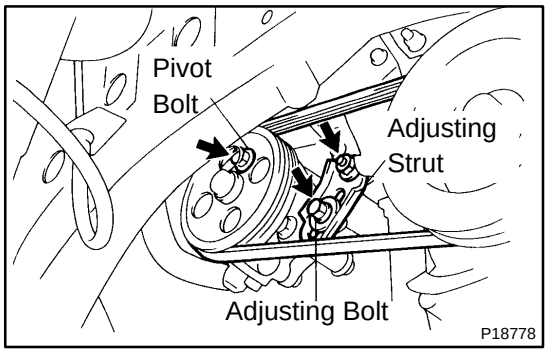
LU01S–01

REMOVAL

HINT:

When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

1. **REMOVE RH FRONT WHEEL**
2. **REMOVE RH FENDER APRON SEAL**
3. **DRAIN ENGINE OIL**
4. **REMOVE FRONT EXHAUST PIPE**
   (See page EM–66)
5. **REMOVE FRONT EXHAUST PIPE BRACKET FROM NO.1 OIL PAN**
6. **REMOVE GENERATOR DRIVE BELT**
   (See page CH–6)
7. **DISCONNECT A/C COMPRESSOR FROM ENGINE**
   (See page EM–66)



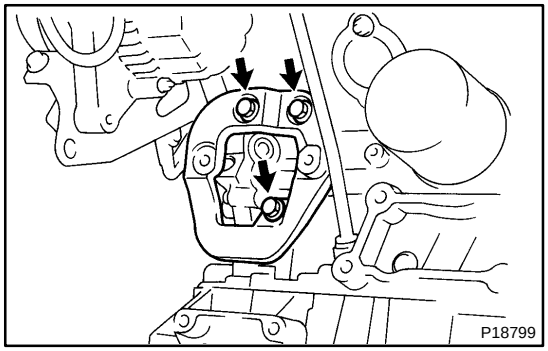
8. **REMOVE PS PUMP DRIVE BELT AND ADJUSTING STRUT**

(a) Loosen the pivot and adjusting bolts, and remove the drive belt.

(b) Remove the bolt, nut and adjusting strut.

9. **REMOVE TIMING BELT**
   (See page EM–14)
10. **REMOVE TIMING PULLEYS**
    (See page EM–14)
11. **REMOVE NO.3 TIMING BELT COVER**
    (See page EM–30)
12. **REMOVE A/C COMPRESSOR HOUSING BRACKET**

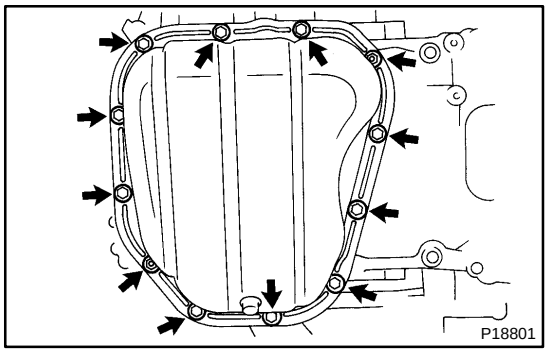
Remove the 3 bolts and housing bracket.



13. **REMOVE OIL LEVEL SENSOR**

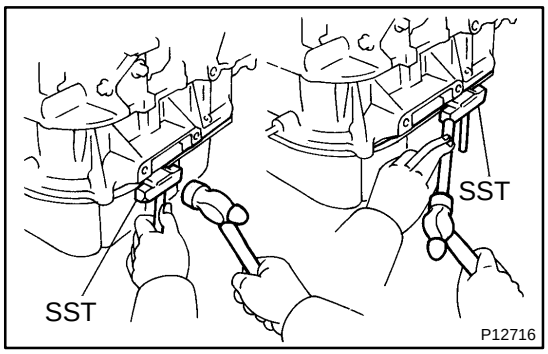
NOTICE:

Be careful not to drop the oil level sensor when removing it.



14. **REMOVE NO.2 OIL PAN**

(a) Remove the 10 bolts and 2 nuts.

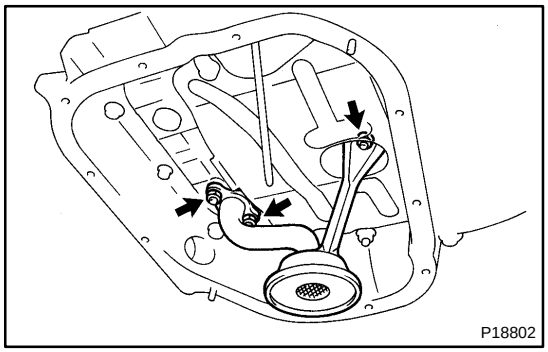


(b) Insert the blade of SST between the No.1 and No.2 oil pans, and cut off applied sealer and remove the No.1 oil pan.
SST 09032–00100

NOTICE:

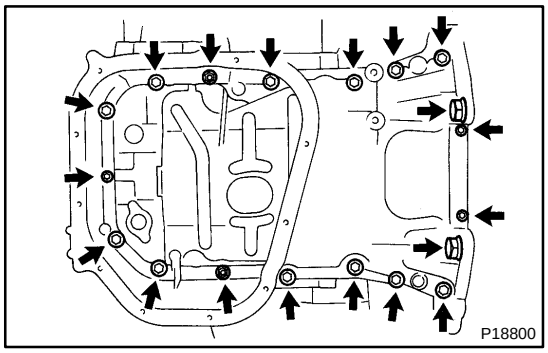
★ **Be careful not to the damage the No.2 oil pan contact surface of the No.1 oil pan.**

★ **Be careful not to damage the No.2 oil pan flange.**



15. REMOVE OIL STRAINER

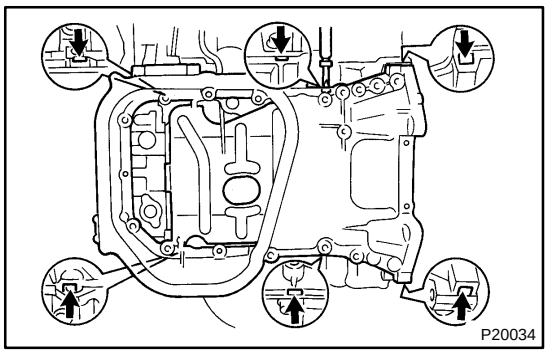
Remove the bolt, 2 nuts, oil strainer and gasket.



16. REMOVE NO.1 OIL PAN

(a) Remove the 2 bolts, exhaust pipe support stay and flywheel housing under cover.

(b) Remove the 17 bolts and 2 nuts.



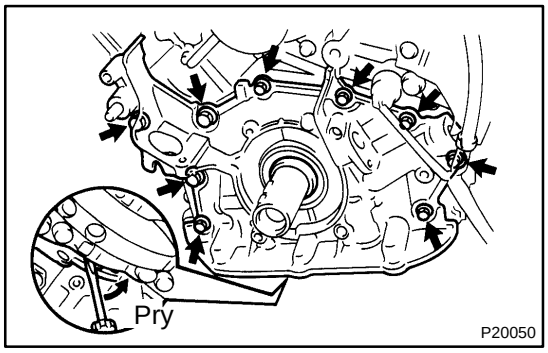
(c) Using a screwdriver, remove the oil pan by prying the portions between the cylinder block and oil pan.

NOTICE:

Be careful not to damage the contact surfaces of the cylinder block and oil pan.

17. REMOVE BAFFLE PLATE FROM NO.1 OIL PAN

18. REMOVE CRANKSHAFT POSITION SENSOR



19. REMOVE OIL PUMP

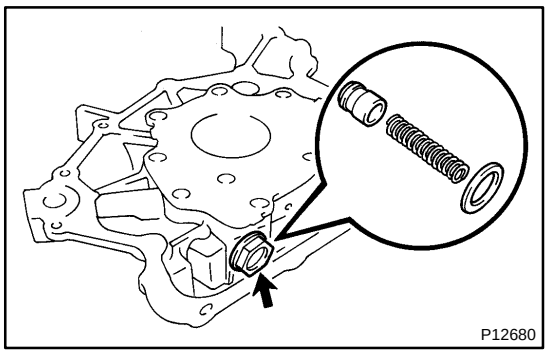
(a) Remove the 9 bolts.

(b) Remove the oil pump by prying a screwdriver between the oil pump and main bearing cap.

(c) Remove the O–ring.

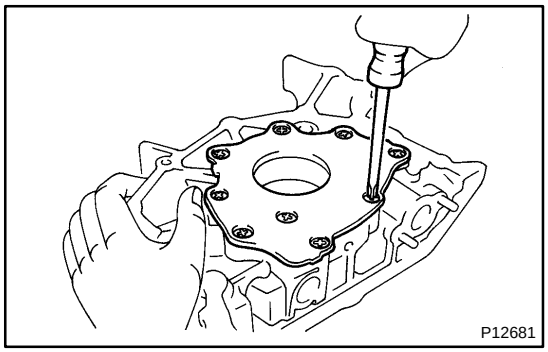
LU01T–01

DISASSEMBLY



1. REMOVE RELIEF VALVE

Remove the plug, gasket, spring and relief valve.

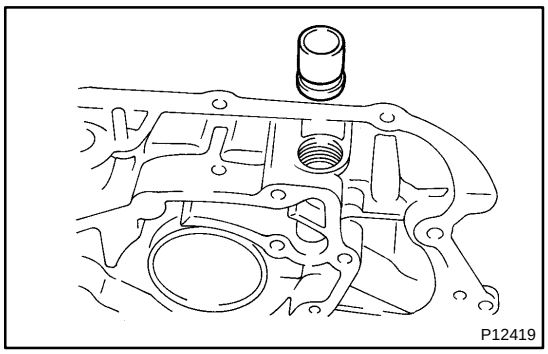


2. REMOVE DRIVE AND DRIVEN ROTORS

Remove the 9 screws, pump body cover, drive and driven rotors.

LU01U–04

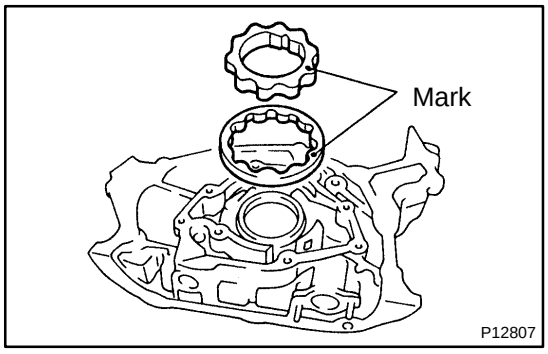
INSPECTION



1. INSPECT RELIEF VALVE

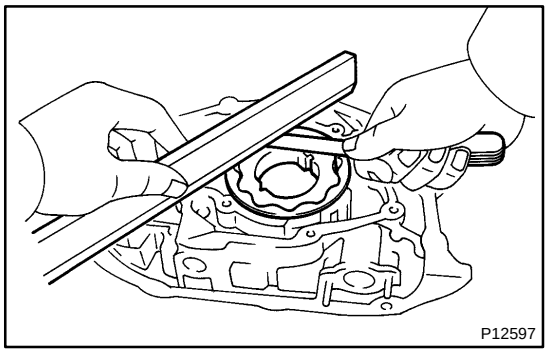
Coat the valve with engine oil and check that it falls smoothly into the valve hole by its own weight.

If it does not, replace the relief valve. If necessary, replace the oil pump assembly.



2. PLACE DRIVE AND DRIVEN ROTORS INTO OIL PUMP BODY

Place the drive and driven rotors into the oil pump body with the mark facing upward.

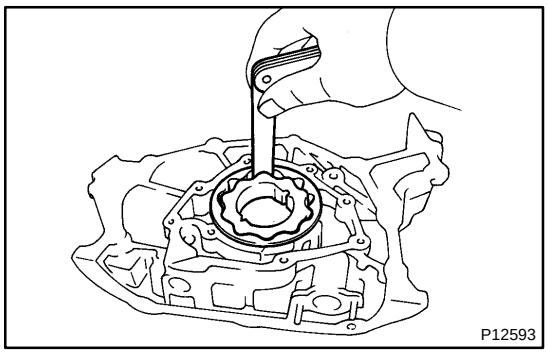


3. INSPECT ROTOR SIDE CLEARANCE

Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Standard side clearance:
0.030 – 0.090 mm (0.0012 – 0.0035 in.)
Maximum side clearance: 0.15 mm (0.0059 in.)

If the side clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

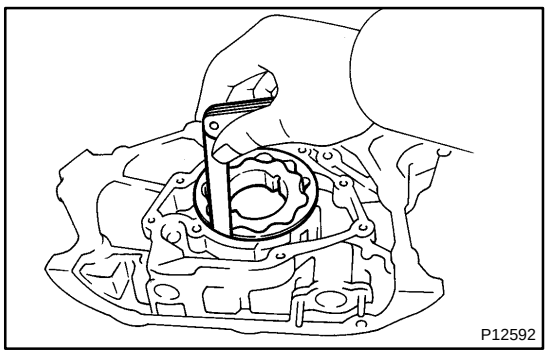


4. INSPECT ROTOR TIP CLEARANCE

Using a feeler gauge, measure the clearance between the drive and driven rotor tips.

Standard tip clearance:
0.110 – 0.240 mm (0.0043 – 0.0094 in.)
Maximum tip clearance: 0.35 mm (0.0138 in.)

If the tip clearance is greater than maximum, replace the rotors as a set.



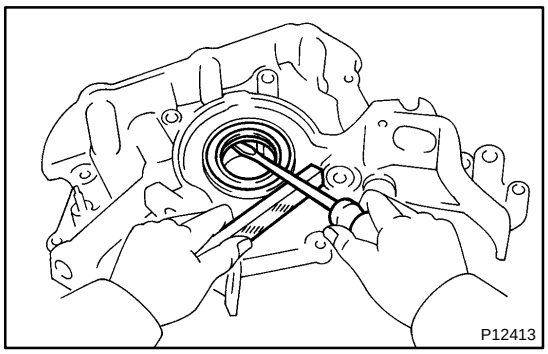
5. INSPECT ROTOR BODY CLEARANCE

Using a feeler gauge, measure the clearance between the driven rotor and body.

Standard body clearance:
0.100 – 0.175 mm (0.0039 – 0.0069 in.)
Maximum body clearance: 0.30 mm (0.0118 in.)

If the body clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

LU01V–01



REPLACEMENT

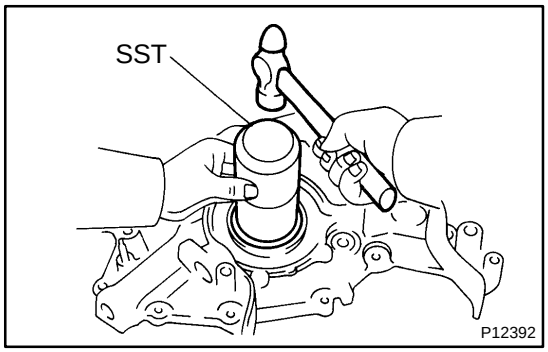
REPLACE CRANKSHAFT FRONT OIL SEAL

HINT:

There are 2 methods ((a) and (b)) to replace the oil seal which are as follows:

(a) If the oil pump is removed from the cylinder block.

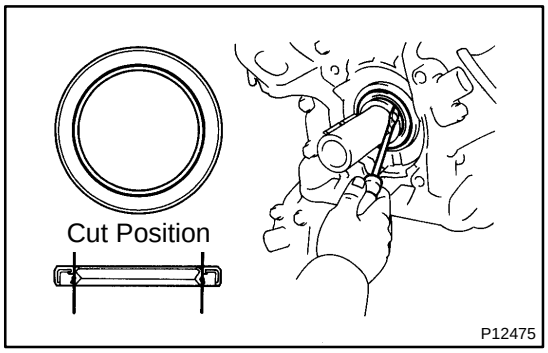
(1) Using a screwdriver, pry out the oil seal.



(2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the oil pump body edge.

SST 09223–00010

(3) Apply MP grease to the oil seal lip.



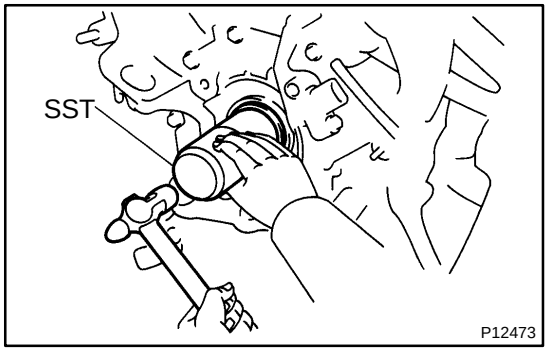
(b) If the oil pump is installed to the cylinder block.

(1) Using a knife, cut off the oil seal lip.

(2) Using a screwdriver, pry out the oil seal.

NOTICE:

Be careful not to damage the crankshaft. Tape the screwdriver tip.

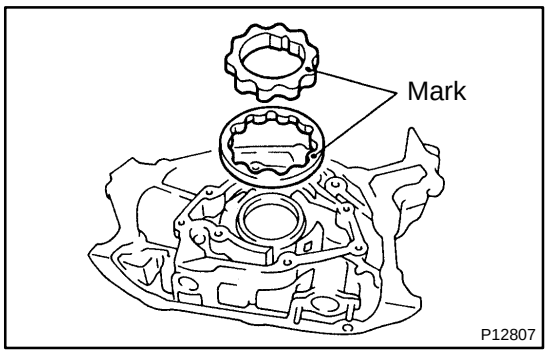


(3) Apply MP grease to a new oil seal lip.

(4) Using SST and a hammer, tap in the oil seal until its surface is flush with the oil pump body edge.

SST 09223–00010

LU01W–01



REASSEMBLY

1. INSTALL DRIVE AND DRIVEN ROTORS

(a) Place the drive and driven rotors into pump body with the marks facing the pump body cover side.

(b) Install the pump body cover with the 9 screws.

2. INSTALL RELIEF VALVE

Insert the relief valve and spring into the pump body hole, and install the plug with a new gasket.

Torque: 36.8 N·m (375 kgf·cm, 37 ft·lbf)

LU01X–01

INSTALLATION

1. INSTALL OIL PUMP

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pump and cylinder block.

★ Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.

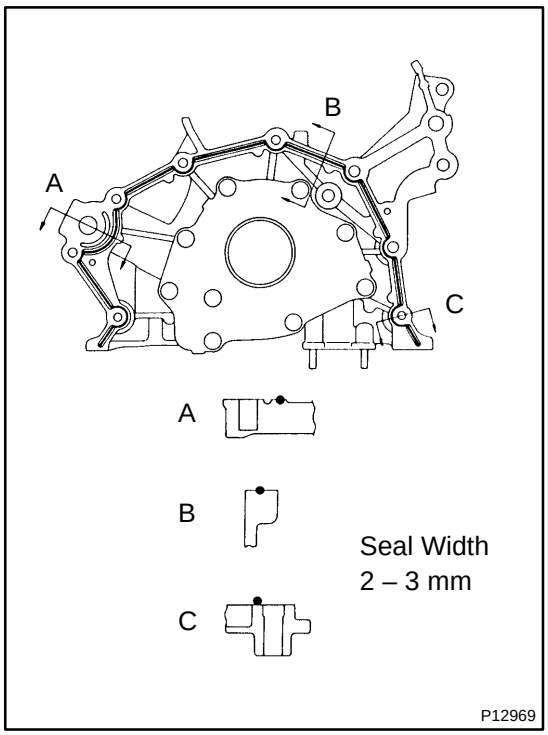
★ Thoroughly clean all components to remove all the loose material.

★ Using a non–residue solvent, clean both sealing surfaces.

(b) Apply seal packing to the oil pump as shown in the illustration.

Seal packing: Part No. 08826–00080 or equivalent

★ Install a nozzle that has been cut to a 2 – 3 mm (0.08 – 0.12 in.) opening.



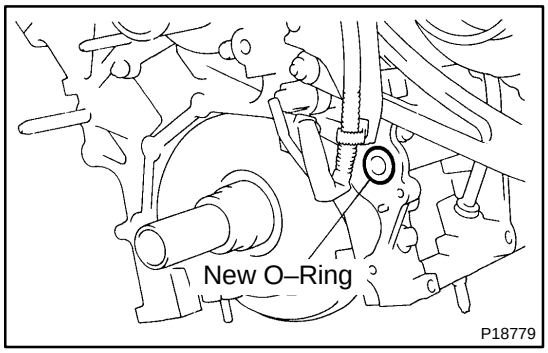
HINT:

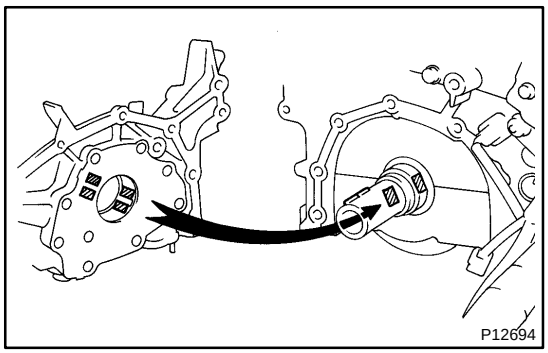
Avoid applying an excessive amount to the surface.

★ Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.

★ Immediately remove nozzle from the tube and reinstall cap.

(c) Place a new O–ring on the cylinder block.





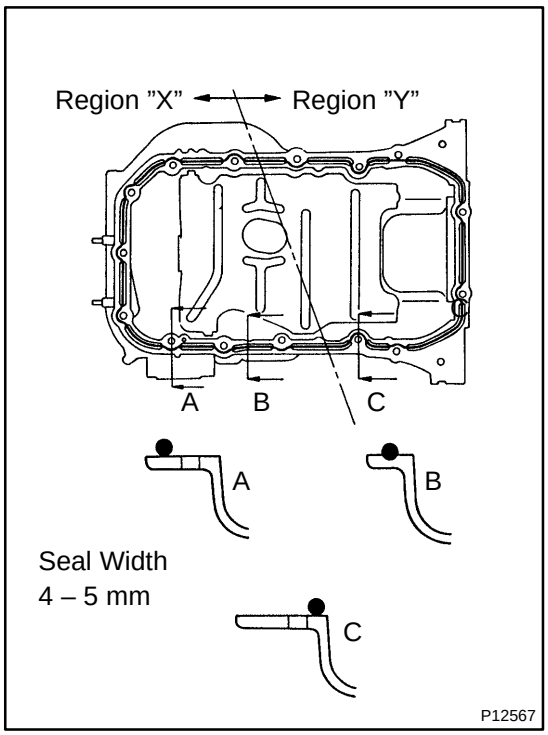
(d) Engage the spline teeth of the oil pump drive gear with the large teeth of the crankshaft, and slide the oil pump on the crankshaft.

(e) Install the oil pump with the 9 bolts. Uniformly tighten the bolts in several passes.

Torque:
10 mm head: 8 N·m (80 kgf·cm, 69 in.·lbf)
12 mm head: 19.5 N·m (200 kgf·cm, 14 ft·lbf)

2. INSTALL CRANKSHAFT POSITION SENSOR
Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

3. INSTALL BAFFLE PLATE TO NO.1 OIL PAN
Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)



4. INSTALL NO.1 OIL PAN

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pan, oil pump and cylinder block.

★ Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.

★ Thoroughly clean all components to remove all the loose material.

★ Using a non–residue solvent, clean both sealing surfaces.

(b) Apply seal packing to the oil pan as shown in the illustration.

Seal packing: Part No. 08826–00080 or equivalent
Region ”X” is at the outer side of the bolt hole.
Region ”Y” is at the inner side of the bolt hole.

★ Install a nozzle that has been cut to a 4 – 5 mm (0.16 – 0.20 in.) opening.

HINT:

Avoid applying an excessive amount to the surface.

★ Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.

★ Immediately remove nozzle from the tube and reinstall cap.

(c) Install the oil pan with the 17 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes.

Torque:
10 mm head: 8 N·m (80 kgf·cm, 69 in.·lbf)
12 mm head: 19.5 N·m (200 kgf·cm, 14 ft·lbf)
14 mm head: 37.2 N·m (380 kgf·cm, 27 ft·lbf)

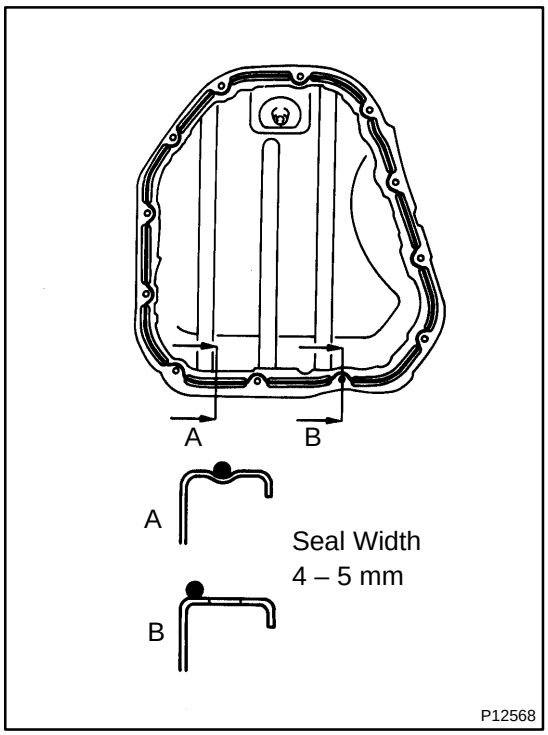
(d) Install the flywheel housing under cover and exhaust pipe support stay with the 2 bolts.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

5. INSTALL OIL STRAINER

Install a new gasket and the oil strainer with the bolt and 2 nuts.

Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)



6. INSTALL NO.2 OIL PAN

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surface of the No.1 and No.2 oil pans.

★ Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.

★ Thoroughly clean all components to remove all the loose material.

★ Using a non–residue solvent, clean both sealing surfaces.

NOTICE:

Do not use a solvent which will affect the painted surfaces.

(b) Apply seal packing to the No.2 oil pan as shown in the illustration.

Seal packing: Part No. 08826–00080 or equivalent

★ Install a nozzle that has been cut to a 4 – 5 mm (0.16 – 0.20 in.) opening.

HINT:

Avoid applying an excessive amount to the surface.

★ Parts must be assembled within 3 minutes of application. Otherwise the material must be removed and reapplied.

★ Immediately remove nozzle from the tube and reinstall cap.

(c) Install the No.2 oil pan with the 10 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes.

Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

7. INSTALL OIL LEVEL SENSOR

Install a new gasket and the oil level sensor with the 4 bolts.

Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

8. INSTALL A/C COMPRESSOR HOUSING BRACKET

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

9. INSTALL NO.3 TIMING BELT COVER

(See page EM–52)

10. INSTALL TIMING PULLEYS

(See page EM–20)

11. INSTALL TIMING BELT

(See page EM–20)

12. INSTALL ADJUSTING STRUT AND PS PUMP DRIVE BELT

(a) Temporarily install the adjusting strut with the bolt and nut.

(b) Install the drive belt with the pivot and adjusting bolts.

Torque: 43.1 N·m (440 kgf·cm, 32 ft·lbf)

(c) Tighten the nut.

Torque: 43.1 N·m (440 kgf·cm, 32 ft·lbf)

13. INSTALL A/C COMPRESSOR

(See page EM–71)

14. INSTALL GENERATOR DRIVE BELT

(See page CH–2)

15. INSTALL FRONT EXHAUST PIPE BRACKET TO NO.1 OIL PAN
    Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)
16. INSTALL FRONT EXHAUST PIPE
    (See page EM–71)
17. INSTALL RH FENDER APRON SEAL
18. INSTALL RH FRONT WHEEL
19. FILL ENGINE WITH OIL
20. START ENGINE AND CHECK FOR LEAKS
21. RECHECK ENGINE OIL LEVEL

OUTSIDE VEHICLE

MA001–05

GENERAL MAINTENANCE

These are some maintenance and inspection items which are considered to be the owner's responsibility. They can be done by the owner or they can have them done at a service shop.
These items include those which should be checked on a daily basis, those which, in most cases, do not require (special) tools and those which are considered to be reasonable for the owner to do.
Items and procedures for general maintenance are as follows.

1. GENERAL NOTES

- Maintenance items may vary from country to country. Check the owner's manual supplement in which the maintenance schedule is shown.
- Every service item in the periodic maintenance schedule must be performed.
- Periodic maintenance service must be performed according to whichever interval in the periodic maintenance schedule occurs first, the odometer reading (miles) or the time interval (months).
- Maintenance service after the last period should be performed at the same interval as before unless otherwise noted.
- Failure to do even one item an cause the engine to run poorly and increase exhaust emissions.

2. TIRES

(a) Check the pressure with a gauge. If necessary, adjust.
(b) Check for cuts, damage or excessive wear.

3. WHEEL NUTS

When checking the tires, check the nuts for looseness or for missing nuts. If necessary, tighten them.

4. TIRE ROTATION

Check the owner's manual supplement in which the maintenance schedule is shown.

5. WINDSHIELD WIPER BLADES

Check for wear or cracks whenever they do not wipe clean. If necessary, replace.

6. FLUID LEAKS

(a) Check underneath for leaking fuel, oil, water or other fluid.
(b) If you smell gasoline fumes or notice any leak, have the cause found and corrected.

7. DOORS AND ENGINE HOOD

(a) Check that all doors including the trunk lid and back door operate smoothly, and that all latches lock securely.
(b) Check that the engine hood secondary latch secures the hood from opening when the primary latch is released.

INSIDE VEHICLE

MA002–02

GENERAL MAINTENANCE

These are some maintenance and inspection items which are considered to be the owner's responsibility. They can be done by the owner or they can have them done at a service shop.
These items include those which should be checked on a daily basis, those which, in most cases, do not require (special) tools and those which are considered to be reasonable for the owner to do.
Items and procedures for general maintenance are as follows.

1. GENERAL NOTES

- Maintenance items may vary from country to country. Check the owner's manual supplement in which the maintenance schedule is shown.
- Every service item in the periodic maintenance schedule must be performed.
- Periodic maintenance service must be performed according to whichever interval in the periodic maintenance schedule occurs first, the odometer reading (miles) or the time interval (months).
- Maintenance service after the last period should be performed at the same interval as before unless otherwise noted.
- Failure to do even one item an cause the engine to run poorly and increase exhaust emissions.

2. LIGHTS

(a) Check that the headlights, stop lights, taillights, turn signal lights, and other lights are all working.
(b) Check the headlight aim.

3. WARNING LIGHTS AND BUZZERS

Check that all warning lights and buzzers function properly.

4. HORN

Check that it is working.

5. WINDSHIELD GLASS

Check for scratches, pits or abrasions.

6. WINDSHIELD WIPER AND WASHER

(a) Check operation of the wipers and washer.
(b) Check that the wipers do not streak.

7. WINDSHIELD DEFROSTER

Check that air comes out from the defroster outlet when operating the heater or air conditioner at defroster mode.

8. REAR VIEW MIRROR

Check that it is mounted securely.

9. SUN VISORS

Check that they move freely and are mounted securely.

10. STEERING WHEEL

Check that it has the specified freeplay. Be alert for changes in steering condition, such as hard steering, excessive freeplay or strange noises.

11. SEATS

(a) Check that all front seat controls such as seat adjusters, seatback recliner, etc. operate smoothly.
(b) Check that all latches lock securely in any position.
(c) Check that the head restraints move up and down smoothly and that the locks hold securely in any latch position.

12. SEAT BELTS

(a) Check that the seat belt system such as the buckles, retractors and anchors operate properly and smoothly.
(b) Check that the belt webbing is not cut, frayed, worn or damaged.

13. ACCELERATOR PEDAL

Check the pedal for smooth operation and uneven pedal effort or catching.

14. BRAKE PEDAL (See page BR–6)

(a) Check the pedal for smooth operation.

(b) Check that the pedal has the proper reserve distance and freeplay.

(c) Check the brake booster function.

15. BRAKES

At a safe place, check that the brakes do not pull to one side when applied.

16. PARKING BRAKE (See page BR–43)

(a) Check that the lever has the proper travel.

(b) On a safe incline, check that the vehicle is held securely with only the parking brake applied.

17. AUTOMATIC TRANSMISSION ”PARK” MECHANISM

(a) Check the lock release button of the selector lever for proper and smooth operation.

(b) On a safe incline, check that the vehicle is held securely with the selector lever in ”P” position and all brakes released.

UNDER HOOD

MA003–14

GENERAL MAINTENANCE

1. GENERAL NOTES

- Maintenance items may vary from country to country. Check the owner's manual supplement in which the maintenance schedule is shown.
- Every service item in the periodic maintenance schedule must be performed.
- Periodic maintenance service must be performed according to whichever interval in the periodic maintenance schedule occurs first, the odometer reading (miles) or the time interval (months).
- Maintenance service after the last period should be performed at the same interval as before unless otherwise noted.
- Failure to do even one item an cause the engine to run poorly and increase exhaust emissions.

2. WINDSHIELD WASHER FLUID

Check that there is sufficient fluid in the tank.

3. ENGINE COOLANT LEVEL

Check that the coolant level is between the "FULL" and "LOW" lines on the see–through reservoir.

4. RADIATOR AND HOSES

(a) Check that the front of the radiator is clean and not blocked with leaves, dirt or bugs.
(b) Check the hoses for cracks, kinks, rot or loose connections.

5. BATTERY ELECTROLYTE LEVEL

Check that the electrolyte level of all battery cells is between the upper and lower level lines on the case.

6. BRAKE AND CLUTCH FLUID LEVELS

(a) Check that the brake fluid level is near the upper level line on the see–through reservoir.
(b) Check that the clutch fluid level is within ± 5 mm (0.20 in.) of the reservoir filling line.

7. ENGINE DRIVE BELTS

Check all drive belts for fraying, cracks, wear or oiliness.

8. ENGINE OIL LEVEL

Check the level on the dipstick with the engine turned off.

9. POWER STEERING FLUID LEVEL

- Check the level on the dipstick.
- The level should be in the "HOT" or "COLD" range depending on the fluid temperature.

10. AUTOMATIC TRANSMISSION FLUID LEVEL

(a) Park the vehicle on a level surface.
(b) With the engine idling and the parking brake applied, shift the selector into all positions from "P" to "L", and then shift into "P" position.
(c) Pull out the dipstick and wipe off the fluid with a clean rag. Re–insert the dipstick and check that the fluid level is in the HOT range.
(d) Do this check with the fluid at normal driving temperature (70 – 80˚C, 158 – 176˚F).

HINT:

Wait until the engine cools down (approx. 30 min.) before checking the fluid level after extended driving at high speeds, in hot weather, in heavy traffic or pulling a trailer.

11. EXHAUST SYSTEM

Visually inspect for cracks, holes or loose supports.

If any change in the sound of the exhaust or smell of the exhaust fumes is noticed, have the cause located and corrected.

ENGINE

MA00F–01

INSPECTION

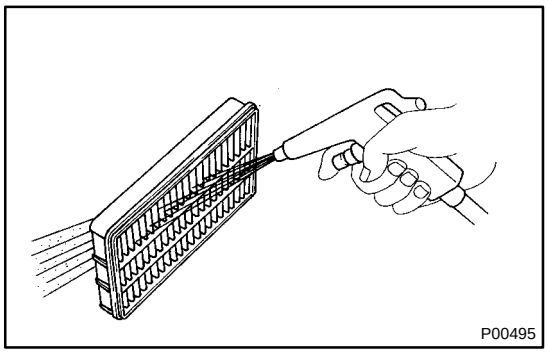
HINT:

Inspect these items when the engine is cold.

1. REPLACE TIMING BELT
(See page EM–14)

2. INSPECT DRIVE BELTS
(See pages CH–2, SR–3 and AC–14)

3. REPLACE SPARK PLUGS
(See page IG–1)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4. INSPECT AIR FILTER

(a) Visually check that the air filter is not excessively dirty or oily.

(b) Clean the air filter with compressed air.
First blow from the inside thoroughly, then blow off the outside of the air filter.

5. REPLACE AIR FILTER

Replace the air filter with a new one.

6. REPLACE ENGINE OIL AND OIL FILTER
(See page LU–3)

7. REPLACE ENGINE COOLANT
(See page CO–2)

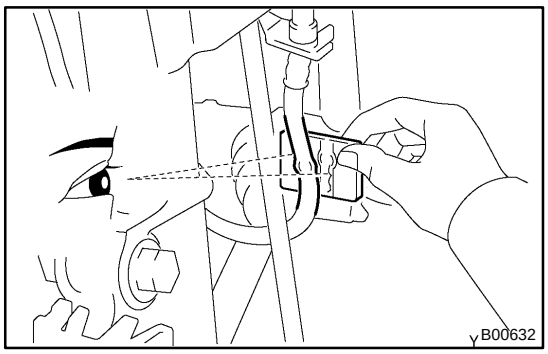
8. INSPECT CHARCOAL CANISTER
(See page EC–5)

9. REPLACE GASKET IN FUEL TANK CAP
(See page EC–5)

10. INSPECT FUEL LINES AND CONNECTIONS
(See page EC–5)

11. INSPECT EXHAUST PIPES AND MOUNTINGS
(See page EC–9)

12. ADJUST VALVE CLEARANCE
(See page EM–4)



BRAKE

MA00G–01

INSPECTION

1. INSPECT BRAKE LINE PIPES AND HOSES

HINT:

Check in a well lighted area. Check the entire circumference and length of the brake hoses using a mirror as required. Turn the front wheels fully right or left before checking the front brake.

(a) Check the all brake lines and hoses for the Damage.
(b) Check the all brake lines and hoses for the Wear.
(c) Check the all brake lines and hoses for the Deformation.
(d) Check the all brake lines and hoses for the Cracks.
(e) Check the all brake lines and hoses for the Corrosion.
(f) Check the all brake lines and hoses for the Leaks.
(g) Check the all brake lines and hoses for the Bends.
(h) Check the all brake lines and hoses for the Twists.
(i) Check all clamps for tightness and connections for leakage.
(j) Check that the hoses and lines are clear of sharp edges, moving parts and the exhaust system.
(k) Check that the lines installed in grommets pass through the center of the grommets.

2. INSPECT FRONT BRAKE PADS AND DISCS
(See page BR–24)

3. INSPECT REAR BRAKE PADS AND DISCS
(See page BR–33)

4. INSPECT PARKING BRAKE LININGS AND DRUMS
(See page BR–43)

CHASSIS

MA00H–01

INSPECTION

1. INSPECT STEERING LINKAGE

(a) Check the steering wheel freeplay. (See page SR–8)

(b) Check the steering linkage for looseness or damage.

Check that:

- Tie rod ends do not have excessive play.
- Dust seals and boots are not damaged.
- Boot clamps are not loose.

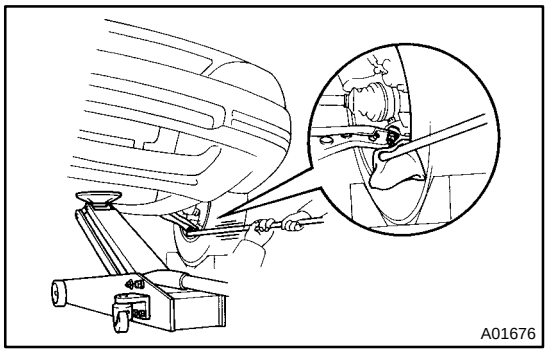
2. INSPECT SRS AIRBAG (See pages RS–9, RS–23)

3. INSPECT STEERING GEAR HOUSING OIL

Check the steering gear housing for oil leakage.

4. INSPECT DRIVE SHAFT BOOTS

Check the drive shaft boots for clamp looseness, leakage or damage.



5. INSPECT BALL JOINTS AND DUST COVERS

(a) Inspect the ball joints for excessive looseness.

- Jack up the front of the vehicle and place wooden blocks with a height of 180–200 mm (7.09–7.87 in.) under the front tires.
- Lower the jack until there is about half a load on the front coil spring. Place stands under the vehicle for safety.
- Check that the front wheels are pointing straight ahead, and block them with chocks.
- Using a lever, pry up the end of the lower arm, and check the amount of play.

Maximum ball joint vertical play: 0 mm (0 in.)

If there is play, replace the ball joint.

(b) Check the dust cover for damage.

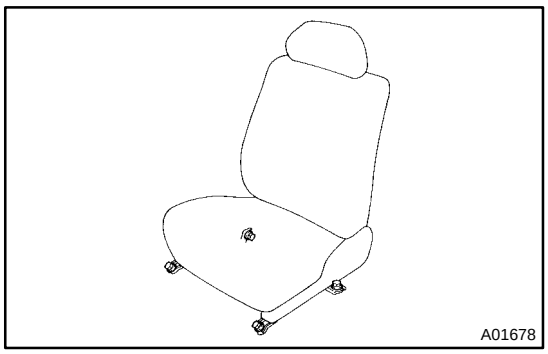
6. CHECK TRANSAXLE OIL (FLUID)

Visually check the transaxle for oil (fluid) leakage.

If leakage is found, check for the cause and repair.

7. REPLACE TRANSAXLE FLUID

(See page DI–150)



BODY

INSPECTION

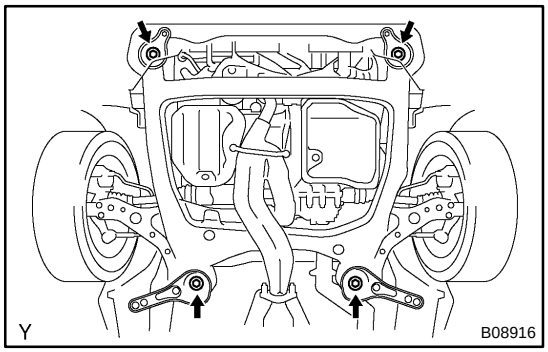
MA00I–01

1. TIGHTEN BOLTS AND NUTS ON CHASSIS AND BODY

Tighten these parts:

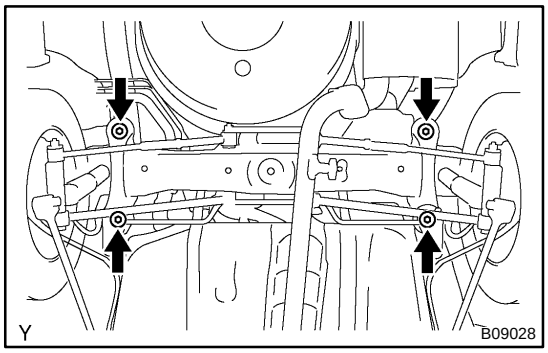
- Front seat mount bolts

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)



- Front suspension member–to–body mounting bolts

Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)



- Rear suspension member–to–body mounting nuts

Torque: 51 N·m (520 kgf·cm, 38 ft·lbf)

2. FINAL INSPECTION

(a) Check the operation of the body parts:

- Hood:
  - Auxiliary catch operates properly
  - Hood locks securely when closed
- Front and rear doors:
  - Door lock operates properly
  - Doors close properly
- Luggage compartment door and back door:
  - Door lock operates properly
- Seats:
  - Seat adjusts easily and locks securely in any position
  - Front seat back locks securely in any position

(b) Road test:
- Check the engine and chassis for abnormal noises.
- Check that the vehicle does not wander or pull to one side.
- Check that the brakes work properly and do not drag.
- Do setting of the parking brake shoes and drum.

(c) Be sure to deliver a clean vehicle and especially check:
- Steering wheel
- Shift lever knob
- All switch knobs
- Door handles
- Seats

FOREWORD

To assist you in your service activities, this manual explains the main characteristics of the new ES300, in particular providing a technical explanation of the construction and operation of new mechanisms and new technology used.

Applicable models: MCV20 series

This manual is divided into 4 sections.

1. **Introduction** — Development objectives of the new model and model line-up.
2. **New Model Outline** — Explanation of the product to give a general understanding of its features.
3. **Technical Description** — Technical explanation of the construction and operation of each new system and component.
4. **Appendix** — Major technical specifications of the vehicle.

CAUTION, NOTICE, *REFERENCE* and **NOTE** are used the following ways:

CAUTION	A potentially hazardous situation which could result in injury to people may occur if instructions on what to do or not do are ignored.
NOTICE	Damage to the vehicle or components may occur if instructions on what to do or not do are ignored.
REFERENCE	Explains the theory behind mechanisms and techniques.
NOTE	Notes or comments not included under the above 3 titles.

For detailed service specifications and repair procedures, refer to the following Repair Manuals:

Manual Name	Pub. No.
● 1997 LEXUS ES300 Repair Manual	RM511U
● 1997 LEXUS ES300 Electrical Wiring Diagram	EWD284U

All information contained herein is the most up-to-date at the time of publication. We reserve the right to make changes without prior notice.

TOYOTA MOTOR CORPORATION

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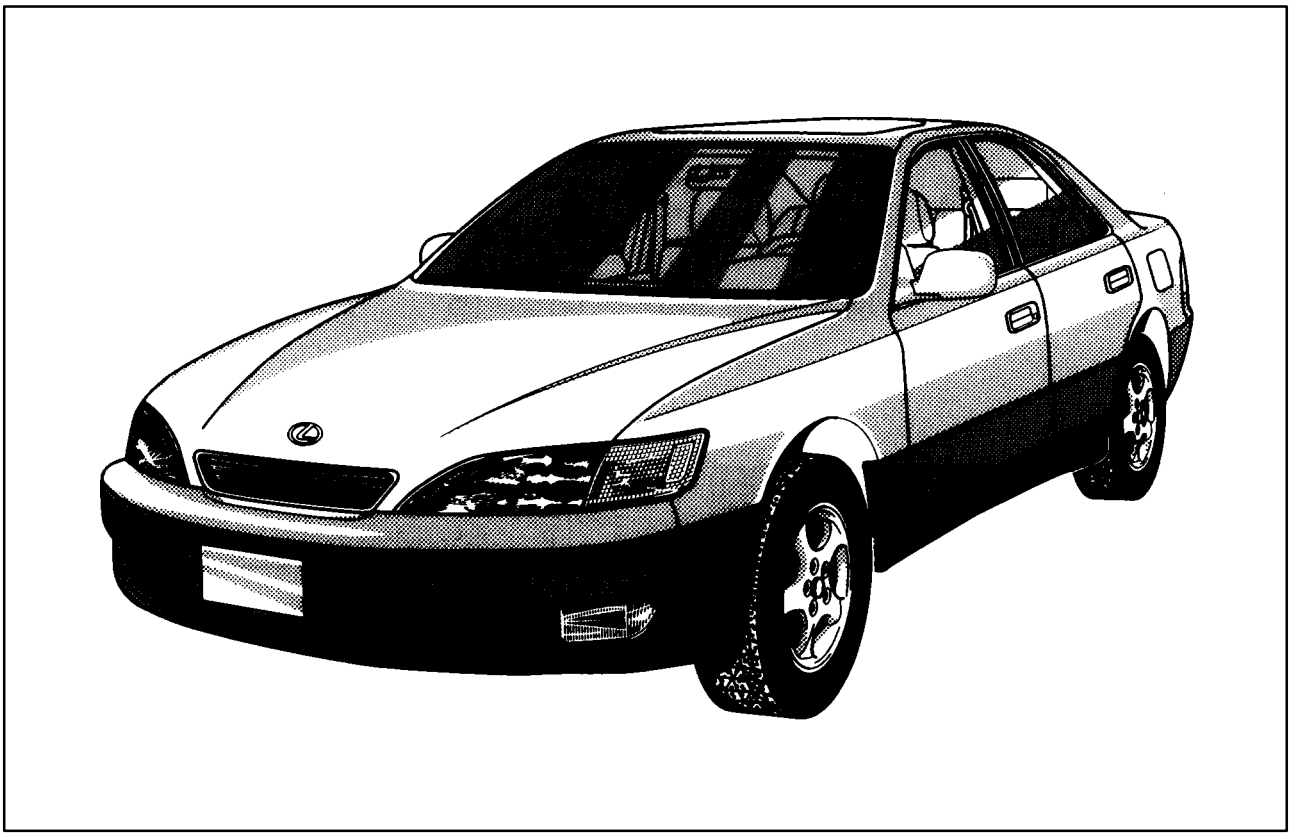
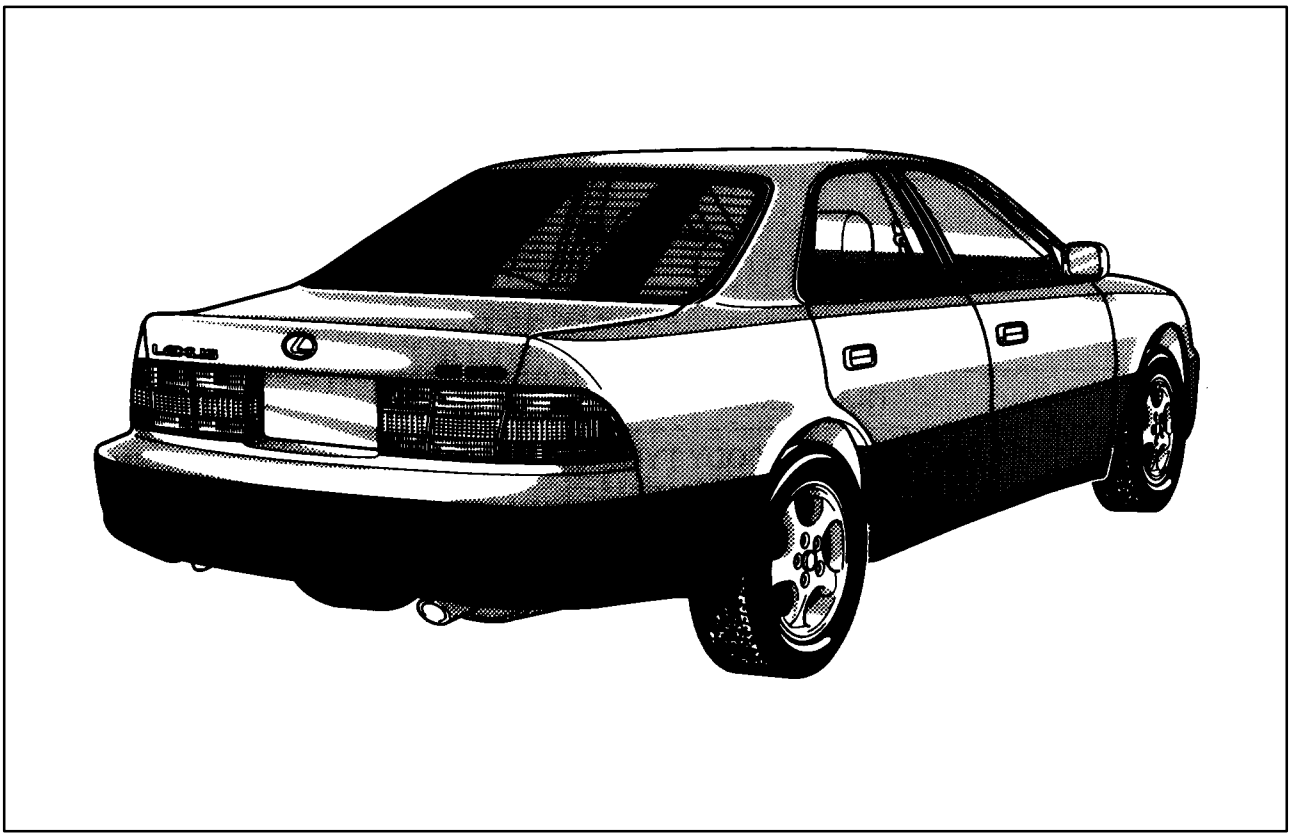
DEVELOPMENT OBJECTIVES

The new ES300 aims to further strengthen its status as a Lexus entry vehicle through appealing more strongly to the young, quality minded drivers by creating more advanced, attractive designs and functions, and through obtaining a wider variety of users by adding more value to the car.

EXTERIOR APPEARANCE





MODEL CODE AND MODEL LINE-UP

MODEL CODE

MCV20 L - B T P G K A

② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑧

②	**BASIC MODEL CODE**
	MCV20 : With 1MZ-FE Engine

③	**STEERING WHEEL POSITION**
	L : Left-Hand Drive

④	**MODEL NAME**
	B : ES 300

⑤	**BODY TYPE**
	T : 4-Door Sedan

⑥	**GEARSHIFT TYPE**
	P : 4-Speed Automatic, Floor

⑦	**GRADE**
	G : —

⑧	**ENGINE SPECIFICATION**
	K : DOHC And SFI

⑧	**DESTINATION**
	A : U.S.A.
	K : Canada

MODEL LINE-UP

TRANSAXLE				4-Speed Automatic
DESTINATION	ENGINE	BODY TYPE	GRADE	A541E*
U.S.A.	1MZ-FE	4-Door Sedan	—	MCV20L-BTPGKA
Canada				MCV20L-BTPGKK

* : Electronically Controlled Transmission with and intelligent control system

MAJOR COMPONENTS

The basic components of the new and previous ES300 are as follows:

Model		New	Previous
Item		FF (Front Engine, Front Wheel Drive)	←
Drive System			
Engine	Type	1MZ–FE: V6, 3.0–Liter	←
	Displacement cm^3 (cu. in.)	2995 (182.7)	←
	Valve Mechanism	24 Valves, DOHC	←
	Fuel System	SFI	←
	Max. Output [SAE–NET] kW @ rpm (HP @ rpm)	149 @ 5200 (200 @ 5200)	140 @ 5200 (188 @ 5200)
	Max. Torque [SAE–NET] N·m @ rpm (ft·lbf @ rpm)	290 @ 4400 (214 @ 4400)	275 @ 4400 (203 @ 4400)
Automatic Transaxle		A541E; 4–Speed	←
Brakes	Front	Ventilated Disc	←
	Rear	Solid Disc	←
Suspension		4–Wheel MacPherson	←
Steering	Gear Type	Rack and Pinion	←
	Power Steering	Engine Revolution Sensing Type	Vehicle Speed Sensing Hydraulic Reaction Type Electronically Controlled PPS*

*: PPS (Progressive Power Steering)

ENGINE

ENGINE LINE-UP

The 1MZ-FE engine adopted in the ES300 is a V6, 3.0-liter, 24-valve, DOHC engine.

Engine Type	Displace-ment	Max. Output [SAE-NET]	Max. Torque [SAE-NET]	Features
1MZ-FE	3.0 ℓ	149 kW @ 5200 rpm (200 HP @ 5200 rpm)	290 N m @ 4400 rpm (214 ft lbf @ 4400 rpm)	The engine performance has been improved with the adoption of a 2-way exhaust control system.

° 1MZ-FE ENGINE

The 1MZ-FE engine is basically the same as the 1MZ-FE engine of the previous model.
However, its engine performance has been improved with the modification of each engine portion and the adoption of a 2-way exhaust control system and its exhaust emissions have been reduced with the adoption of the fuel returnless system and with a change in the EGR control system.

CHASSIS

The new ES300 chassis provides outstanding steering stability and is built and laid out basically the same as the previous model. However its excellent drivability and comfort are further achieved through the improvement of various components, also excellent stability is realized.

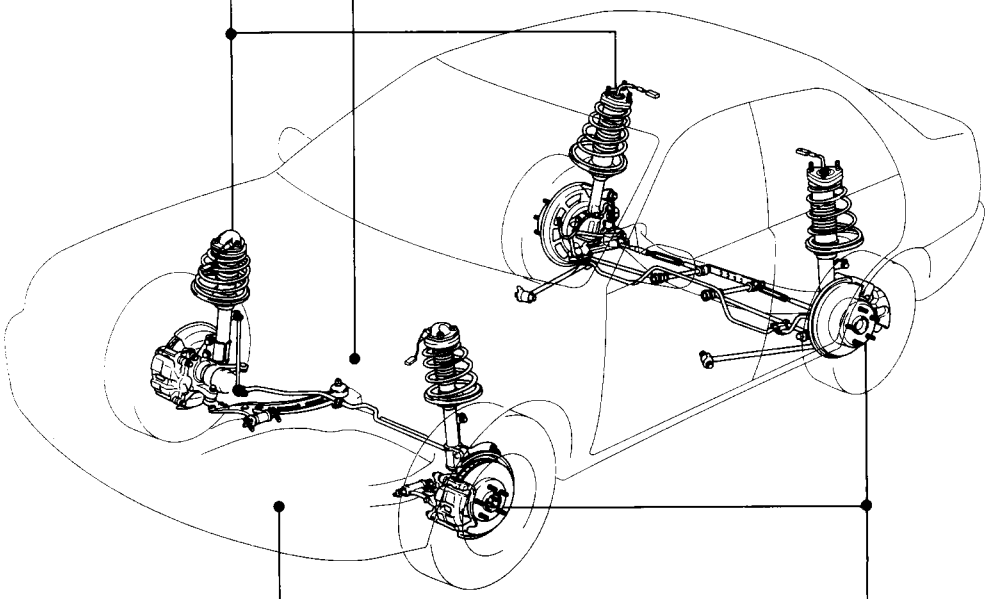
MAJOR COMPONENTS

Suspension

- MacPherson strut independent suspension is used for all 4 wheels. The L-shaped lower arm type is used in the front and a dual link type is used in the rear.
- Electric modulated suspension is available as an option.

Steering

Engine revolution sensing type rack and pinion power steering is used.



Transaxle

4-speed ECT (Electronically Controlled Transaxle with an intelligent control system) A541E automatic transaxle is used.

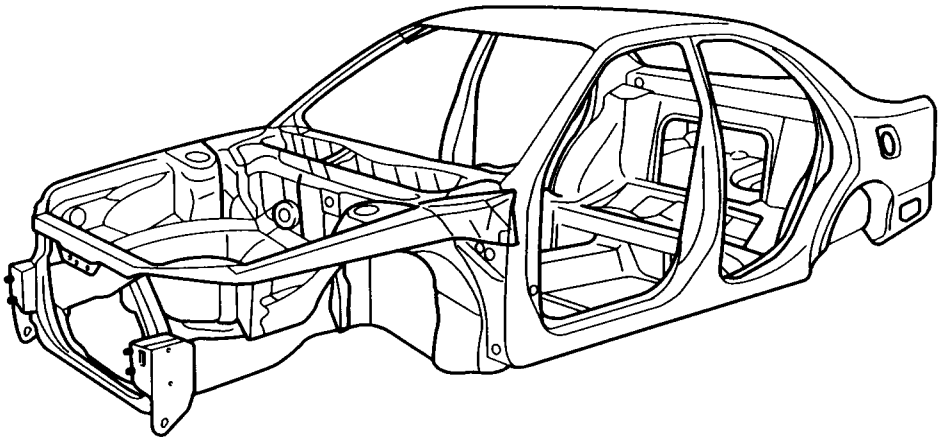
Brakes

- 4-wheel disc brakes are used. The front disc brakes are the ventilated type.
- The ABS is available as standard equipment on all models.
- The TRAC (Traction Control) system is available as an option for U.S.A. It is standard equipment for Canada.

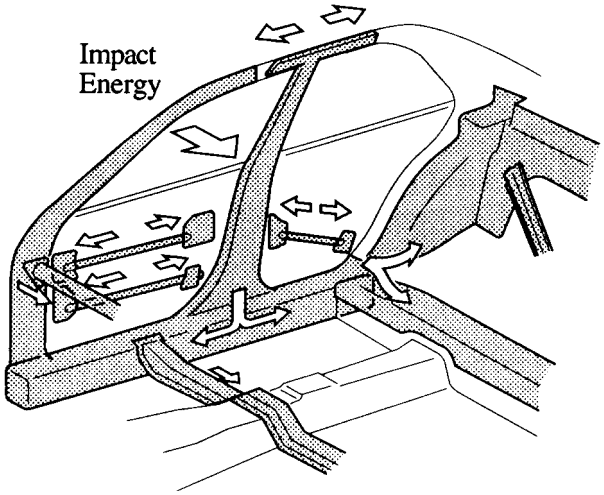
BODY

A crash impact absorbing structure for side collisions is adopted in addition to that for frontal and, rear collisions. The body is made highly rigid and lightweight through the optimized allocation of materials and the generous application of high-strength sheet steel, etc. Furthermore, the vehicle creates less noise and vibration through the use of advanced noise insulation technology, and the application of anti-corrosion sheet steel produces a highly rest-resistant body.

▶ Body Shell ◀



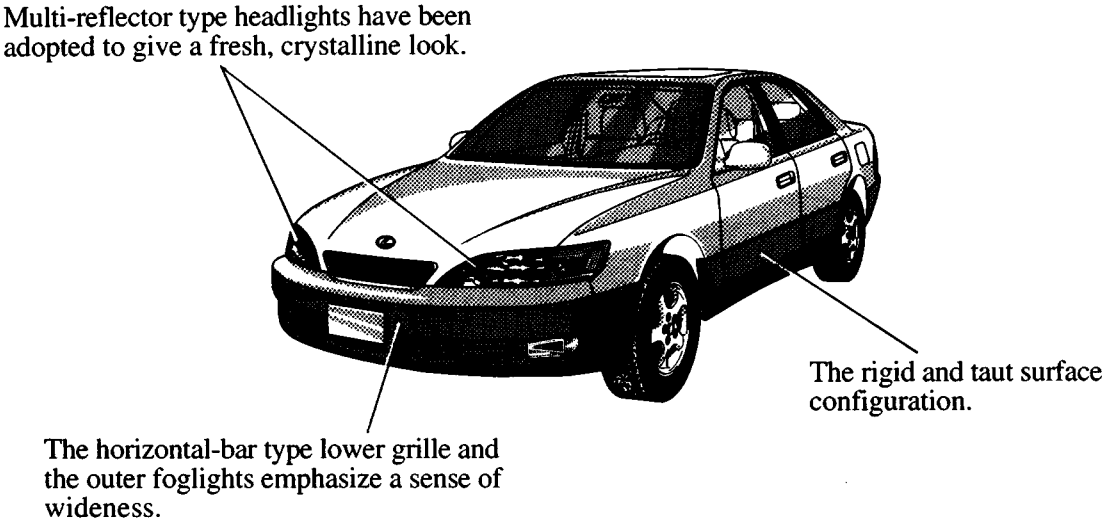
▶ Impact Absorbing Structure for Side Collision ◀

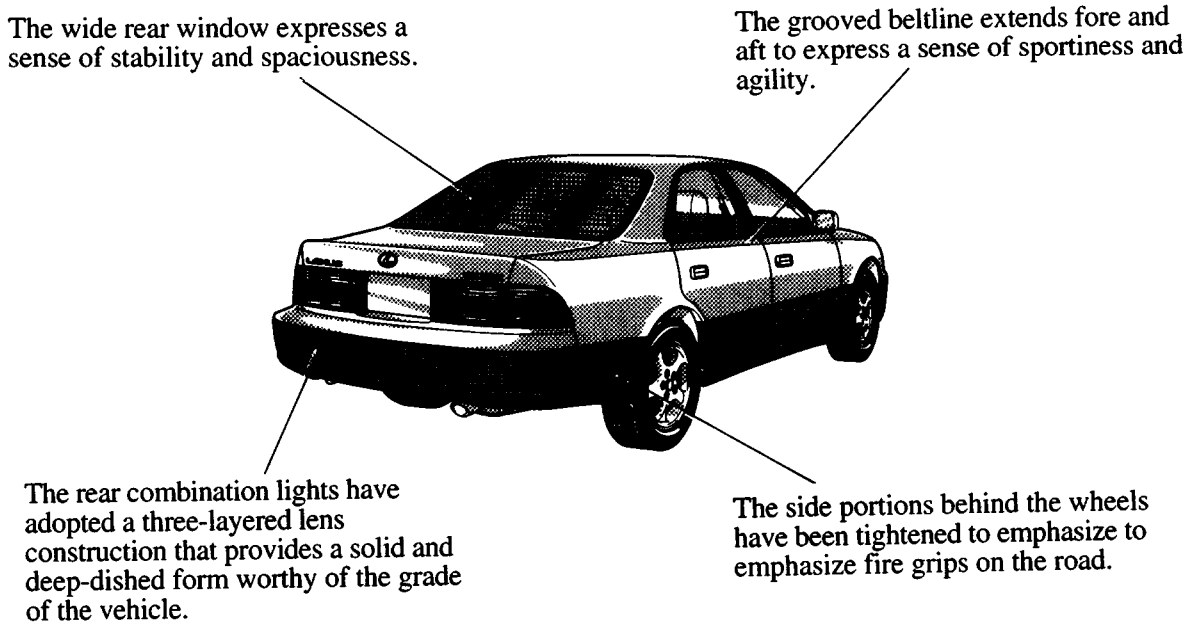


EXTERIOR

STYLING

The exterior styling pursues very ES300-1ike elegance and sportiness while expressing luxury in every detail. In addition to featuring the next-generation, sharp and rigid form, the new ES300 provides a longer wheelbase and a cab-forward configuration, thus realizing an exterior design that will carry the ES300 into the 21st century.



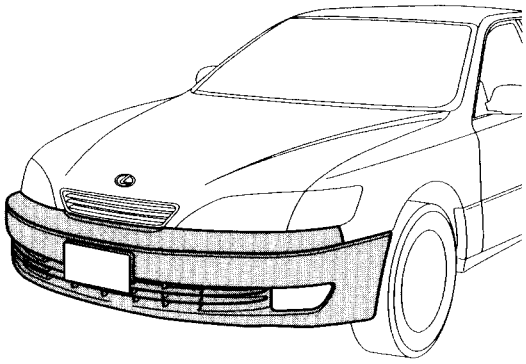


EXTERIOR

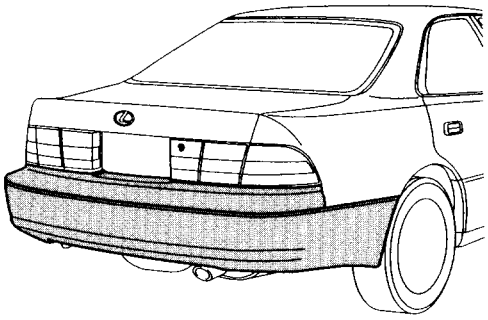
EXTERIOR EQUIPMENT

◦ BUMPER

The Super Olefin Polymer, a material that is light, scratch resistant and highly recyclable, has been adopted in the front and rear bumpers.



Front



Rear

◦ LIGHTS

1. Front Lights

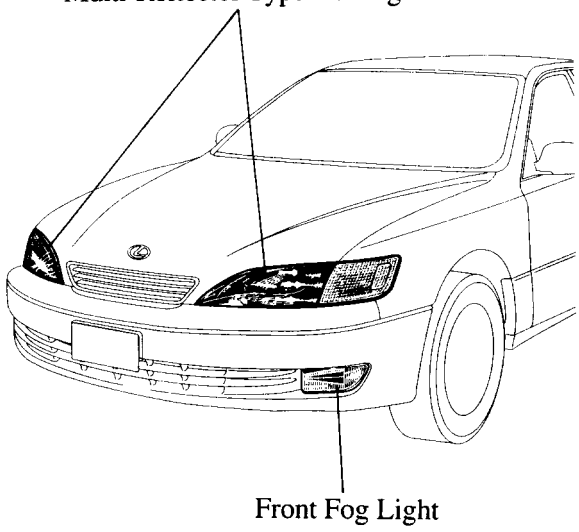
Four-light multi-reflector type headlights are used. The low beams use H7 bulbs that emit light that resembles natural light, thus providing excellent night-time visibility.

The front fog lights are standard equipment for all model.

The automatic light control system and the auto turn-off system are standard equipment for all model.

The daytime running light system is standard equipment on models for Canada.

Multi-Reflector Type Headlight



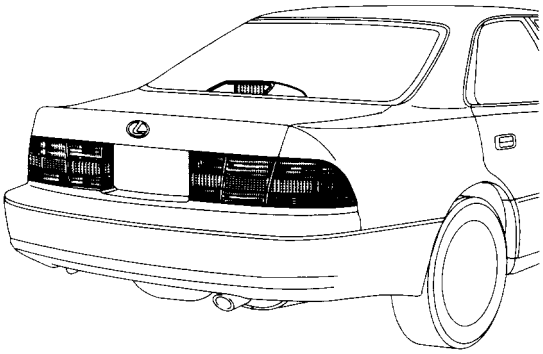
Front Fog Light

EXTERIOR

2. Rear Lights

Vertically laid out rear combination lights that incorporate side marker lights have been adopted.

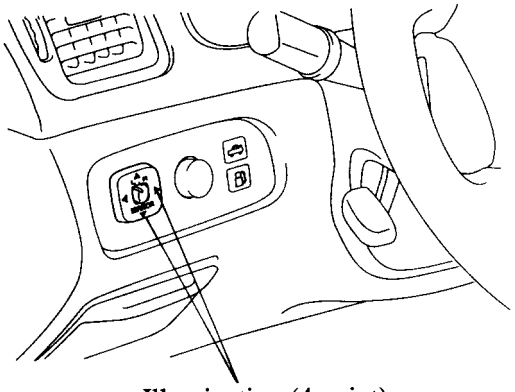
The high-mounted stop light is provided with a heating element of the rear window defogger. This prevents the deterioration of the visibility of the high-mounted stop light due to the fog or to snow on the glass.



◦ OUTSIDE REAR VIEW MIRRORS

Electrical remote-control mirrors are standard equipment and so are the mirror heaters.

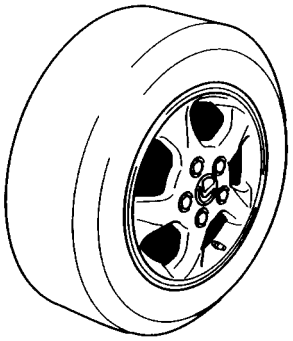
The control switch is provided with illumination to improve its ease of use at night.



Illumination (4 point)

◦ DISC WHEEL

15-inch 6JJ size, ultra-class chrome plated aluminum alloy disc wheels are optional equipment.



EXTERIOR

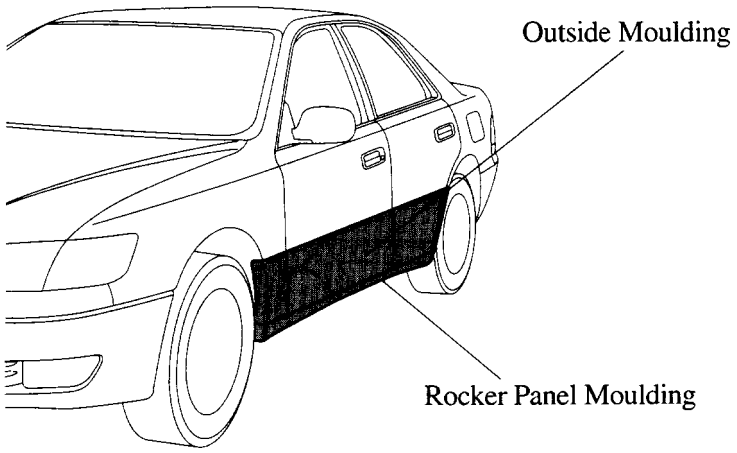
◦ MOON ROOF

A power tilt-up and sliding moon roof is optional equipment. A one-touch slide-open function is added.

◦ OUTSIDE MOULDING

In addition to the conventional outside moulding, a rocker panel moulding that improves the chip resistance and the vehicle's appearance has been adopted.

Both the outside moulding and rocker panel moulding are made of lightweight, scratch-resistant and highly recyclable super olefin polymer material.



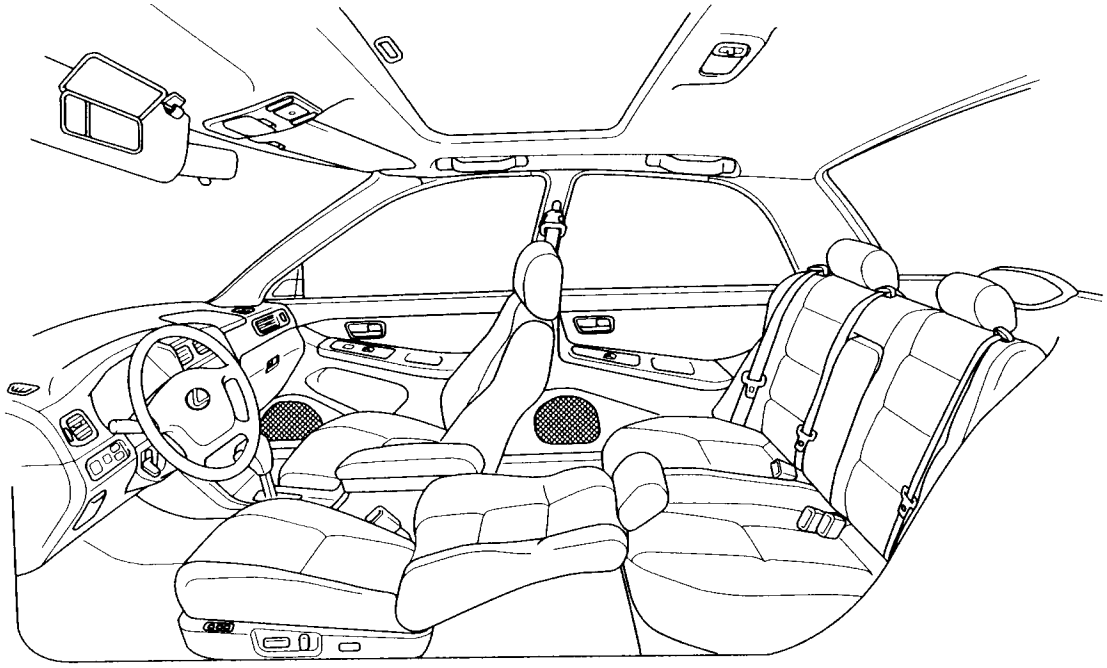
◦ WINDSHIELD GLASS AND WINDOW GLASS

The front windshield, the rear window, and all door windows use the type of glass that dramatically shuts out ultraviolet and infrared rays. As a result, sunburns from ultraviolet rays and heat from infrared rays have been reduced, and reduction of heat load of the air conditioning system.

INTERIOR

CABIN

Through the use of two-tone configuration that extends through the console, instrument panel, and the door trims, the new ES300's cabin provides a sporty yet luxurious space.



INTERIOR

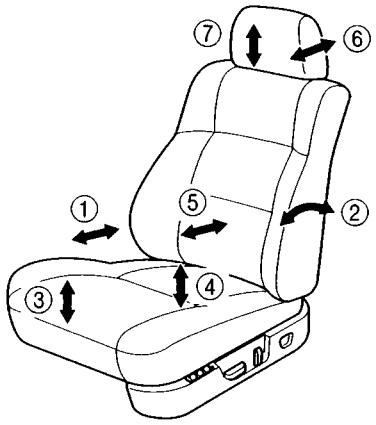
◦ SEATS

1. Front Seat

Power seats are standard equipment for the front seats. These seats include the following adjustment controls.

●: Power ○: Manual

Adjustment Function		Driver	Passenger
①	Fore-and-Aft Slide	●	●
②	Reclining	●	●
③	Front Vertical Height	●	●
④	Rear Vertical Height	●	●
⑤	Lumbar Support	●	—
⑥	Headrest Fore-and-Aft Adjustment	○	○
⑦	Headrest Height	○	○



Driver's Seat

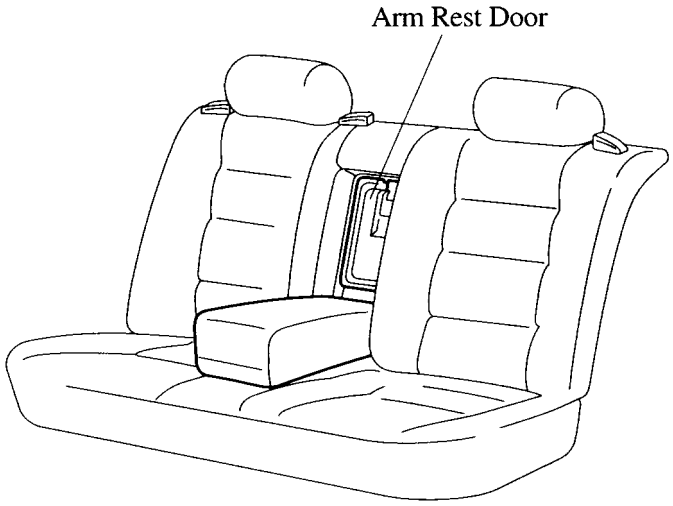
If the vehicle is equipped with the leather seat option, a memory system is provided for the driver's seat. This system adjusts the seat to a previously set position with a one-touch operation.

Front seat with seat heaters are an option for all models.

2. Rear Seat

The fixed type rear seat with arm rest is standard equipment.

Arm rest doors are provided for versatile access to the luggage compartment.



INTERIOR

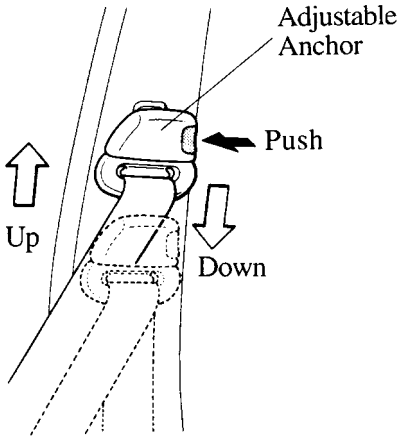
◦ SEAT BELTS

1. Front Seat Belts

3-point ELR (Emergency Locking Retractor) seat belts are provided. The passenger seat is additionally provided with an ALR (Auto-Locking Retractor) mechanism.

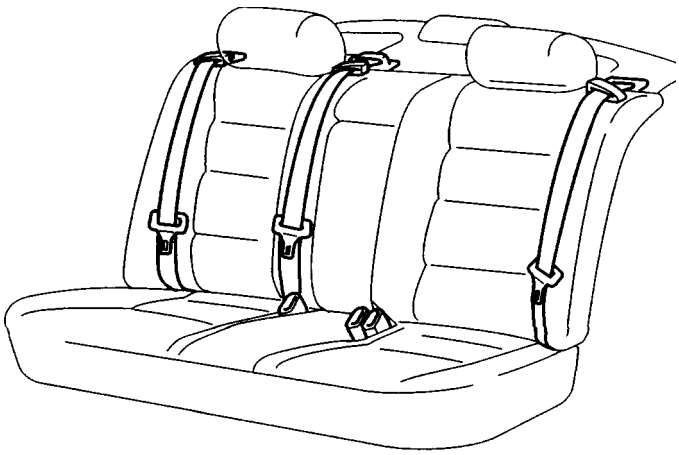
An adjustable shoulder belt anchor is provided on all models.

A seat belt pretensioner is provided on all models.



2. Rear Seat Belts

In addition to those on the outer seats, a 3-point ELR with ALR seat belt is provided for the center seat.



INTERIOR

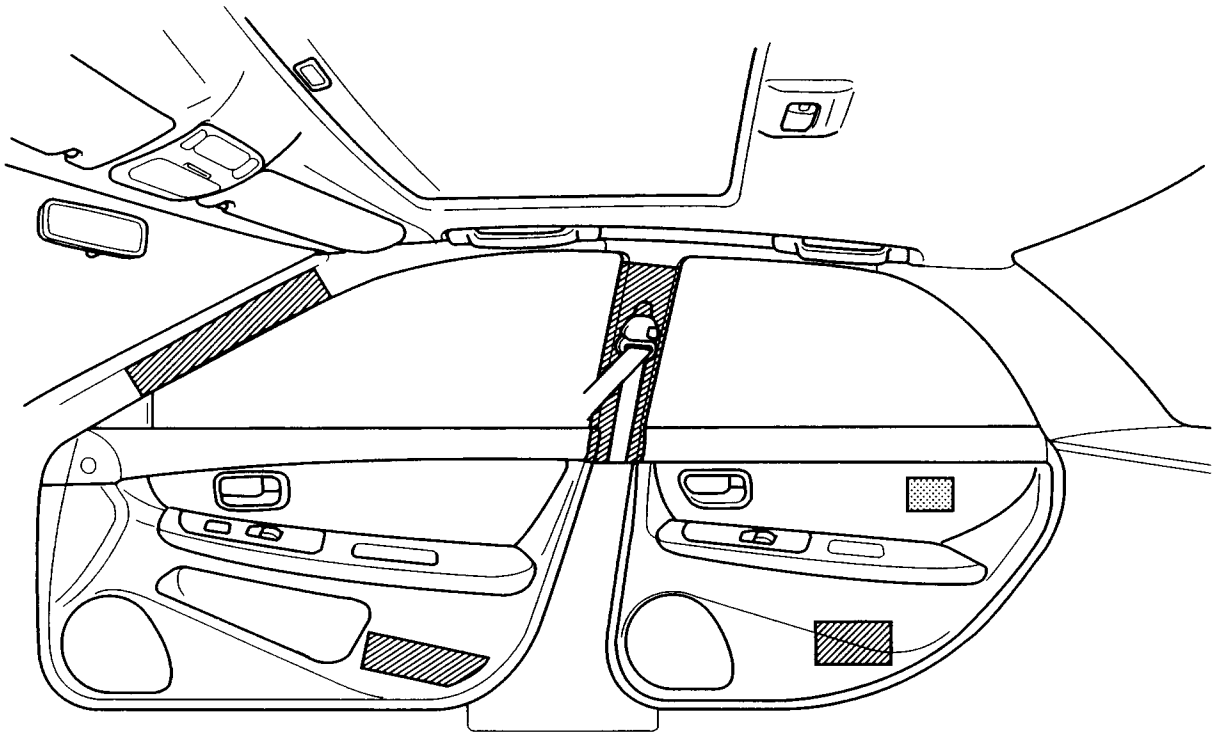
° TRIM AND GARNISH

The door trim design is adapted to the side collision impact absorbing structure. Impact energy absorbing ribs and high impact absorbing material are used at the inside of door trim.

The front pillar garnish and the center pillar garnish provide an impact-absorbing structure consisting of internal ribs that dampen the impact.

: **Impact Absorbing Rib**

: **Impact Absorbing Material**

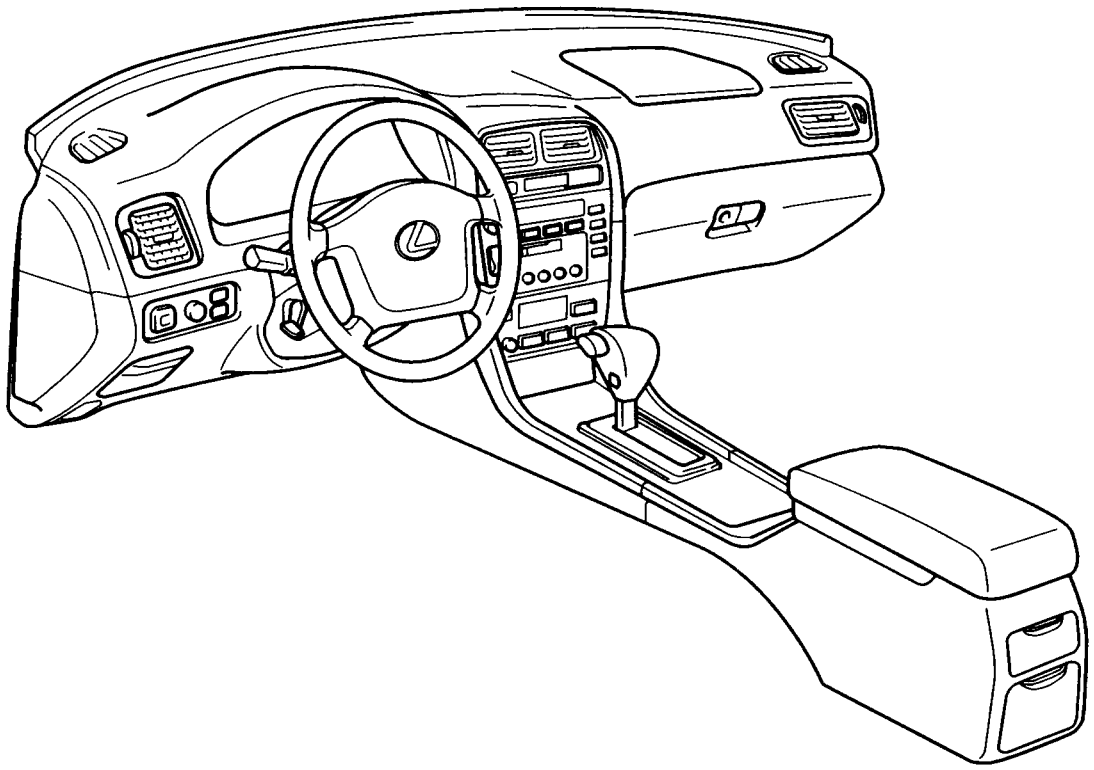


INTERIOR

INSTRUMENT PANEL, SWITCH LAYOUT AND EQUIPMENT

A two-tone parting line is used to give the upper portion a sense of agility and freedom, and the lower portion a sense of snugness and lower center of gravity.

The switches, the audio system, and the heater control panel are functionally laid out, thus improving their eases of use.



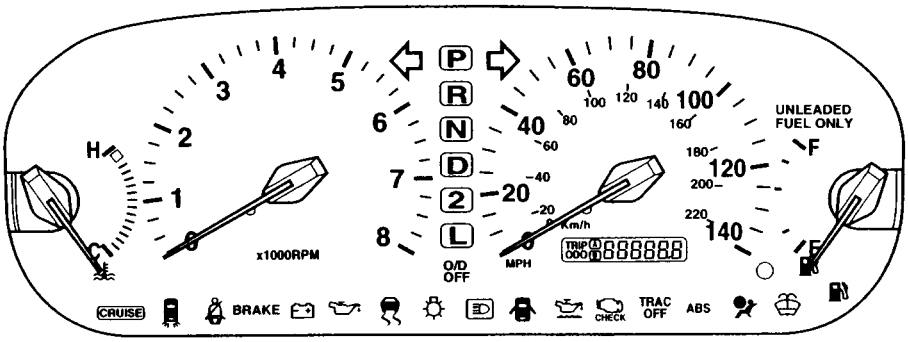
INTERIOR

◦ COMBINATION METER

An electronic analog meter with superb visibility and high-tech appearance is used as well as in the LS400.

When the ignition switch is off, the meter panel is fully blacked out, giving a strong high-tech impression and a remote image from ordinary analog meters.

An electronic twin-trip meter and an electronic odometer are used for convenience and good visibility.



Models for U.S.A.

◦ AIR CONDITIONING

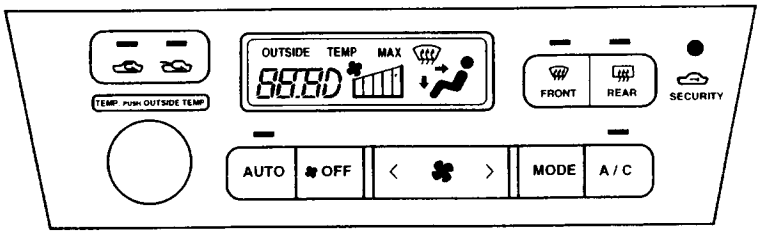
An ECU controlled automatic air conditioning system which has sufficient heating and cooling capacity as well as low fan noise is used.

The control panel is an easy-to-use dial and push button type panel.

The temperature and air flow status, etc. are displayed in the center of the air conditioner control panel, making adjustment and checking easy.

An outside temperature display function is provided.

The air conditioner ECU has a self-diagnosis function to increase serviceability.



Control Panel

INTERIOR

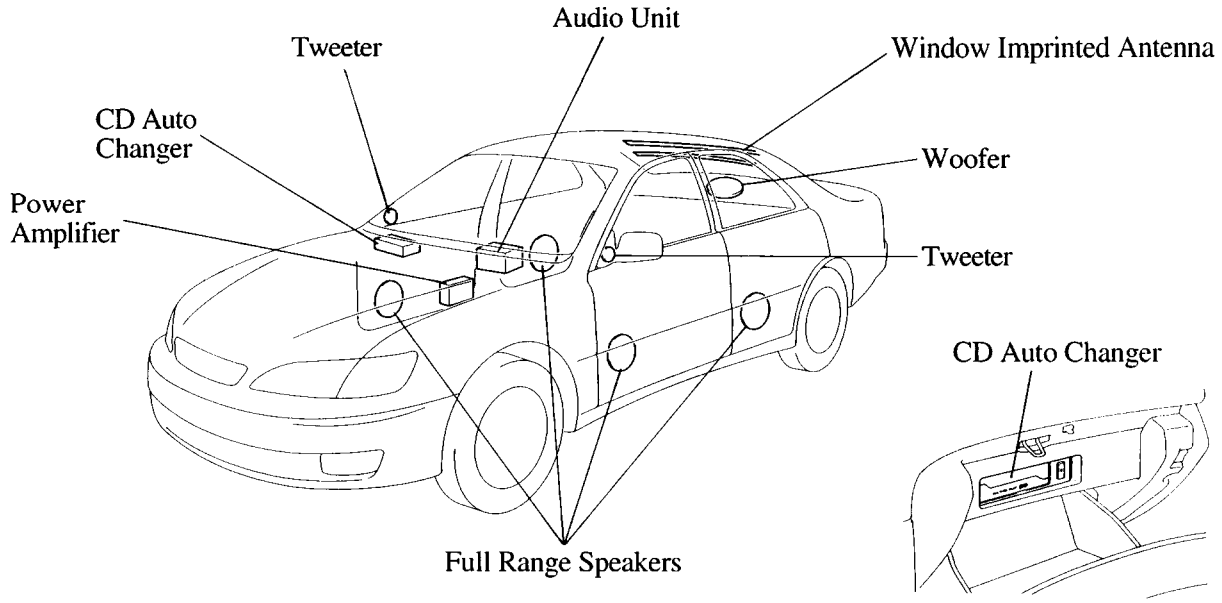
° AUDIO SYSTEM

An AM/FM multiplex ETR (Electronic Turning Radio) with cassette deck is standard, and a CD (Compact Disc) player with an automatic changer is available as an option. This CD auto changer is built into the glove box and accommodates 6 discs at the same time.

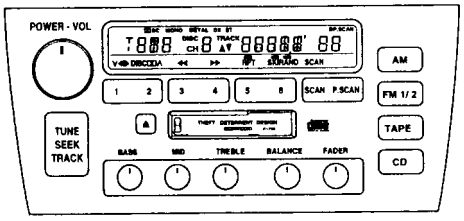
A 7-speaker system provides high quality sound across all ranges.

A diversity rear window imprinted antenna system is provided.

▶ Layout of Audio System ◀



▶ Specifications ◀

Components	Specifications
Audio Unit	● AM/FM ETR with Cassette Deck and CD Auto Changer (OPT) ● Separate Power Amplifier 
CD Auto Changer	● Takes up to 6 Compact Discs. ● Use 12 cm (4.7 in.) discs only.
Power Amplifier	● 35W (Max.) x 2 Channel (For Front Speakers) ● 35W (Max.) x 2 Channel (For Rear Speakers) ● 55W (Max.) x 1 Channel (For Woofer)
Full Range Speaker	● Fr: 160 mm (6.3 in.), 35W, 2 Pieces ● Rr: 140 mm (5.5 in.), 35W, 2 Pieces.
Tweeter	● 13 mm (0.5 in.), 35W, 2 Pieces
Woofer	● 200 mm (7.9 in.) with Box, 60W, 1 Piece

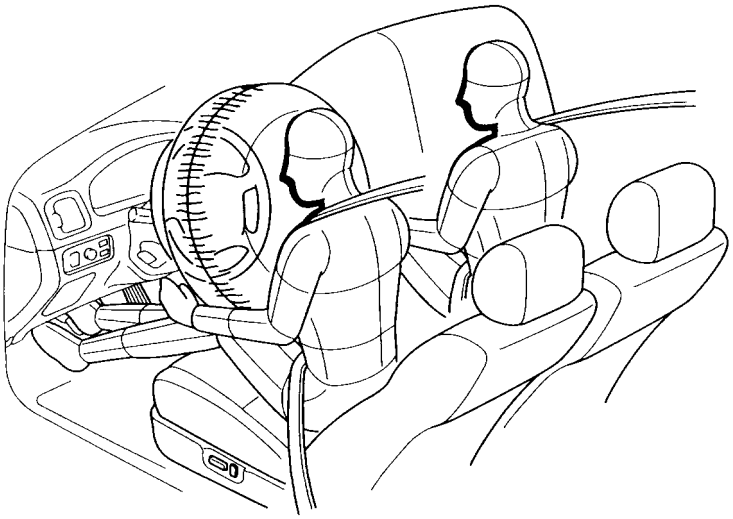
INTERIOR

° SRS AIRBAG AND SEAT BELT PRETENSIONER

As standard equipment, there is an SRS airbag and seat belt pretensioner for the driver and the front passenger.

This is a supplemental restraint system which activates in the event of a frontal collision, if the shock is higher than a predetermined value. The airbags help to protect the head and chest from secondary impacts and injuries.

The pretensioners take the emergency locking concept one step further. When they sense the impact of severe frontal collision, they instantly rewind the seat belt.



° TILT STEERING

The tilt steering is standard on all models.

The steering wheel position can be changed to any of 6 positions.

° POWER WINDOW SYSTEM

A power window system is standard equipment. The power window system includes one-touch auto down and key-off operation functions. The one-touch auto down function automatically opens the driver’s side window fully. The key-off operation function makes it possible to operate the power windows for approximately 45 seconds after the ignition key is turned to the ACC or LOCK position, if the front doors are not opened.

INTERIOR

◦ DOOR LOCK CONTROL SYSTEM

The door lock control system with 2-step unlock function is standard equipment. With the 2-step function, turning the key once in the driver's door unlocks the driver's door only. Turning it twice unlocks all the doors.

A key confinement prevention function is provided. When the door is opened and the door lock button is locked with the key still inserted in the ignition key cylinder, the key confinement prevention mechanism immediately turns the door lock button to UNLOCK. This prevents the key from being inadvertently locked inside the vehicle.

◦ WIRELESS DOOR LOCK REMOTE CONTROL SYSTEM

The multi-function type wireless door lock remote control system is standard equipment. With the wireless door lock remote control system, all the doors can be locked and unlocked by signals emitted by the transmitter.

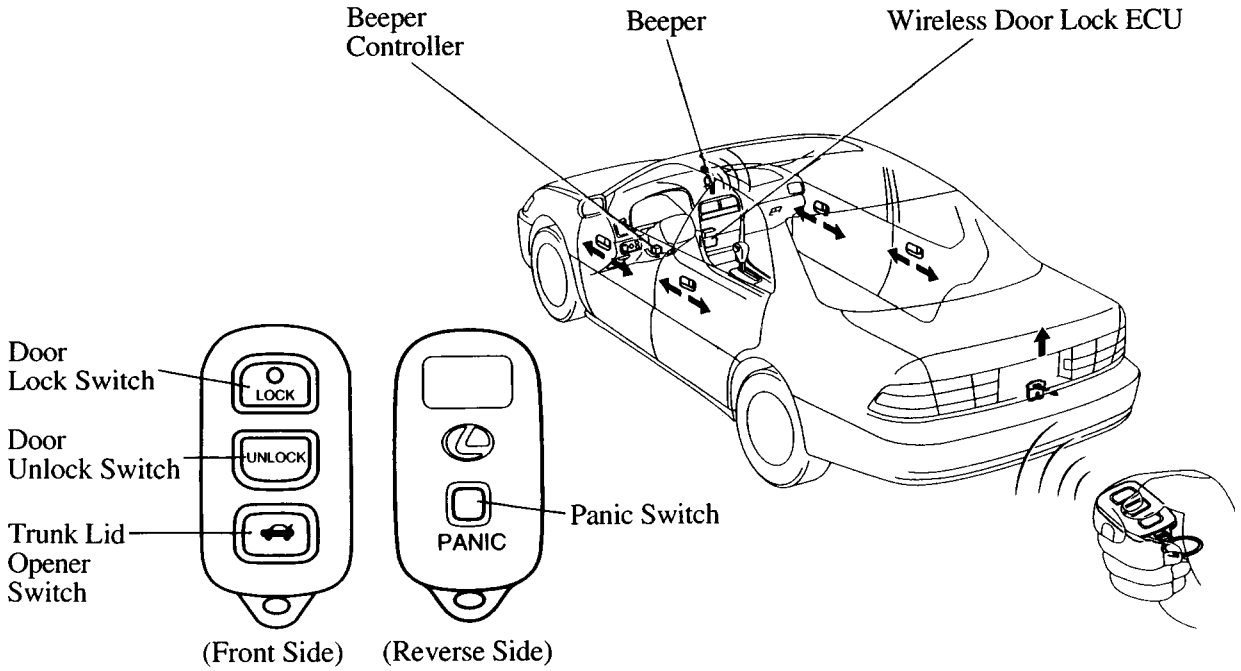
A 2-step unlock function is provided. When the unlock switch of the transmitter is pressed once, only the driver's door is unlocked. When it is pressed twice, all the doors are unlocked.

A trunk lid opener function is provided. The trunk lid can be opened by pressing the trunk lid opener switch of the transmitter.

Operation verification light and beeper function is provided. This makes it possible to check the operating condition of the wireless door lock from the outside of the vehicle.

A panic switch is provided in the transmitter to force the theft deterrent system siren to operate.

A wireless door lock ECU with EEPROM (Electrical Erasable Programmable ROM) is used so that the transmitter recognition code can be easily reprogrammed.



Transmitter

INTERIOR

° THEFT DETERRENT SYSTEM

A theft deterrent system is used to prevent vehicle theft. When the system is set, the horn, headlights and taillights operate if the door, hood or trunk is forcibly opened.

° ILLUMINATED ENTRY SYSTEM

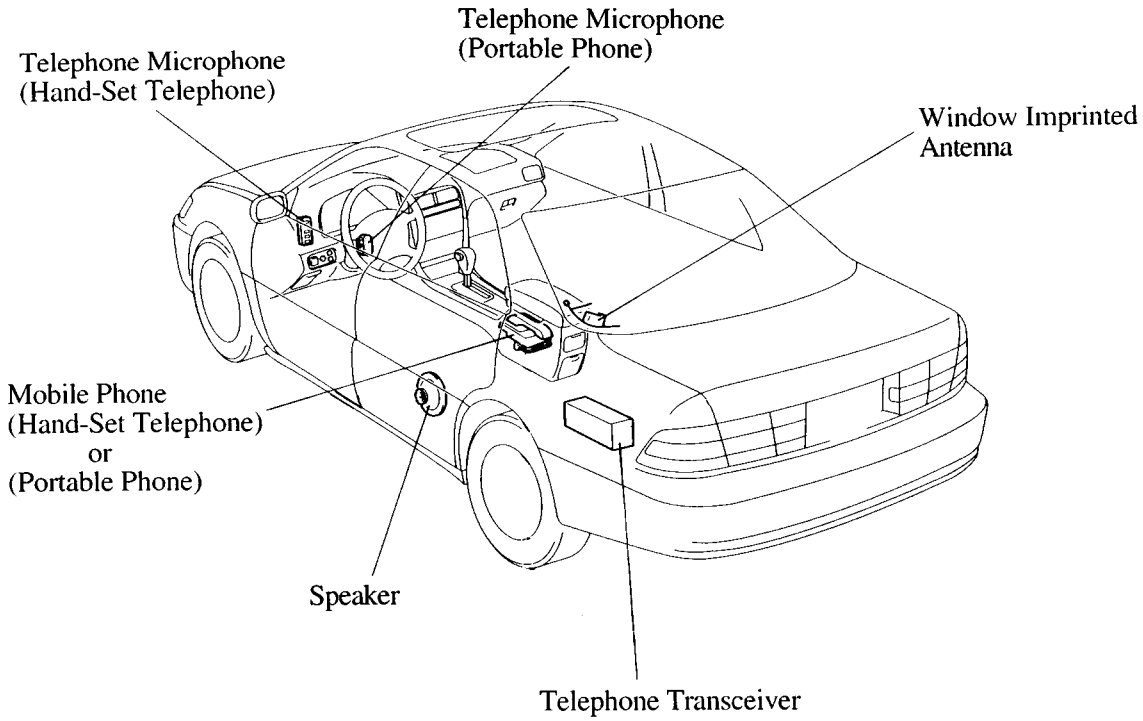
An illuminated entry system is standard equipment. This system makes it easy to let the ES300 in and out at night, etc.

The illuminated entry system turns on the dome light and ignition key illumination for 15 seconds after either door is closed when passengers am entering or leaving the vehicle. While these lights are on for 15 seconds, if the ignition switch is turned to the ACC or ON position, or if all doors am locked, the dome light and ignition key illumination go off immediately.

° CELLULAR MOBILE TELEPHONE

A cellular mobile telephone system is available as a dealer option. There are 2 types of operations to choose from; a hand-set telephone or a portable phone.

A mobile telephone antenna is imprinted on the rear window for improving looks and enhancing rear vision of rear field.



INTERIOR

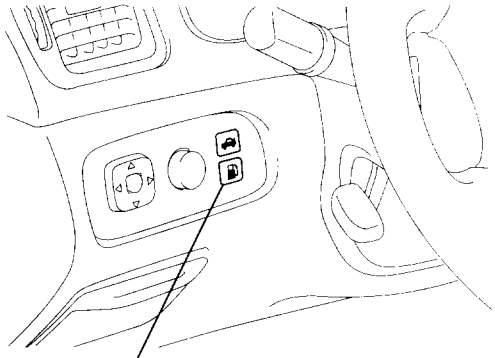
◦ KEY REMINDER SYSTEM

All vehicles have a key reminder system as standard equipment. When the ignition key is left inserted in the ignition key cylinder at ACC or LOCK position and the driver's door is opened, this system sounds a warning tone to remind the driver to remove the ignition key.

◦ ELECTRIC FUEL LID AND TRUNK OPENER

An electric fuel lid and trunk opener switch are located on the lower left part of the instrument panel.

A trunk opener cancel switch is provided in the glove box.



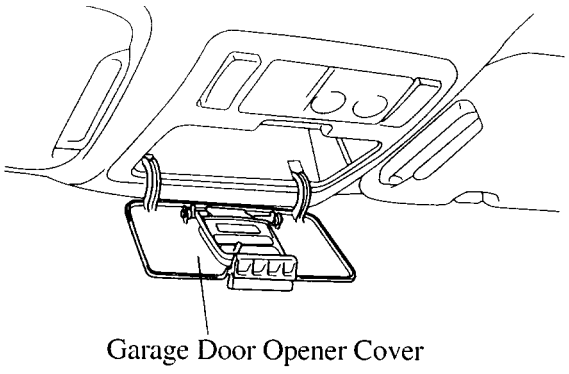
◦ CRUISE CONTROL SYSTEM

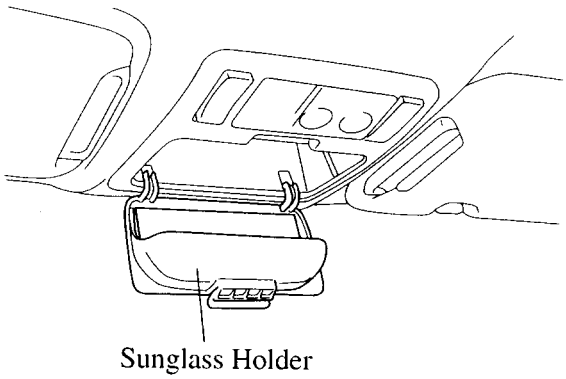
The cruise control system is standard equipment. The main switch and control switch are on a single lever, which is installed on the steering column and can be operated easily.

◦ OVERHEAD CONSOLE

An overhead console is provided in front of the map lamp to store a garage door opener transmitter. This console is constructed to enable the operation of a transmitter in its stored state.

Also, by changing its cover, the console can be used to store a pair of sunglasses.

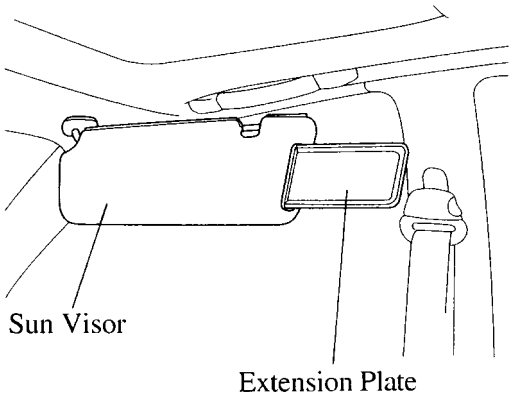




INTERIOR

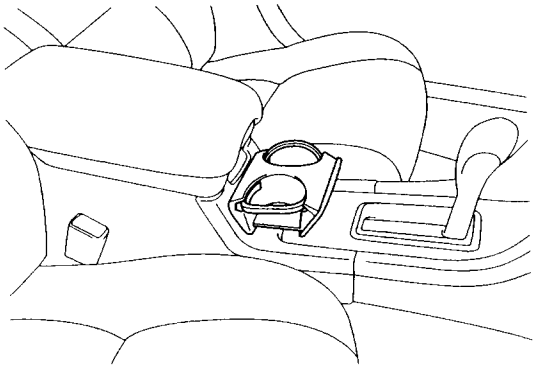
◦ SUN VISOR

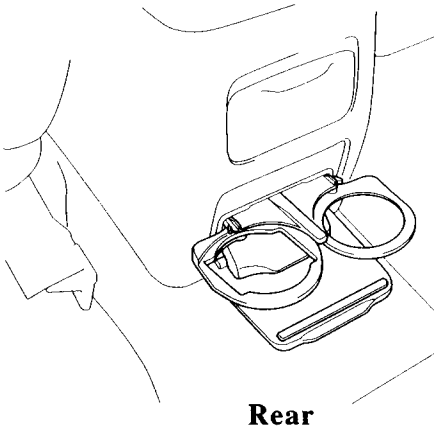
An extension plate has been added to reduce glare coming into the vehicle from the side.



◦ CUP HOLDER

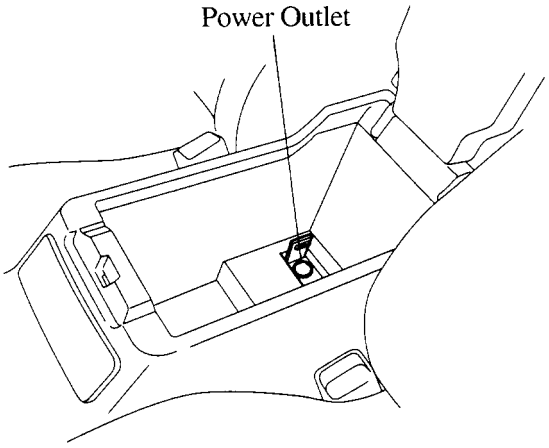
A push open type cup holder is located in the front of the rear console box. 2 cup holders for rear passenger are located in the rear of the rear console.


Front


Rear

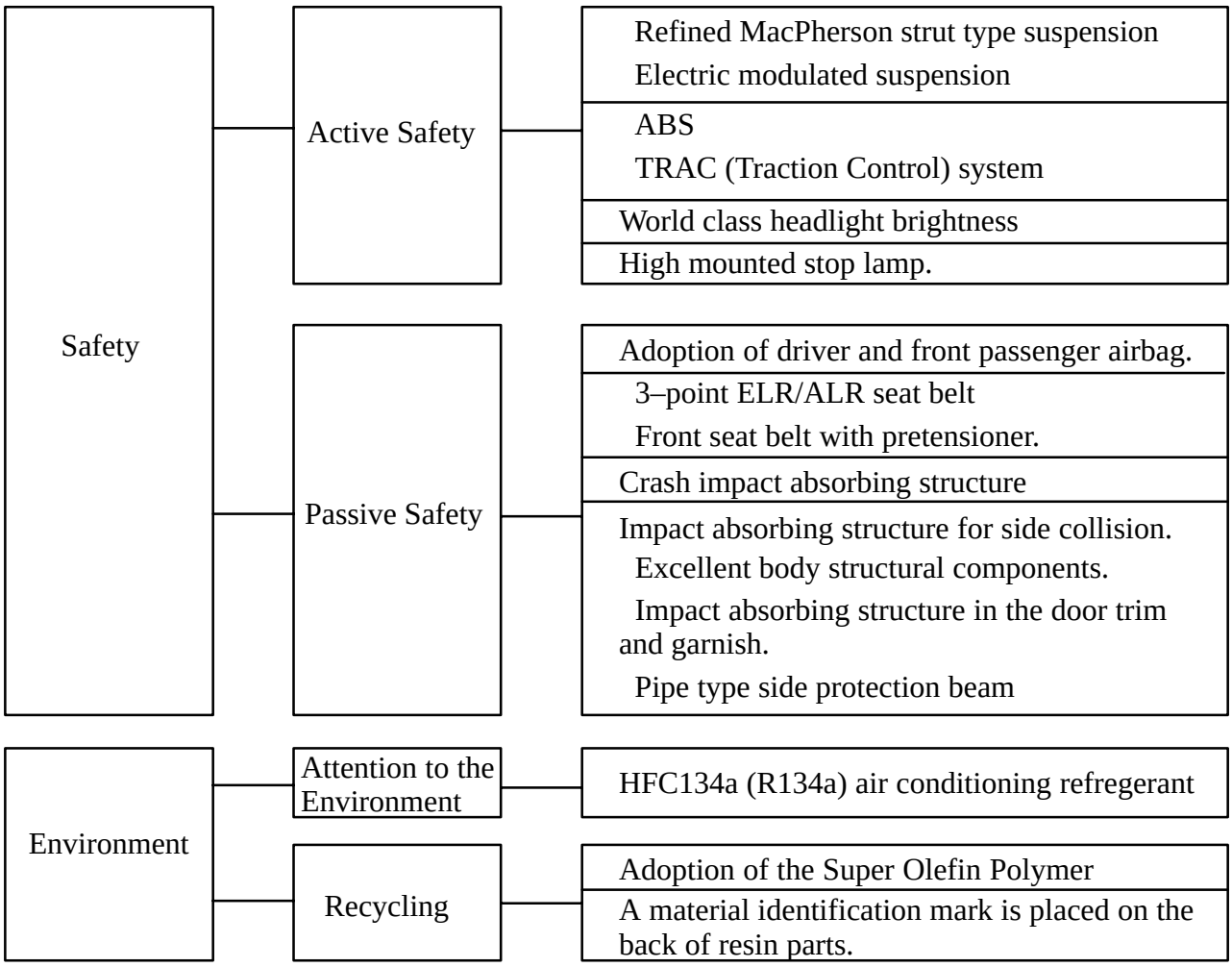
◦ POWER OUTLET

A power outlet is provided in the bottom of the console box. The power outlet can be used to supply power to various car accessories.



SAFETY AND ENVIRONMENT

A variety of safety and environmental measures are provided based on the theme of ”Gentle to People and the Environment”.



ENGINE

1MZ-FE ENGINE

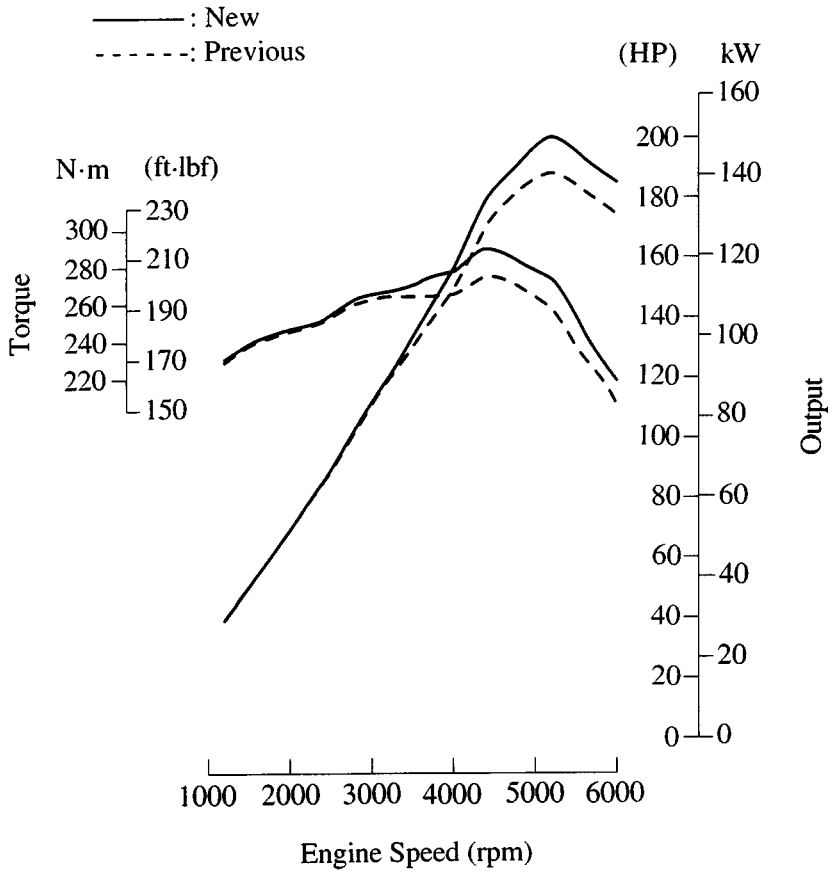
° DESCRIPTION

The performance of the 1MZ-FE engine has been improved through the adoption of the 2-way exhaust control system. In addition, its exhaust emissions have been reduced through the adoption of the fuel returnless system and the modification of the EGR control system.

° ENGINE SPECIFICATIONS AND PERFORMANCE CURVE

Engine 1MZ–FE Engine / Item			New	Previous
No. of Cyls. & Arrangement			6–Cylinder, V Type	←
Valve Mechanism			24–Valve DOHC, Belt & Gear Drive	←
Combustion Chamber			Pentroof Type	←
Manifolds			Cross–Flow	←
Fuel System			SFI	←
Displacement cm^3 (cu. in.)			2995 (182.7)	←
Bore x Stroke mm (in.)			87.5 x 83.0 x (3.44 x 3.27)	←
Compression Ratio			10.5 : 1	←
Max. Output [SAE–NET]			149 kW @ 5200 (200HP @ 5200)	140 kW @ 5200 (188HP @ 5200)
Max. Torque [SAE–NET]			290 N·m @ 4400 rpm (214 ft·lbf @ 4400 rpm)	275 N·m @ 4400 rpm (203 ft·lbf @ 4400 rpm)
Valve Timing	Intake	Open	4°BTDC	←
		Closed	44°ABDC	←
	Exhuast	Open	46°BBDC	←
		Closed	2°ADTC	←
Fuel Octane Number RON			91 or Higher	←
Oil Grade			API SH EC–II, ILSAC or Better	←

Premium unleaded gasoline (96 RON) is used for the above specifications.



Premium unleaded gasoline is used for the above performance curve.

° MAJOR DIFFERENCES

Major differences between the new 1MZ-FE engine and previous engine are listed below.

Item	Outline
Cooling System	● An aluminum radiator core is used for weight reduction. ● An electric cooling fan has been adopted. The fan speed is controlled in 3 steps to improve cooling performance and reduce cooling fan noise.
Intake and Exhaust System	● A 2-way exhaust control system has been adopted to improve engine performance and to ensure an even quieter operation. ● Through the optimized allocation of the exhaust pipe supports, the number of supports has been reduced from 5 to 4, thus reducing the noise and vibration which are transmitted to the vehicle body.
Fuel System	A fuel returnless system has been adopted to prevent the internal temperature of the fuel tank from rising, and to reduce evaporative emissions.
Engine Mounting	The characteristics of the engine mounts, torque rod, and absorber have been optimized to reduce noise and vibration.
Engine Control System	● A communication circuit has been provided between the ECM and the ABS & TRAC ECU in conjunction with the adoption of the TRAC (Traction Control) system.* ● The fuel pressure control has been discontinued in conjunction with the adoption of the fuel returnless system. ● Instead of using the IDL signal input from the throttle position sensor, the ECM now uses the VTA signal to detect the completely closed state of the throttle valve. ● The power steering idle-up control has been changed from the system using an air control valve to the one using a pressure switch and an IAC valve. ● A new EGR system which uses a EGR valve position sensor is used. ● A communication method of the ECM and the hand-held tester has been changed from the SAEJ1962 to the ISO9141-2.

*: Applicable only to Vehicles Equipped with the TRAC system.

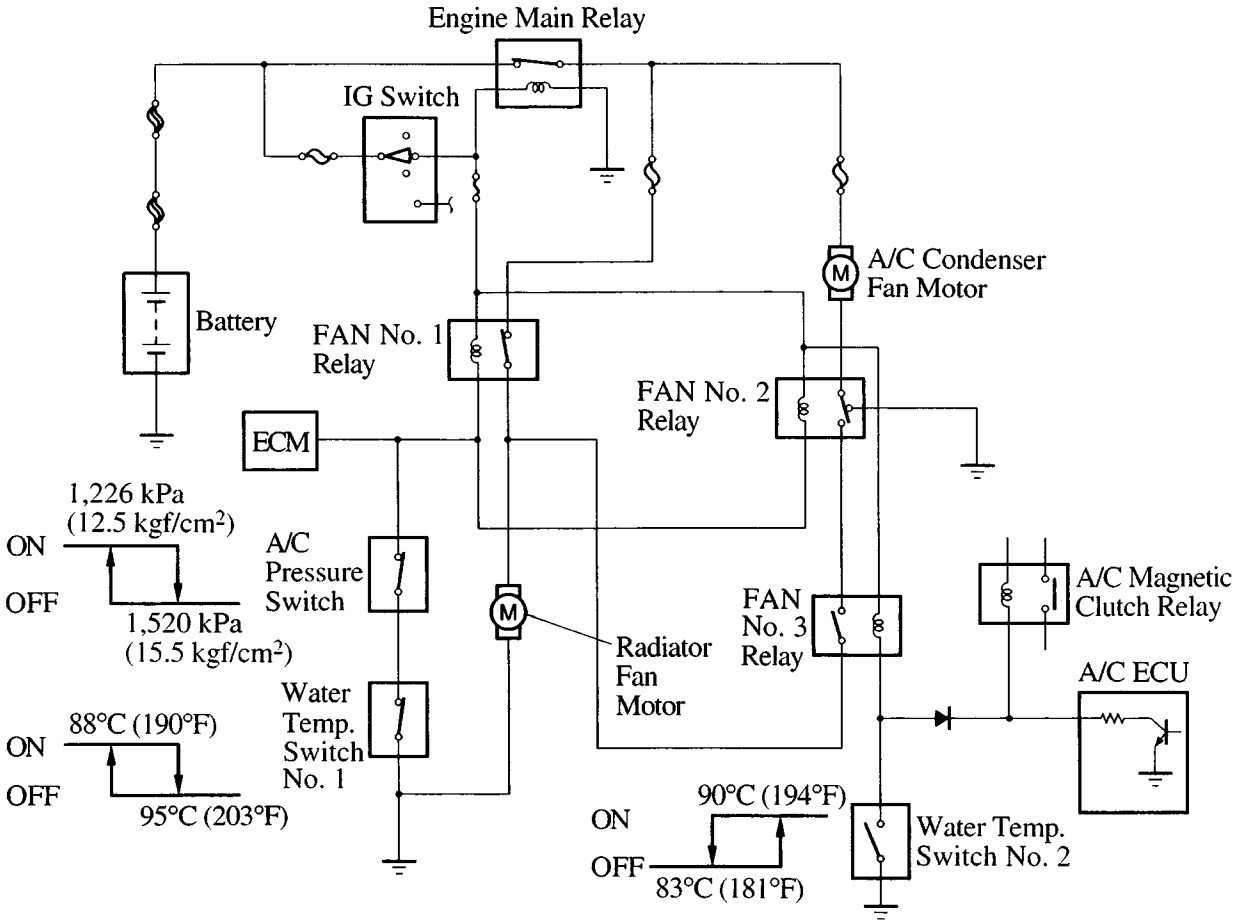
° COOLING SYSTEM

1. Cooling Fan System

The cooling system has been changed from the previous electronically controlled hydraulic cooling fan system to an electric cooling fan system.

The cooling fan controls the fan speed in 3 steps (OFF, Low, High) by using the 2 water temperature switches in accordance with the water temperature and the operating condition of the air conditioner and by turning the 3 fan relays ON and OFF and connecting 2 fan motors in a series or parallel circuit.

▶ Wiring Diagram ◀



▶ Cooling Fan Operation ◀

Water Temperatue		90°C (194°F) or lower	90°C (194°F) ~95°C (203°F)	95°C (203°F) or higher
Water Temperature Switch	No. 1	ON	ON	OFF
	No. 2	OFF	ON	ON
A/C Condition				
A/C OFF		OFF	LOW	HIGH
A/C ON	Pressure Switch ON	LOW	LOW	HIGH
	Pressure Switch OFF	HIGH	HIGH	HIGH

° INTAKE AND EXHAUST SYSTEM

1. 2-Way Exhaust Control System

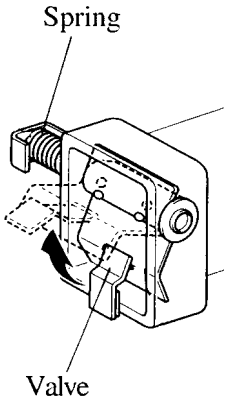
A 2-way exhaust control system is used. This system reduces the back pressure by opening and closing a variable valve that is enclosed in the main muffler, thus varying the exhaust gas passage.

The valve opens steplessly in accordance with the operating condition of the engine, thus enabling a quieter operation at lower engine speeds, and reducing back pressure at higher engine speeds.

Construction

1) Control Valve

The control valve is enclosed in the main muffler. When the exhaust gas pressure overcomes the spring pressure, the control valve opens steplessly in accordance with the exhaust gas pressure.



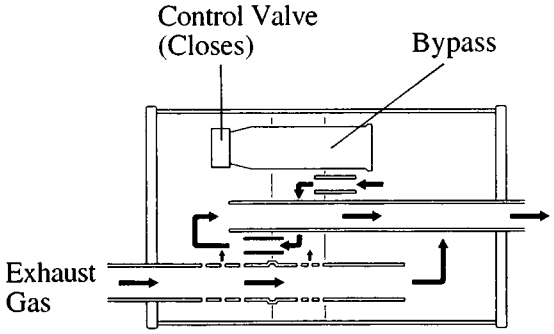
Operation

1) When Control Valve is Closed (low engine speed)

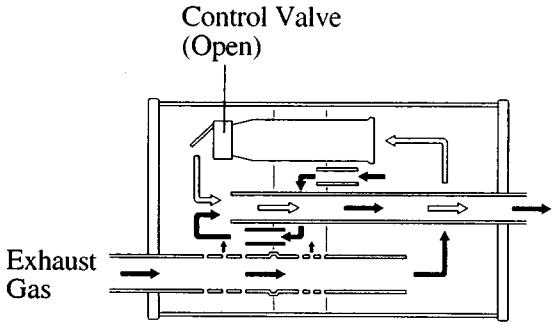
Since the pressure in the main muffler is low, the control valve is closed. Hence exhaust gas does not pass the bypass passage, and exhaust noise is decreased by the main muffler.

2) When Control Valve is Opened (middle to high engine speed)

The valve opens more as the engine speed and the back pressure in the muffler increase. This allows a large volume of exhaust gas to pass the bypass passage thereby substantially decreasing the back pressure.



Control Valve Closed

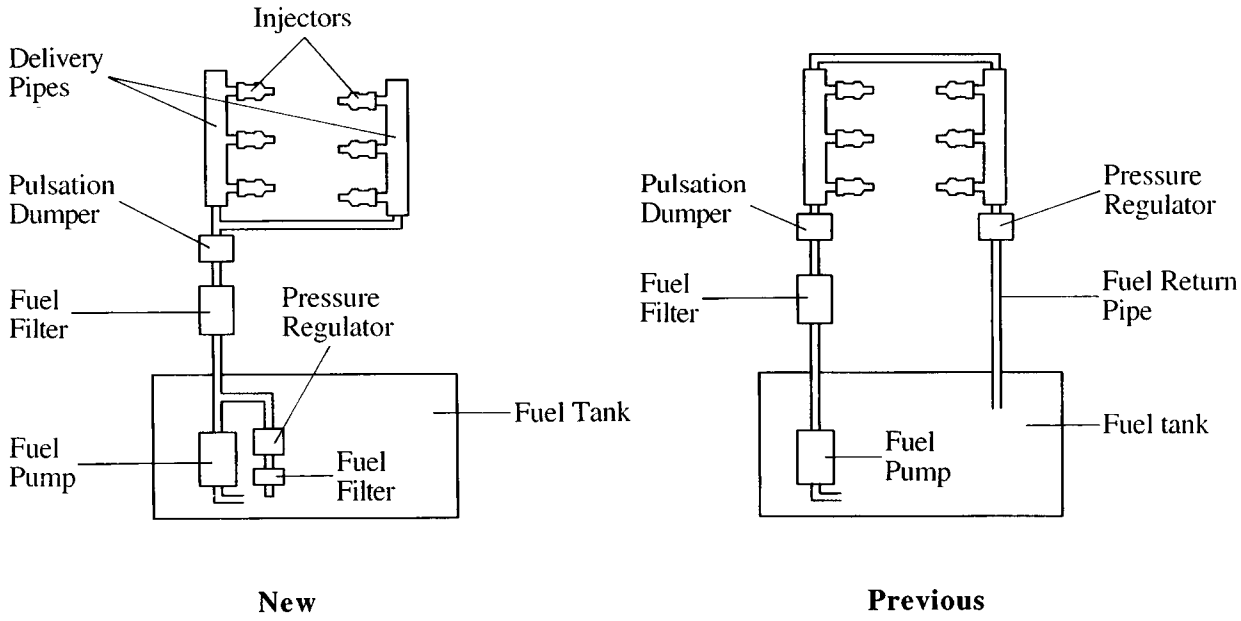


Control Valve Open

◦ FUEL SYSTEM

1. Fuel Returnless System

The new ES300 has adopted a fuel returnless system to reduce evaporative emissions. With the pressure regulator housed inside the fuel tank, this system eliminates the return of fuel from the engine area. This prevents the internal temperature of the fuel tank from rising, and reduces evaporative emissions.



◦ ENGINE MOUNTING

1. General

The internal orifice of the front mount has been modified to improve the tiding comfort and to ensure a quieter operation at idling.

The characteristics of the rear mount, left mount, torque rod, and absorber have been optimized.

° ENGINE CONTROL SYSTEM

1. General

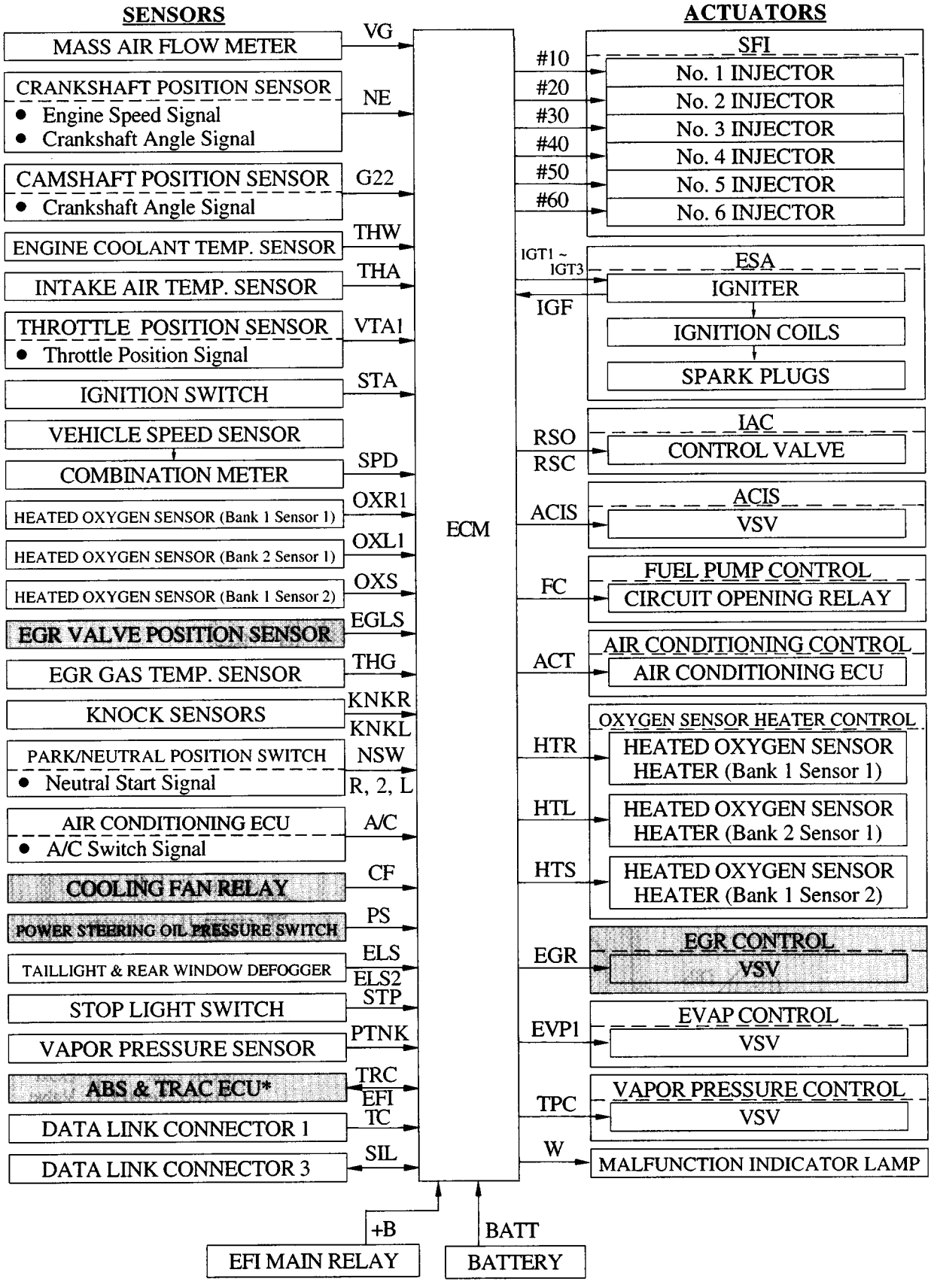
The engine control system of the new 1MZ-FE engine is basically the same in construction and operation as that of the previous 1MZ-FE engine. However, the fuel pressure control has been discontinued and the EGR control system has been changed.

The engine control system of the new 1MZ-FE engine and previous 1MZ-FE engine are compared below.

System	Outline	New	Previous
EFI (Sequential Multiport Fuel Injection)	An L-type SFI system directly detects the intake air mass with a hot wire type mass air flow meter.	○	○
	The fuel injection system is a sequential multiport fuel rejection system.	○	○
ESA (Electronic Spark Advance)	Ignition timing is determined by the ECM based on signals from various sensors. The ECM corrects ignition timing in response to engine knocking.	○	○
	2 knock sensors are used to improve knock detection.	○	○
	Torque control correction during gear shifting has been used to minimize the shift shock.	○	○
IAC (idle Air Control)	A rotary solenoid type IAC valve controls the fast idle and idle speeds.	○	○
ACIS (Acoustic Control Induction System)	The intake air passages are switched according to the engine speed and throttle valve angle to increase performance in all speed ranges.	○	○
Fuel Pressure Control	In hot engine conditions, the fuel pressure is increased to improve restartability.	—	○
Oxygen Sensor Heater Control	Maintains the temperature of the oxygen sensors at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.	○	○
EGR Cut-Off Control	Cuts off EGR according to the engine condition to maintain drivability of the vehicle and durability of the EGR components.	—	○
EGR Control	Uses the duty control type VSV and EGR valve position sensor, controlling the EGR volume in accordance with the engine condition.	○	—
Evaporative Emission Control	The ECM controls the purge flow of evaporative emissions (HC) in the charcoal canister in accordance with engine conditions.	○	○
Diagnosis	When the ECM detects a malfunction, the ECM diagnoses and memorizes the failed section.	○	○
	The diagnosis system includes a function that detects a malfunction in the evaporative emission control system.	○	○
Fail-Safe	When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in memory.	○	○

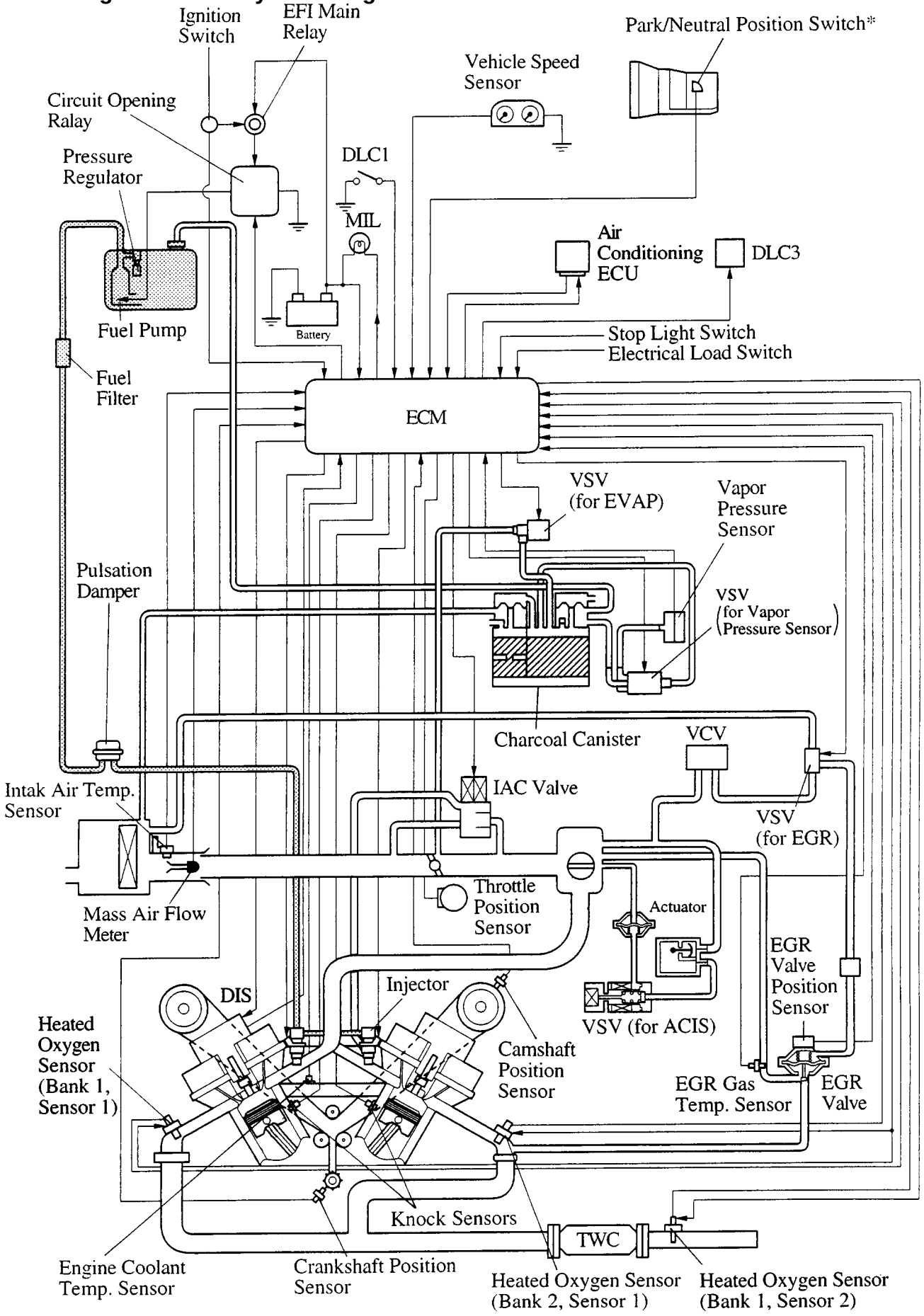
2. Construction

The configuration of the engine control system in the new 1MZ-FE engine is as shown in the following chart. Shaded portions differ from the previous 1MZ-FE engine.

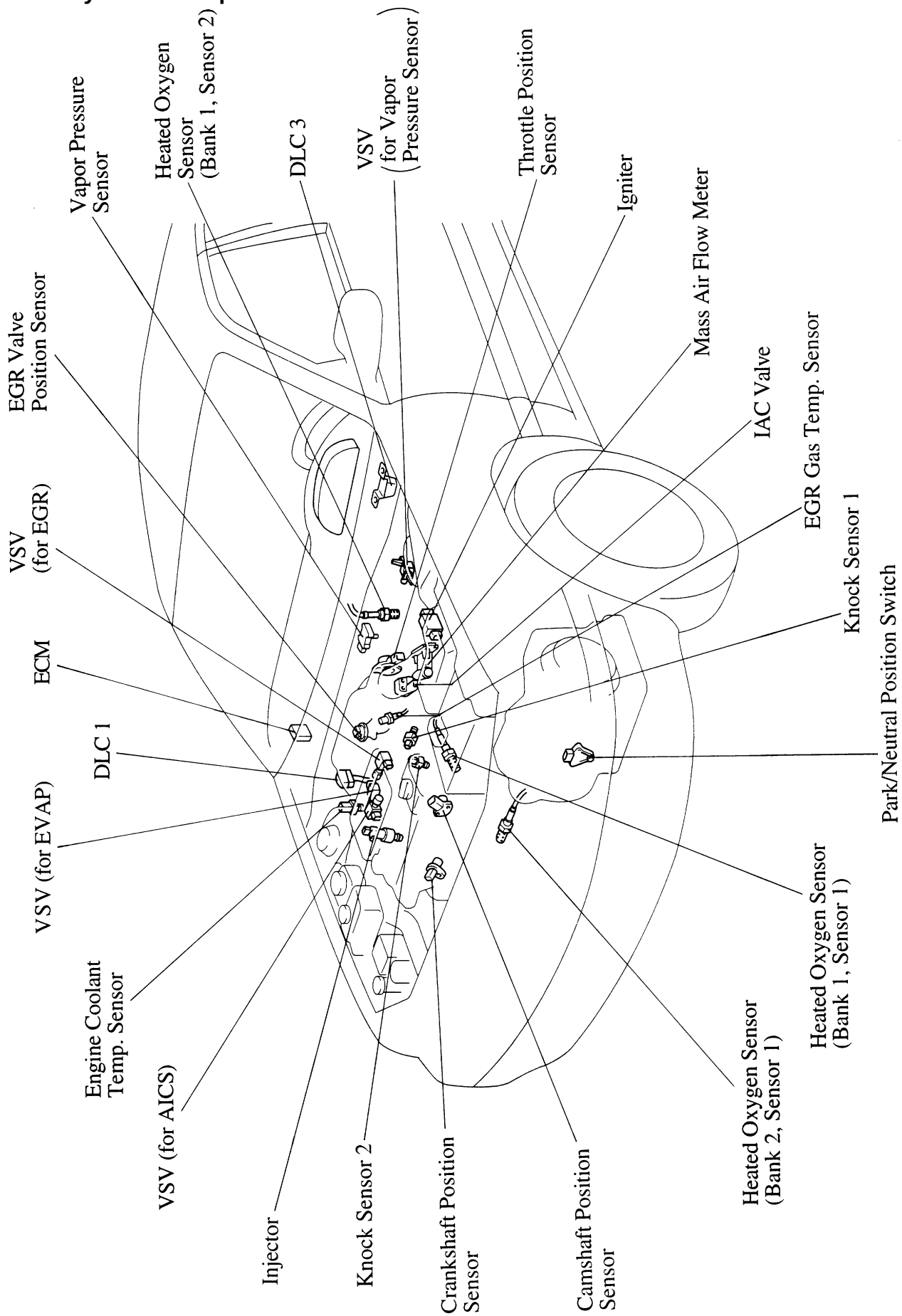


*: Applicable only to Vehicles Equipped with the TRAC system

3. Engine Control System Diagram



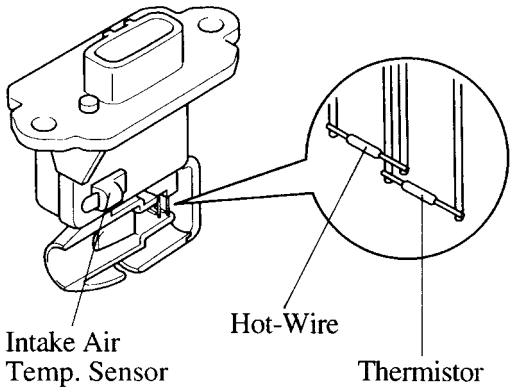
4. Layout of Components



5. Main Components of Engine Control System

Mass Air Flow Meter

The hot wire type mass air flow meter has been changed to the plug-in type. Its basic operation is the same as that of the previous type.



6. IAC (Idle Air Control)

The idle speed has been changed in conjunction with the adoption of the electric cooling fan. When the cooling fan is at high speed while the air conditioner is operating, the idle speed has been increased from 700 rpm to 750 rpm, thus reducing the body vibration that is caused by the electrical load.

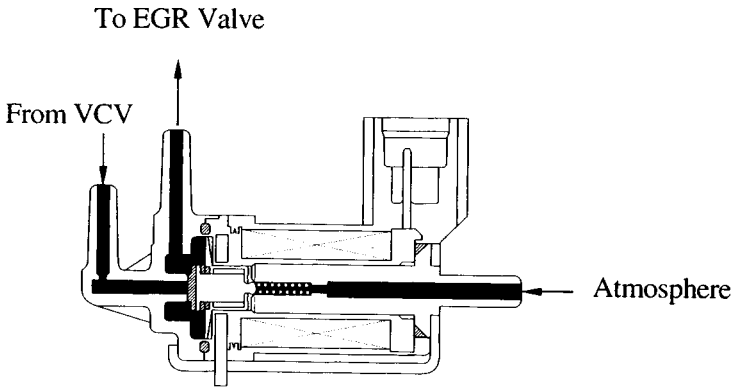
7. EGR Control

In the previous models, an EGR vacuum modulator or a VSV was used to control the EGR gas volume. In the new model. the ECM regulates the VSV to control the vacuum that is applied to the EGR valve, thus ensuring an optimal EGR gas volume according to the engine condition and improving drivability.

Construction

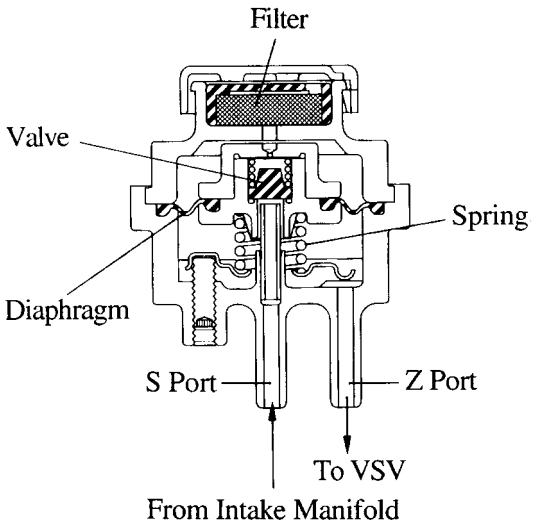
1) VSV

The VSV controls the vacuum from the VCV that is applied to the EGR valve, in accordance with the duty signals received from the ECM.



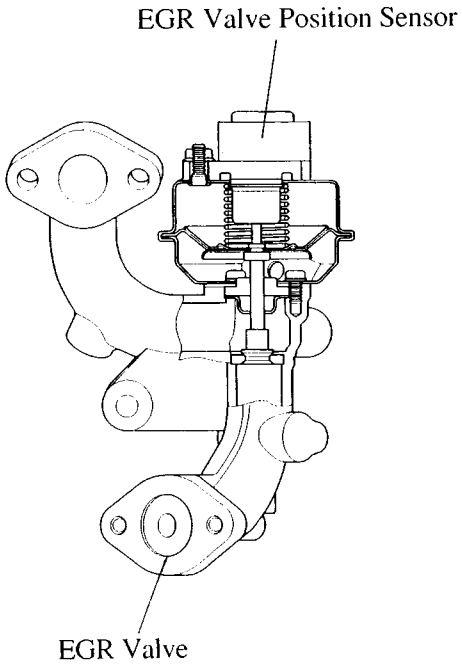
2) VCV (Vacuum Control Valve)

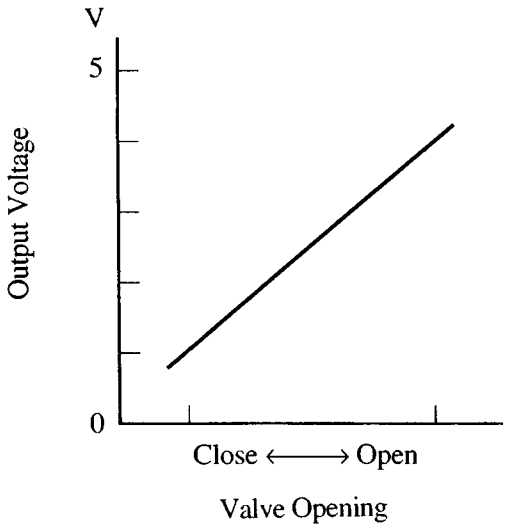
The VCV is a valve that regulates the intake manifold vacuum that is applied to the VSV to a constant level (-17 kPa, -130mm Hg). The intake manifold vacuum that is supplied through the S port is applied to the diaphragm. If this force becomes greater than the spring force, the diaphragm moves downward, allowing the valve to close the S port and the atmosphere supplied through the filter. Conversely, if the vacuum that is applied to the diaphragm becomes weaker, the diaphragm moves upward, causing the valve to open and to shut off the atmosphere and supply the intake manifold vacuum. This process is repeated to regulate the vacuum in the Z port to a constant level.



3) EGR Valve Position Sensor

The EGR valve position sensor is mounted on the EGR valve. This sensor converts the EGR valve opening into a voltage and sends it to the ECM as the EGR valve position signal.

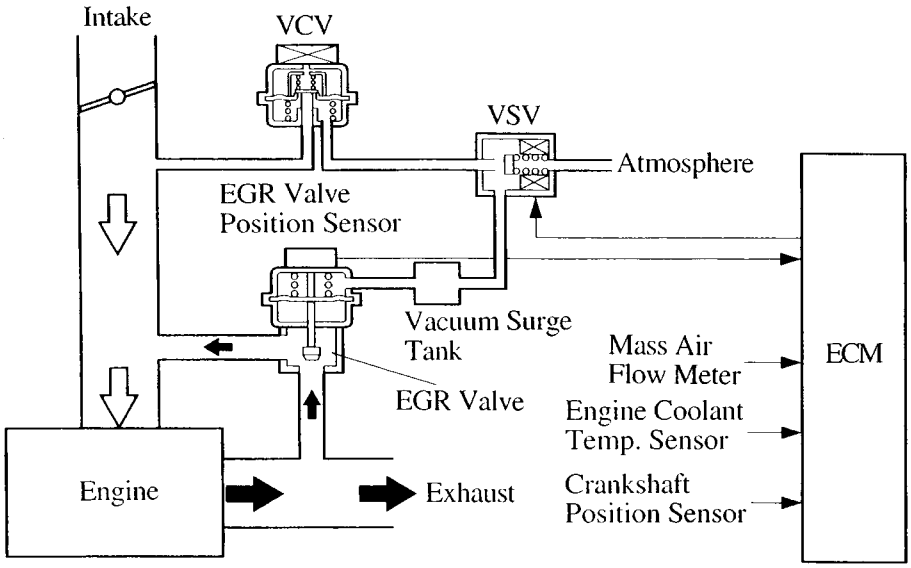




Output Characteristics

Operation

The ECM executes duty control of the VSV to control the vacuum that has been regulated to a constant level by the VCV, thus controlling the vacuum that is applied to the EGR valve.
Also, the EGR valve position sensor in the EGR valve detects the EGR valve opening to provide feedback control to the ECM, thus achieving a target opening that is appropriate for the engine condition.



8. Others

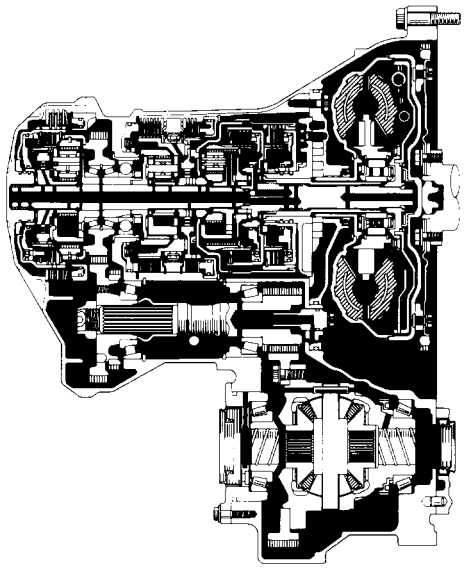
A communication circuit has been provided between the ECM and the ABS & TRAC ECU in conjunction with the adoption of the TRAC (Traction Control) system. The ECM sends signals such as the throttle position signal and the engine speed signal to the ABS & TRAC ECU. In addition, the ECM executes fuel cutoff in accordance with the request signals from the ABS & TRAC ECU.

CHASSIS

A541E AUTOMATIC TRANSAXLE

• DESCRIPTION

The A541E automatic transaxle used in the previous model is also used in the new model. However, the pattern select switch has been discontinued.



▶ Specifications ◀

Transaxle Type / Item		A541E
Gear Ratio	1st	2.810
	2nd	1.549
	3rd	1.000
	4th (Overdrive)	0.735
	Reverse	2.296
Counter Gear Ratio		0.945
Differential Gear Reduction Ratio		3.933
Fluid Capacity liters (US qts, Imp. qt)	Transmission	6.8 (7.2, 5.9)
	Differential	0.9 (0.9, 0.8)
Fluid Type		ATF D–II or DEXTRON° III (DEXTRON° II)

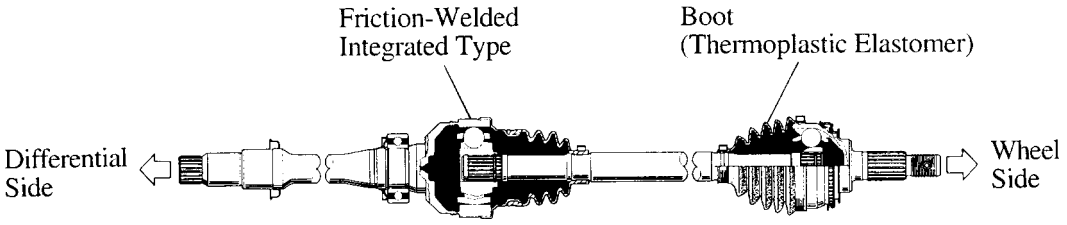
DRIVE SHAFT

• DESCRIPTION

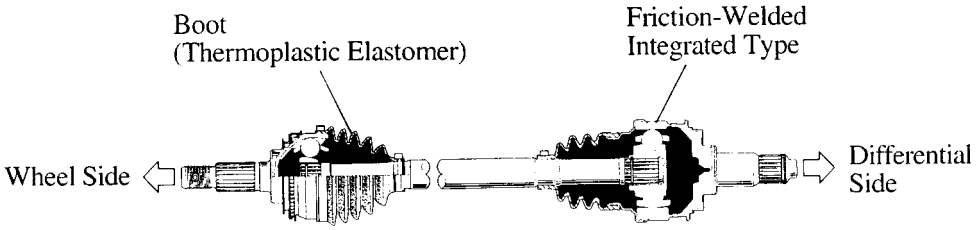
° The inboard joint of the drive shaft on the previous model was the bolt-mounted type. However, the new model has adopted a friction-welded integrated joint.

° The boot of the outboard joint are made of thermoplastic elastomer, which has superior durability.

▶ New ◀

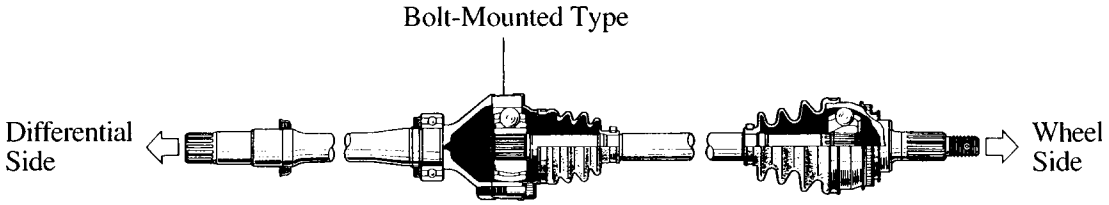


Right-Hand

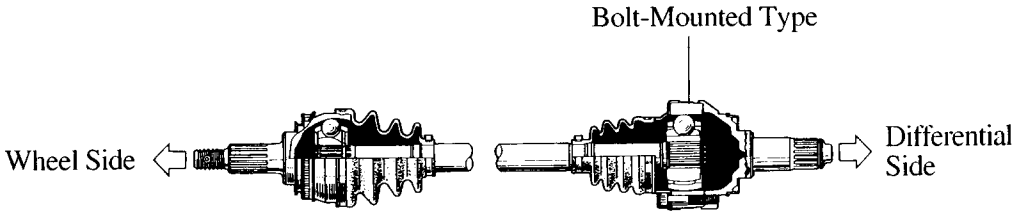


Left-Hand

▶ Previous ◀



Right-Hand

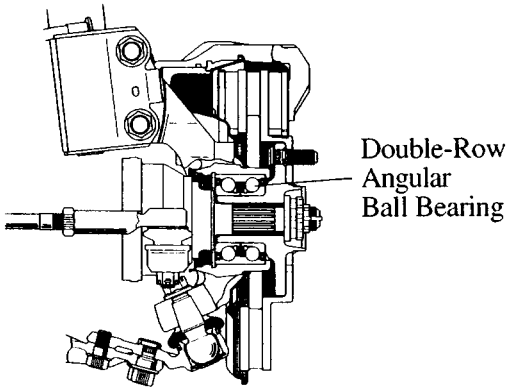


Left-Hand

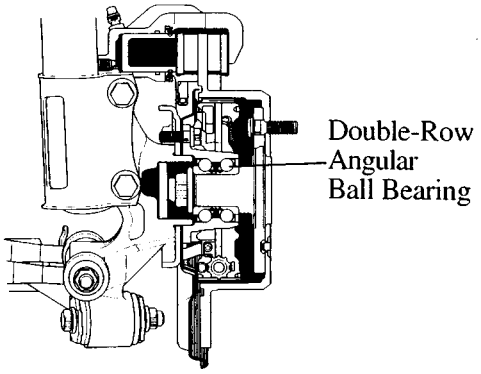
AXLES

▶ DESCRIPTION

As in the previous model, a double-row angular ball bearing is used for both the front and rear axles in the new model.



Front Axle

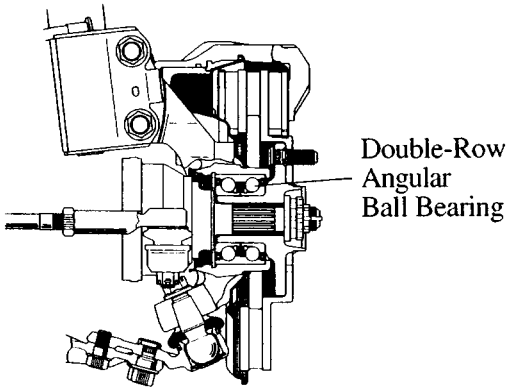


Rear Axle

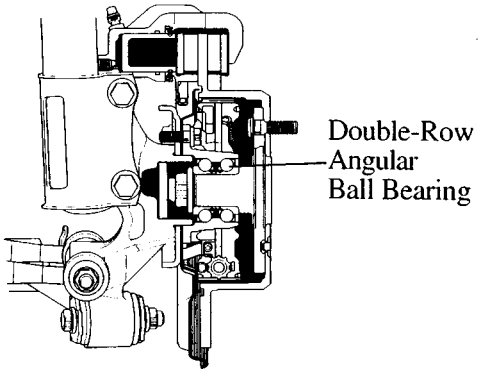
AXLES

• DESCRIPTION

As in the previous model, a double-row angular ball bearing is used for both the front and rear axles in the new model.



Front Axle

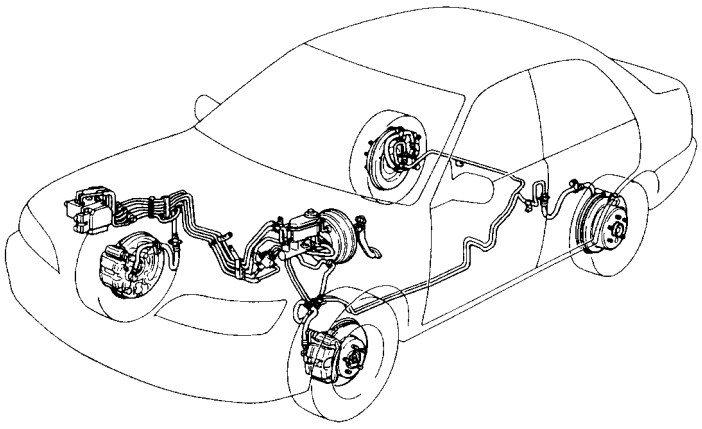


Rear Axle

BRAKES

• DESCRIPTION

- A ventilated disc brakes are used for the front, and a solid disc brakes are used for the rear.
- The front brake caliper has been changed from the 2-piston type to the single-piston type.
- As on the previous model, all models are provided with ABS as standard equipment. However, the ABS actuator has been changed to the 2-position solenoid valve type actuator.
- The ABS & TRAC system has been newly provided as standard equipment on models for Canada, and as optional equipment on models for the U.S.A.
- A portless and portless type master cylinder is used on the models with ABS & TRAC system.
- A pedal type parking broke lever has been adopted.



Models with ABS & TRAC System

▶ Specifications ◀

Model / Item		New	Previous
Master Cylinder	Type	Tandem	←
	Diameter mm (in.)	25.4 (1.00)	←
Brake Booster	Type	Tandem	←
	Size in.	8.5” + 8.5”	8” + 9”
Front Brake	Type	Ventilated Disc	←
	Pad Area cm^2 ($in.^2$)	44 (6.82)	57 (8.84)
	Wheel Cylinder Dia. mm (in.)	60.33 (2.38)	42.9 (1.69) x 2
	Rotor Size (D x T)*1 mm (in.)	275 x 28 (10.83 x 1.10)	←
Rear Brake	Type	Soid Disc	←
	Pad Area cm^2 ($in.^2$)	34 (5.27)	←
	Wheel Cylinder Dia. mm (in.)	34.9 (1.38)	←
	Rotor Size (D x T)*1 mm (in.)	269 x 10 (10.59 x 0.39)	288 x 10 (11.34 x 0.39)
Brake Control Valve	Type	Dual–P Valve	←
	Deflection Point of Hydraulic Pressure kPa (kgf/cm^2, psi)	2942 (30, 427)	←
	Pressure Reduction Gradient	0.6	0.37
Parking Brake	Type	Duo Servo	←
	Size mm (in.)	170 (6.69)	←
	Lever Type	Pedal Type	Center Lever Type
ABS		STD	STD
ABS & TRAC System		STD*2, OPT*3	—

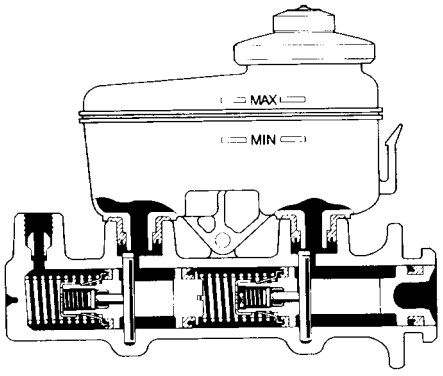
*1: D: Outer Diameter, T: Thickness,

*2: Models for Canada

*3: Models for Canada

• MASTER CYLINDER

As in the previous model, the portless and lockheed type master cylinder is used on the models with ABS.
The portless and portless type master cylinder is used on the models with ABS & TRAC system.

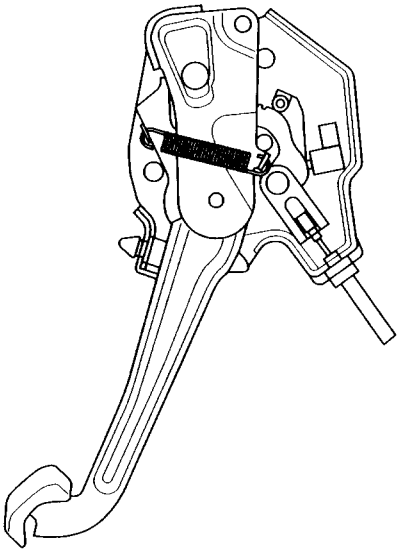


Models with ABS & TRAC System

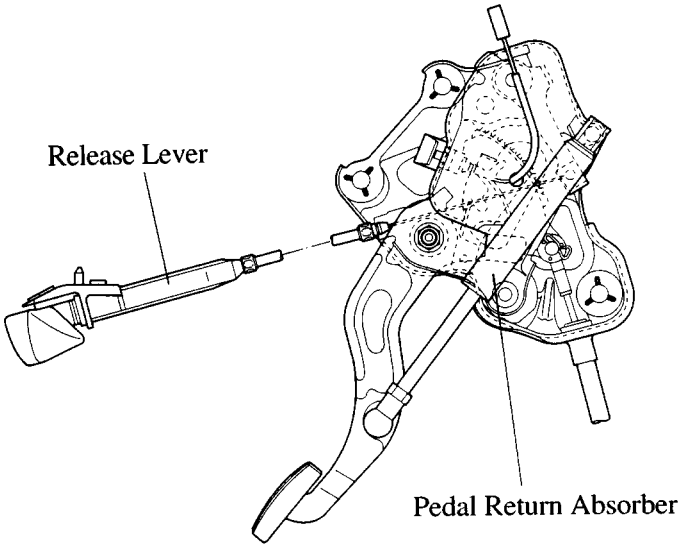
▶ PARKING BRAKE

1. General

As on the ’97 LS400, a pedal type parking brake has been adopted. However, the new ES300 uses a type of parking brake pedal that releases the parking brake by pressing the pedal further. Along with this change, the release lever and the pedal return absorber have been discontinued, resulting in weight reduction.



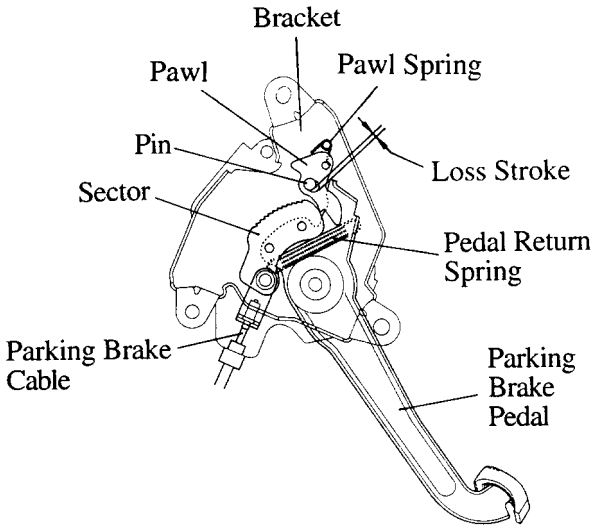
'97 ES300



'97 LS400

2. Construction

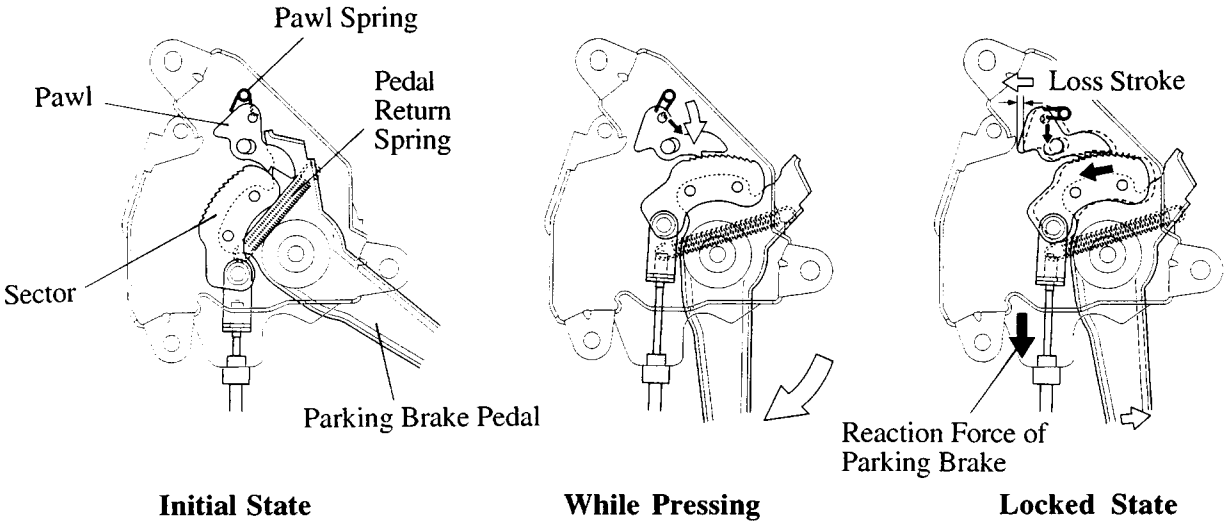
A pedal type parking brake lever consists of a parking brake pedal, sector, pawl, pawl spring, pedal return spring and etc.
The pedal and sector are integrated, and the parking brake cable is attached to the tip of the sector.
The sector is provided with a ratchet into which the pawl meshes.
The pawl and bracket are assembled with a pin. Also, the pawl has an oblong hole, which can realize a loss stroke.



3. Operation

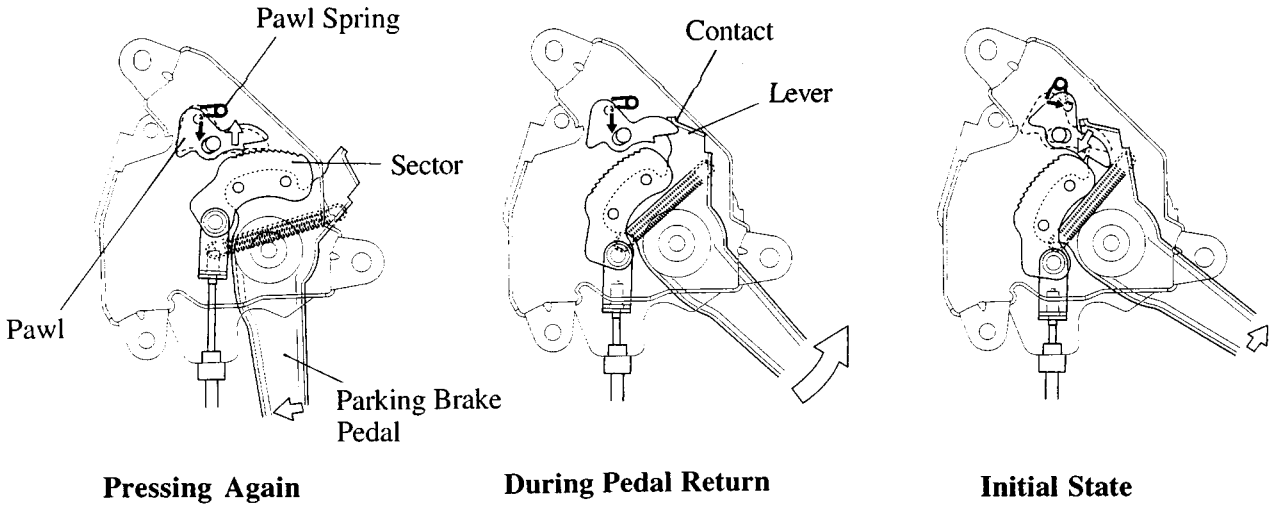
During Applying

Pressing the parking brake pedal causes the sector's ratchet to engage with the pawl.
At this time, a clockwise force is applied to the pawl by the pawl spring.
Then, when the pressure on the brake pedal is released, the reaction force of the parking broke and the force of the pedal return spring cause the pawl and sector, which remain engaged, to return (only for the amount of the loss stroke). As a result, the parking brake becomes locked.
At this time, a counterclockwise force is applied by the pawl spring to the pawl. However, as the reaction force of the parking brake and the force of the pedal return spring are stronger, the pawl and the sector do not become disengaged.



During Releasing

When the parking brake pedal is pressed again, as the reaction force of the parking brake and the force of the pedal return spring will not be applied to the pawl, the pawl spring causes the pawl to rotate counterclockwise. As a result, the pawl is released from the sector's ratchet.
Next, when the parking brake pedal returns to its initial point, the lever that is provided on the pedal will push the pawl downward. This force, along with the force of the pawl spring, causes the parking brake to revert to the initial state.



• ABS

1. General

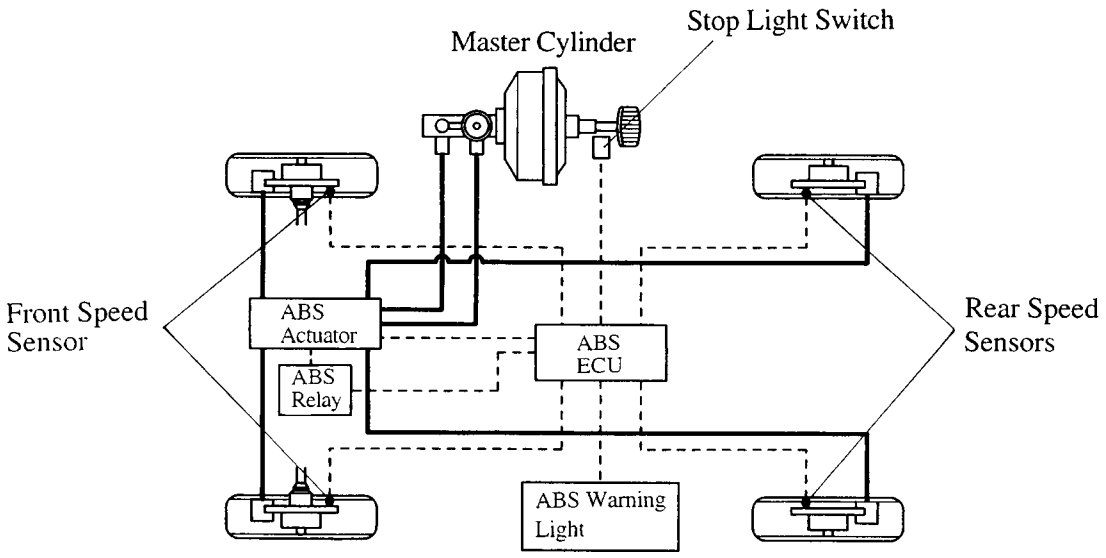
As in the previous model, the brake control of each wheel during ABS activation is implemented by the following three modes: pressure reduction, pressure holding, and pressure increase modes.

During ABS activation, the ECU controls the fluid pressure of each front left and right wheels independently while the fluid pressure of rear left and right wheels is controlled simultaneously. However, the ABS actuator has been changed from the 3-position solenoid valve type to the 2-position solenoid valve type for weight reduction. And, the diagnostic codes have been changed.

For the diagnostic code check method, diagnostic code, and diagnostic code clearance, see the 1997 ES300 Repair Manual (Pub. No. RM511U).

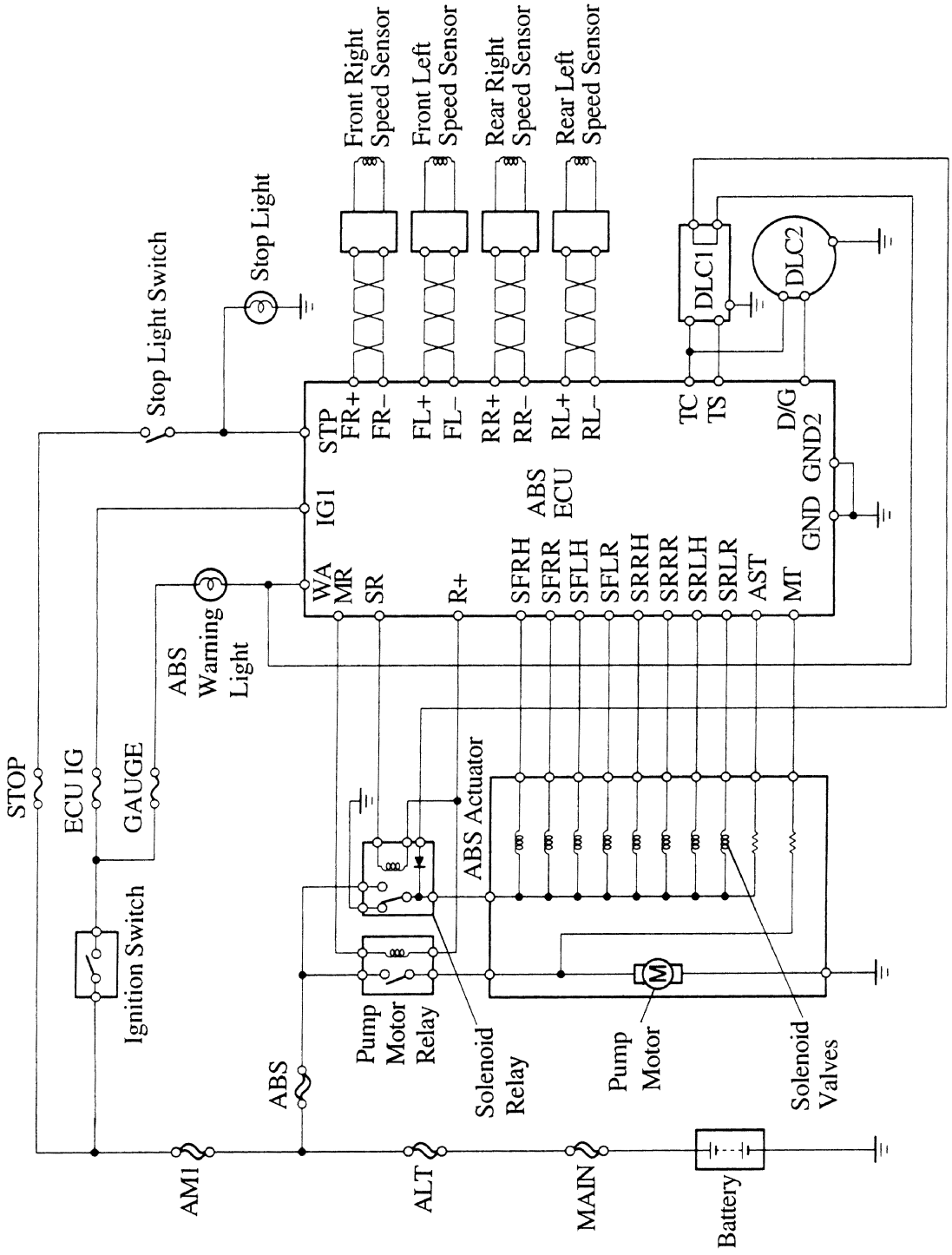
The operation of the ABS on models with ABS and on models with ABS & TRAC system are the same.

2. System Diagram

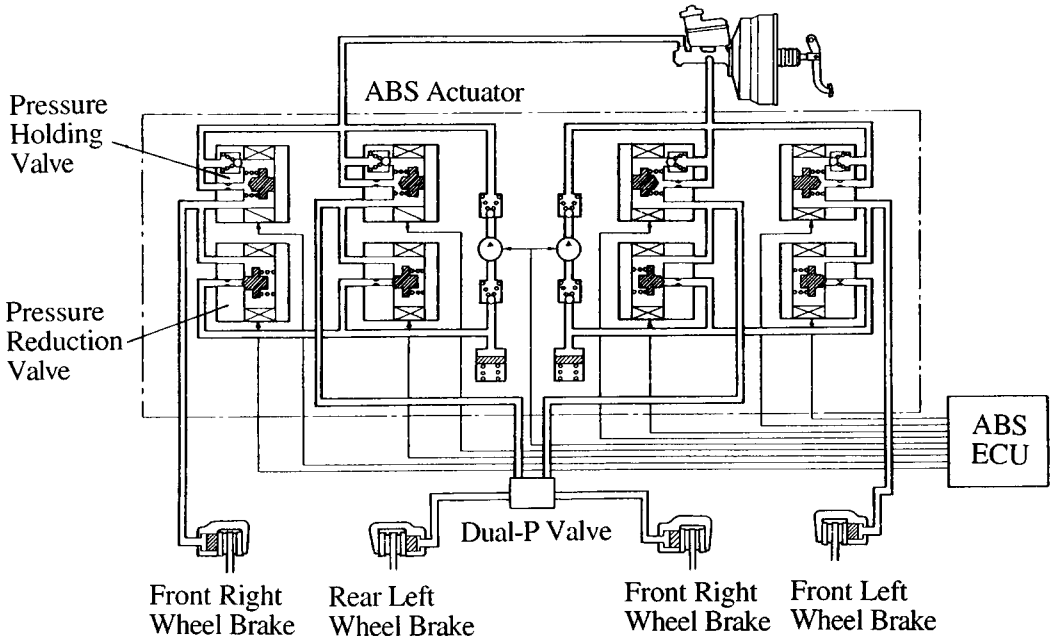


Models with ABS

3. Wiring Diagram



4. Hydraulic Circuit



Models with ABS

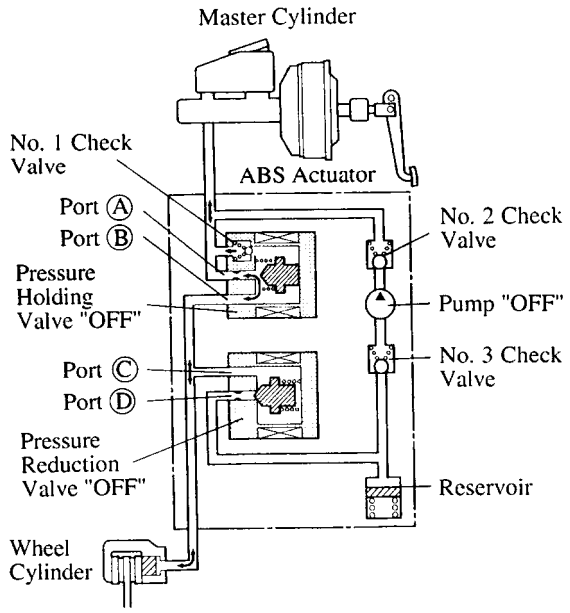
5. Operation

The hydraulic system of the ABS has 4 circuits. Although the hydraulic circuit described below is 1 circuit, it is applicable to other circuits as well.

During Normal Braking (ABS not activated)

During normal braking, the ABS is not activated and the ECU dose not send control signal.
When the brake pedal is depressed, the fluid pressure in the master cylinder rises, brake fluid passes from port (A) to port (B), and then flows to the brake wheel cylinder. When the brake pedal is released, brake fluid returns from the brake wheel cylinder to the master cylinder through port (B) to port (A) and the No. 1 Check Valve.

▶ Hydraulic Circuit ◀



▶ Condition of Each Valve and Pump Motor ◀

Part Name	Signal from ABS ECU	Operation	
Pressure Holding Valve	OFF	Port (A)	Open
Pressure Reduction Valve	OFF	Port (D)	Closed
Pump Motor	OFF	Stop	

During Emergency Braking (ABS activated)

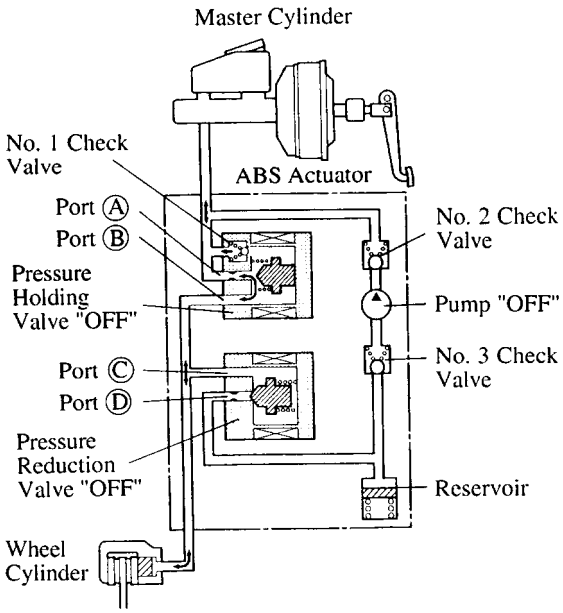
1) Pressure Reduction Mode

When the wheel is about to lock, the control signal from the ECU causes port (A) to close, port (D) to open, thus engaging the pressure reduction mode.
At this time, the brake fluid flows from the wheel cylinder, through ports (C) and (D), to the reservoir, reducing the wheel cylinder pressure. At the same time, the brake fluid is pumped and returned to the master cylinder.

▶ Condition of Each Valve and Pump Motor ◀

Part Name	Signal from ABS ECU	Operation	
Pressure Holding Valve	ON	Port (A)	Closed
Pressure Reduction Valve	ON	Port (D)	Open
Pump Motor	ON	Rotating	

▶ Hydraulic Circuit ◀



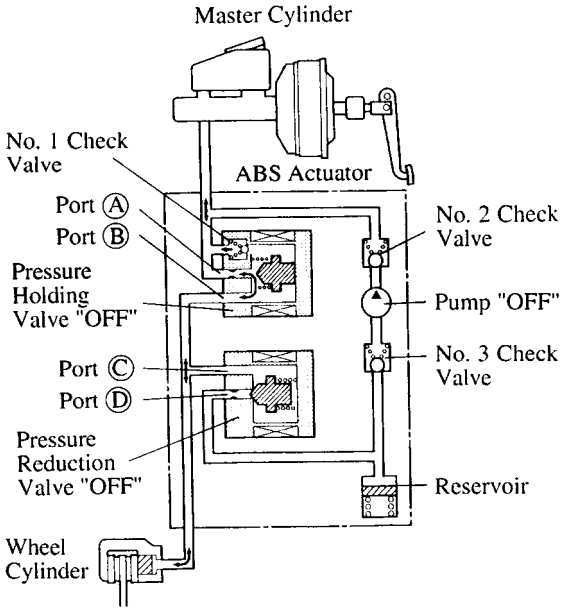
2) Pressure Holding Mode

After the fluid pressure in the wheel cylinder is reduced or increased to the required pressure, a control signal from the ECU causes ports (A) and (D) to close. As a result, the system engages in the pressure holding mode to maintain the fluid pressure in the wheel cylinder.

▶ Condition of Each Valve and Pump Motor ◀

Part Name	Signal from ABS ECU	Operation	
Pressure Holding Valve	ON	Port (A)	Closed
Pressure Reduction Valve	OFF	Port (D)	Closed
Pump Motor	ON	Rotating	

▶ Hydraulic Circuit ◀



3) Pressure Increase Mode

When the fluid pressure in the wheel cylinder needs to be increased in order to apply more braking force, a control signal from the ECU causes port (A) to open, port (D) to close, thus engaging in the pressure increase mode.

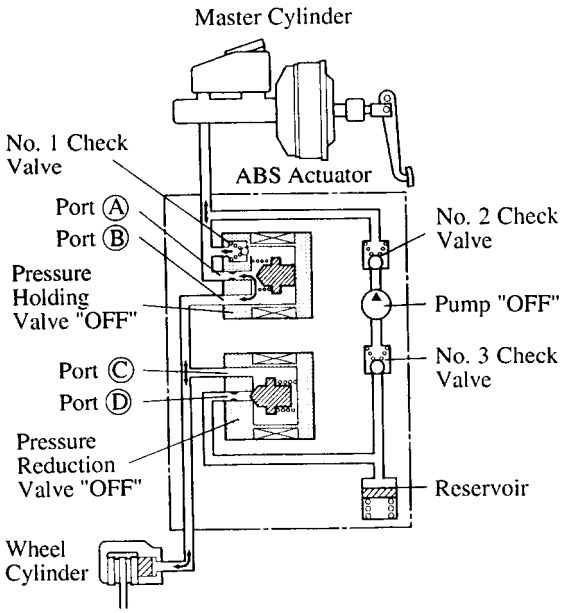
Accordingly, the circuit will be in the same state as in normal braking, in which the brake fluid is sent from the master cylinder to the wheel cylinder to increase the fluid pressure in the wheel cylinder.

The fluid pressure increase rate is controlled by repetition of the pressure increase and pressure holding mode.

▶ Condition of Each Valve and Pump Motor ◀

Part Name	Signal from ABS ECU	Operation	
Pressure Holding Valve	OFF	Port (A)	Open
Pressure Reduction Valve	OFF	Port (D)	Closed
Pump Motor	ON	Rotating	

▶ Hydraulic Circuit ◀



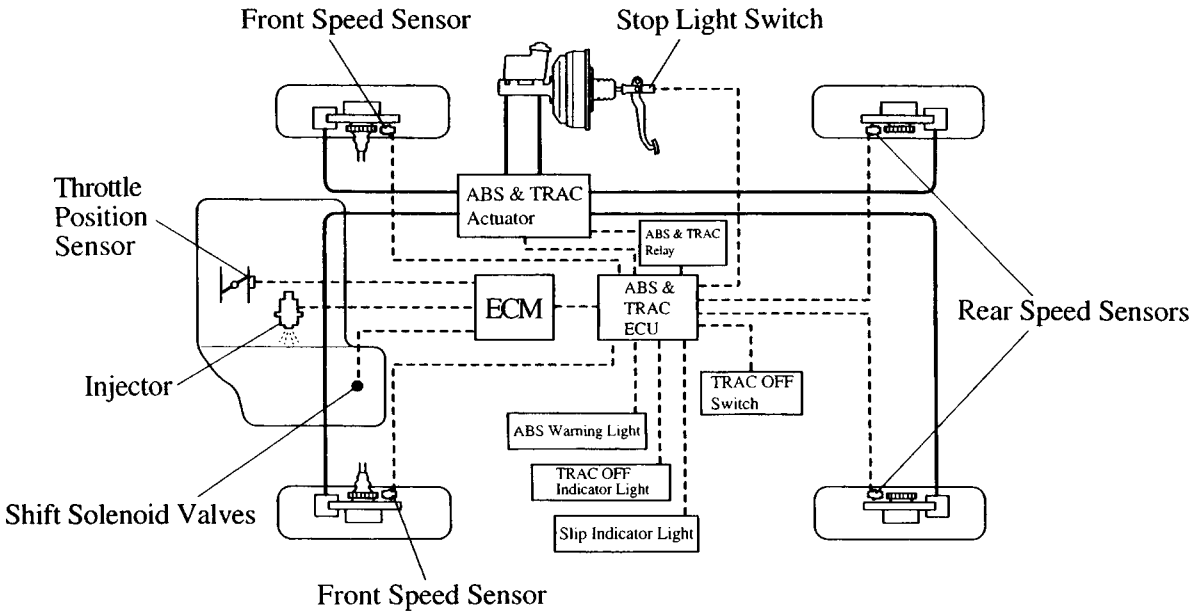
° ABS & TRAC SYSTEM

1. General

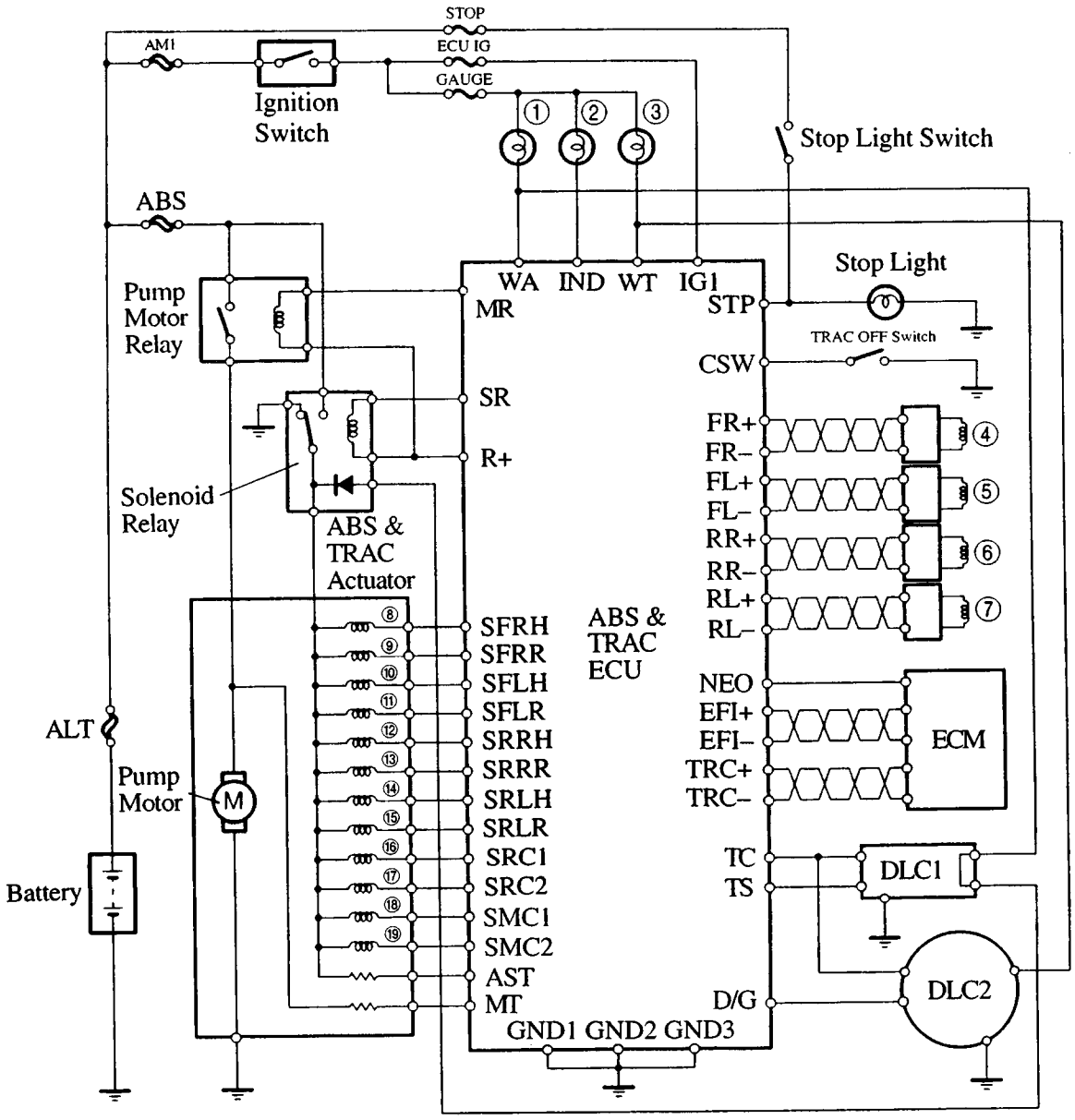
The ABS & TRAC system totally controls the engine torque control through the fuel cutoff and the braking of the driving wheels (front wheels). It helps to avoid slippage of the driving wheels that tends to happen during starting and acceleration and to maintain an optimal driving force according to the road surface conditions. The system eliminates the need for a subtle accelerator pedal operation and ensures vehicle stability when starting, accelerating or turning on slippery roads.

The operation of the ABS portion of the ABS & TRAC system is the same as that of the models with ABS.

2. System Diagram

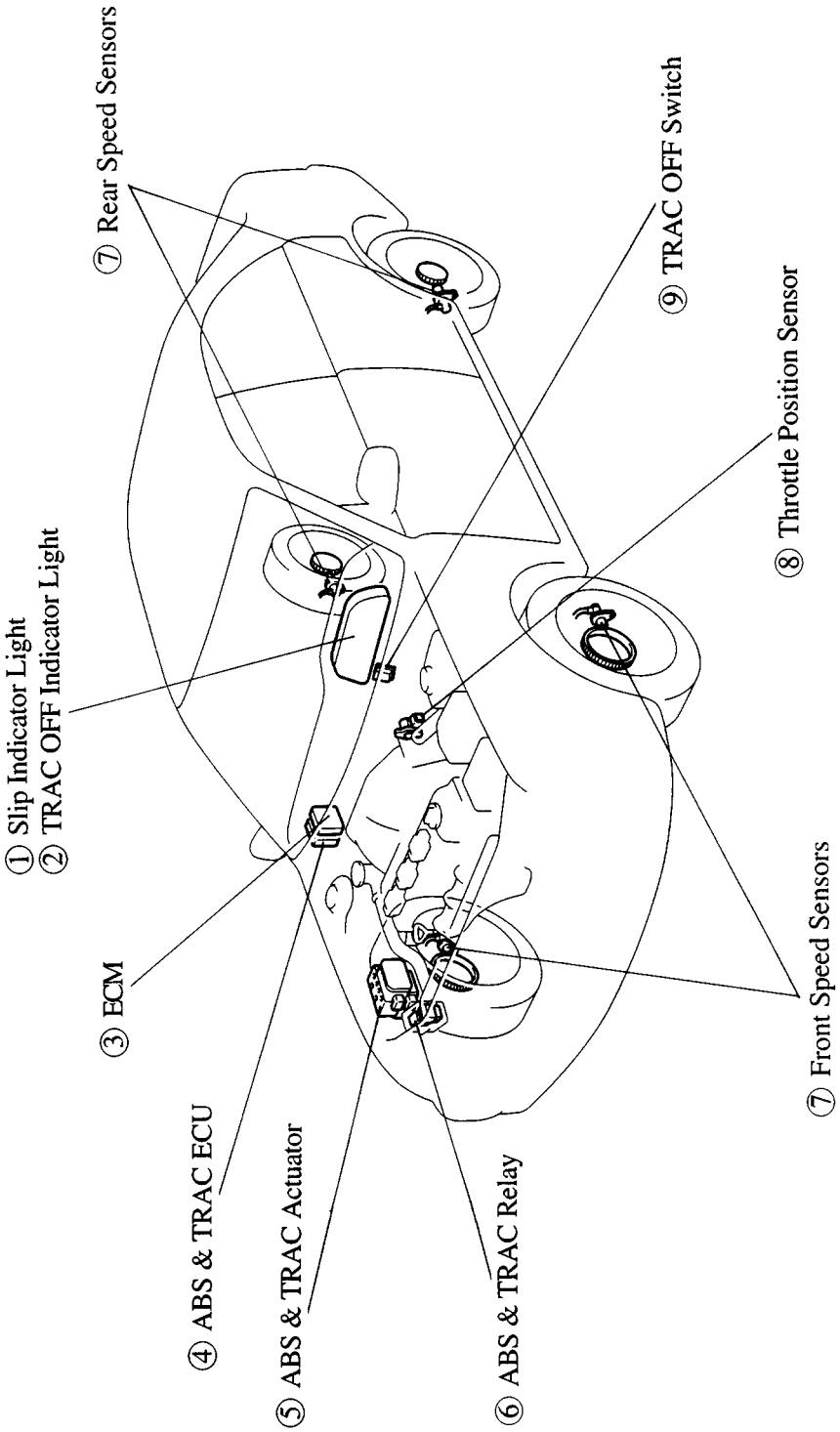


3. Wiring Diagram



① ABS Warning Light
② Slip Indicator Light
③ TRAC OFF Indicator Light
④ Front Right Speed Sensor
⑤ Front Left Speed Sensor
⑥ Rear Right Speed Sensor
⑦ Rear Left Speed Sensor
⑧ Front Right Pressure Holding Valve
⑨ Front Right Pressure Reduction Valve
⑩ Front Left Pressure Holding Valve
⑪ Front Left Pressure Reduction Valve
⑫ Rear Right Pressure Holding Valve
⑬ Rear Right Pressure Reduction Valve
⑭ Rear Left Pressure Holding Valve
⑮ Rear Left Pressure Reduction Valve
⑯ Reservoir Cut Solenoid Valve
⑰ Reservoir Cut Solenoid Valve
⑱ Master Cut Solenoid Valve
⑲ Master Cut Solenoid Valve

4. Layout of Components



5. Function of Components

No.	Component		Function
①	Slip Indicator Light		Blinks to inform the driver when the TRAC system is operated.
②	TRAC OFF Indicator Light		Lights to inform the driver when the TRAC system is turned OFF by the TRAC OFF switch. And, blinks to alert the driver when the ECU detects the malfunction in the TRAC system.
③	ECM		● Sends signals to the ABS & TRAC ECU, such as the throttle valve opening angle, specific volume of intake air signal, etc. ● Controls the engine output and shift timing in accordance with the fuel cutoff request and shift timing request that are output by the ABS & TRAC ECU.
④	ABS & TRAC ECU		Judges the vehicle driving condition based on signals from 4 speed sensors and signals from ECM, and sends fuel cut and shift timing demand signals to the ECM and brake control signal to the ABS & TRAC actuator.
⑤	ABS & TRAC Actuator		Controls the brake fluid pressure to each brake wheel cylinder of the driving wheel (front wheel) by signals from the ABS & TRAC ECU.
⑥	ABS & TRAC Relay	Solenoid Relay	Directs electricity to the solenoid valves in the actuator.
		Pump Motor Relay	Controls the pump motor operation in the actuator.
⑦	Speed Sensors (Front and Rear)		Detect the wheel speed of each of four wheels.
⑧	Throttle Position Sensor		Detects the throttle valve opening angle.
⑨	TRAC OFF Switch		Turns the TRAC system inoperative.

6. Construction and Operation of Components

TRAC OFF Switch and Indicator Light

1) TRAC OFF Switch

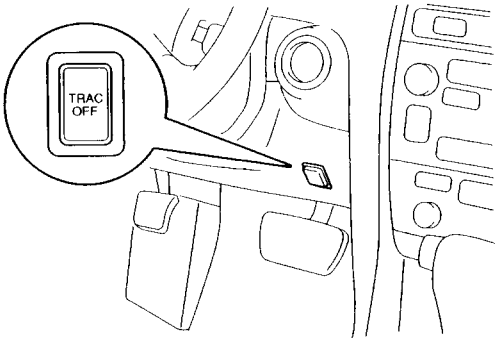
When pressed, this switch turns the TRAC system inoperative. Pressing it again changes it to operative. It is always operative right after the engine is restarted.

2) TRAC OFF Indicator Light

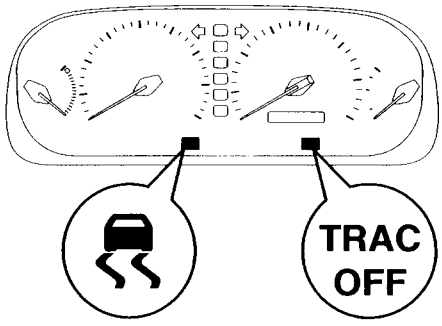
This light goes on when the TRAC system is set inoperative by the TRAC OFF switch, and informs the driver accordingly. And, blinks to alert the driver when a malfunction has occurred in the engine and TRAC system.

3) Slip Indicator Light

When the TRAC system is operative, this light blinks and informs the driver accordingly.



TRAC OFF Switch



ABS & TRAC Actuator

1) Construction

The ABS & TRAC actuator consists of 12 two-position solenoid valves, I motor 2 pumps, 2 reservoir and 2 pressure regulator valves.

The 12 two-position solenoid valves consist of 2 master cut solenoid valves, 2 reservoir cut solenoid valves, 4 pressure holding valves, and 4 pressure reduction valves.

Pressure regulator valve is assembled into the master cut solenoid valve.

The basic construction and operation of the pump, reservoir pressure holding valve, and pressure reduction valve are shared with the ABS.

a. Master Cut Solenoid Valve

When the TRAC system is active, a signal from the ABS & TRAC ECU causes the master cut solenoid valve to turn ON in order to shut off the circuit between the master cylinder and the front brake wheel cylinder.

The basic construction and operation are the same as those of the pressure holding valve.

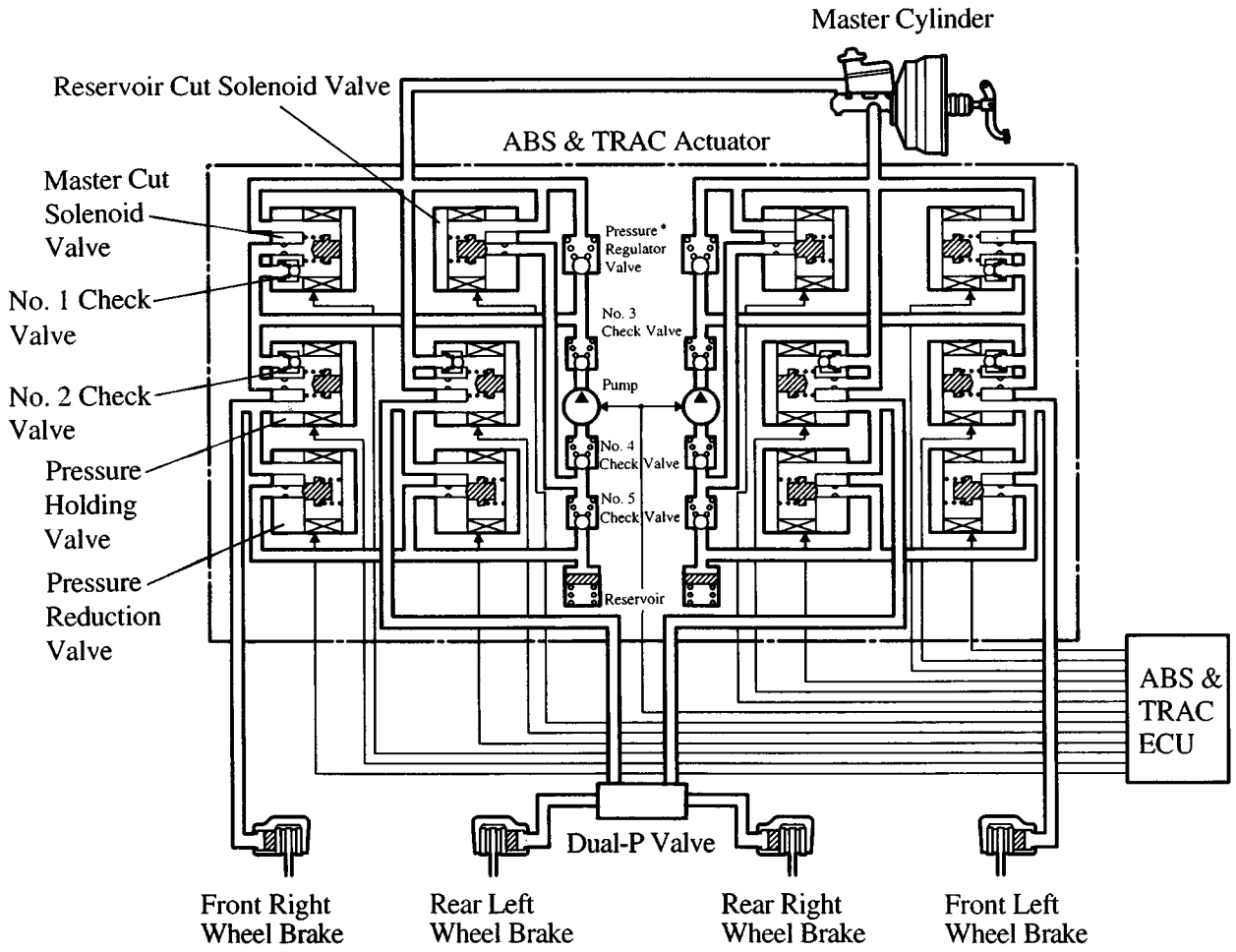
b. Reservoir Cut Solenoid Valve

When the TRAC system is active, a signal from the ABS & TRAC ECU causes the reservoir cut solenoid valve to turn ON in order to open the circuit from the master cylinder to the pump.
The basic construction and operation are the same as those of the pressure reduction valve.

c. Pressure Regulator Valve

Regulates the brake fluid pressure generated by the pump to a pressure level needed for TRAC control.

2) Hydraulic Circuit



*: Pressure regulator valve is assembled into the master cut solenoid valve, however, it is illustrated separately to explain its operation.

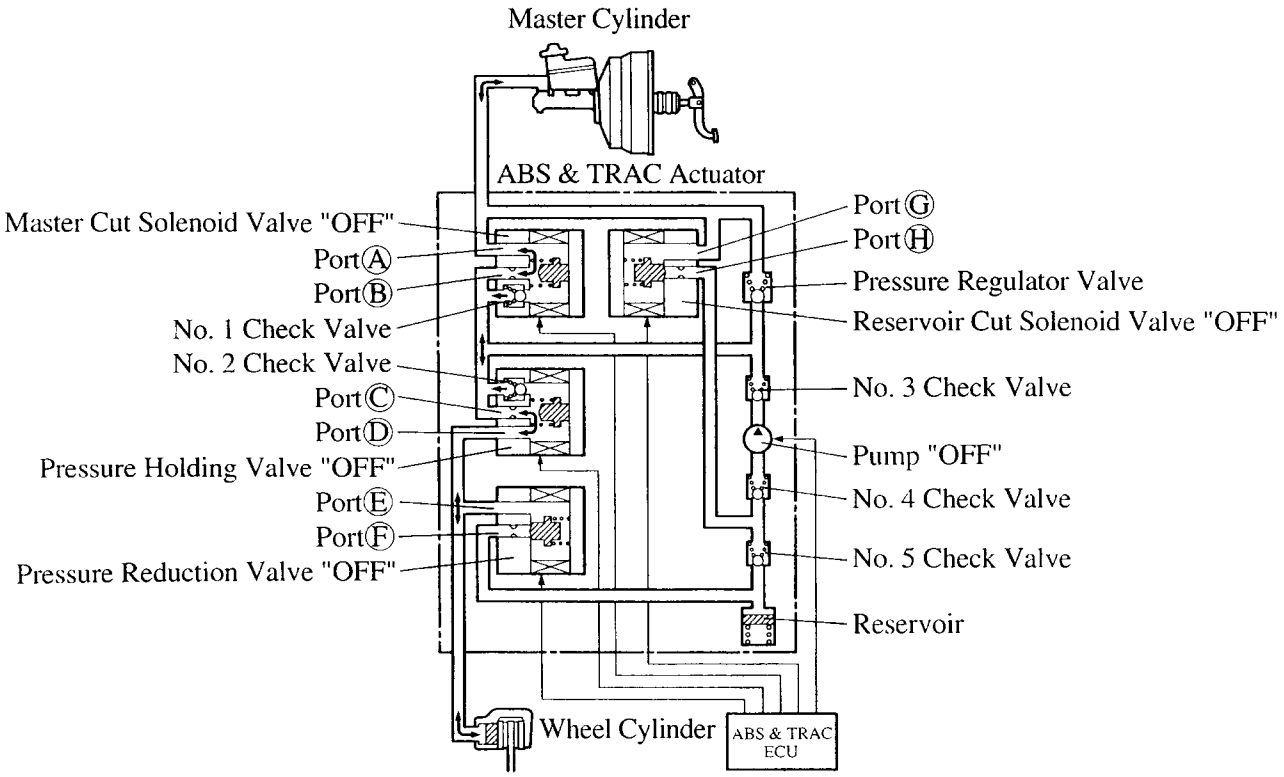
3) Operation

The hydraulic system of the TRAC system consists of the following 2 circuits: the front right and front left. Although the hydraulic circuit described below is one circuit, it is applicable to other circuits as well.

a. During Normal Operation (TRAC System not Activated)

When the TRAC system is inactive, the ABS & TRAC ECU does not output any control signals. Thus, all valves are OFF.
Accordingly, pressing on the brake pedal causes the brake fluid to flow from the master cylinder to port (A), port (B), No. I check valve, port (C), and port (D), thus applying fluid pressure to the wheel cylinder.
Also, releasing the brake pedal causes the brake fluid to flow from the wheel cylinder to port (D), port (C), No. 2 check valve, port (B), and port (A), thus returning to the master cylinder.
Thus, the brakes operate in the normal brake mode.

▶ Hydraulic Circuit ◀



▶ Condition of Each Valve and Pump Motor ◀

Part Name	Signal from ABS & TRAC ECU	Operation	
Master Cut Solenoid Valve	OFF	Port (B)	Open
Reservoir Cut Solenoid Valve	OFF	Port (H)	Closed
Pressure Holding Valve	OFF	Port (C)	Open
Pressure Reduction Valve	OFF	Port (F)	Closed
Pump	OFF	Stop	

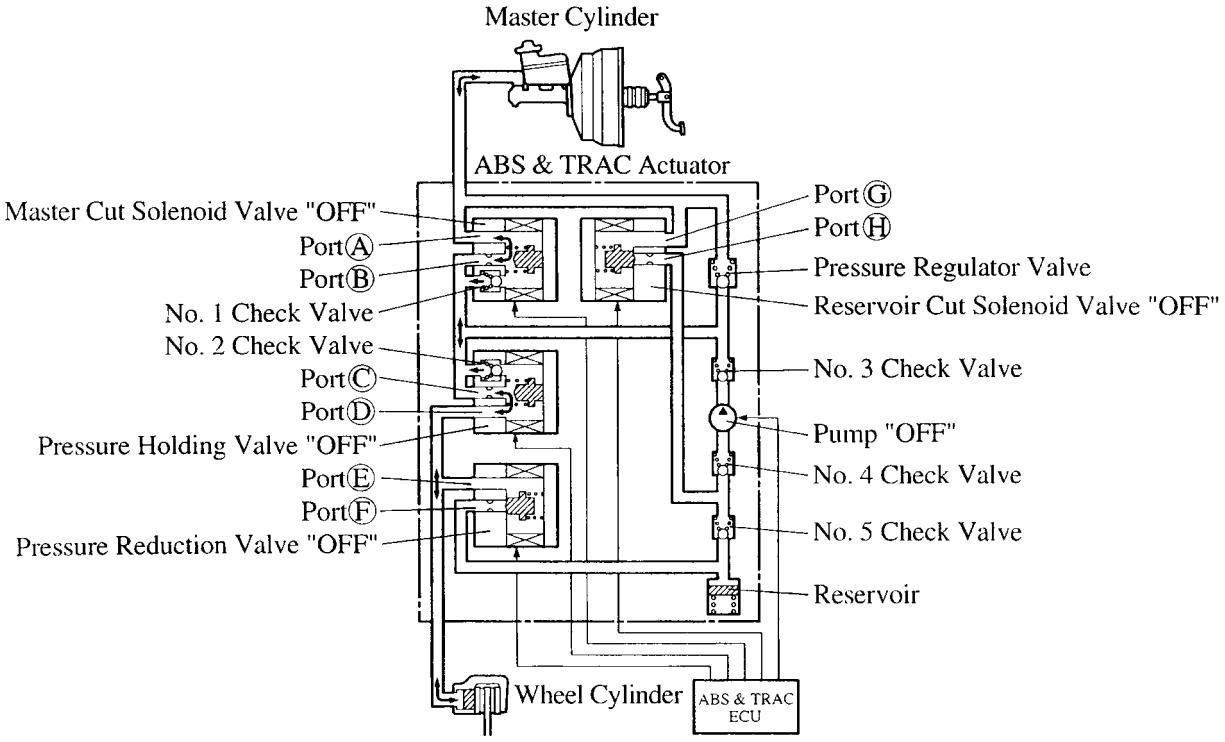
b. During Vehicle Acceleration (TRAC System Activated)

When a front wheel slips during acceleration, the TRAC system controls the engine output and braking of the front wheels to help prevent wheel slippage.
The brake fluid pressure applied to the right and left front wheels is controlled separately according to 3 control modes (pressure increase, holding, and pressure reduction) as explained below.

i) Pressure Increase Mode

During sudden acceleration or driving on a slippery surface, if the front wheels starts to slip, a control signal from the ABS & TRAC ECU causes the ABS & TRAC actuator to control the valves and pumps as described below, to effect the pressure increase mode.
When the master cut and reservoir cut solenoid valves turn ON, port (B) close, port (H) opens, and the pump operates at the same time.
Accordingly, the brake fluid will be suctioned up from the master cylinder through port (G) and (H). Then the brake fluid pressurized by the pump will be applied to the wheel cylinder through port (C) and (D).
Also, the brake fluid that is pressurized by the pump is regulated to a constant pressure by the pressure regulator valve.

▶ Hydraulic Circuit ◀



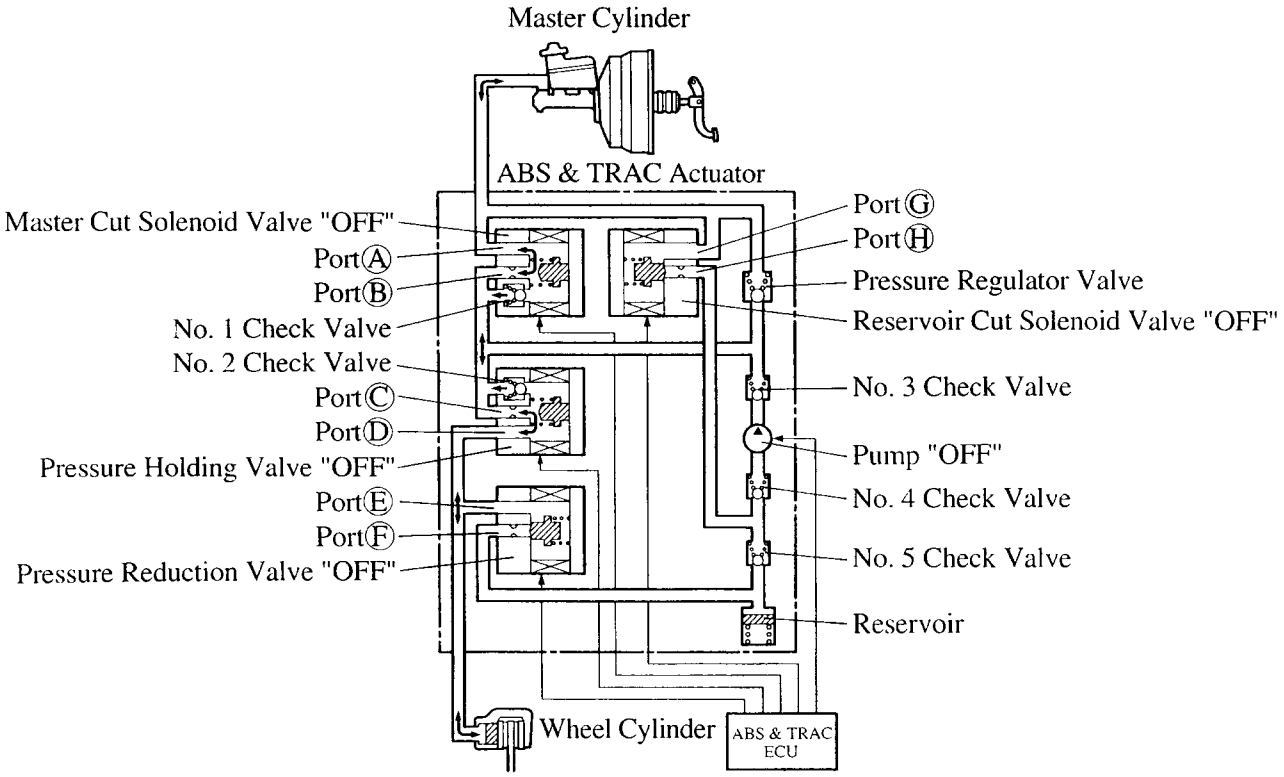
▶ Condition of Each Valve and Pump Motor ◀

Part Name	Signal from ABS & TRAC ECU	Operation	
Master Cut Solenoid Valve	ON	Port (A)	Closed
Reservoir Cut Solenoid Valve	ON	Port (H)	Open
Pressure Holding Valve	OFF	Port (C)	Open
Pressure Reduction Valve	OFF	Port (F)	Closed
Pump	ON	Rotating	

ii) Pressure Holding Mode

When the fluid pressure in the wheel cylinder is increased or decreased to attain the required pressure, the ABS & TRAC ECU sends a control signal to tuna ON the pressure holding valve.
Then, the fluid pressure that is applied to the wheel cylinder is cut off to hold the fluid pressure in the wheel cylinder.

▶ Hydraulic Circuit ◀



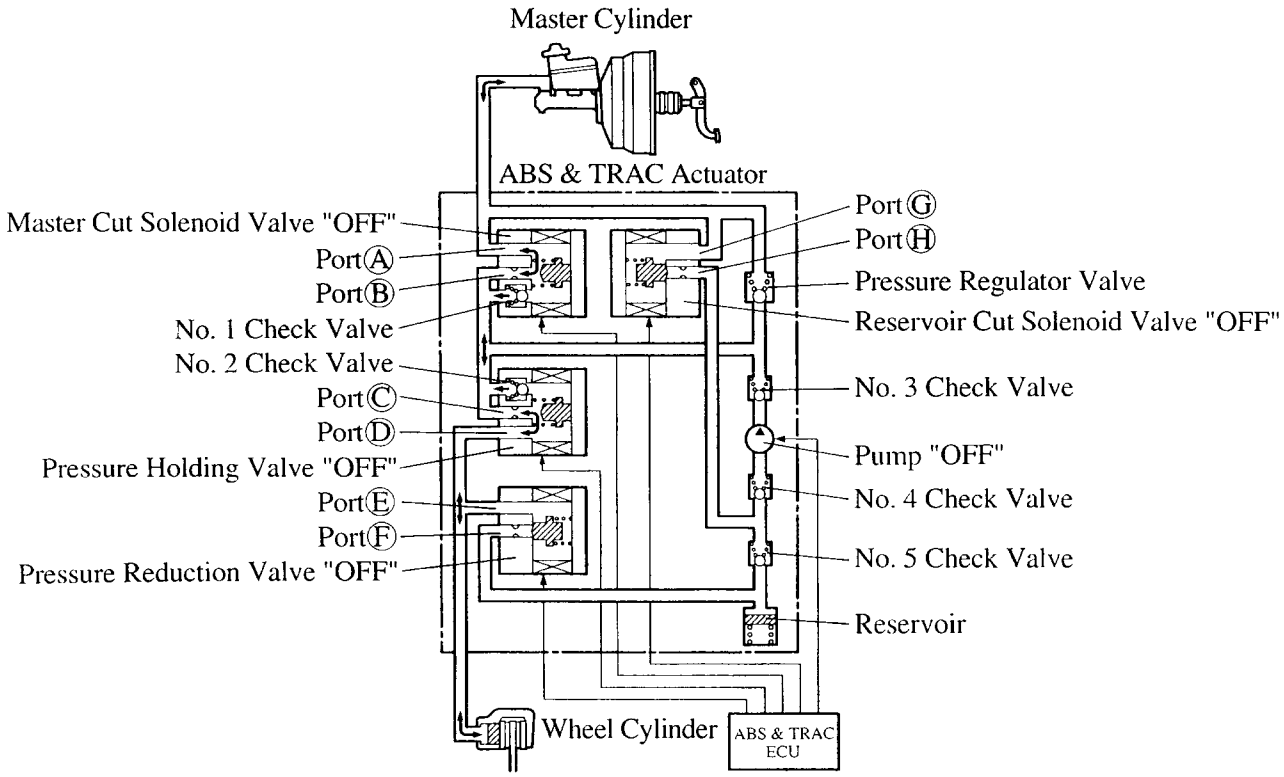
▶ Condition of Each Valve and Pump Motor ◀

Part Name	Signal from ABS & TRAC ECU	Operation	
Master Cut Solenoid Valve	ON	Port (B)	Closed
Reservoir Cut Solenoid Valve	OFF	Port (H)	Closed
Pressure Holding Valve	ON	Port (C)	Closed
Pressure Reduction Valve	OFF	Port (F)	Closed
Pump	ON	Rotating	

iii) Pressure Reduction Mode

When the fluid pressure in the wheel cylinder needs to be decreased, the ABS & TRAC ECU sends a control signal to turn the pressure reduction valve ON, causing port (F) to open.
Accordingly, the brake fluid in the wheel cylinder flows to ports (E) and (F), reservoir, and pump, to reduce the fluid pressure in the wheel cylinder.
The fluid pressure reduction rate is controlled by repetition of the pressure reduction and holding mode.

▶ Hydraulic Circuit ◀



▶ Condition of Each Valve and Pump Motor ◀

Part Name	Signal from ABS & TRAC ECU	Operation	
Master Cut Solenoid Valve	ON	Port (B)	Closed
Reservoir Cut Solenoid Valve	OFF	Port (H)	Closed
Pressure Holding Valve	ON	Port (C)	Closed
Pressure Reduction Valve	ON	Port (F)	Open
Pump	ON	Rotating	

ABS & TRAC ECU

1) Wheel Speed Control

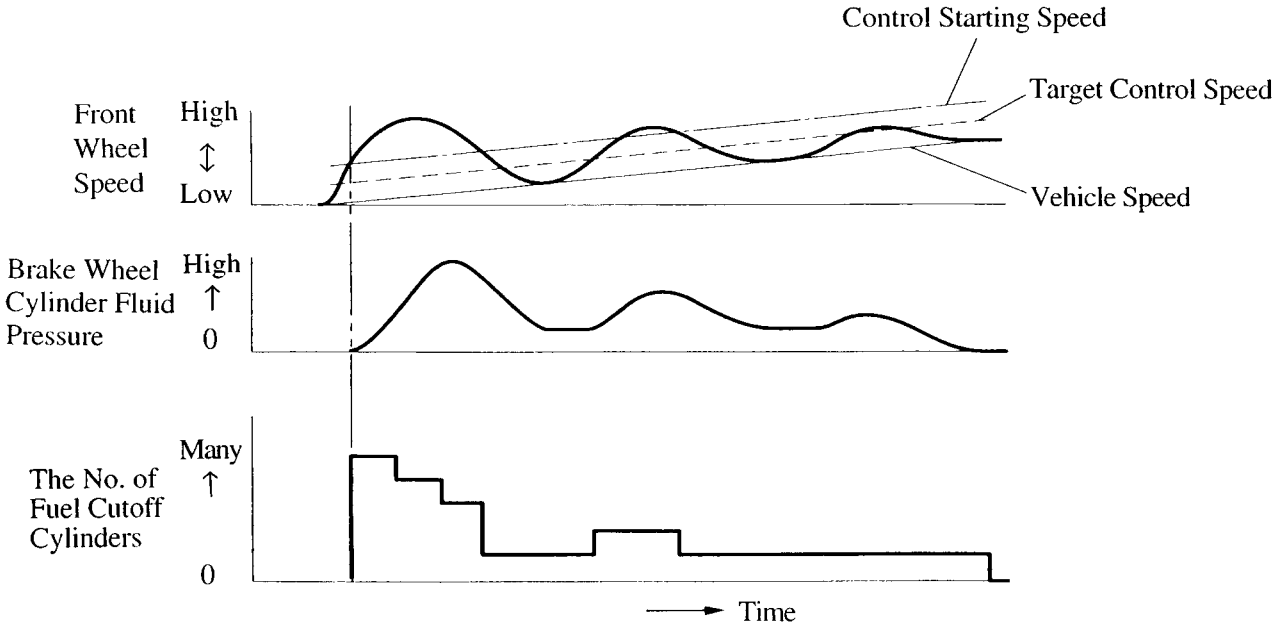
The ABS & TRAC ECU constantly receives signals from the 4 speed sensors and calculates the speed of each wheel and vehicle speed.
During sudden acceleration or driving on a slippery surface, if the drive wheels (front wheels) start to slip, the difference in speed between the drive wheels and the non-drive wheels (rear wheels) becomes greater, causing the ECU to determine that the drive wheels are slipping.
Then, the ABS & TRAC ECU executes the right and left independent control of the front wheel brakes, the engine torque control through fuel cutoff, and shift timing control, according to the extent of the slip.
TRAC operation processes are described below.

① The vehicle speed is determined by way of the rear wheel speed. This speed is then compared to the speed of the front wheels, which are the drive wheels, to determine the slip condition of the drive wheels (front wheels).

② The target control speed for the drive wheels is set based on the estimated vehicle speed.

③ If the speed of the front wheels, which are the drive wheels, exceeds the control starting speed, the ABS & TRAC ECU determines that a slip has occurred and cuts off fuel according to the number of cylinders. By executing engine torque control and brake control in this manner, the system regulates the speed so that the front wheels attain the target control speed. In addition, the system executes control to prohibit the shifting of the automatic transaxle at this time.

④ TRAC control ends when the drive wheels move to a non-slippery surface or when the driver releases the accelerator pedal.



2) Initial Check

An initial check is carried out once every a few seconds after the ignition was turned on. The function of each solenoid valve and pump motor in the actuator are checked in order.

3) Self-Diagnosis

If the ABS & TRAC ECU detects a malfunction in the engine, ABS or TRAC system, it blinks the TRAC OFF indicator light to alert the driver of the malfunction. At the same time, the ABS & TRAC ECU turns the ABS warning light on. The ECU will also store the codes of the malfunctions. See the 1997 ES300 Repair Manual (Pub. No. RM511 U) for the diagnostic code check method, diagnostic code and diagnostic code clearance.

4) Fail-Safe

In the event of a malfunction in the engine, ABS or TRAC system, the ABS & TRAC ECU prohibits the TRAC system.

Thus, the brake and engine controls will operate in the same conditions as those without the TRAC system.

SUSPENSION

◦ DESCRIPTION

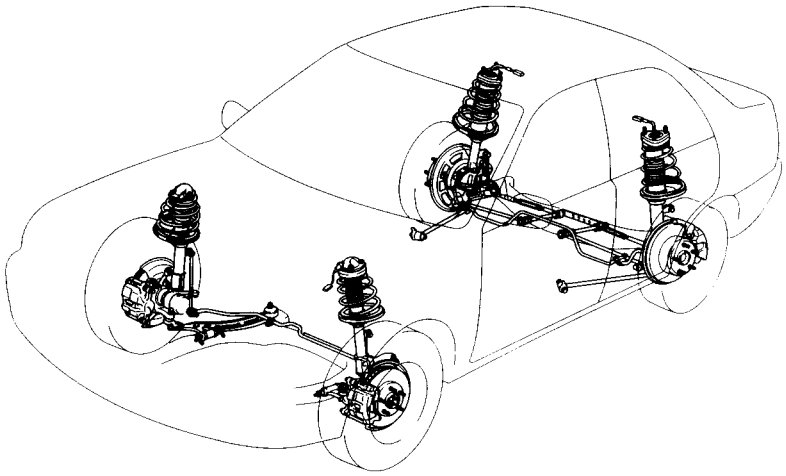
As in the previous model, the new model uses MacPherson strut type independent suspension for both front and rear.
An electric modulated suspension has been made newly available on all models as an option. The items given below have been changed from the previous model.

The caster angle has been changed on the front suspension.

The mounting method of the front suspension stabilizer has been changed.

The mounting position of the rear suspension's lower arm has been changed and its roll center height has been changed.

The rear suspension upper support has been changed.



Models with Electric Modulated Suspension

▶ Specifications ◀

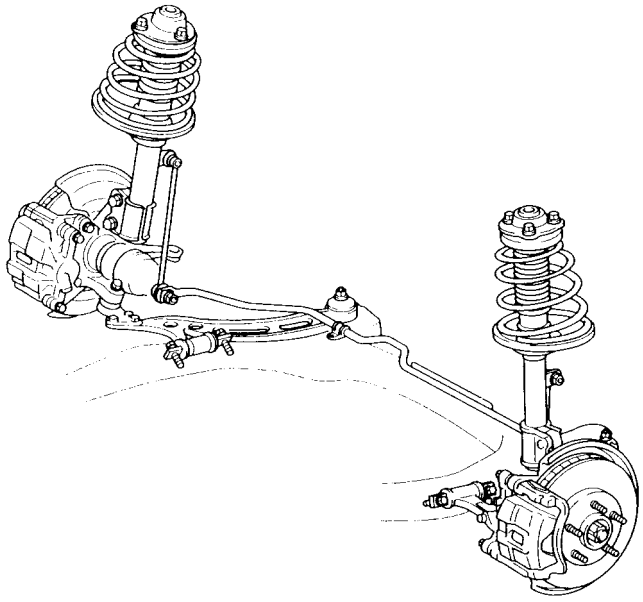
Model / Item			New	Previous
Front Suspension	Tread	mm (in)	1550 (61.0)	←
	Caster*1	degrees	2°15′	1°15′
	Camber*1	degrees	–0°40′	←
	Toe–In*1	degrees	0	←
	King Pin Inclination*1	degrees	13°05′	←
Rear Suspension	Tread	mm (in)	1520 (59.8)	1500 (59.1)
	Camber*1	degrees	–0°45′	–0°30′
	Toe–In*1	mm (in)	4 (0.16)	←

*1:Unloaded Vehicle Condition

° FRONT SUSPENSION

1. General

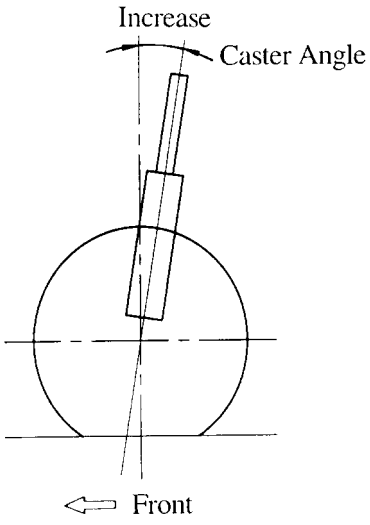
As in the previous model, the new model uses MacPherson strut type independent suspension.
However, each part of suspension has been revised to realize excellent riding comfort, in addition, this provides excellent stability and controllability.



Conventional Suspension Model

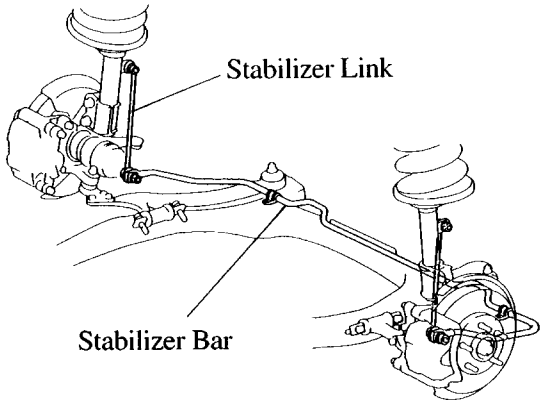
2. Geometry

The caster angle has been increased to realize excellent directional stability and steering response.

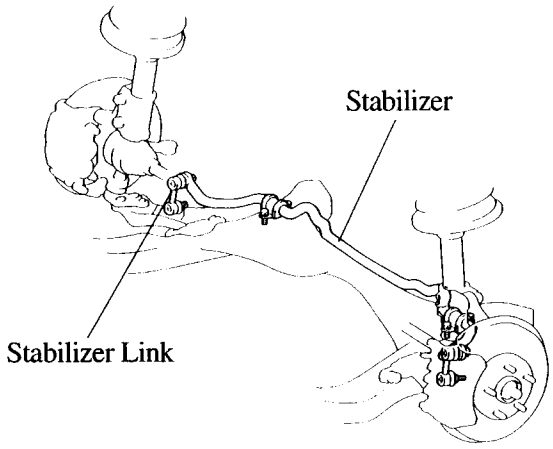


3. Stabilizer Bar

The mounting position of the stabilizer link has been changed from the lower arm to the strut.
As a result of realizing rolling control and excellent steering feeling, the spring rate of the coil spring could be lowered to improve riding comfort.



New



Previous

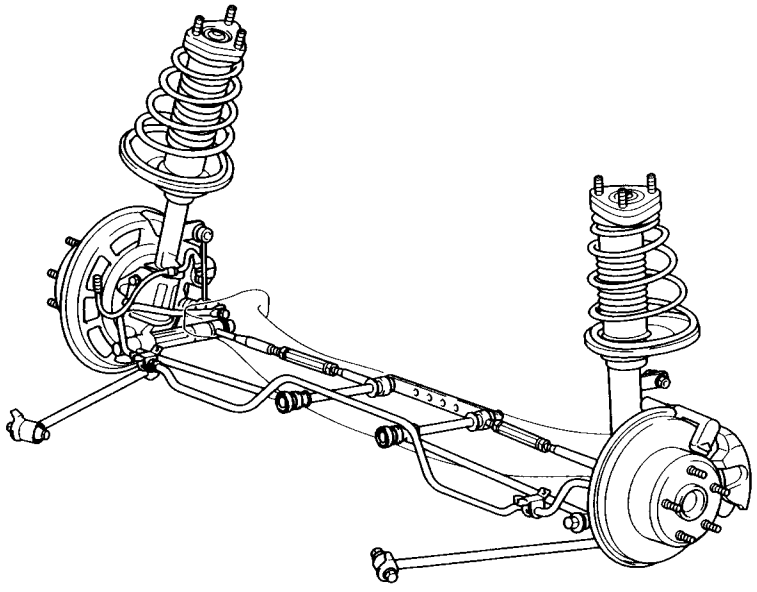
4. Suspension Upper Support, Coil Spring and Shock Absorber

The spring rate and damping force have been revised to realize excellent riding comfort, in addition, this provides excellent stability and controllability.

◦ REAR SUSPENSION

1. General

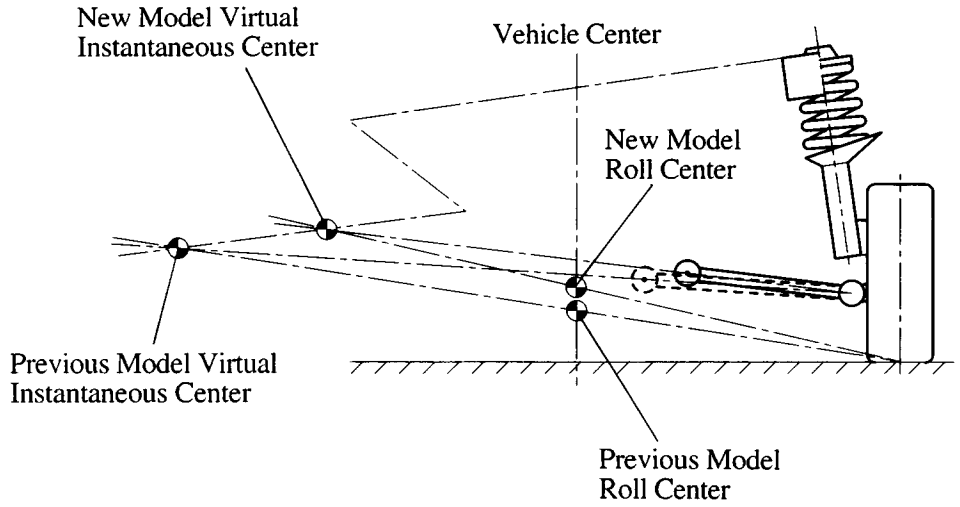
As in the previous model, the new model uses MacPherson strut type independent suspension.
However, each part of suspension has been revised to realize excellent riding comfort, in addition, this provides excellent stability and controllability.



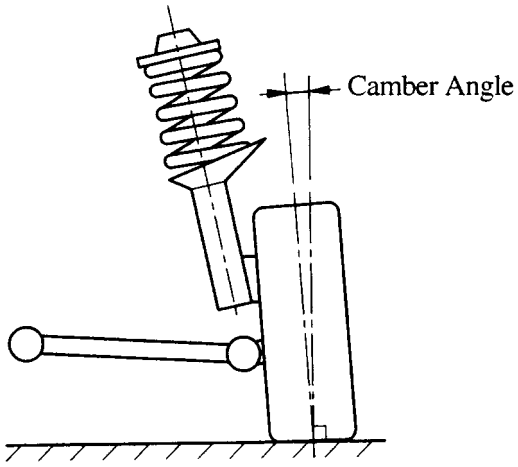
Conventional Suspension Model

2. Geometry

The position of the lower arm where it mounts to the subframe has been raised to relocate the rear roll center higher than that of previous model. As a result of this change, the body roll is restrained when a lateral force is applied, such as during cornering and lane changes, thus realizing excellent stability and steering response.

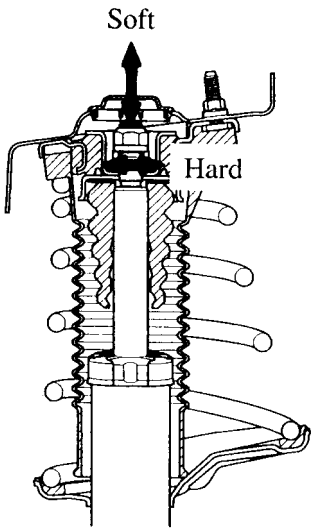


The negative camber angle realizes excellent stability during cornering and lane changes.



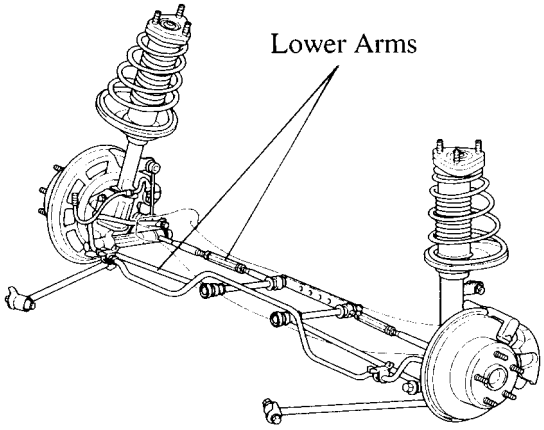
3. Suspension Upper Support

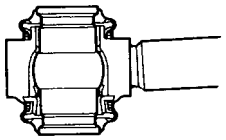
The spring rate of the suspension upper support has been made soft in the axial direction and hard in the perpendicular direction of axis to improve riding comfort.



4. Lower Arm

A pillow ball bushing is used for the lower arm to realize excellent riding comfort, stability and controllability.





Pillow Ball Bushing

5. Coil Spring and Shock Absorber

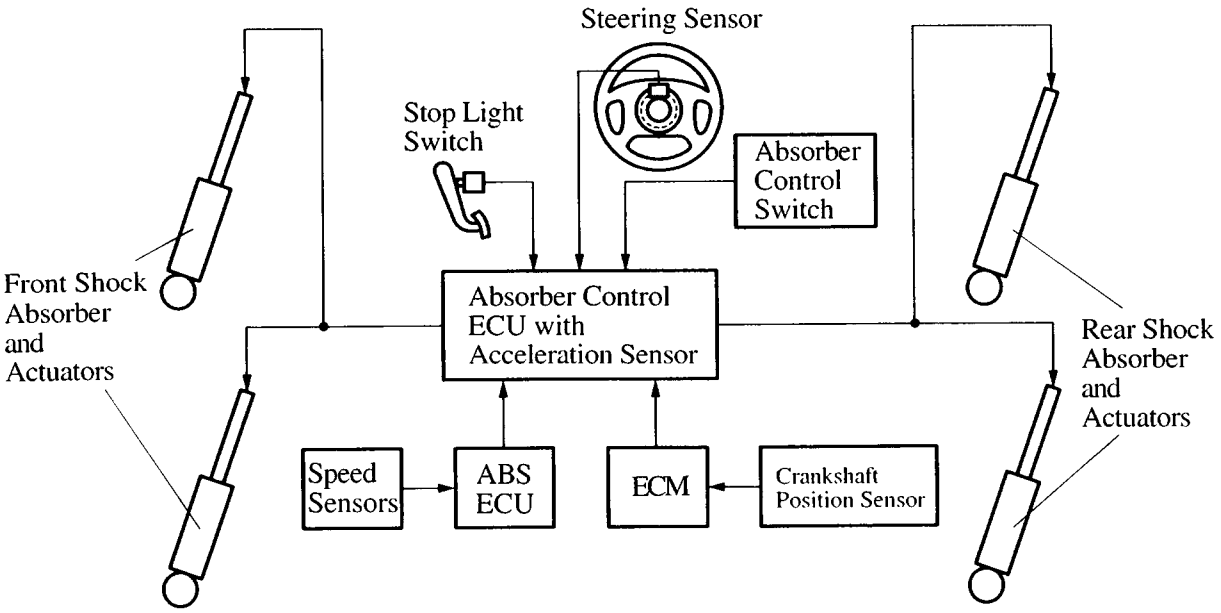
The spring rate and damping force have been revised to realize excellent riding comfort, in addition, this provides excellent stability, and controllability.

◦ ELECTRIC MODULATED SUSPENSION

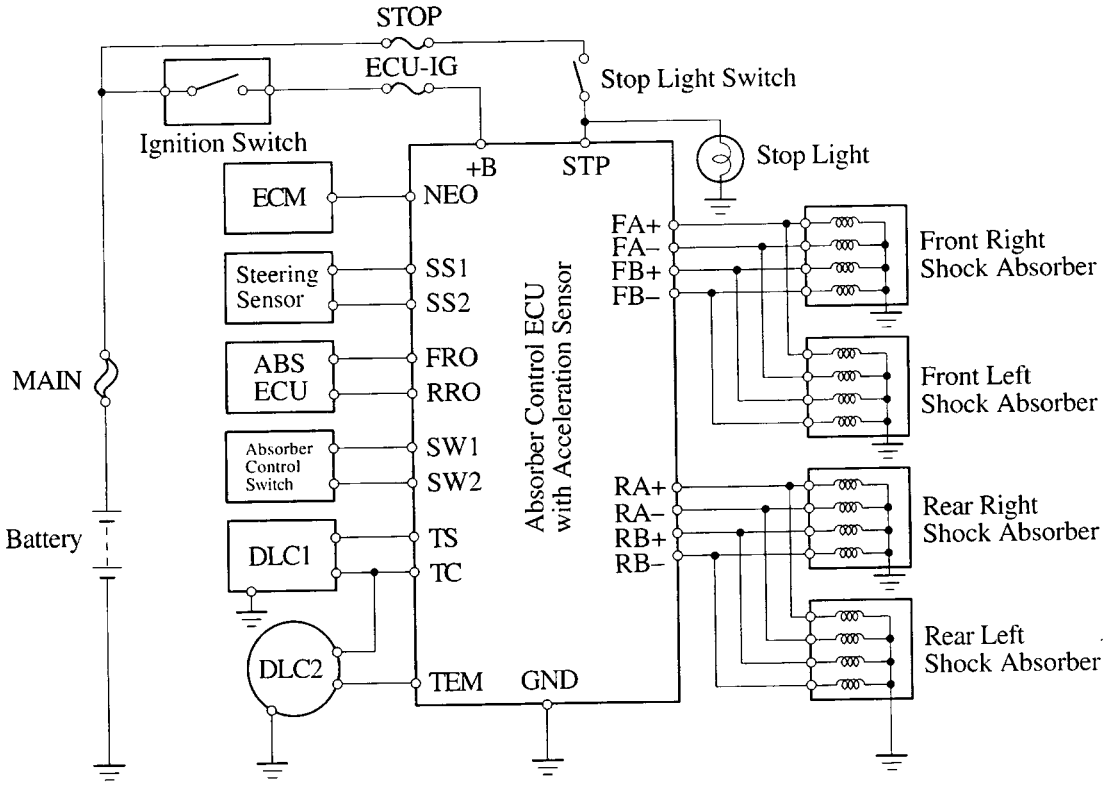
1. General

An electric modulated suspension is available as an option on all models.
Through electronic control, this system automatically controls the damping force of the shock absorbers, thus realizing excellent riding comfort, stability, and controllability.

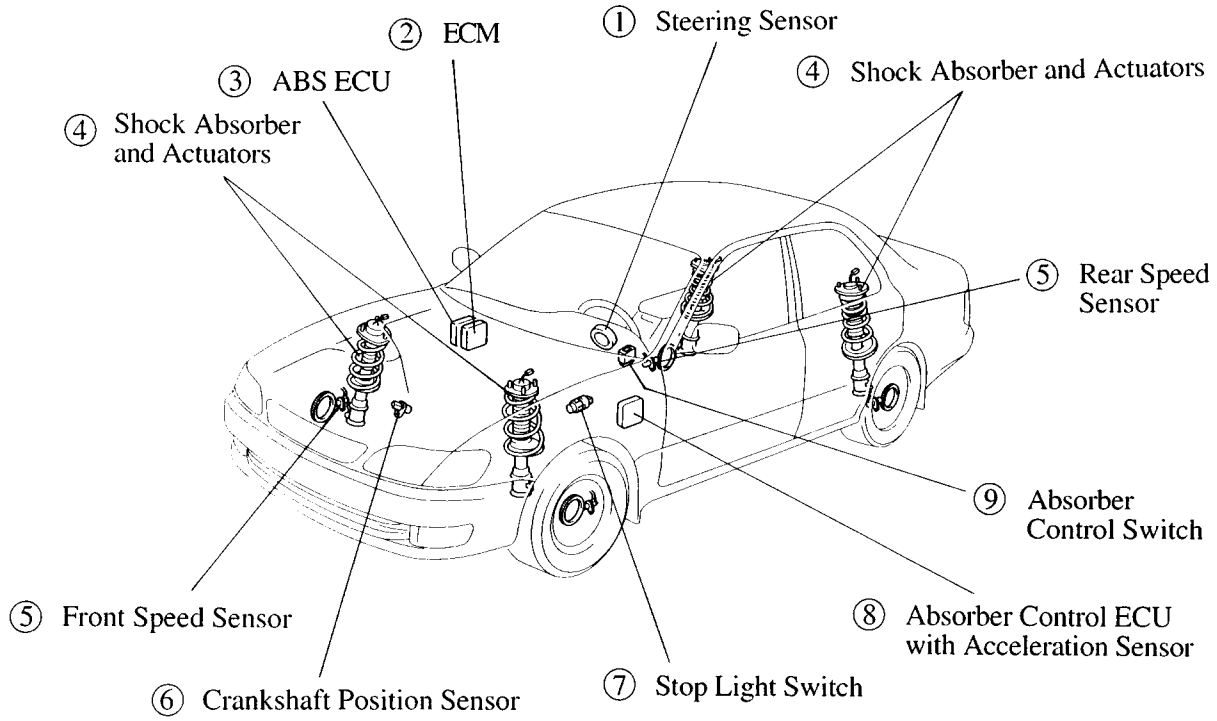
2. System Diagram



3. Wiring Diagram



4. Layout of Components



5. Function of Components

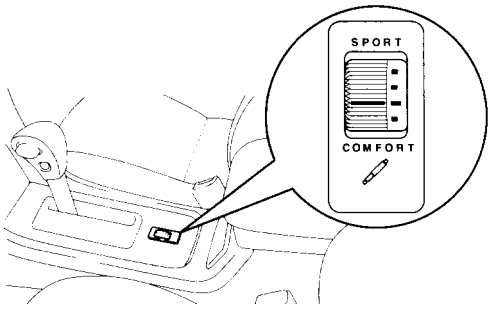
No.	Component	Function
①	Steering Sensor	Detects the steering direction and angle of the steering wheel.
②	ECM	Sends the engine signal from the crankshaft position sensor to the absorber control ECU.
③	ABS ECU	Converts the wheel speed signal from the speed sensors and sends it to the absorber control ECU.
④	Shock Absorber and Actuator	Switches the damping force of the shock absorber based on the control signal received from the absorber control ECU.
⑤	Speed Sensors (Front and Rear)	Detects the wheel speed of each wheels.
⑥	Crankshaft Position Sensor	Detects the engine revolution speed.
⑦	Stop Light Switch	Detects the brake condition.
⑧	Absorber Control ECU with Acceleration Sensor	• Determines the condition of the vehicle based on the signals received from the sensors and switches and sends a control signal to the actuator located in the shock absorber. • Uses an internal acceleration sensor to detect the vehicle's vertical acceleration rate.
⑨	Absorber Control Switch	Selects the damping force of the shock absorber.

6. Construction and Operation of Components

Absorber Control Switch

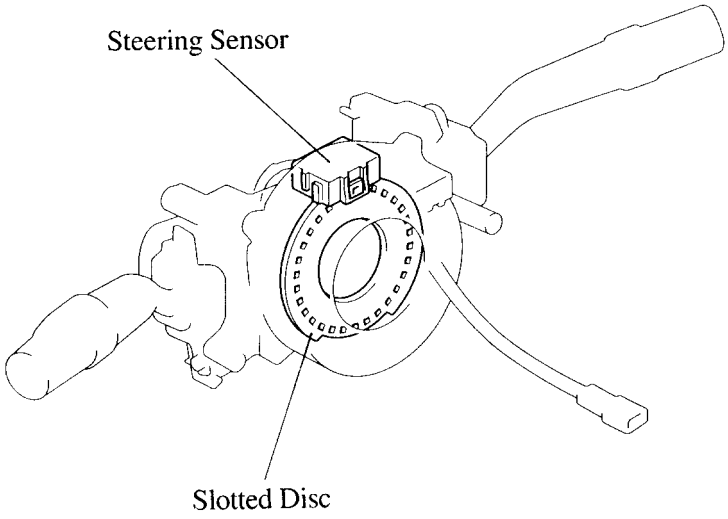
The absorber control switch uses a rotary type switch and is located in front of the rear console box.

By operating this switch, the driver can select four types of damping forces of the shock absorbers.



Steering Sensor

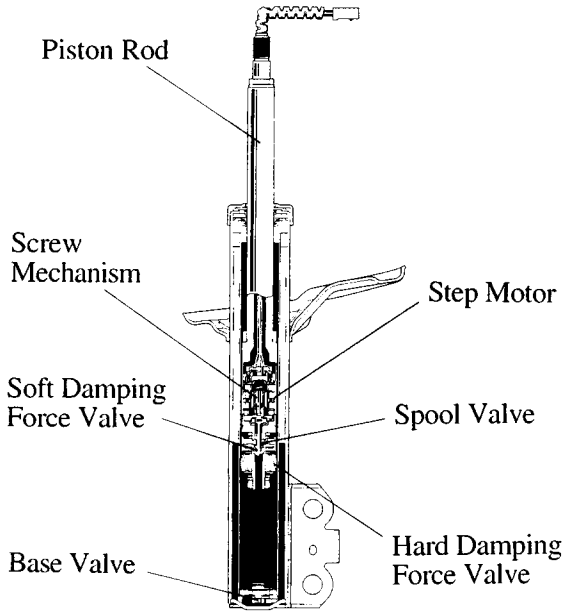
The steering sensor is fitted to the turn signal switch assembly and detects the steering direction and angle. The sensor includes a slotted disc that rotates with the steering wheel and a pair of photo interrupters. Each photo interrupter consists of an LED (Light Emitting Diode) and a photo transistor, located facing each other. It converts the change in the light radiation between the two elements to on/off signals. The slotted disc rotates between the LED and photo transistor. As the steering wheel is turned, the slotted disc rotates with the wheel and controls the light transmission between the two elements. The pair of photo interrupters are phased and the absorber control ECU detects the steering direction and angle based on the changes of each output.

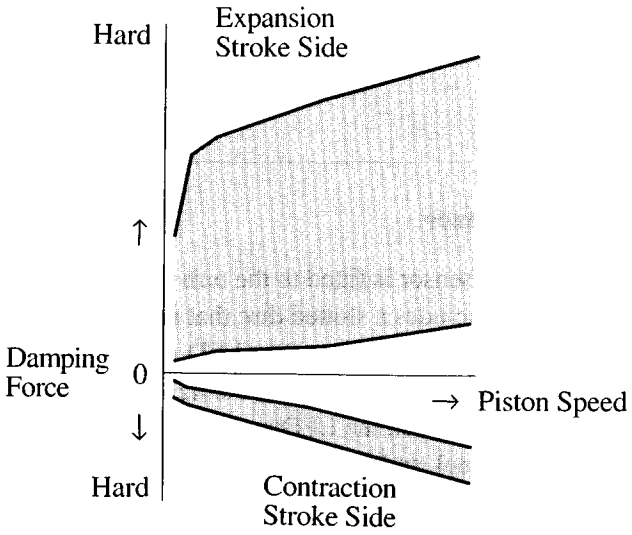


Front and Rear Shock Absorber and Actuators

The piston rod of the shock absorber is equipped with an internal actuator. The actuator consists of a step motor, a screw mechanism (which converts the rotational movement to a linear movement) and a spool valve. Also, the piston rod is equipped with a soft damping force valve and a hard damping force valve. Signals from the absorber control ECU activate the actuator causing the spool valve to switch the oil passage. Thus, the volume of oil that passes through each valve is varied in order to control the damping force in 16 steps.

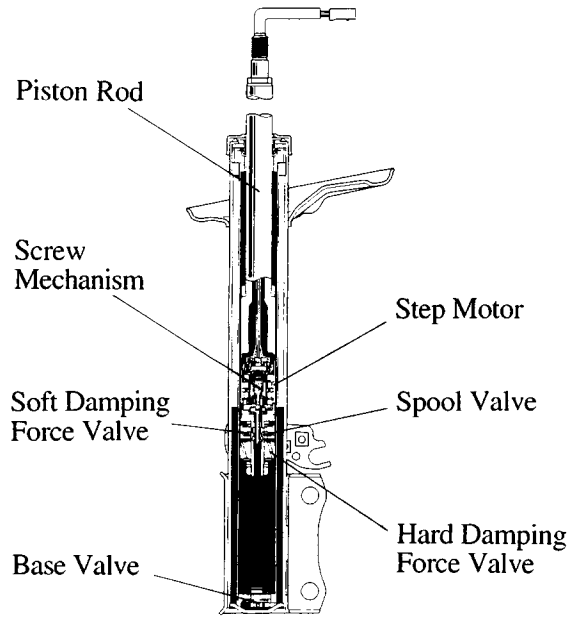
▶ Front Shock Absorber ◀

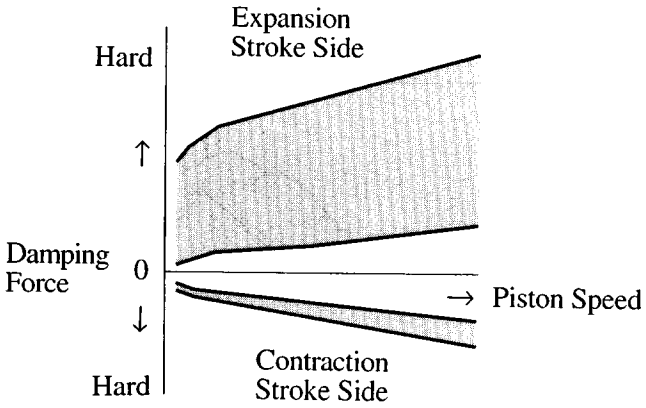




Damping Force Characteristic

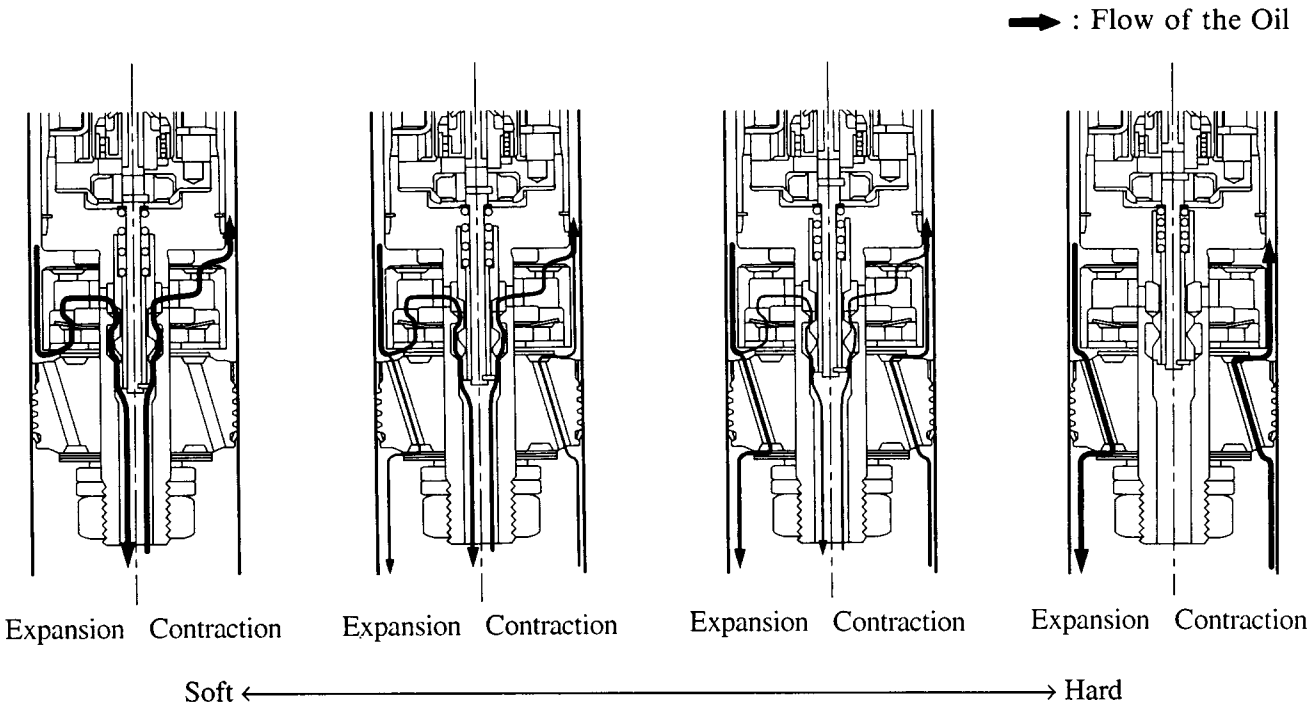
▶ Rear Shock Absorber ◀





Damping Force Characteristic

▶ **Flow of the Oil** ◀



Absorber Control ECU

1) General

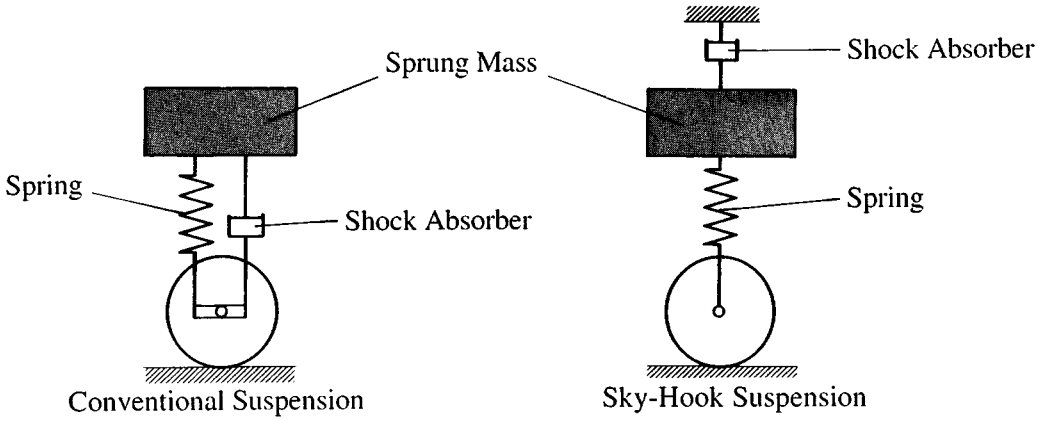
The absorber control ECU, which is located in the instrument panel, is equipped with an internal acceleration sensor to detect the vehicle's vertical movement.

Based on the signals received from the acceleration sensor enclosed in the absorber control ECU and other sensors, the absorber control ECU detects the driving conditions and the vertical movement of the vehicle body (as caused by bumpy roads).

According to the sky-hook theory, the absorber control ECU performs a front/rear wheel control of the damping force of the shock absorbers independently to realize excellent riding comfort, stability, and controllability.

— REFERENCE —

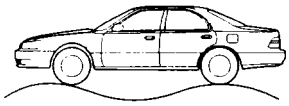
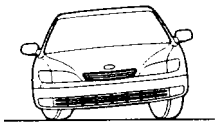
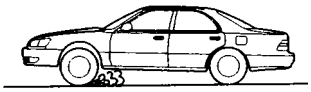
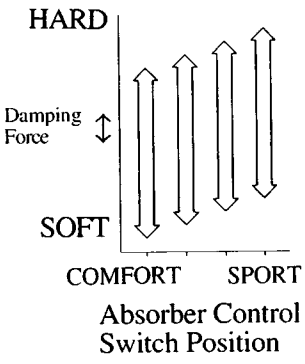
In order to maintain the vehicle posture fiat and stable, the sky-hook theory is a theory that renders as ideal condition of a vehicle in which only the wheels move up and down when the bumpy road conditions are transmitted to the vehicle body, while the body remains suspended in space via the shock absorbers. In order to attain the movements that are as close as possible to those of the sky-hook theory, the new model minutely controls the shock absorbers' clamping force in response to bumpy roads.



Model Based on Vibration Engineering

2) Function of Electric Modulated Suspension

This suspension system performs the controls described below in order to constantly maintain an optimal vehicle posture, thus realizing excellent riding comfort, stability, and controllability.

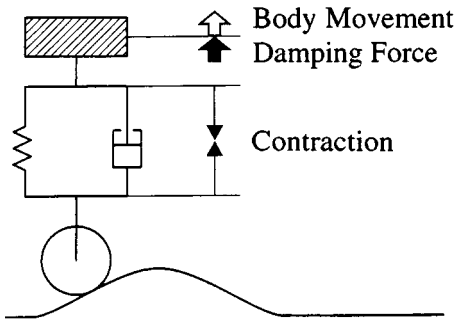
Control			Function
Road-Sensitive Control	Float and Pitch Control		Estimates the relative speed between the vehicle body and wheels based on the vehicle body vertical acceleration rate detected by the acceleration sensor and performs a (front/rear wheel independent) semi-active control* of the shock absorbers' damping force. As a result, a damping force that is constantly optimal to the road surface deviation is attained. *: For details, see the next page.
	Thumping Sensitive Control		When the road surface condition does not require a damping force, this function controls the shock absorbers so that their damping force will not increase.
	Unsprung Vibration Control		If unsprung resonance is detected, this function controls so that the damping force will not decrease below a certain level, in order to reduce the unsprung resonance.
Anti-Roll Control			During cornering, this function makes the damping force firmer, thus restraining the body roll speed in order to realize excellent stability and controllability.
Anti-Dive Control			During braking, this function makes the damping force firmer to restrain the body dive, thus ensuring excellent stability and controllability.
Anti-Squat Control			During acceleration, this function makes the damping force firmer to minimize the changes in the vehicle body posture.
High Speed Control			This function varies the variable range of the damping force according to vehicle speed in order to realize a soft .and comfortable ride and a stable driving condition. The damping force is controlled at a softer variable range at low speeds, and at a firmer variable range at high speeds.
Control by Absorber Control Switch			As shown on the left, the absorber control switch enables the driver to select a desired damping force from the 4 modes.

3) Semi-Active Control

Based on the sprung mass and the direction of the shock absorber's movement, the semi-active control determines the conditions which assist and suppress the vibration in terms of the shock absorber's sprung mass. Thus, the semi-active control controls the damping force so that the shock absorber will only apply an effective suppressing force against sprung mass.
Let us take an example of vehicle overcoming a gentle bump and separate it into 4 basic stages (stages ① to ④).

① Starting uphill (1st stage)

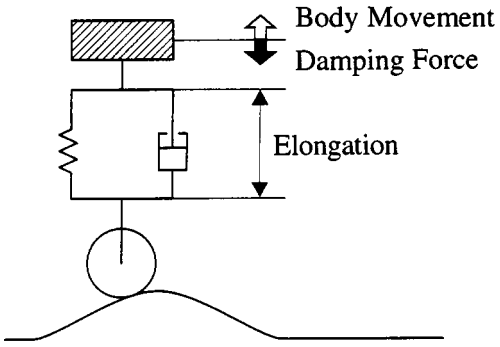
According to the variation in the road surface, the shock absorber contracts and the body moves upward. At this time, the damping force of the shock absorber is applied in the direction which assists the body movement.



Assisting the Vibrations

② Ascending (2nd stage)

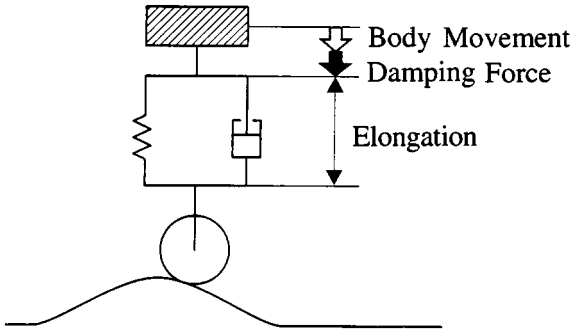
By inertia, the body keeps moving upward causing the shock absorber to elongate gradually. At this time, the damping force of the shock absorber is applied in the direction which restrains the movement of the body.



Suppressing the Vibrations

③ Starting Downhill (3rd stage)

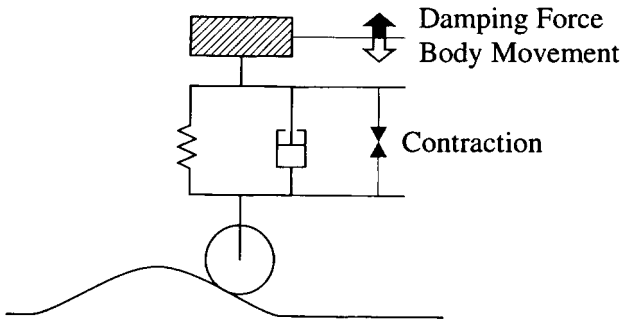
The shock absorber deeps elongating along with the variation of the road surface, but the body starts moving downward. At this time, the damping force of the shock absorber is applied in the direction which assists the body movement.



Assisting the Vibrations

④ Descending (4th stage)

By inertia, the body keeps moving downward causing the shock absorber to contract gradually. At this time, the damping force of the shock absorber is applied in the direction which restrains the movement of the body.



Suppressing the Vibrations

Thus, during stages ① and ③ the shock absorbers assist the vibration to create a softer damping force, and during stages ② and ④ the shock absorber suppress the vibration to create a hard damping force, the shock absorbers are minutely controlled to suppress the vibration to restrain the movement of the body and of the shock absorbers.
The above processes are performed independently between the front and rear wheels in order to stabilize the vehicle to a flat posture.

4) Self-Diagnosis

If a malfunction occurs in any of the sensors or actuators, the diagnostic code of that malfunction is stored in memory. However, once the ignition switch is turned OFF, the diagnostic code is erased.
For diagnostic code check method, diagnostic code and diagnostic code clearance, see the 1997 ES300 Repair Manual (Pub. No. RM511U).

5) Fail-Safe

If a malfunction occurs in any of the sensors or actuators, the control of the damping force will be limited.

STEERING

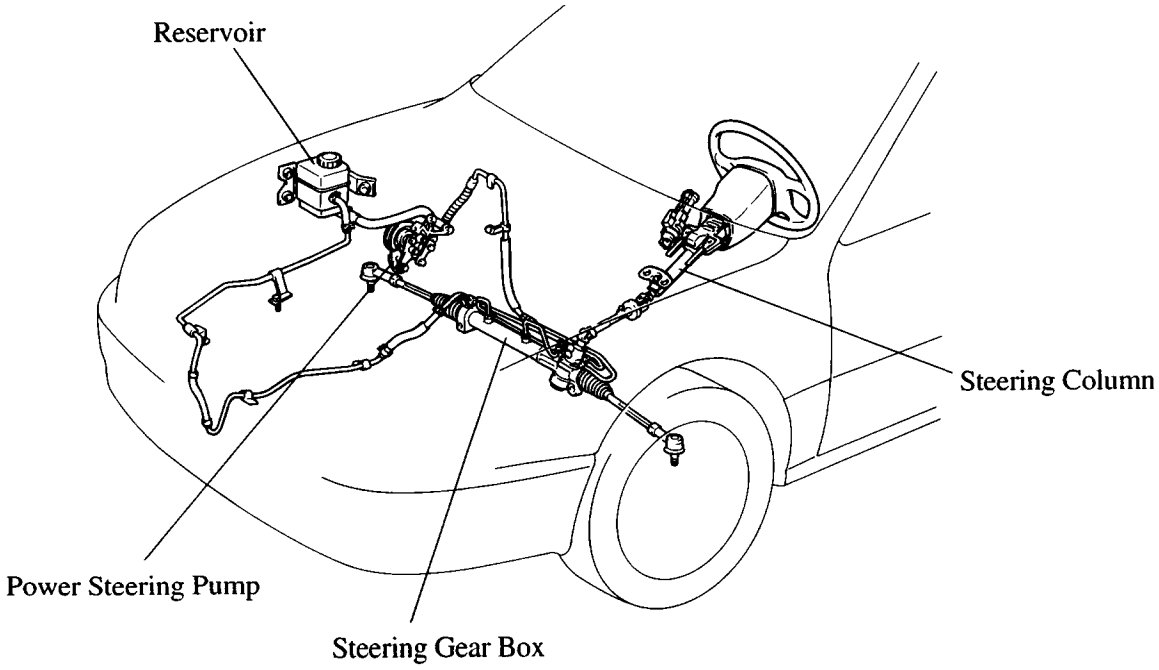
● DESCRIPTION

° An engine revolution sensing type rack and pinon power steering is used on all models.

° A compact and lightweight tilt steering is used on all models.

° An energy absorbing mechanism has been changed.

° Along with the discontinuance of the electronically controlled hydraulic cooling fan system, a single type power steering pump has been adopted.



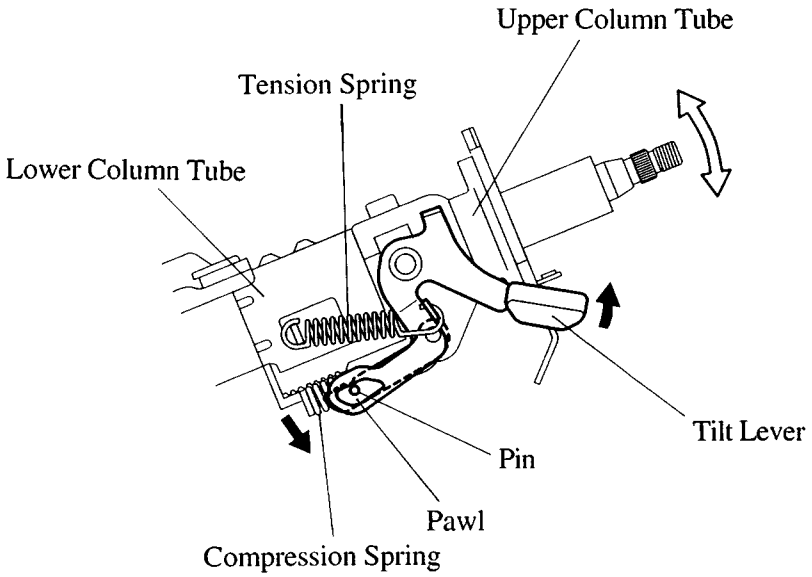
▶ Specifications ◀

Model / Item	New	Previous
Gear Ratio (Overall)	17.4 :1	15.9: 1
No. of Turn Lock to Lock	3.0	2.7
Rack Stroke mm (in)	145 (5.71)	←
Fluid Type	ATF Type DEXRON®II or III	←

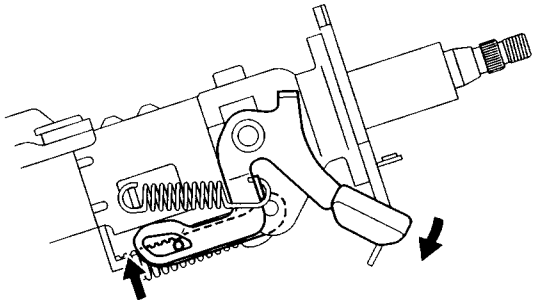
• STEERING COLUMN

1. Tilt Mechanism

The tilt mechanism consists of a tilt lever, pawl, upper column tube, lower column tube, tension spring and compression spring.
A hole is provided at the tip of the tilt lever, into which the pawl pin is inserted.
Because the pawl pin is inserted into the hole at the tip of the lever, moving the tilt lever causes the pawl to move downward. As a result, the ratchet of the lower column tube and the ratchet of the pawl disengage from each other to release the tilt lock.
Releasing the tilt lever causes the lever (which is under spring tension) to return. Accordingly, the pawl is pushed upward, causing the ratchet of the column tube and the ratchet of the pawl to engage with each other, thus locking the tilt lock.



Free

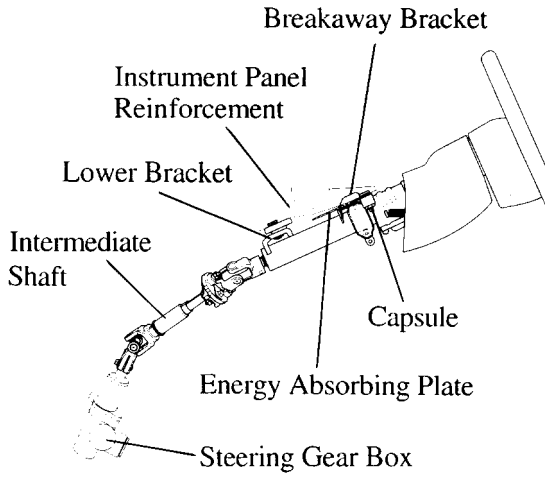


Lock

2. Energy Absorbing Mechanism

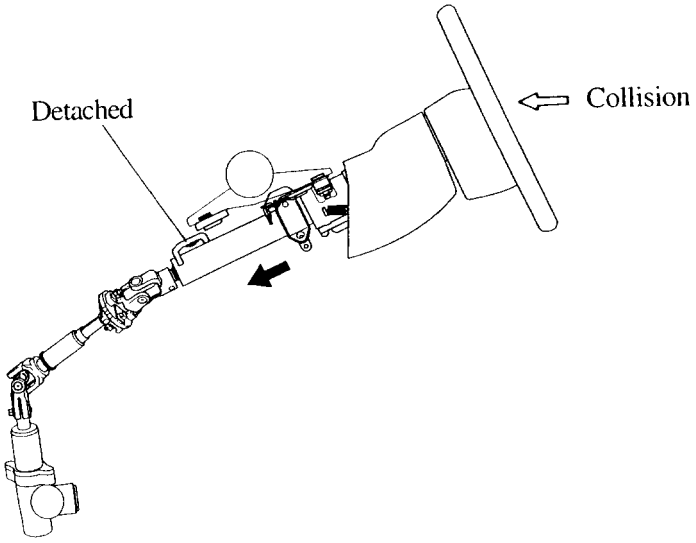
Construction

The energy absorbing mechanism of the steering column consists of a lower bracket, breakaway bracket and energy absorbing plate.
The breakaway bracket is attached to the instrument panel reinforcement via the capsule and the energy absorbing plate.
The steering column and steering gear box are connected with an elastic intermediate shaft.

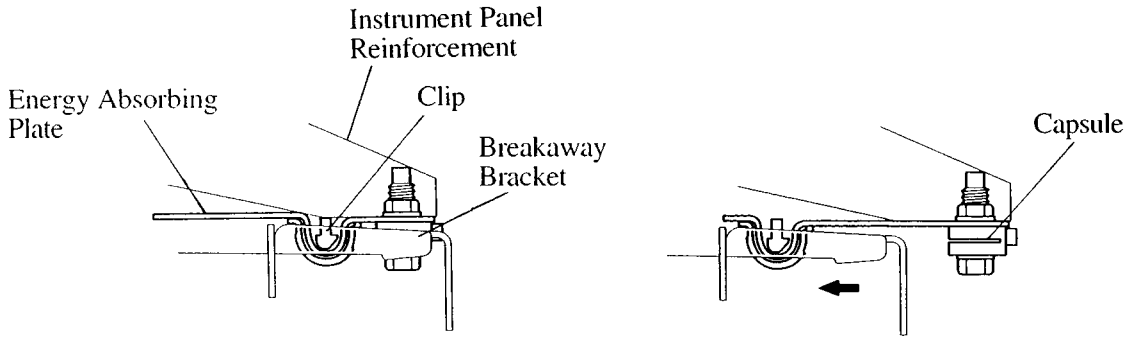


Operation

The collision is transmitted to the steering wheel, the lower bracket and the breakaway bracket will become detached from each other, thus moving the entire unit forward. At the same time, the energy absorbing plate becomes deformed to absorb the energy of the impact.



▶ Energy Absorbing Plate ◀



Before Collision **During Collision**

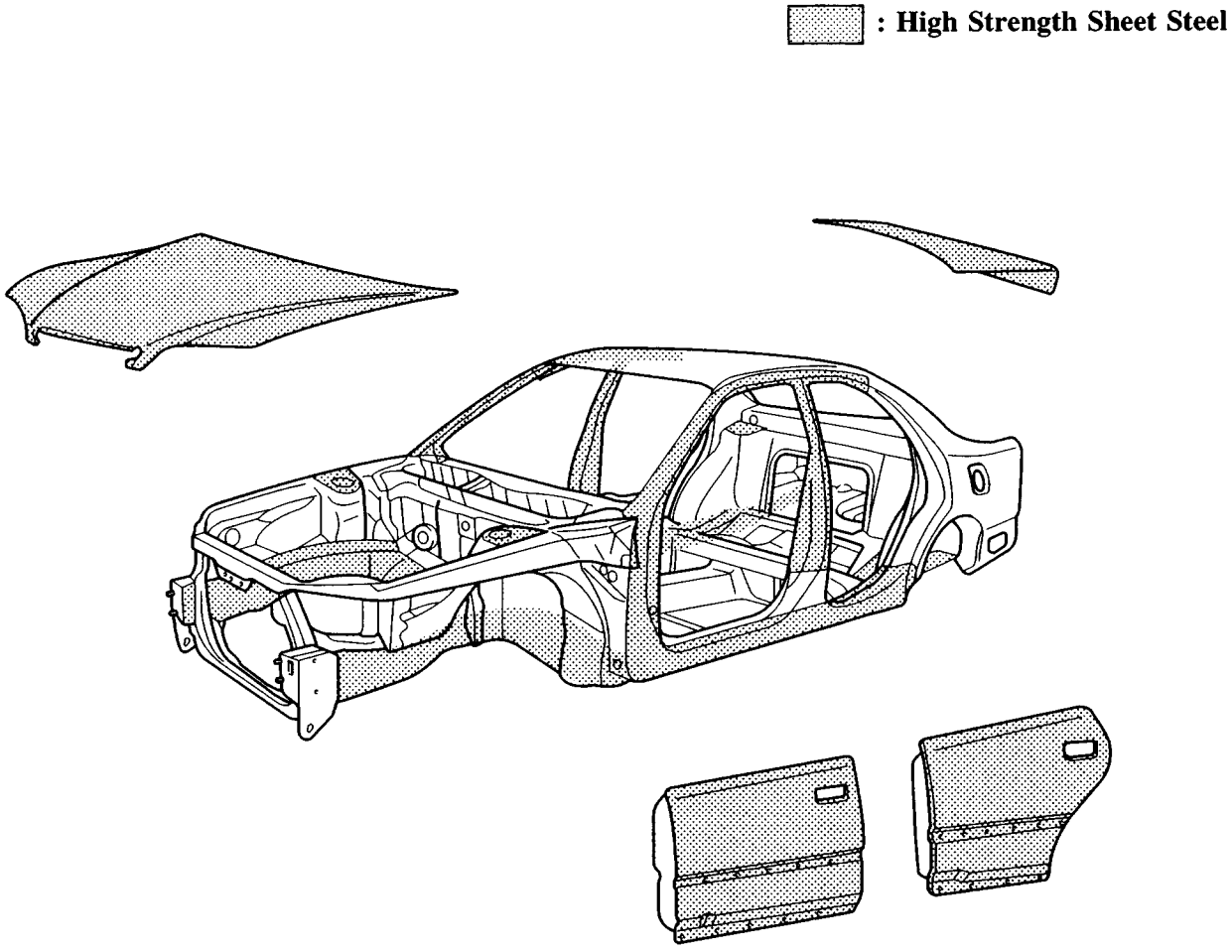
BODY

LIGHTWEIGHT AND HIGHLY RIGID BODY

The body of the new ES300 is made highly rigid and lightweight through refinement of the shape and construction of each part, improved joint rigidity, and increased use of high strength sheet steel.

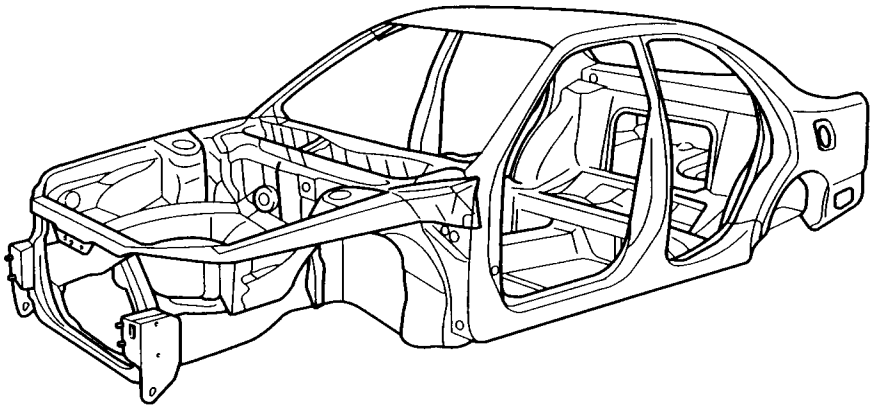
• HIGH STRENGTH SHEET STEEL

Light and highly rigid high strength sheet steel is used for the hood, door panels and members.

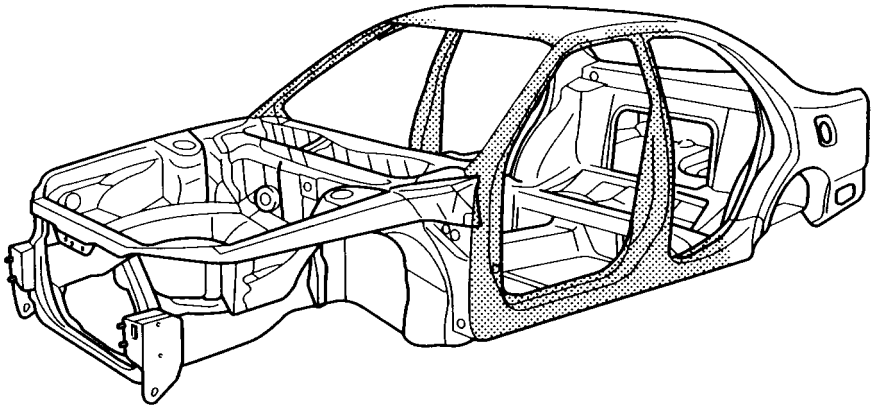


● BODY SHELL

° The body of the new ES300 is made highly rigid through the optimization of the location of reinforcements, the continuity in underbody members, and via excellent joint rigidity.

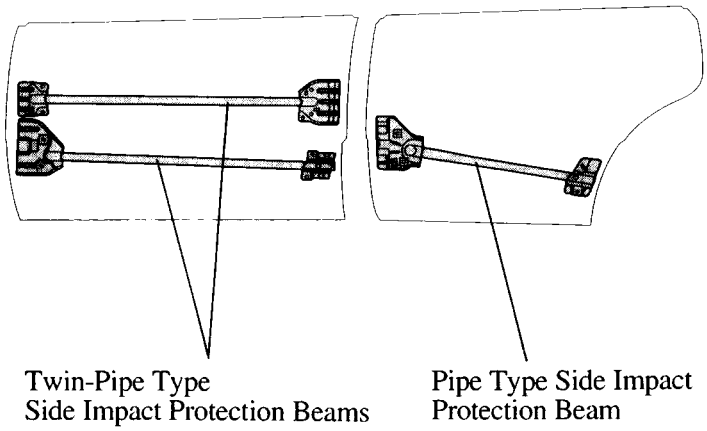


° At each pillar, a continuous reinforcement is provided from where the pillar meets the roof, all the way to the rocker, thus resulting in a strong pillar construction. In addition, the areas where the pillar joins the roof side rail and the rocker have been strengthened to realize excellent body rigidity.



• DOORS

A twin-pipe type side impact protection beams are mounted in the center space between the front door panels. Similarly, a side impact protection beam is provided in the rear door.



● IMPACT ABSORBING STRUCTURE

1. General

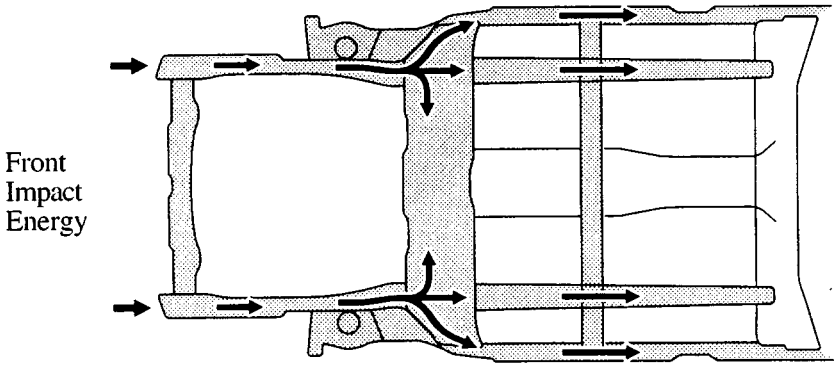
The impact absorbing structure of the new ES300 provides a body construction that can effectively absorb the energy of impact in the event of a front, rear, or side collision. Also, it realizes an excellent occupant protection performance through the use of reinforcements and members that help minimize cabin deformation.

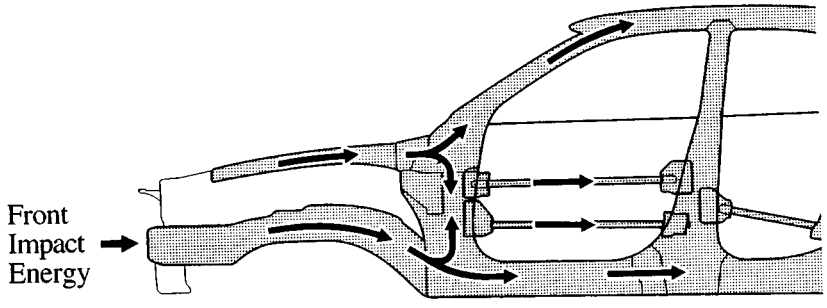
2. Construction

Impact Absorbing Structure for Front/Rear Collision

In conjunction with the revision made to the impact absorbing structure for a front or rear collision, the cross section of the underbody members, pillars, and reinforcements have been increased in size and thickness of the material used.
Accordingly, the underbody and cabin framework were made to efficiently absorb and dissipate the impact energy in case of a front or rear collision, thus realizing a body structure to minimize cabin deformation.

▶ Impact Absorbing Structure for Front Collision ◀

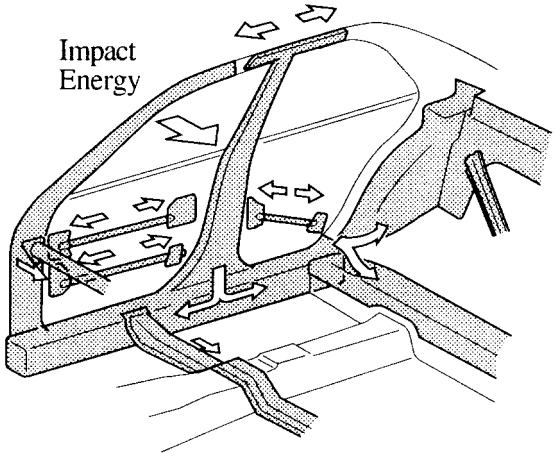




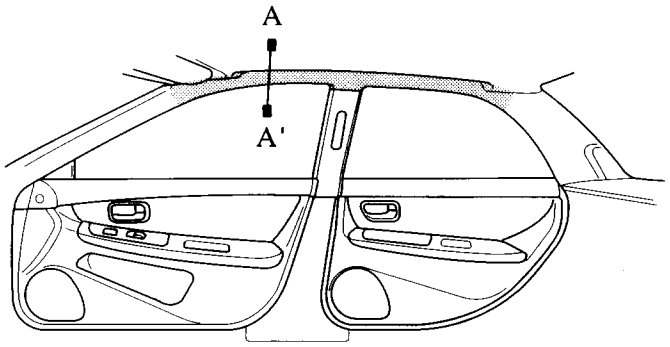
Impact Absorbing Structure for Side Collision

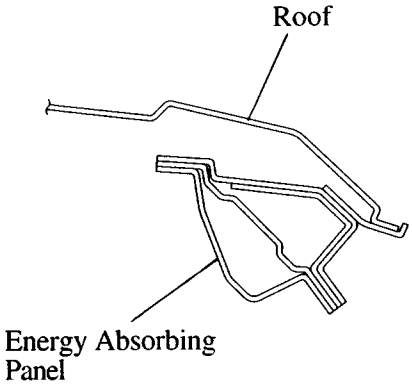
Impact energy of a side collision directed to the cabin area is dispersed throughout the body via pillar reinforcements, side impact protection beams, floor cross members, etc. This dispersion of energy keeps the energy directed to the cabin to a minimum level. In addition, the body is made highly rigid through reinforced joints and the use of high strength sheet steel in order to maintain the maximum preservation of the cabin space. And, in order to make the door more energy absorbent, a closed cross section configuration is provided at the belt line area of the front and rear doors.
Also, a soft upper interior construction has been adopted. With this type of construction, if the occupant's head collides against the roof side rail in reaction to a collision, the inner panel of the roof side rail collapses to reduce the impact.

▶ Impact Absorbing Structure for Side Collision ◀



▶ Soft Upper Interior Structure ◀





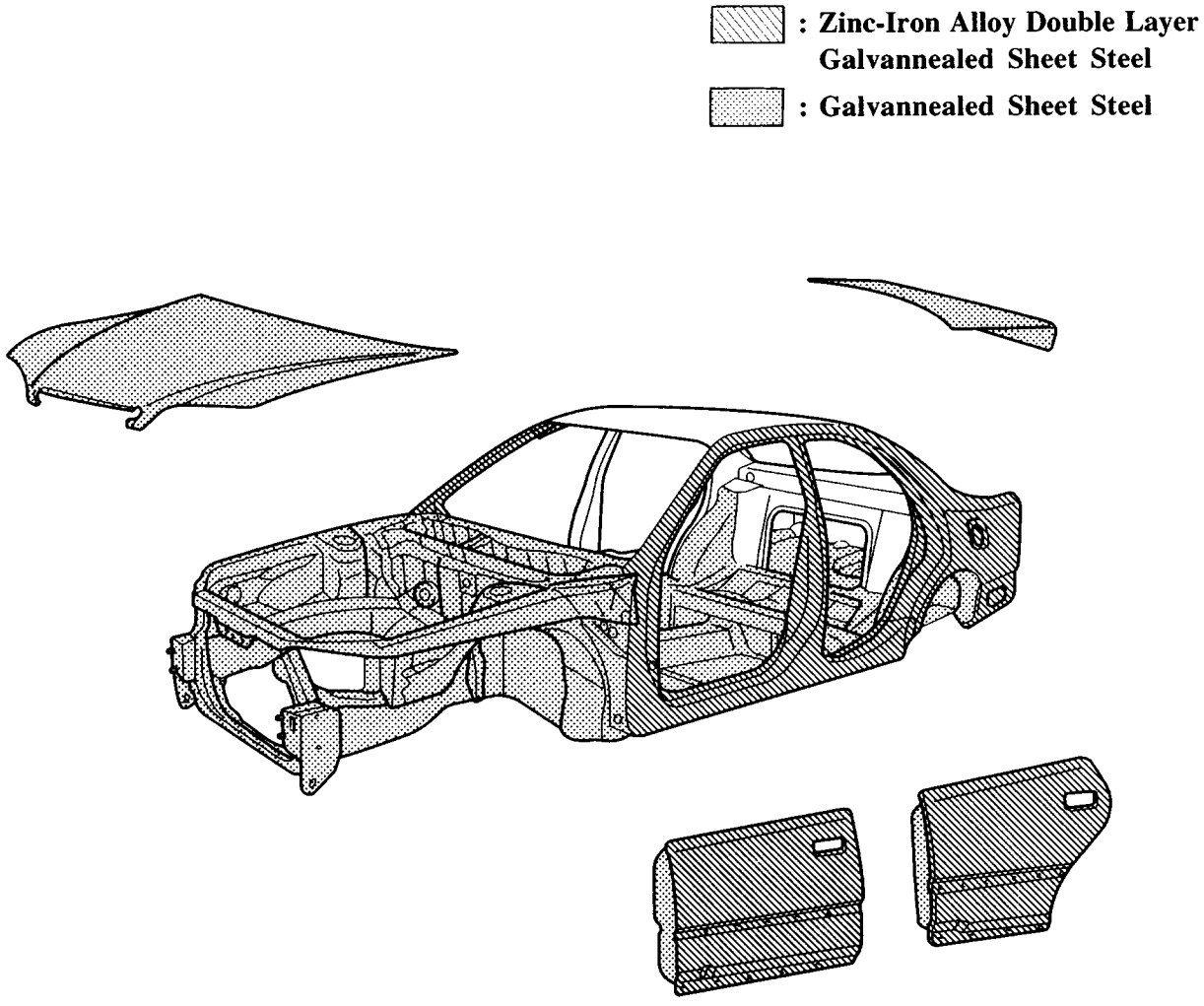
A – A' Cross Section

RUST-RESISTANT BODY

Rust-resistant performance is enhanced by extensive use of anti-corrosion sheet steel and is performing an anti-corrosion treatment by applying wax, sealer and anti-chipping paint to easily corroded pans such as the hood, doors and rocker panels.

▶ ANTI-CORROSION SHEET STEEL

Two types of anti-corrosion sheet steel are used: galvannealed sheet steel and zinc-iron alloy double layer galvannealed sheet steel. Galvannealed sheet steel is used for hood, luggage compartment door, many inner panels and engine compartment. Zinc-iron alloy double layer galvannealed sheet steel is used for side outer panels and doors.



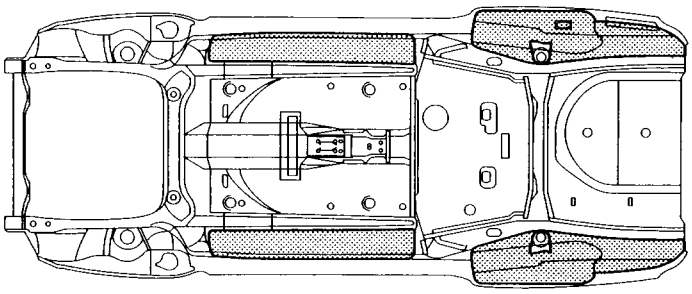
▶ WAX AND SEALER

Wax and sealer are applied to the hemmed portions of the hood, door panels and luggage compartment door to improve rest-resistant performance.

▶ UNDER COAT

PVC (Polyvinyl Chloride) coating is applied to the under side of the body. A thick coating to improve rust resistant performance is applied to the bottom side of the cowl panel, the fender apron and other pans which are subject to damage by flying stones, etc.

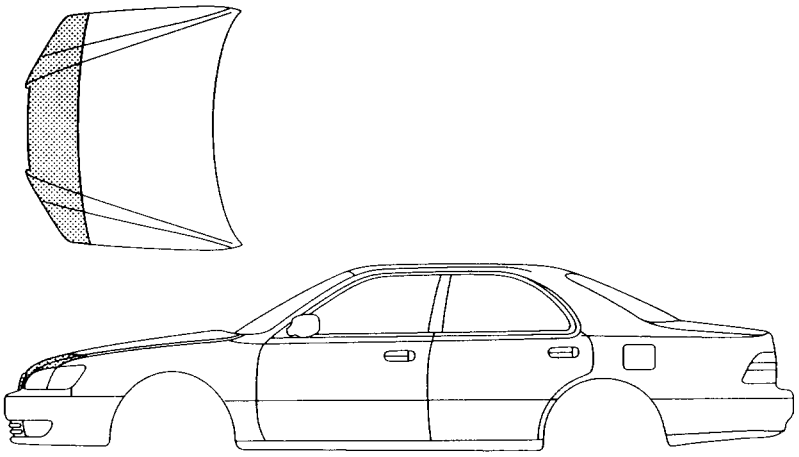
: PVC Coating Area



▶ ANTI-CHIPPING APPLICATION

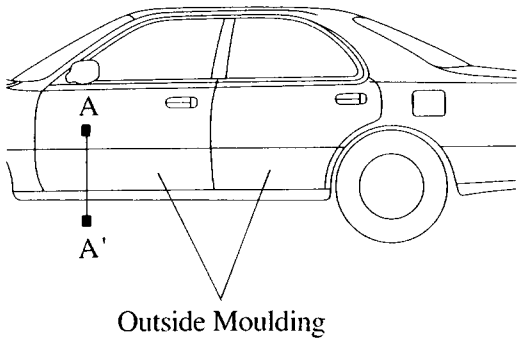
Soft-chip primer is applied to the hood.

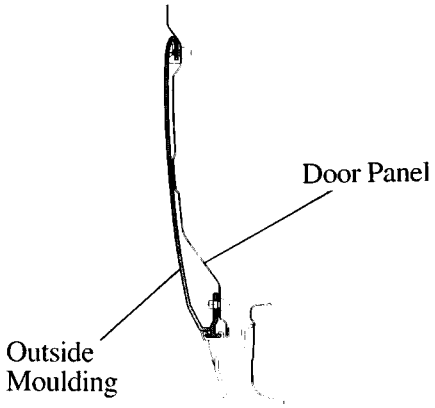
: Soft-Chip Primer



▶ OUTSIDE MOULDING

Outside mouldings made of TSOP (The Super Olefin Polymer) have been provided to protect the bottom of the doors from chipping by flying stones.

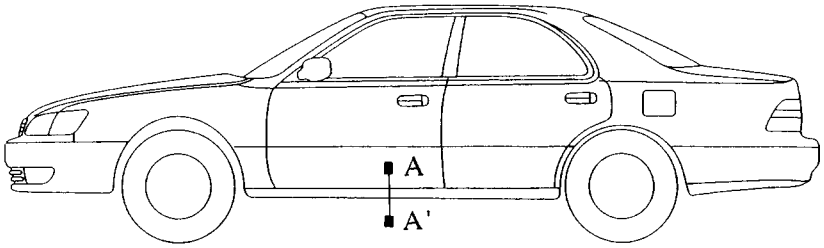


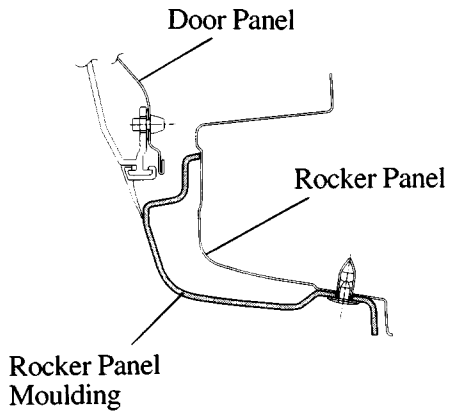


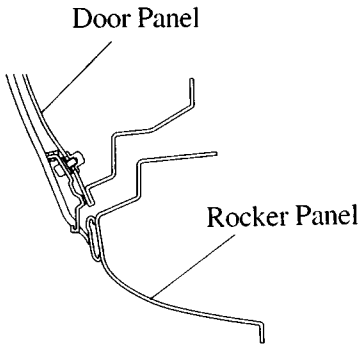
A – A' Cross Section

▶ ROCKER PANEL MOULDING

A rocker panel moulding has been provided to protect the rocker panels from chipping by flying stones. This moulding is a fore-aft integrated type that offers a seamless, attractive design.







New **Previous**

A – A' Cross Section

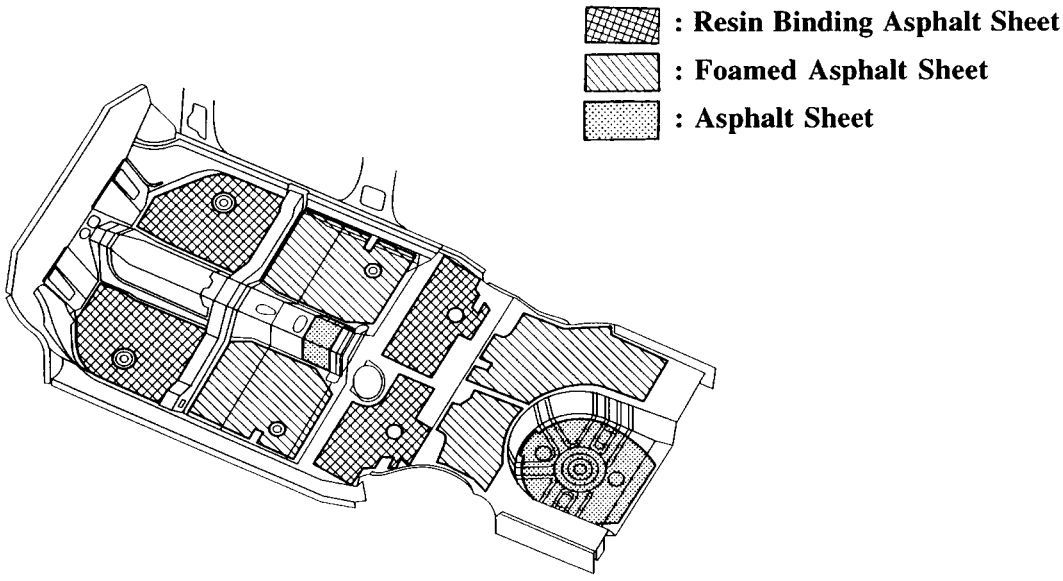
LOW VIBRATION, LOW NOISE BODY

Effective application of vibration damping and noise suppressant materials reduces engine and road noise.

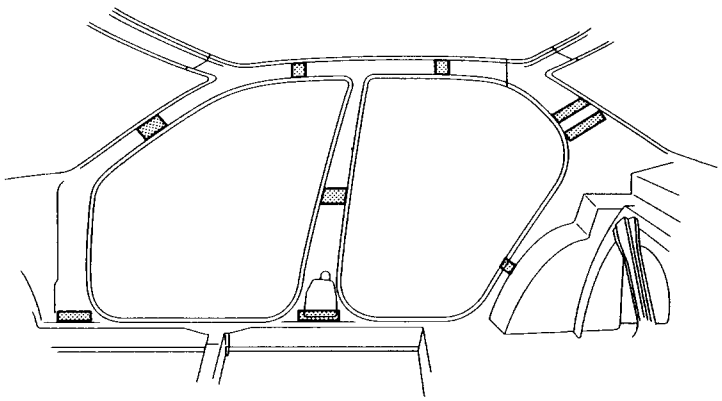
• SOUND ABSORBING AND VIBRATION DAMPING MATERIALS

- Sandwich panels are used in the dash panel, cowl panel, front floor panel and rear wheel housings.
- Resin binding asphalt sheet and foamed asphalt sheet are optimally allocated to reduce engine and road noise for quieter vehicle operation.
- Foamed material is applied onto the roof panel and pillars to reduce wind noise.

▶ Resin Binding Asphalt Sheet and Foamed Asphalt Sheet ◀



▶ Foamed Sponge Rubber ◀



AERODYNAMICS

To improve aerodynamic performance, the following measures have been taken.

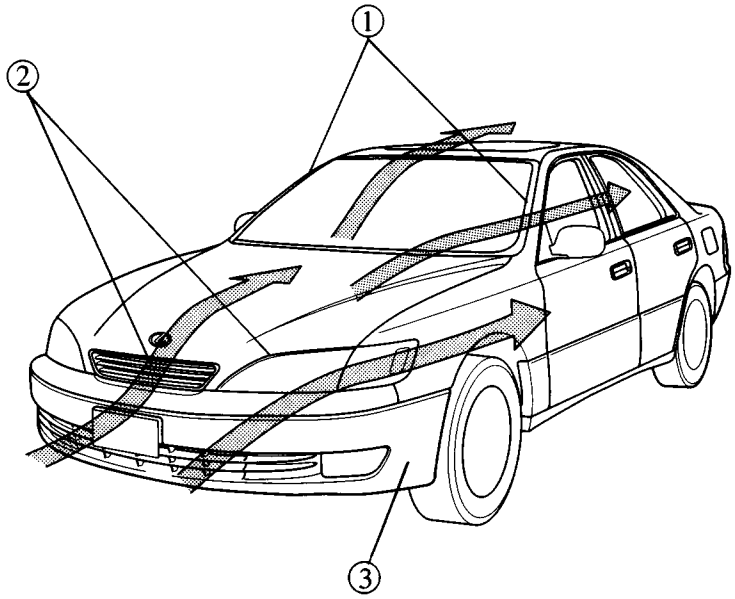
① A large rain gutter has been provided in the front pillar to ensure a smooth airflow from the front to the side.

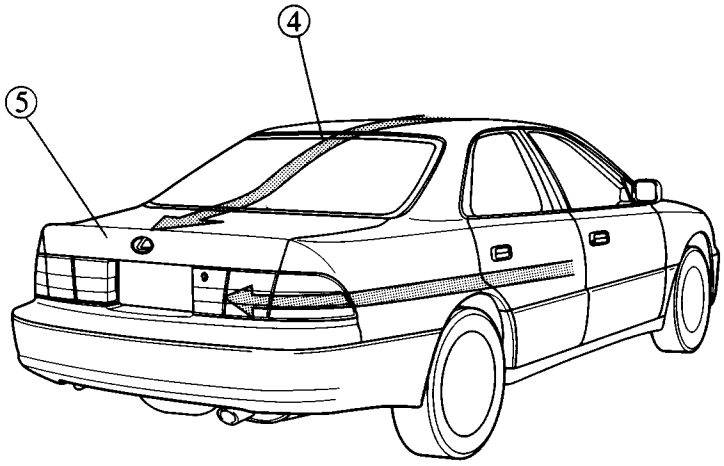
② The front edge of the hood and the area around the headlights offers a smooth shape with minimal level differences for smooth airflow characteristics.

③ The under shape of the front bumper collects the flow of air under the floor.

④ The body line from the roof to the luggage compartment allows the air to flow smoothly from the top of the roof to the rear.

⑤ To ensure a smooth airflow from the roof to the rear, the shape of the luggage compartment door has been optimized.

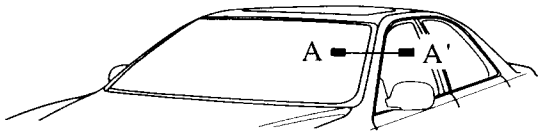


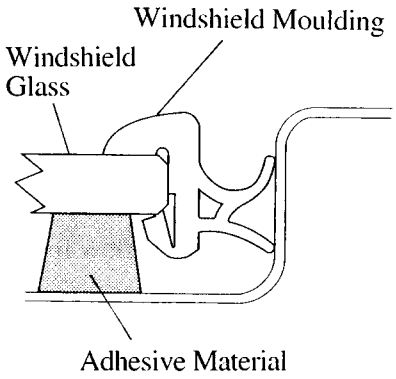


ENHANCEMENT OF PRODUCT APPEAL

▶ WINDSHIELD MOULDING

A rain gutter has been incorporated into the periphery of the windshield moulding in order to reduce the rain flow down from the roof panel to the windshield glass.

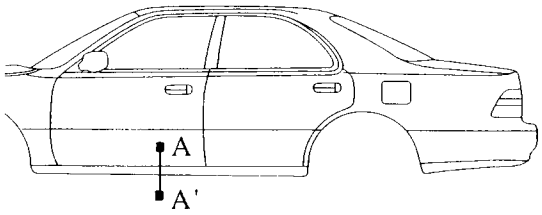


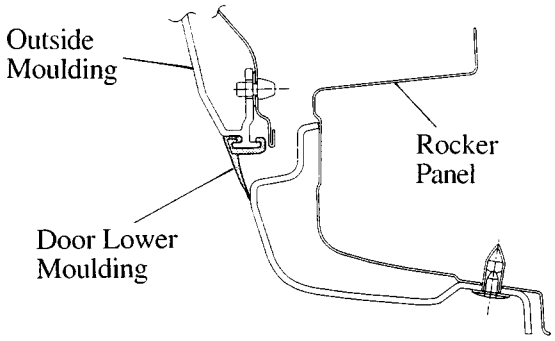


A – A' Cross Section

▶ DOOR LOWER MOULDING

A door lower moulding has been provided below the outside moulding to prevent the top of the rocker panels from getting soiled. This prevents the passengers' clothes from getting dirty when entering and exiting the vehicle.





A – A' Cross Section

SEAT BELT PRETENSIONER

• DESCRIPTION

A mechanical sensing type seat belt pretensioner is incorporated with the front outerside seat belt.
In a collision, the pretensioner sensor detects the shock and if the front-to-rear shock is greater than a specified value, the seat belt pretensioner is activated instantaneously to pull in a predetermined length of the seat belt.

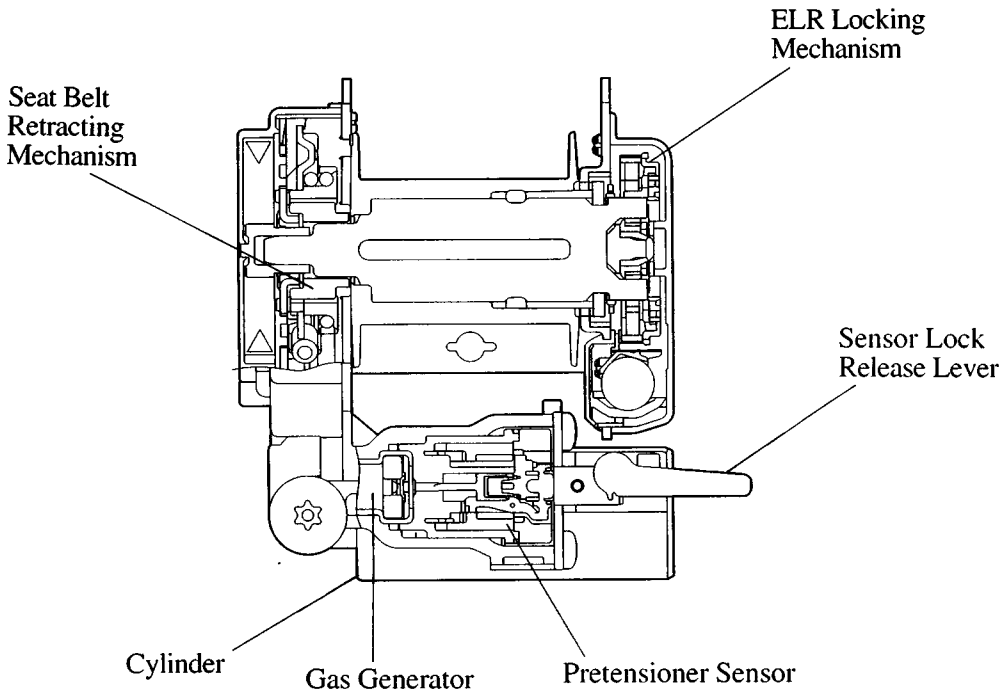
— REFERENCE —

The mechanical sensing type seat belt pretensioner is equipped with an independent pretensioner sensor. For this reason, depending on the circumstances of the collision, the seat belt pretensioner may not operate when the airbag is deployed, and vice versa. The same is applied between the right and left seat belt pretensioners.

• CONSTRUCTION AND OPERATION

1. General

The seat belt pretensioner consists of the pretensioner mechanism, retractor mechanism, and ELR locking mechanism. The pretensioner mechanism consists of a pretensioner sensor, gas generator, cylinder, etc. The pretensioner sensor detects the vehicle's deceleration speed during a collision.
In addition, a safety device is installed to prevent the seat belt pretensioner from being activated by the seat belt retractor assembly alone.

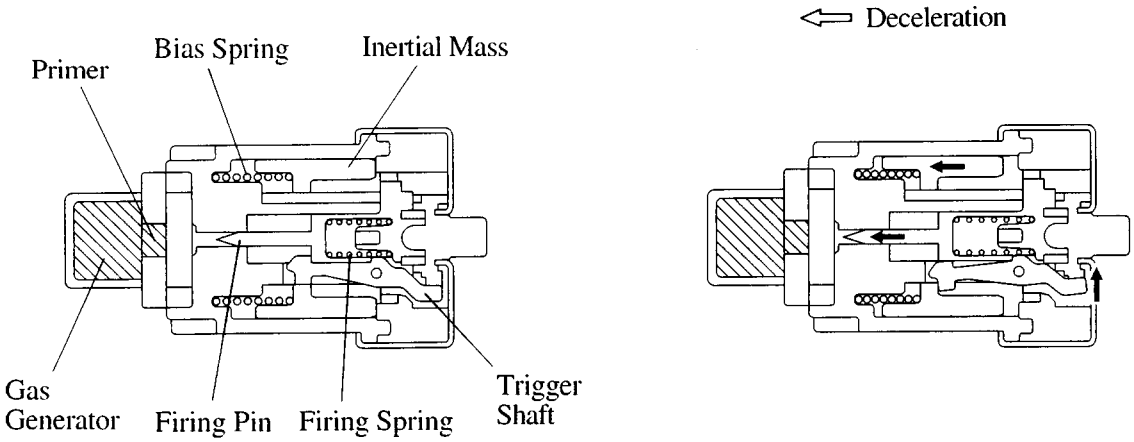


Right-Hand

2. Gas Generator with Pretensioner Sensor

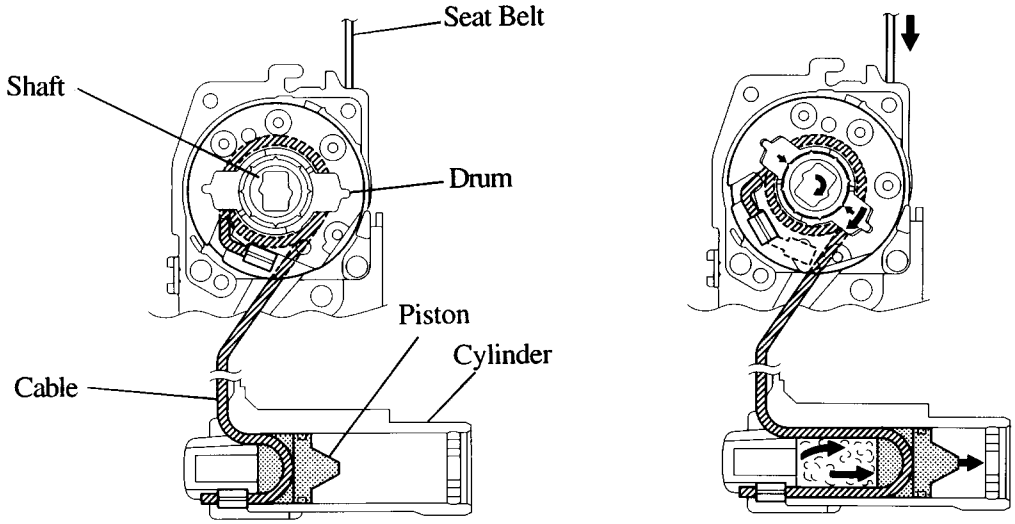
The pretensioner sensor consists of a inertial mass, trigger shaft, firing pin, firing spring, etc.
The trigger shaft and the firing pin are normally engaged with each other so that the firing pin is not ejected. In addition, if any unnecessary inertial mass movement is suppressed by the bias spring force, the seat belt pretensioner is not activated by mistake.
If a severe frontal collision occurs, the vehicle decelerates instantaneously. The inertial mass begins to move despite the bias spring force. If rapid deceleration continues, the spring force of the firing spring disengages the firing pin from the trigger shaft, ejects the firing pin, and ignites the primer. The flame spreads instantaneously to the gas generator and a large amount of gas is generated from the gas generator.

▶ Non-Deployed State ◀ **▶ Deployed State ◀**



3. Pretensioner Mechanism

When the pretensioner sensor comes on, the gas generator emits gas in an extremely short time and pushes the piston. Since the cable is attached to the piston, the piston will pull on the cable causing the drum to grab onto the shaft. The shaft will then move in the retracting direction taking up the belt for a predetermined length.

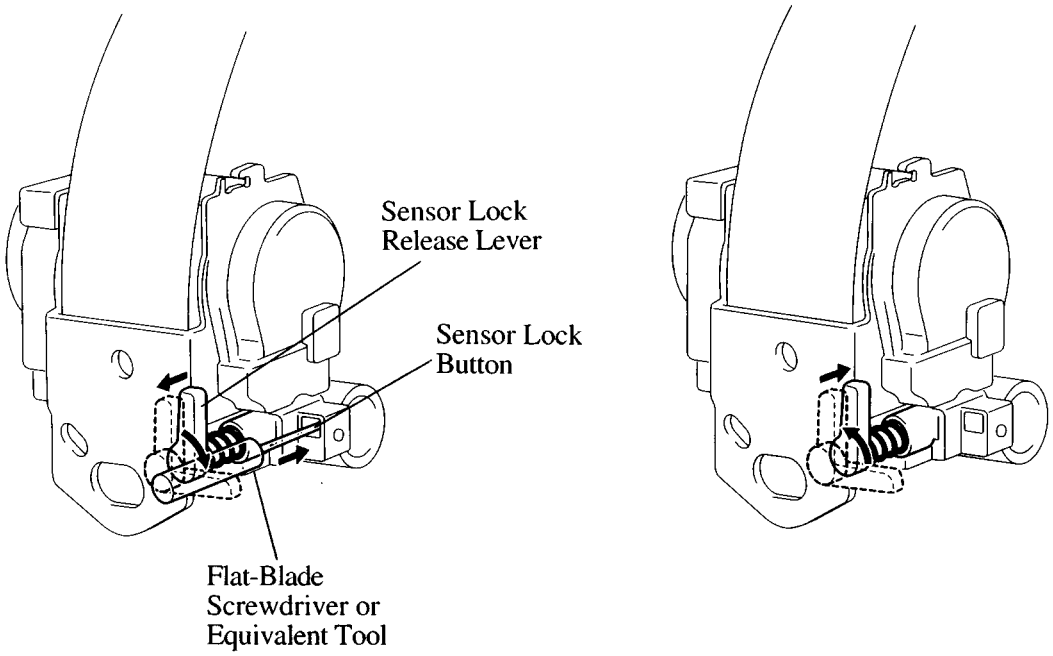


Inactive **Activated**

4. Safety Device

To activate the safety device, the sensor lock button illustrated below must be pressed with a flat-blade screwdriver or an equivalent tool, which causes the sensor lock release lever to push out and turn 90° clockwise. As a result, the trigger shaft becomes fixed and stops the operation of the seat belt pretensioner. To release the safety device, rum the sensor lock release lever counterclockwise and press it in.

▶ Safety Device Active ◀ **▶ Safety Device Released ◀**



Service Tip

During the installation of a seat belt pretensioner onto the vehicle, if the safety device is active, the sensor lock release lever and center pillar garnish infringe upon each other and will prevent the center pillar garnish from attaching. This prevents the technician from forgetting to release the safety device.

BODY ELECTRICAL

LIGHTING

• DESCRIPTION

The new ES300 has the following systems:

System	Outline
Headlights	The new ES300 has newly adopted the 4-light multi-reflector type headlights. For details, see the next page.
Automatic Light Control System	Positioning the light control switch at AUTO turns the headlights and taillights on or off, depending on the light availability surrounding the vehicle, as detected by the automatic light control sensor. In the new model, automatic light control relay is integrated with the automatic light control sensor. The basic construction and operation are the same as in the '95 LS400.
Daytime Running Light System	This system is designed to automatically activate the headlights during the daytime to keep the car highly visible to other vehicles. As in the previous model, the headlights are activated at a reduced level from the normal high beam brightness. Also, only the high beam headlight bulb is turned on as daytime running light. The basic construction and operation are the same as in the previous model.
Auto Turn-Off Light System	When the ignition key is turned from ON to ACC or LOCK position and the driver's door is opened with the taillights and headlights turned on, this system automatically turns them off. The basic operation of this system is the same as in the previous model.
Illuminated Entry System	This system is useful when entering the vehicle, fastening the seat belts and inserting the ignition key into the key cylinder in the dark. As in the previous model, when any of the doors is opened, the illuminated entry system turns on the illumination lights around the ignition key cylinder and dome light (only when the control switch is at DOOR position) simultaneously and fade out in about 15 seconds. The basic operation of this system is the same as in the previous model.

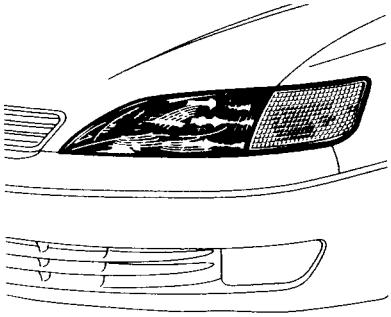
• HEADLIGHTS

1. General

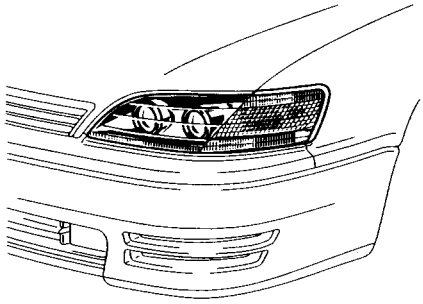
On the new ES300, the headlight construction has been changed from the 4-light projector type headlights of the previous model to the 4-light multi-reflector type headlights.

2. Multi-Reflector Type Headlight

Conventional headlights accomplish the dispersion and distribution of the light that is emitted by the bulbs through the lens cut pattern. However, with the multi-reflector type headlights, the light from the bulbs is dispersed and distributed through multiple parabolic shaped reflectors. As a result, the lens cut pattern is no longer provided in the center of the lens, thus realizing a clear look.

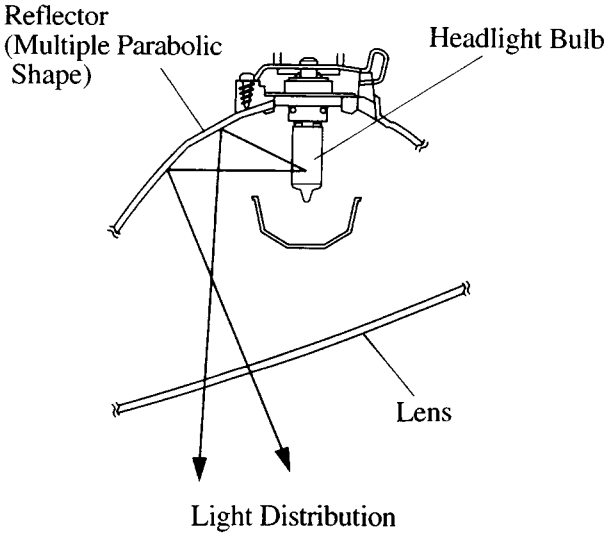


New

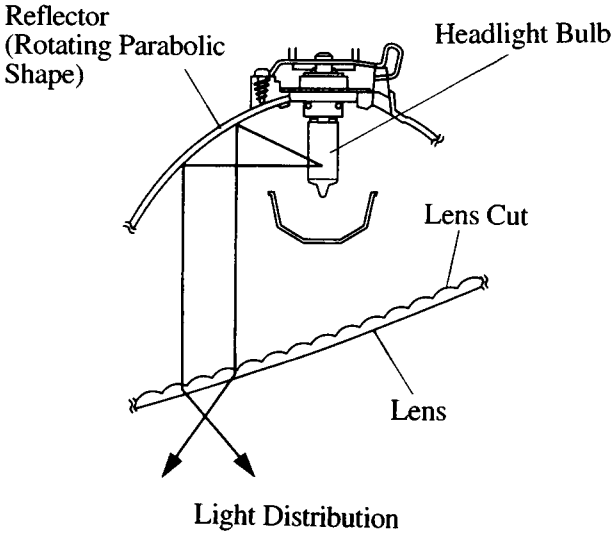


Previous

▶ Light Distribution Diagram ◀



Multi-Reflector Type Headlight



Conventional Headlight

AIR CONDITIONING

● DESCRIPTION

1. General

The air conditioning system in the new ES300 has the following features:

- ° A fully automatic controlled type air conditioning system is used on all models.
- ° The heater control panel is an easy-to-use dial and push button type panel.
- ° As in the previous model, an air conditioning unit that incorporates a blower, heater and cooler unit, has been adopted.
- ° An aluminum heater core has been adopted on all models.
- ° The defroster nozzle inner wall is modified into a radial configuration for smoother air flow.
- ° A defroster-linked air conditioning startup control, which automatically engages the air conditioning when the defroster mode has been selected, is provided.
- ° As in the previous model, the self-diagnosis function has been adopted.

▶ Performance ◀

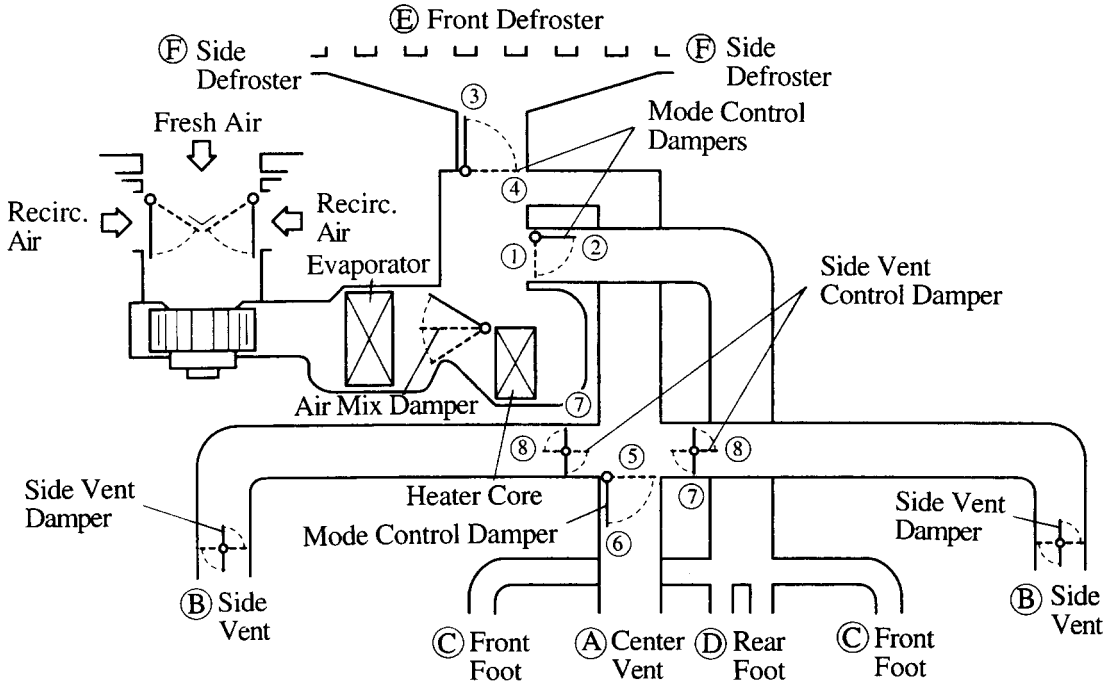
Model / Item			New	Previous
Heater	Heat Output	W (Kcal/h)	5580 (4800)	←
	Air Flow Volume*	m^3/h	360	380
	Power Consumption	W	220	←
Air Conditioning	Heat Output	W (Kcal/h)	5350 (4600)	←
	Air Flow Volume	m^3/h	530	←
	Power Consumption	W	260	←
Defroster	Air Flow Volume*	m^3/h	360	←

*:With Side Vent Closed

▶ Specifications ◀

Model / Item			New	Previous
Ventilation and Heater	Heater Core	Type	Dimpled Tube Type	←
		Size W x H x L mm (in.)	155.7 x 220 x 27 (6.1 x 8.7 x 1.1)	160 x 220 x 32 (6.3 x 8.7 x 1.3)
		Fin Pitch mm (in.)	2.0 (0.08)	1.8 (0.07)
	Blower	Motor Type	S80Fs12.5T	S80Fs12T
		Size Dia. x H mm (in.)	150 x 75 (5.9 x 3.0)	←
Air Conditioning	Condenser	Type	3–Passage Flow Type	←
		Size W x H x L mm (in.)	415.6 x 726 x 22 (16.4 x 28.6 x 0.9)	435.2 x 686 x 22 (17.1 x 27.0 x 0.9)
		Fin Pitch mm (in.)	4.5 (0.18)	3.5 (0.14)
	Evaporator	Type	Draw Cup Type	←
		Size W x H x L mm (in.)	260 x 252 x 90 (10.2 x 9.9 x 3.5)	←
		Fin Pitch mm (in.)	4.0 (0.16)	←
	Compressor	Type	10PA17C	←
	Refrigerant	Type	HFC134a (R134a)	←

2. Damper Position and Air Flow Relationship



Air Outlet Mode		Mode Control Damper Position	Vent		Foot		Defroster	
			Ⓐ Center	Ⓑ Side	Ⓒ Front	Ⓓ Rear	Ⓔ Front	Ⓕ Side
Face		①④⑥⑧	○	○				
Bi-Level		②④⑥⑧	○	○	○	○		
Foot		②④⑤⑦		○	○	○	○	○
Foot/Defroster		②③⑤⑦		○	○	○	○	○
Defroster		①③⑤⑦		○			○	○

Air flow volume differs according to the size of the circle ○ shown in the table.

● CONSTRUCTION AND OPERATION

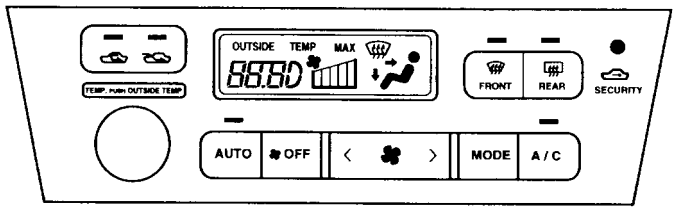
1. Heater Control Panel

° An easy-to-use dial and push button type heater control panel is used.

° The size and the position of the buttons are designed with the frequency of use and the order of operation controls is taken into account.

° The heater control panel uses a larger LCD (Liquid Crystal Display) to display the set temperature, air outlet status, etc., and improves its visibility.

° The set temperature display and the outside temperature display on the heater control panel can be switched by the push of a button.



2. Air Conditioning Unit

As in the previous model, the air conditioning unit incorporates a blower, heater and cooler units. This provides high rigidity and lower ventilating resistance.

Heater Core

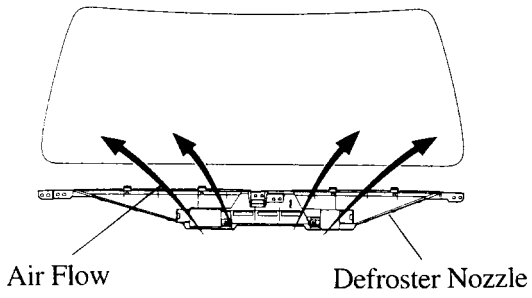
A lightweight aluminum heater core is used on all models.

3. Condenser

As in the previous model, the 3-passage flow type condenser which has a greater heat exchanging capability has been adopted on all models.

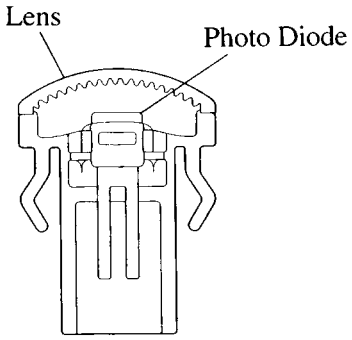
4. Defroster Nozzle

The front defroster nozzle inner wall is modified into a radial configuration for a smoother air flow.

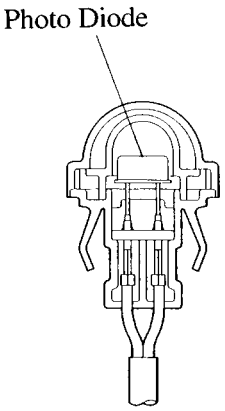


5. Solar Sensor

As in the previous model, a dome-type solar sensor is used. However, in the new model, the sensor is made compact for improved appearance, and the orientation of the light is improved through the lens cutting process. As a result, the air-conditioning control capabilities while under diagonal solar radiation are improved.



New



Previous

6. Air Conditioning ECU

The following table is a comparison of the air conditioning ECU functions between the new and previous model.

System	Function	New	Previous
Calculation of Required Outlet Air Temperature	Calculates the required outlet air temperature based on the set temperature, room air temperature, ambient air temperature and solar radiation.	○	○
Temperature Control	To drive the air mix servomotor in accordance with the required outlet air temperature, the air temperature passed through the evaporator and the engine coolant temperature and to control the outlet air temperature (Air Mix Damper Control).	○	○
Blower Control	Sets the blower speed according to operation of the blower switch (Manual Control).	○ (5-step)	○ (5-step)
	When the automatic control or front defroster switch is turned on, the blower starts. Then the blower speed that is appropriate for the required outlet air temperature is compared with the blower speed that is appropriate for solar radiation, and the blower is controlled with the faster speed of the above two speeds (Automatic Control). However, when the coolant temperature is below a predetermined level and the air outlet is in the “foot” or “bi-level” mode, the blower will not operate (Warm-Up Control).	○	○

System	Function	New	Previous
Blower Control	When the air outlet mode is at “face” or “bi-level” and the required outlet air temperature is below a predetermined level, the blower is set to operate after a time lag in order to prevent hot air from being blown out suddenly right after the engine is started (Time-Lagged Air Flow Control).	○	○
Air inlet Control	Drives the air inlet servomotor according to the operation of the air inlet control switch and fixes the dampers in the “fresh” or “recirc.” position (Manual Control).	○	○
	Switches the damper position between “fresh”, “fresh and recirc. mix” or “recirc.” according to the required outlet air temperature (Automatic Control).	○	○
	Fixes the damper position on “fresh” if the front defroster switch is turned on during automatic control (Forced Fresh Air Intake Control).	○	○
Air Outlet Control	Drives the air outlet step motor in accordance with the operation of the mode select and front defroster switches and fixes the dampers in the “face”, “bi-level”, “foot”, “foot and def.” or “def.” position (Manual Control).	○	○
	Switches the damper position between “face”, “bi-level” of “foot” according to the required outlet air temperature (Automatic Control)	○	○
	If the blower is under warm-up control when the air outlet mode is in “bi-level” or “foot” mode, the LCD display remains as it is while the air outlet step motor is driven and the dampers are switched to the “def.” position, preventing cool air from leaking from the foot vent (Def.-Foot Control).	○	○

System	Function	New	Previous
Compressor Control	If the A/C switch is switched on while the blower is turned on, this turns on the magnetic clutch relay and operates the compressor (Manual Control).	○	○
	When the AUTO switch is pressed, the magnetic clutch relay is turned on. (Automatic Control).	○	○
	Switches the magnetic clutch relay off when the engine speed is below 450 rpm, when the blower is turned off by the warm-up control, or when the refrigerant pressure is abnormally high or low (Abnormal Condition Detection).	○	○
	Switches the magnetic clutch relay on regardless of the operating condition of the A/C and automatic control switches if the front defroster switch and blower are turned on (Def. Linked Control).	○	○
	Compares the engine speed and compressor speed. If it is judged that the compressor is locked, the magnetic clutch relay goes off and the A]C switch indicator light blinks to warm the driver (Compressor Lock Detection).	○	○
	If the temperature of the air immediately after having passed through the evaporator is detected by the thermistor to be below 3 C (37.4 F), the magnetic clutch relay is turned off (Low Temperature Control).	○	○
	In order to maintain engine condition, the magnetic clutch relay operation is delayed for predetermined time after the A/C switch is turned on (Compressor Delay Control).	○	○
Rear Defogger Control	Switches the rear defogger on for 15 minutes when the rear defogger switch is switched on. Switches the rear defogger off if the switch is pressed while it is operating.	○	○
Self-Diagnosis	Checks the sensors in accordance with operation of the air conditioning switches, then displays a code No. to indicate if there is a malfunction or not (Sensor Check Function).	○	—
	Checks the sensors in accordance with operation of the air conditioning switches, then displays a code No. and sounds a buzzer to indicate if there is a malfunction or not (Sensor Check Function).	—	○
	Drives the actuators through a predetermined sequence in accordance with the operation of the air conditioning switches (Actuator Check Function).	○	○

ACCESSORIES

▶ DESCRIPTION

The new ES300 includes the accessory systems shown in the below.

System	Outline
Power Window System	The power window system includes one-touch auto down and key-off operation functions. The one-touch auto down function automatically opens the driver's door window fully. The key-off operation function makes it possible to operate the power windows for approximately 45 seconds after the ignition key is turned to the ACC or LOCK position, if the front doors are not opened. The basic construction and operation are the same as in the previous model.
Door Lock Control System	This system has a "key-linked lock and unlock function" and a "key-confine prevention function". All doors can be locked and unlocked simultaneously by a key operation at the front fight or left door (the key needs to be operated twice to unlock all the doors at the driver's door). If the door lock operation is performed when one of the front doors is open and the ignition key inserted in the key cylinder, doors are unlocked automatically to prevent the ignition key from being left inside the vehicle. The basic construction and operation are the same as in the previous model.
Wireless Door Lock Remote Control System	A remote control system is adopted in which the lock and unlock functions of all doors and panic alarm function can be controlled by the signals emitted from a transmitter. The transmitter is also provided with a 2-step unlock function to unlock all the doors by pressing the switch twice. For details, see page 104.
Theft Deterrent System	As in the previous model, when an attempt is made to forcibly enter the vehicle or open the hood or trunk lid without a key, or when the battery terminals are removed and reconnected, this system sounds the horn and flashes the headlights and taillights for about 1 minute to alert the owner. At the same time, it locks all the doors and electronically disconnects the starter. The basic operation is the same as in the previous model.
Power Seat	As in the previous model, the front seats am power assisted by electric motors so that the seat positions can be adjusted easily by a simple switch operation. The basic construction and operation are the same as in the previous model.
Seat Heater	The heater output temperature switchover (HI or LO position) function that was provided in the previous model's seat heater system has been discontinued. Along with this change, the previous 3-mode, HI-OFF- LO seat heater switch has been changed to the 2-mode, ON-OFF seat heater switch.

System	Outline
SRS Airbag	The SRS (Supplemental Restraint System) airbag is provided for the driver and front passenger. The SRS airbag has been designed to lessen the shock to the head and chest of the driver and front passenger in the event of a frontal impact collision as a supplement to the seat belt. A 1-sensor type airbag system is used in which the detection of deceleration during a collision as well as control of the airbag system is accomplished by the airbag sensor assembly. The basic construction and operation am the same as in the ’95 LS400. However, the inflator for front passenger has been changed. For details, see page 108.
Cruise Control System	Once it has been set at desired vehicle speed, this system automatically adjusts the engine throttle position to maintain the vehicle speed at the desired speed without operating the acceleration pedal. The basic construction and operation are the same as in the previous model. However, in the new model, a new type actuator has been adopted. Also, the function of the cruise control ECU has been changed. For details, see page 112.
Moon Roof	A tilt-up and sliding type moon roof has been adopted. Also, a “onetouch slide open” function used in the ’95 LS400 has been newly adopted. The basic operation is the same as in the ’95 LS400.
Electrical Remote Control Mirror	The electrical remote control mirrors used in the previous model are also used in the new model. Heaters are also included in the outside rear view mirrors which are linked to the rear window defogger.
Key Reminder System	It sounds a buzzer to warn the driver that the ignition key is still in the key cylinder. This helps to prevent the driver from getting locked out. The basic operation is the same as in the previous model.

• WIRELESS DOOR LOCK REMOTE CONTROL SYSTEM

1. General

The wireless door lock remote control system is a convenient system for locking and unlocking all the doors, from a distance. This system in the new ES300 has the following features:

° The new model adopts a multi-function type wireless door lock remote control system which features luggage compartment door opener and panic alarm operation, in addition to all doors lock and unlock function of the previous model.

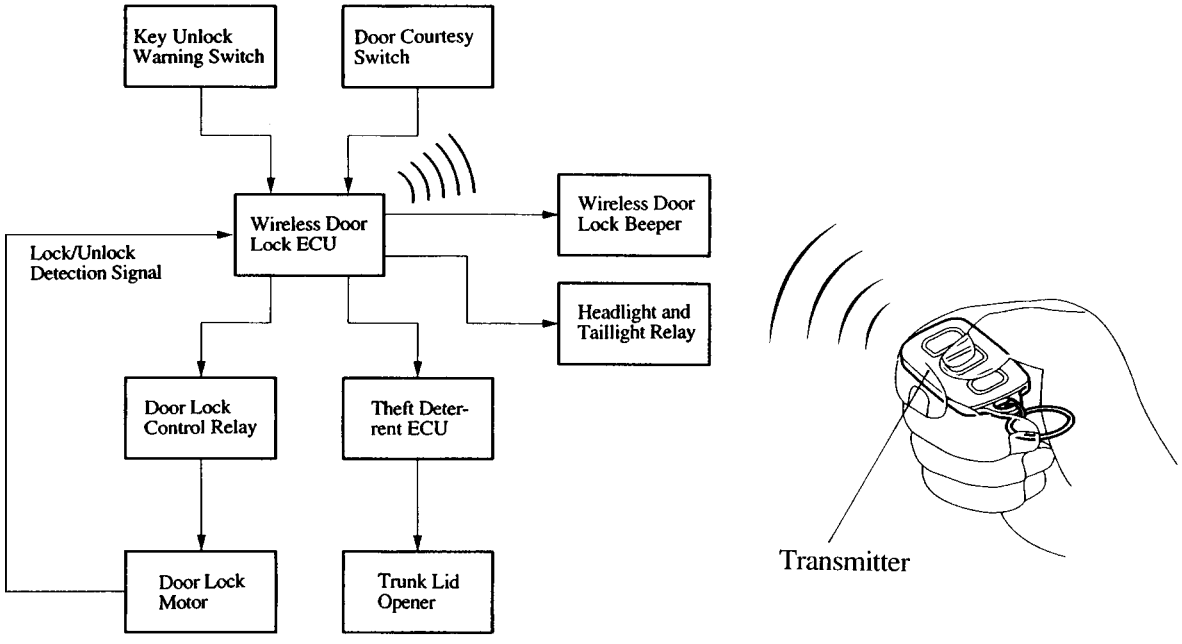
° To accommodate multiple functions, the transmitter has been changed from the previous integrated type with the ignition key to a separate key-holder type.

° The antenna that receives transmitter signals has been changed from the previous printed wiring of the rear window defogger to the one that is enclosed in the wireless door lock ECU.

° To facilitate the verification of its operation, this system sounds the beeper and flashes the parking lights and taillights upon completion of each operation.

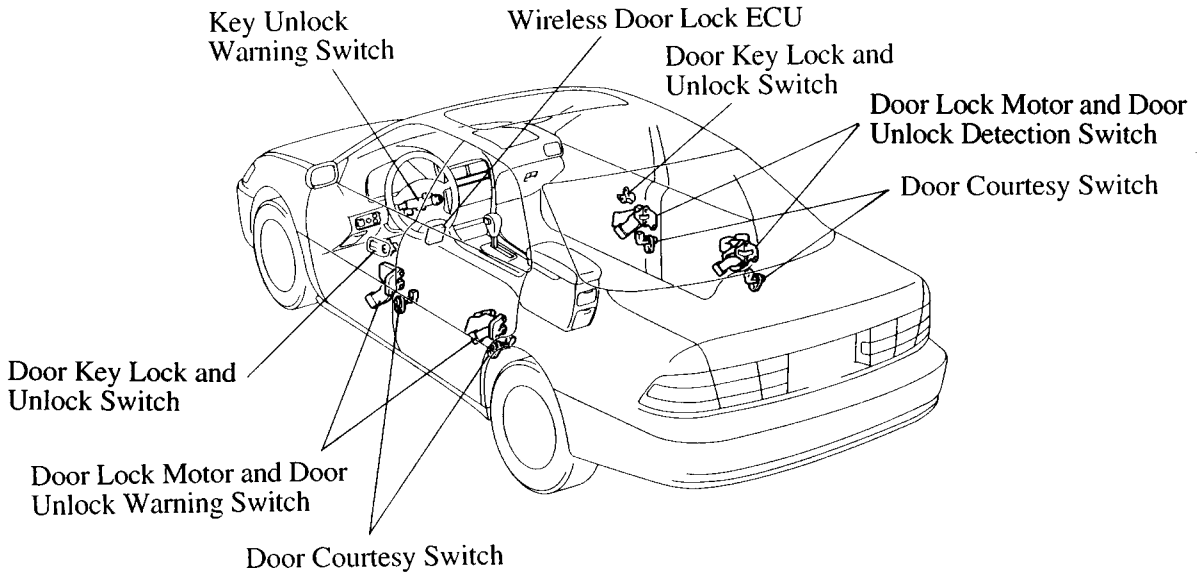
° A prohibit mode, which prohibits the activation of this system, has been newly provided in the registration function of the transmitter recognition code.

▶ System Diagram ◀



2. Layout of Functional Parts

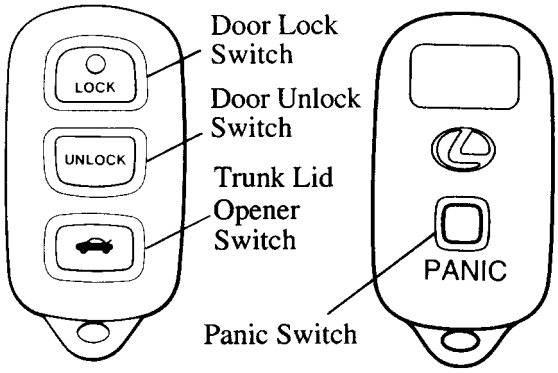
The major functional parts of the wireless door lock remote control system are shown below.



3. Construction

Transmitter

To accommodate the multiple functions provided in the wireless door lock remote control system, and to improve the ease-of-use of the switches, a keyholder type transmitter, which is separate from the ignition key, has been adopted. This transmitter is equipped with a panic switch which activates the security alarm of the theft deterrent system.



Transmitter

Wireless Door Lock ECU

The frequency of the signal transmitted by the transmitter has been raised and the antenna which receives this signal has been changed from the printed wiring of the rear window defogger to the one which is enclosed in the wireless door lock ECU.

Accordingly, the wireless door lock ECU mounting position has been changed from inside the luggage compartment to the inside of the instrument panel.

4. Function

The following table is a comparison of the functions of wireless door lock remote control system between the new ES300, previous ES300 and '97 LS400.

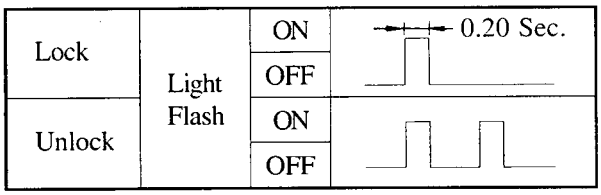
Function	Outline	New ES300	Previous ES300	'97 LS400
All Doors Lock Operation	Pressing the "door lock" switch of the transmitter locks all doors.	○	—	○
All Doors Lock Operation	Pressing the transmitter switch locks all doors.	—	○	—
Driver's Door Unlock Operation	Pressing the "door unlock" switch of the transmitter once unlocks only the driver's door.	○	—	○
All Doors Unlock Operation	Pressing the "door unlock" switch twice within 3 seconds opens all doors after opening the driver's door.	○	—	○
All Doors Unlock Operation	Pressing the transmitter switch unlocks all doors.	—	○	—
Trunk Lid Open Operation	Keeping the "trunk lid opener" switch of the transmitter pressed longer than 0.8 seconds opens the trunk lid.	○	—	○
Panic Alarm Operation	Pressing the "panic" switch of the transmitter activates the alarm of the theft deterrent system (to sound the horn and flash the headlights and taillights).	○	—	○
Operation Verification Beeper Function	When the transmitter is used to lock or unlock the doors, this function sounds the beeper to inform that the operation has been completed.	○	○	○
Operation Verification Light Function	When the transmitter is used to lock or unlock the doors, this function flashes the parking lights and taillights to inform that the operation has been completed.	○	—	—
Auto Lock Function	If none of the doors are opened within 30 seconds after they are unlocked by the wireless door lock remote control, all the doors are locked again automatically.	○	○	○
Transmitter Switch Misoperation Prevention Function	When an ignition key is in the ignition key cylinder or any of the doors is not closed completely, the wireless door lock remote control is temporarily canceled to prevent misoperation.	○	○	○
Repeat Function	If a door is not locked in response to the locking operation of the transmitter, the wireless door lock ECU will output a lock signal once after 2 seconds.	○	—	—
Repeat Function	If a door is not locked or unlocked in response to the locking or unlocking operation of the transmitter, the wireless door lock ECU will output a lock or unlock signal 10 times at 2-second intervals.	—	○	○

Function	Outline	New ES300	Previous ES300	'97 LS400
Door Ajar Warning Function	If any door is open or ajar, pressing the "door lock" switch of the transmitter will cause the beeper to sound.	○	—	○
Beeper Volume Control Function	The beeper volume can be adjusted by adjusting the wireless door lock beeper controller.	○	○	—
Security Function	If the wireless door lock ECU receives more than 10 types of incorrect codes within 10 minutes, it will stop receiving all codes, including the correct code.	—	○	○
	Send an operation signal as a cryptographic code.	○	—	—
Transmitter Recognition Code Registration Function	4 types of transmitter recognition codes can be registered (written to and stored) in the EEPROM that is contained in the wireless door lock ECU.	○	○	○

Operation Verification Light Function

When the doors are locked by the transmitter switch operation, the parking light and taillight flashes once to confirm that the operation has been completed.
Similarly, the parking light flashes twice when the doors are unlocked.

▶ Light Flash Patterns ◀



Transmitter Recognition Code Registration Function

In addition to the 3 special coded ID registration function modes (rewrite mode, add mode and confirm mode), a prohibit mode has been newly provided in the registration function of the transmitter recognition code.
The table below shows the 4 special coded ID registration function modes through which up to 4 different codes can be registered. The codes are electronically registered (written to and stored) in the EEPROM. For details of the recognition code registration procedure, refer to the 1997 ES300 Repair Manual (Pub. No. RM511 U) to register the codes correctly.

Mode	Function
Rewrite Mode	Erases all previously registered codes and registers only the newly received codes. This mode is used whenever a transmitter or the wireless door lock ECU is replaced.
Add Mode	Adds a newly received code while preserving any previously registered codes. This mode is used when adding a new transmitter. If the number of codes exceeds 4, the oldest registered code is erased first.
Confirm Mode	Confirms how many codes are currently registered. When adding a new code, this mode is used to check how many codes already exist.
Prohibit Mode	To delete all the registered codes and to prohibit the wireless door lock function. This mode is used when the transmitter is lost.

• SRS AIRBAG

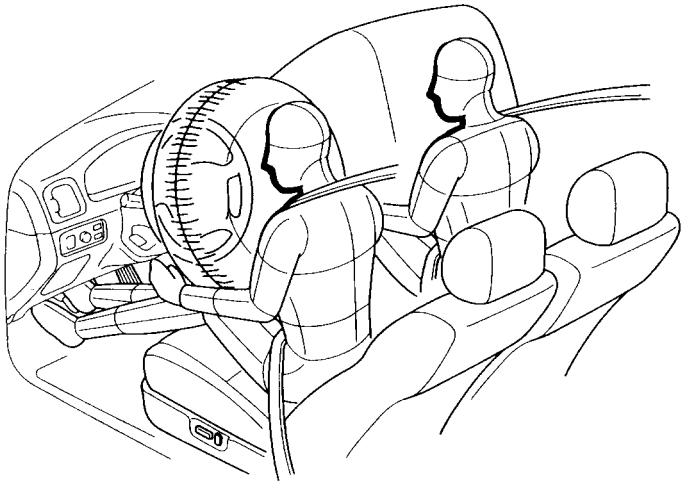
1. General

° The SRS (Supplemental Restraint System) airbag is designed to help lessening the shock to the driver and front passenger as a supplement to the seat belt.
In a collision, the airbag sensor detects the shock and if the front-to-rear shock is greater than a specified value, the airbags stored in the steering wheel pad for the driver and above the glove box for the front passenger inflate instantly to help reducing the likelihood of the driver's or front passenger's head and chest directly hitting the steering wheel or instrument panel.

° As in the '95 LS400, a 1 -sensor type airbag system is used, in which the detection of deceleration during a collision is accomplished by the airbag sensor enclosed in the airbag sensor assembly.

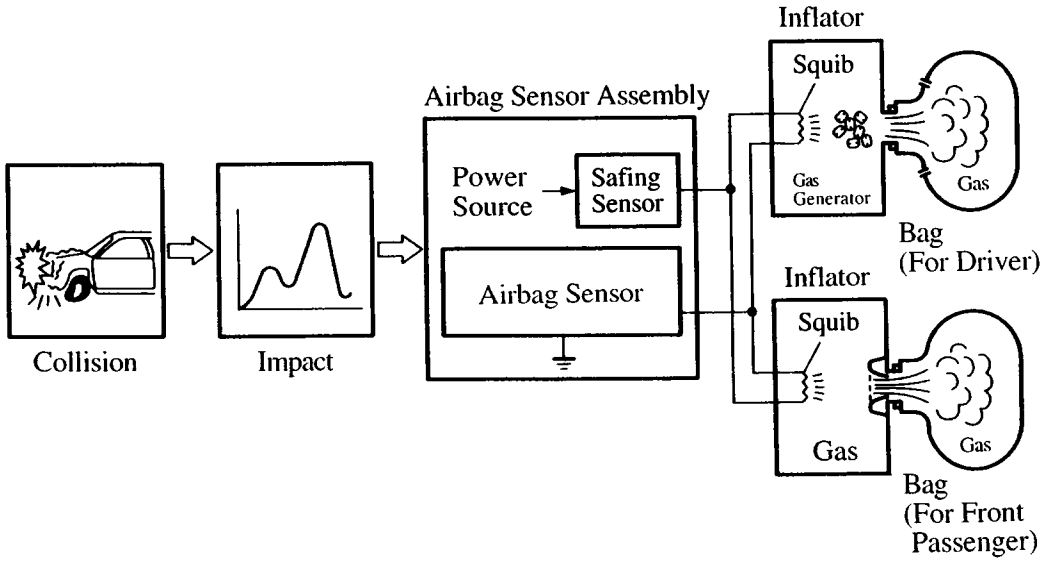
° The airbag system is controlled by the airbag sensor assembly. It has a self-diagnosis function. When it detects a system malfunction, it lights up the SRS Warning light on the combination meter to alert the driver.

The basic construction and operation are the same as in the '95 LS400. However, the construction and operation of inflator for front passenger has been changed.



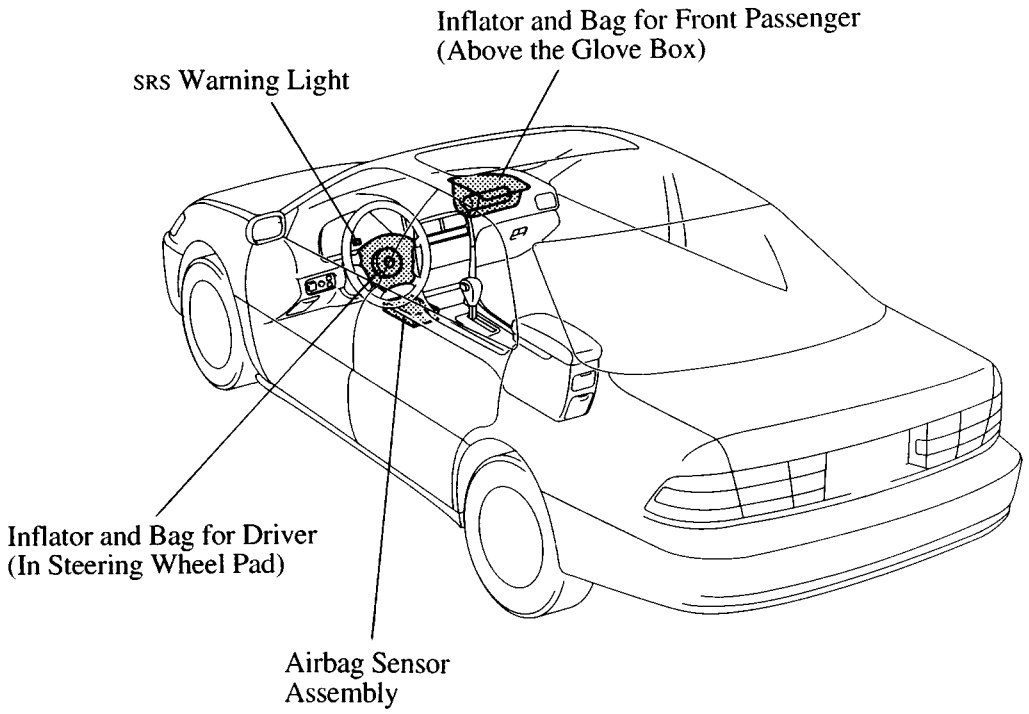
▶ System Diagram ◀

The activation processes of the SRS airbag is as illustrated below.

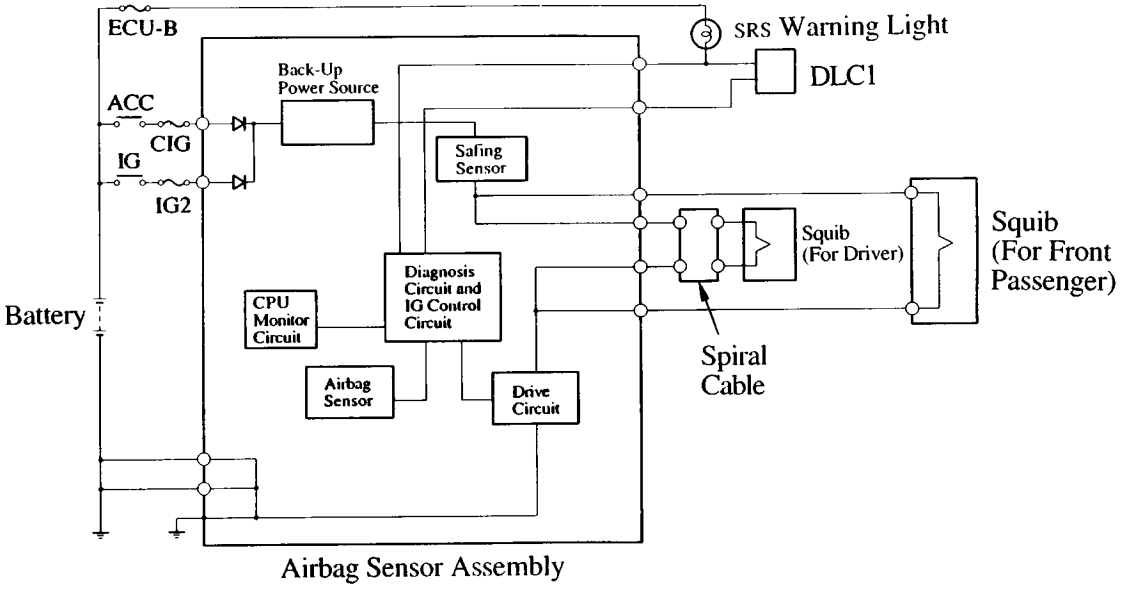


2. Layout of Components

The major function parts of the airbag system are shown below.



3. Wiring Diagram

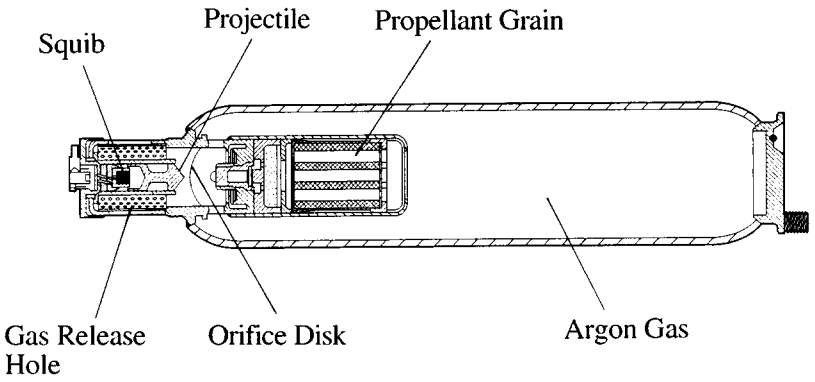


4. Construction and Operation

Inflator and Bag for Front Passenger

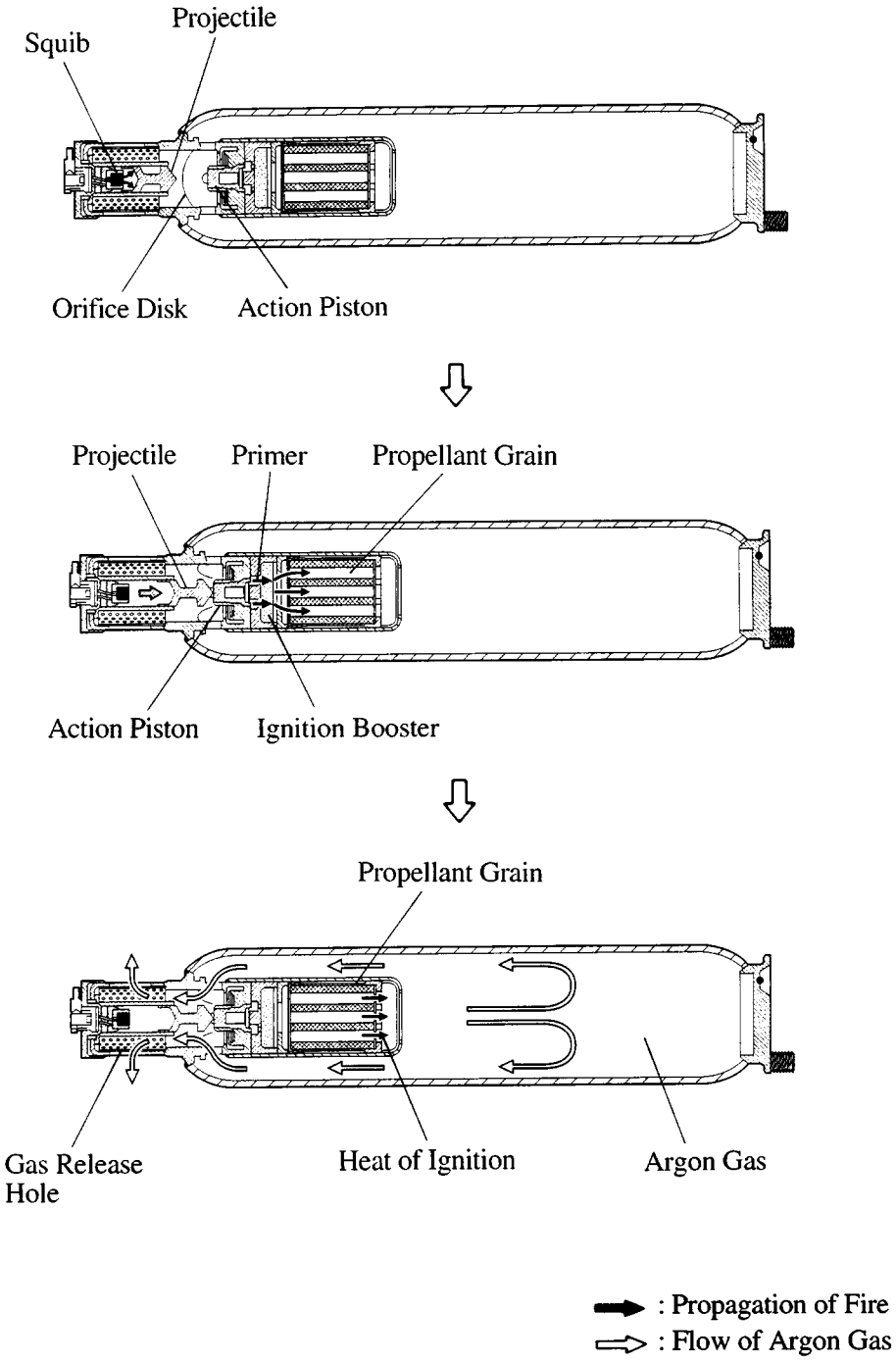
1) Construction

The inflator is comprised of a squib, projectile, orifice disk, propellant grain, high pressure argon gas and etc. The bag is made of strong nylon cloth, and becomes inflated by the argon gas generated by the inflator. The inflator and bag are integrated inside the case, and located in the passenger side instrument panel.



2) Operation

If the airbag sensor is activated by deceleration due to frontal collision, the electric current then ignites the squib located in the inflator. The projectile which fired by the ignition of the squib pierces through the orifice disk and collides with the action piston, which causes the primer to ignite. The flame of the primer spreads instantaneously to the ignition booster and to the propellant grain. The gas which expanded by the heat of the ignition of the propellant grain flows into the airbag via the gas release hole, thus inflating the airbag. The airbag pushes the airbag door open to further expand and to help restrain the impact applied to the head and chest of the front passenger.



◦ CRUISE CONTROL SYSTEM

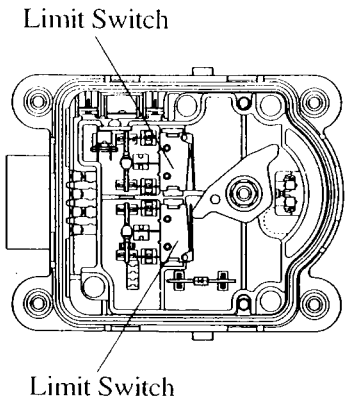
1. General

Once the system is set to a desired vehicle speed, the engine throttle position is adjusted automatically to maintain the vehicle speed at that speed without depressing the accelerator pedal.
The basic construction and operation of this system are the same as in the previous model. However, on the new model, the control method for the manual and auto cancel functions have been changed. Also, a new motor type actuator that is both lightweight and simple in construction has been adopted.

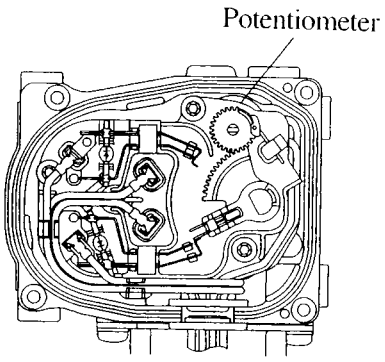
2. Construction and Operation

Actuator

The new ES300 has adopted a new motor type actuator. The new motor type actuator consists of a motor, control link and limit switch, etc. as shown below.
The potentiometer that measured the opening angle of the control link and transmitted the signals to the cruise control ECU has been discontinued in the new actuator. The new actuator is equipped it with a compact motor. As a result, the new actuator is made both lightweight and simple in construction. Without the potentiometer, the new actuator continuously regulates the opening angle of the control link. This is made possible by the ECU, which compares the current vehicle speed input with the desired vehicle speed that is stored in memory, and the result of that comparison is transmitted to the actuator.



New



Previous

Cruise Control ECU

1) Manual Cancel Function

The manual cancel function has been changed as follows:

New	Previous
Transaxle shifted to positions other than “D”.	Transaxle shifted to “N” position.
—	Pull up the parking brake lever.

2) Auto Cancel Function

When the vehicle is being driven under cruise control, if any of the conditions listed below is present, the vehicle speed stored in memory is deleted, the control is lifted, the current to the actuator is disrupted, and the power indicator light is made to flash. The methods to reactivate the cruise control at that time, in accordance with that particular condition (malfunction category A or B), are classified in the chart below. Other auto cancel functions are basically the same as those of the previous model.

Condition	Malfunction Category	How to reactivate
● Continuous current applied to the motor's acceleration output. ● The motor did not move.	A	Turn off the ignition switch, and turn it back on. Then turn on the main switch.
● Excessive current flowed to the motor or magnetic clutch drive transistor. ● Open circuit in magnetic clutch. (Includes a blown stop light fuse.) ● The vehicle speed signal is not sent for a predetermined period of time (approx. 140 reset.) ● The vehicle speed is equal to the set speed minus approximately 16 km/h (10 mph) or below. ● Short circuit in the control switch. ● Open circuit in deceleration control. (Including an open circuit in the motor.)	B	Turn the main switch back on.

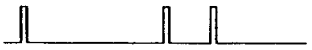
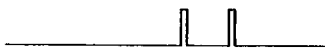
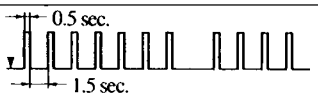
3) Diagnosis Function

a. Warning Indication

The cruise control ECU immediately blinks the power indicator light in the combination meter on and off repeatedly to alert the driver of a system malfunction.
When the power indicator light is flashing, and the cruise control is released by pressing on the main switch, the power indicator light will be turned off. When the main switch is turned back on, and cruise control driving is resumed, the power indicator light output pattern, as shown on the next page, differs according to the malfunction categories A or B. When a category A malfunction is occurring, the power indicator light will flash again, but if it is a category B malfunction, the indicator light will remain on, indicating that the system is operating.

▶ Power Indicator Light Blinking Pattern ◀

▼ : Malfunction Occurred

Condition / Operation Method			Actuator power source is off.	Actuator power source is on.
Main Switch		ON		
		OFF		
Power Indicatro Light	A*	ON		
		OFF		
	B*	ON		
		OFF		

*: "A" and "B" Indicate the Malfunction Categories.

b. Diagnostic Trouble Code Indication

The diagnostic trouble codes have been modified in the new model. For details of inspection, diagnostic trouble codes and repair procedures, see 1997 ES300 Repair Manual (Pub. No. RM 511U).

MAJOR TECHNICAL SPECIFICATIONS

Item		Area	U.S.A.	Canada
Body Type			4–Door Sedan	
Vehicle Grade			—	
Model Code			MCV20L–BTPGKA	MCV20L–BTPGKK
Major Dimensions & Vehicle Weights	Overall	Length mm (in.)	4830 (190.2)	←
		Width mm (in.)	1790 (70.5)	←
		Height* mm (in.)	1395 (54.9)	←
	Wheel Base	mm (in.)	2670 (105.1)	←
	Tread	Front mm (in.)	1545 (60.8)	←
		Rear mm (in.)	1520 (59.8)	←
	Effective Head Room	Front mm (in.)	966 (38.0), 934 (36.8)*1	←
		Rear mm (in.)	919 (36.2), 913 (35.9)*1	←
	Effective Leg Room	Front mm (in.)	1105 (43.5)	←
		Rear mm (in.)	874 (34.4)	←
	Shoulder Room	Front mm (in.)	1411 (55.6)	←
		Rear mm (in.)	1374 (54.1)	←
	Overhang	Front mm (in.)	1010 (39.8)	←
		Rear mm (in.)	1150 (45.3)	←
	Min Running Ground Clearance	mm (in.)	147 (5.8)	←
	Angle of Approach	degrees	15º	←
	Angle of Departure	degrees	16º	←
	Curb Weight	Front kg (lb)	940 (2072)	←
		Rear kg (lb)	555 (1224)	←
		Total kg (lb)	1495 (3296)	←
	Gross Vehicle Weight	Front kg (lb)	1050 (2315)	←
		Rear kg (lb)	885 (1951)	←
		Total kg (lb)	1935 (4266)	←
	Fuel Tank Capacity	l (U.S. gal., Imp. gal.)	70 (18.5, 15.4)	←
	Luggage Compartment Capacity	m^3 (cu.ft)	0.365 (12.9)	←
Performance	Max. Speed	km/h (mph)	221 (137)	←
	Max. Cruising Speed	km/h (mph)	177 (109)	←
	Acceleration	0 to 100 km/h sec.	8.6	←
		0 to 400 m sec.	16.7	←
	Max. Permissible Speed	1st Gear km/h (mph)	63 (39)	←
		2nd Gear km/h (mph)	116 (72)	←
		3rd Gear km/h (mph)	—	←
		4th Gear km/h (mph)	—	←
	Turning Diameter (Outside Front)	Wall to Wall m (ft.)	11.8 (38.7)	←
		Curb to Curb m (ft.)	11.2 (36.7)	←
Engine	Engine Type		1MZ–FE	←
	Valve Mechanism		24–Valve, DOHC	←
	Bore x Stroke	mm (in.)	87.5 x 83.0 (3.44 x 3.27)	←
	Displacement	cm^3 (cu.in.)	2995 (182.7)	←
	Compression		10.5 : 1	←
	Carburetor Type or Injection Pump Type (Diesel)		SFI	←
	Research Octane No.	RON	91 or higher	←
	Max Output (SAE–NET)	kW/rpm (HP @ rpm)	149/5200 (200 @ 5200)	←
	Max Torque (SAE–NET)	N·m/rpm (lb–ft @ rpm)	290/4400 (214 @ 4400)	←
Engine Electrical	Battery Capacity (5HR)	Voltage & Amp. hr.	12–52	←
	Generator Output	Watts	960	←
	Starter Output	kW	1.4	←
Chassis	Clutch Type		—	←
	Transmission Type		A541E	←
	Transmission Gear Ratio	In First	2.810	←
		In Second	1.549	←
		In Third	1.000	←
		In Fourth	0.735	←
		In Fifth	—	←
		In Reverse	2.296	←
	Counter Gear Ratio		0.945	←
	Differential Gear Ratio (Final)		3.933	←
	Brake Type	Front	Ventilated Disc	←
		Rear	Solid Disc	←
	Parking Brake Type		Drum	←
	Brake Booster Type and Style	in.	Tandem 8.5” + 8.5”	←
	Proportioning Valve Type		Dual–P Valve	←
	Suspension Type	Front	MacPherson Strut	←
		Rear	MacPherson Strut	←
	Stabilizer Bar	Front	STD	←
		Rear	STD	←
	Steering Gear Type		Rack & Pinion	←
	Steering Gear Ratio (Overall)		17.4 : 1	←
	Power Steering Type		Integral Type	←

* : Unladen Vehicle

*1: With Moon Roof

MAINTENANCE

EQUIPMENT

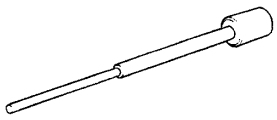
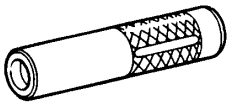
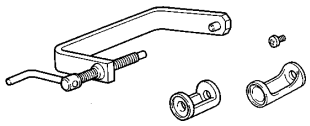
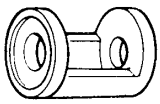
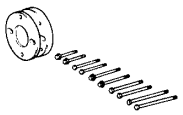
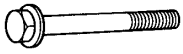
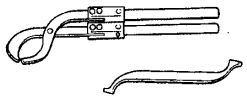
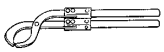
PP06N–01

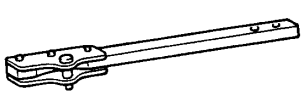
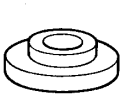
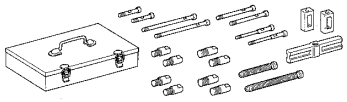
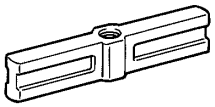
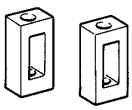
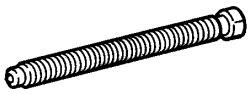
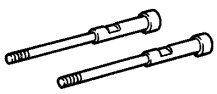
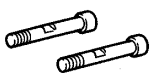
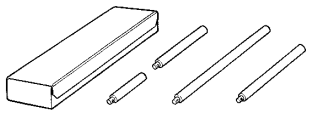
Mirror	Brake hose
Torque wrench	

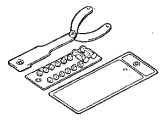
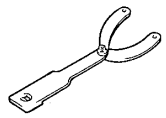
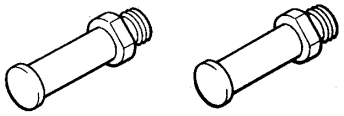
ENGINE MECHANICAL

PP06O–07

SST (Special Service Tools)

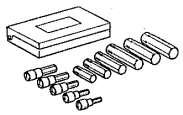
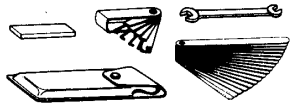
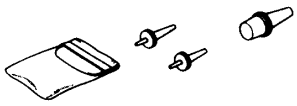
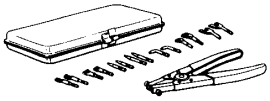
	09201–01055	Valve Guide Bushing Remover & Replacer 5.5	
	09201–41020	Valve Stem Oil Seal Replacer	
	09202–70020	Valve Spring Compressor	
	(09202–00010)	Attachment	
	09213–54015	Crankshaft Pulley Holding Tool	
	(91651–60855)	Bolt	
	09222–30010	Connecting Rod Bushing Remover & Replacer	
	09223–15030	Oil Seal & Bearing Replacer	Crankshaft rear oil seal
	09248–55040	Valve Clearance Adjust Tool Set	
	(09248–05410)	Valve Lifter Press	
	(09248–05420)	Valve Lifter Stopper	
	09249–63010	Torque Wrench Adaptor	RH camshaft timing pulley

	09330–00021	Companion Flange Holding Tool	Crankshaft pulley
	09608–03071	Replacer	Spark plug tube gasket
	09816–30010	Oil Pressure Switch Socket	Knock sensor
	09843–18020	Diagnosis Check Wire	
	09950–50010	Puller C Set	
	(09951–05010)	Hanger 150	Crankshaft pulley Crankshaft timing pulley
	(09952–05010)	Slide Arm	Crankshaft pulley Crankshaft timing pulley
	(09953–05010)	Center Bolt 100	Crankshaft pulley Crankshaft timing pulley
	(09953–05020)	Center Bolt 150	Crankshaft pulley Crankshaft timing pulley
	(09954–05010)	Claw No.1	Crankshaft timing pulley
	(09954–05020)	Claw No.2	Crankshaft pulley
	09950–70010	Handle Set	
	(09951–07100)	Handle 100	Valve guide bushing Crankshaft rear oil seal

	09960–10010	Variable Pin Wrench Set	
	(09962–01000)	Variable Pin Wrench Arm Assy	Camshaft timing pulley Camshaft sub–gear
	(09963–01000)	Pin 10	Camshaft timing pulley
	(09963–00500)	Pin 5	Camshaft sub–gear

PP06P–08

RECOMMENDED TOOLS

	09040–00010	Hexagon Wrench Set .	
	09090–04020	Engine Sling Device	For suspending engine
	09200–00010	Engine Adjust Kit .	
	09258–00030	Hose Plug Set .	Plug for the vacuum hose, fuel hose etc
	09904–00010	Expander Set .	

PP06Q–01

EQUIPMENT

Abrasive compound	
Caliper gauge	
CO/HC meter	
Connecting rod aligner	
Cylinder gauge	
Dial indicator	
Dye penetrant	
Engine tune–up tester	
Groove cleaning tool	
Heater	
Magnetic finger	
Micrometer	
OBDII scan tool	
Pin hole grinder	Piston pin hole
Piston ring compressor	
Piston ring expander	
Plastigage	
Precision straight edge	
Ridge reamer	
Soft brush	
Spring tester	Valve spring
Steel square	Valve spring
Thermometer	
Torque wrench	
Valve seat cutter	
Vernier calipers	
Wire brush	Valve

PP2XF–01

SSM (Special Service Materials)

08826–00080	Seal Packing Black or equivalent (FIPG)	Camshaft bearing cap Semi–circular plug Cylinder head cover Rear oil seal retainer
08826–00100	Seal Packing 1282B, THREE BOND 1282B or equivalent (FIPG)	Engine coolant drain union Water seal plate Water inlet housing
08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	Spark plug tube Drive plate bolt
08833–00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	No.1 idler pulley pivot bolt

EMISSION CONTROL

EQUIPMENT

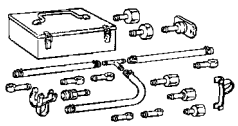
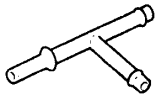
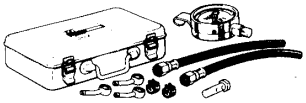
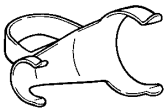
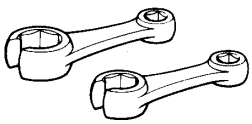
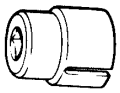
PP06S–01

Torque wrench	
MITYVAC (Hand–held vacuum pump)	

SEQUENTIAL MULTIPORT FUEL INJECTION

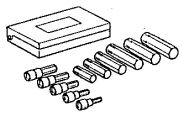
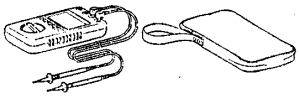
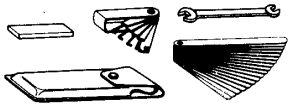
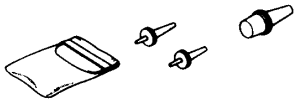
PP06T–01

SST (Special Service Tools)

	09268–41047	Injection Measuring Tool Set	
	09268–41250	T Joint	
	09268–45012	EFI Fuel Pressure Gauge	
	(09268–41100)	Clamp	Except California
	(09268–41300)	Clamp	For California
	09631–22020	Power Steering Hose Nut 14 x 17 mm Wrench Set	Fuel line flare nut
	09817–16011	Back–up Light Switch Tool	Knock sensor
	09842–30070	Wiring ”F” EFI Inspection	
	09843–18020	Diagnosis Check Wire	

PP06U–01

RECOMMENDED TOOLS

	09040–00010	Hexagon Wrench Set .	
	09082–00040	TOYOTA Electrical Tester.	
	09200–00010	Engine Adjust Kit .	
	09258–00030	Hose Plug Set .	Plug for the vacuum hose, fuel hose etc.

PP06V–01

EQUIPMENT

Carburetor cleaner	Throttle body
Graduated cylinder	Injector
OBD II scan tool	
Soft brush	Throttle body
Sound scope	Injector
Torque wrench	
Vacuum gauge	

PP2XL–01

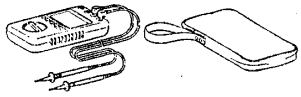
SSM (Special Service Materials)

	08826–00080	Seal Packing Black or equivalent (FIPG)	Intake air control valve

COOLING

RECOMMENDED TOOLS

PP06X–07

	09082–00040 TOYOTA Electrical Tester.	

PP06Y–01

EQUIPMENT

Heater	ECT switch
Radiator cap tester	
Thermometer	ECT switch
Torque wrench	

PP06Z–01

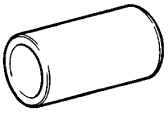
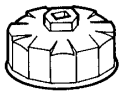
COOLANT

Item	Capacity	Classification
Engine coolant	9.2 liters (9.7 US qts, 8.1 lmp. qts)	Ethylene–glycol base

LUBRICATION

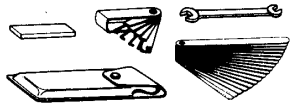
PP070–06

SST (Special Service Tools)

	09032–00100	Oil Pan Seal Cutter	No.2 oil pan
	09223–00010	Cover & Seal Replacer	Crankshaft front oil seal
	09228–07501	Oil Filter Wrench	
	09816–30010	Oil Pressure Switch Socket	

PP071–05

RECOMMENDED TOOLS

	09200–00010 Engine Adjust Kit .	

PP072–01

EQUIPMENT

Oil pressure gauge	
Precision straight edge	Oil pump
Torque wrench	

PP073–01

LUBRICANT

Item	Capacity	Classification
Engine oil		API grade SH, Energy–Conserving II or SJ, Energy–Conserving or ILSAC multigrade engine oil. SAE 5W–30 is the best choice for your vehicle, for good fuel economy, and good starting in cold weather.
Dry fill	5.2 liters (5.5 US qts, 4.6 lmp. qts)	
Drain and refill		
w/ Oil filter change	4.7 liters (5.0 US qts, 4.1 lmp. qts)	
w/o Oil filter change	4.5 liters (4.8 US qts, 4.0 lmp. qts)	

PP2XG–01

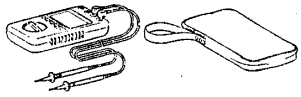
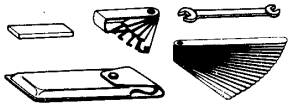
SSM (Special Service Materials)

08826–00080	Seal Packing Black or equivalent (FIPG)	Oil pump No.1 oil pan No.2 oil pan
08833–00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	Oil pressure switch

IGNITION

RECOMMENDED TOOLS

PP075–07

	09082–00040 TOYOTA Electrical Tester.	
	09200–00010 Engine Adjust Kit .	

PP076–01

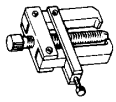
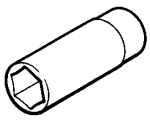
EQUIPMENT

Megger insulation resistance meter	Spark plug
Spark plug cleaner	

STARTING

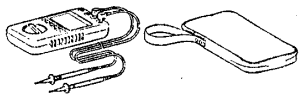
PP077–03

SST (Special Service Tools)

	09286–46011	Injection Pump Spline Shaft Puller	Armature bearing
	09810–38140	Starter Magnet Switch Nut Wrench 14	Terminal nut
	09820–00030	Alternator Rear Bearing Replacer	Armature front bearing

PP078–03

RECOMMENDED TOOLS

	09082–00040 TOYOTA Electrical Tester.	

PP079–01

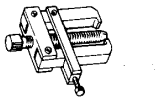
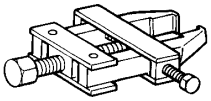
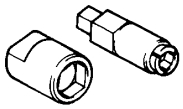
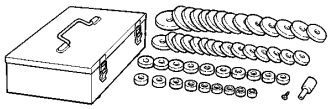
EQUIPMENT

Dial indicator	Commutator
Magnetic finger	Steel ball
Press	Magnetic switch terminal kit
Pull scale	Brush spring
Sandpaper	Commutator
Torque wrench	
V–block	Commutator
Vernier calipers	Commutator, Brush

CHARGING

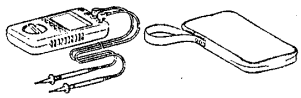
PP07A–03

SST (Special Service Tools)

	09285–76010	Injection Pump Camshaft Bearing Cone Replacer	Rotor rear bearing cover
	09286–46011	Injection Pump Spline Shaft Puller	Rectifier end frame
	09820–00021	Alternator Rear Bearing Puller	
	09820–00030	Alternator Rear Bearing Replacer	Rotor rear bearing
	09820–63010	Alternator Pulley Set Nut Wrench Set	
	09950–60010	Replacer Set	
	(09951–00500)	Replacer 50	Rotor front bearing

PP07B–03

RECOMMENDED TOOLS

	09082–00040 TOYOTA Electrical Tester.	

PP07C–01

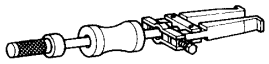
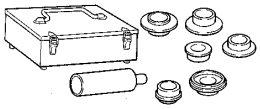
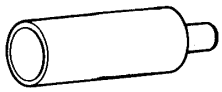
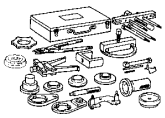
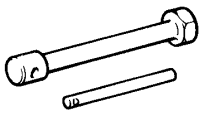
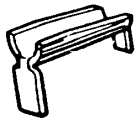
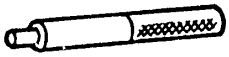
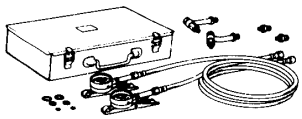
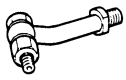
EQUIPMENT

Ammeter(A)	
Battery specific gravity gauge	Except maintenance free battery
Belt tension gauge	
Torque wrench	
Vernier calipers	Rotor (Slip ring), Brush

AUTOMATIC TRANSAXLE

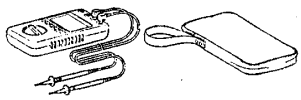
PP0BA–01

SST (Special Service Tools)

	09223–15020	Oil Seal & Bearing Replacer	
	09308–00010	Oil Seal Puller	Side gear shaft oil seal
	09316–60011	Transmission & Transfer Bearing Replacer	RH side bearing
	(09316–00011)	Replacer Pipe	RH side gear shaft oil seal
	09350–32014	TOYOTA Automatic Transmission Tool Set	
	(09351–32010)	One–way Clutch Test Tool	
	(09351–32020)	Stator Stopper	
	(09351–32130)	Handle	
	09992–00095	Automatic Transmission Oil Pressure Gauge Set	Line pressure
	(09992–00231)	Adaptor C	
	(09992–00271)	Gauge Assy	

PP0BB–01

RECOMMENDED TOOLS

	09082–00040 TOYOTA Electrical Tester.	
	09090–04010 Engine Sling Device .	

PP0BC–01

EQUIPMENT

Straight edge	Torque converter clutch
Vernier calipers	Torque converter clutch
Dial indicator or dial indicator with magnetic base	Drive plate
Hexagon Wrench (10 mm)	
Torque wrench	
OBD II scan tool	

PP0BD–03

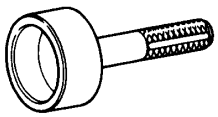
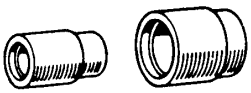
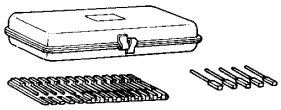
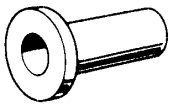
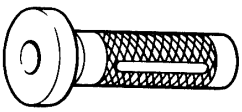
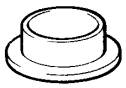
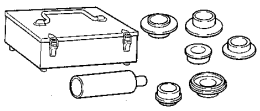
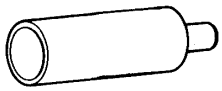
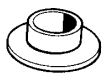
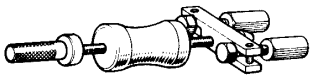
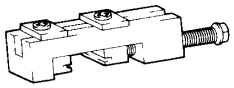
LUBRICANT

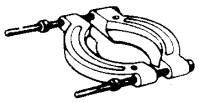
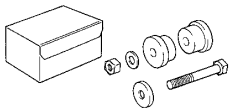
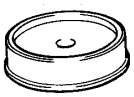
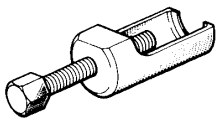
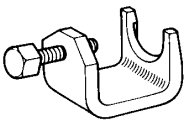
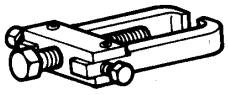
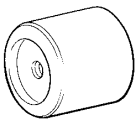
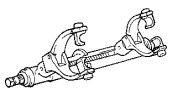
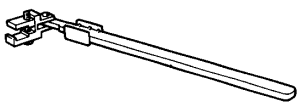
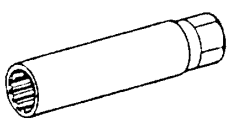
Item	Capacity	Classification
Automatic transaxle fluid (w/o Differential oil) Dry fill Drain and refill	 6.75 liters (7.1 US qts, 5.9 Imp. qts) 3.50 liters (3.7 US qts, 3.1 Imp. qts)	 ATF D–II or DEXRON®III (DEXRON®II)
Differential fluid	0.85 liters (0.9 US qts, 0.7 Imp. qts)	ATF D–II or DEXRON®III (DEXRON®II)

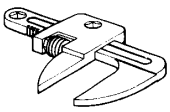
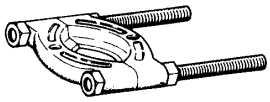
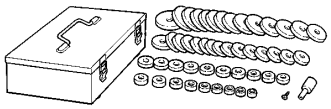
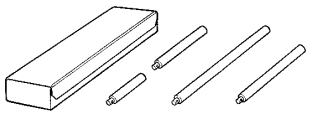
SUSPENSION AND AXLE

PP0AO–02

SST (Special Service Tools)

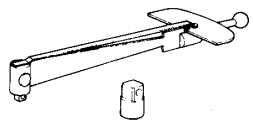
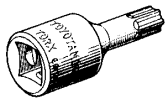
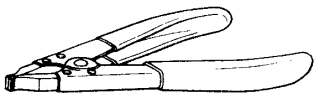
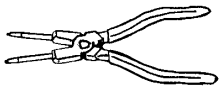
	09223–56010	Crankshaft Rear Oil Seal Replacer	Drive shaft
	09238–47012	Water Pump Bearing Remover & Replacer	Front suspension
	09240–00020	Wire Gauge Set	Drive shaft
	09309–36010	Transmission Rear Bearing Replacer	Drive shaft
	09310–35010	Countershaft Bearing Replacer	Front axle hub
	09316–20011	Transfer Bearing Replacer	Drive shaft
	09316–60011	Transmission & Transfer Bearing Replacer	Front axle hub Front suspension
	(09316–00011)	Replacer Pipe	
	(09316–00041)	Replacer ”C”	
	09520–00031	Rear Axle Shaft Puller	Front axle hub
	09521–24010	Drive Shaft Boot Clamping Tool	Drive shaft
	09527–17011	Rear Axle Shaft Bearing Remover	Front axle hub

	09555–55010	Differential Drive Pinion Bearing Replacer	Drive shaft
	09608–16042	Front Hub Bearing Adjusting Tool	Drive shaft
	(09608–02021)	Bolt & Nut	
	(09608–02041)	Retainer	
	09608–32010	Steering Knuckle Oil Seal Replacer	Front axle hub Front suspension
	09610–20012	Pitman Arm Puller	Front axle hub
	09628–10011	Ball Joint Puller	Front wheel hub bolt Rear wheel hub bolt
	09628–62011	Ball Joint Puller	Front axle hub Front suspension
	09649–17010	Steering Knuckle Tool	Front suspension
	09710–04081	Base	Front suspension
	09727–30021	Coil Spring Compressor	Front suspension Rear suspension
	09729–22031	Front Spring Upper Seat Holder	Front suspension
	09817–33190	Sensor Socket Wrench	Front suspension Rear suspension

	09922–10010	Variable Open Wrench	Front suspension Rear suspension
	09950–00020	Bearing Remover	Front axle hub Drive shaft
	09950–60010	Replacer Set	Front axle hub
	(09951–00400)	Replacer 40	
	09950–70010	Handle Set	Front axle hub
	(09951–07100)	Handle 100	

PP0AP–02

RECOMMENDED TOOLS

	09025–00010	Torque Wrench (30 kgf–cm)	
	09042–00010	Torx Socket T30 .	
	09905–00012	Snap Ring No.1 Expander .	
	09905–00013	Snap Ring Pliers .	

PP0AQ–01

EQUIPMENT

Dial indicator	
Torque wrench	
Drill	

PP0AR–01

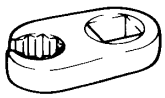
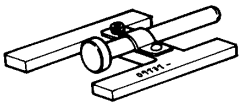
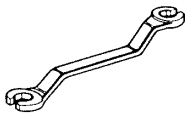
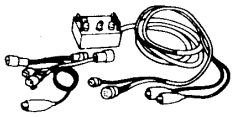
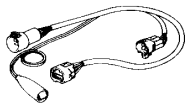
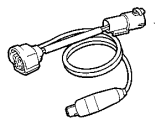
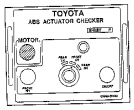
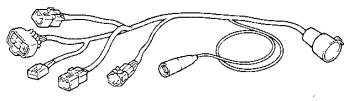
LUBRICANT

Item		Capacity	Application
Outboard joint grease	Color = Black	105 – 125 g (3.7 – 4.4 oz.)	Outboard joint
Inboard joint grease	Color = Gray		Inboard joint
	Joint side	142.5 – 157.5 g (5.0 – 5.6 oz.)	
	Boot side	52.5 – 57.5 g (2.1 – 2.3 oz.)	

BRAKE

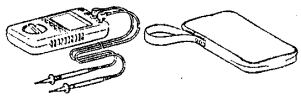
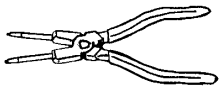
SST (Special Service Tools)

PP0CH–03

	09023–00100	Union Nut Wrench 10 mm	
	09709–29018	LSPV Gauge Set	
	09737–00010	Brake Booster Push Rod Gauge	
	09751–36011	Brake Line Union Nut 10 x 12 mm Wrench	
	09843–18020	Diagnosis Check Wire	
	09990–00150	ABS Actuator Checker and Sub–harness	
	09990–00163	ABS Actuator Checker Sheet ”A”	w/ ABS & TRAC only
	09990–00250	ABS Actuator Checker Sub–harness ”G”	
	09990–00300	ABS Actuator Checker Sub–harness ”I”	w/ ABS only
	09990–00360	ABS Actuator Checker Sub–harness ”L”	
	09990–00430	ABS Actuator Checker Sheet ”P”	w/ ABS only
	09990–00450	ABS Actuator Checker Sub–harness ”P”	w/ ABS & TRAC only

PP0CI–07

RECOMMENDED TOOLS

	09082–00040 TOYOTA Electrical Tester.	
	09905–00013 Snap Ring Pliers .	

PP0CJ–01

EQUIPMENT

Torque wrench	
Micrometer	Brake disc
Dial indicator	Brake disc
Vernier calipers	Brake disc

PP0CK–01

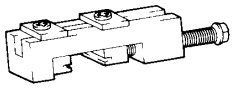
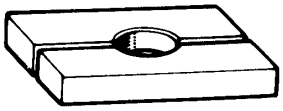
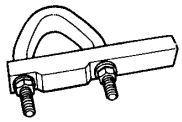
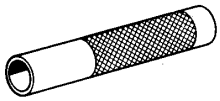
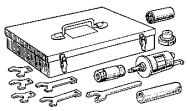
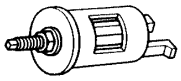
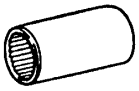
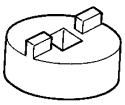
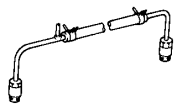
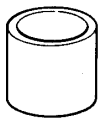
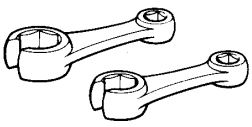
LUBRICANT

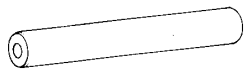
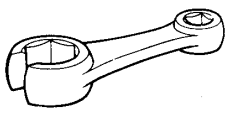
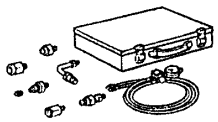
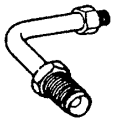
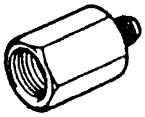
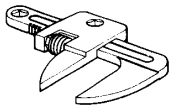
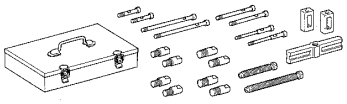
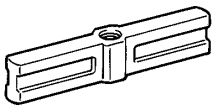
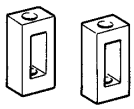
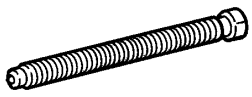
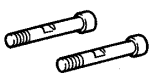
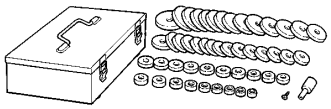
Item	Capacity	Classification
Brake fluid	–	SAE J1703 or FMVSS No.116 DOT3

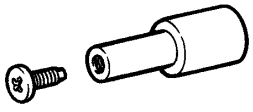
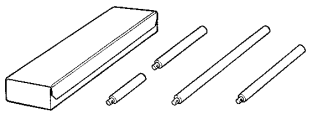
STEERING

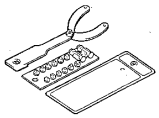
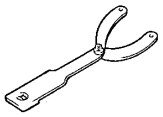
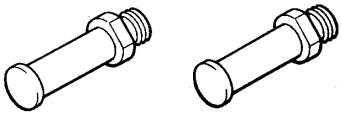
PP0AS–04

SST (Special Service Tools)

	09249–63010	Torque Wrench Adaptor	PS vane pump
	09521–24010	Drive Shaft Boot Clamping Tool	PS gear
	09527–20011	Rear Axle Shaft Bearing Remover	PS gear
	09612–00012	Rack & Pinion Steering Rack Housing Stand	PS gear
	09612–22011	Tilt Handle Bearing Replacer	PS gear
	09612–24014	Steering Gear Housing Overhaul Tool Set	
	(09613–22011)	Steering Rack Shaft Bushing Puller	PS gear
	09616–00010	Steering Worm Bearing Adjusting Socket	PS gear
	09631–10021	Rack Stopper Wrench	PS gear
	09631–12071	Steering Rack Oil Seal Test Tool	PS gear
	09631–20081	Seal Ring Tool	PS gear
	09631–22020	Power Steering Hose Nut 14 x 17 mm Wrench Set	PS vane pump PS gear

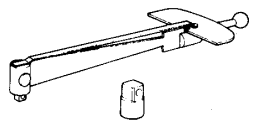
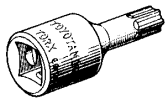
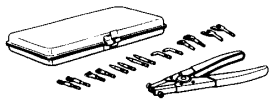
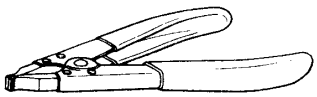
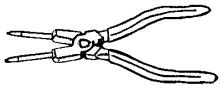
	09631–33010	Steering Rack Cover "I"	PS gear
	09633–00020	Power Steering Hose Nut Wrench	PS gear
	09640–10010	Power Steering Pressure Gauge Set	
	(09641–01010)	Gauge Assy	Power steering fluid
	(09641–01030)	Attachment B	Power steering fluid
	(09641–01060)	Attachment E	Power steering fluid
	09922–10010	Variable Open Wrench	PS gear
	09950–50010	Puller C Set	
	(09951–05010)	Hanger 150	Tilt steering column
	(09952–05010)	Slide Arm	Tilt steering column
	(09953–05020)	Center Bolt 150	Tilt steering column
	(09954–05020)	Claw No.2	Tilt steering column
	09950–60010	Replacer Set	

	(09951–00180) Replacer 18	PS gear
	(09951–00240) Replacer 24	PS gear
	(09951–00250) Replacer 25	PS gear
	(09951–00260) Replacer 26	PS gear
	(09951–00290) Replacer 29	PS gear
	(09951–00310) Replacer 31	PS gear
	(09951–00320) Replacer 32	PS gear
	(09951–00330) Replacer 33	PS vane pump
	(09951–00340) Replacer 34	PS gear
	(09951–00400) Replacer 40	PS gear
	(09951–00430) Replacer 43	PS gear
	(09952–06010) Adapter	PS gear
	09950–70010 Handle Set	

	(09951–07100)	Handle 100	PS vane pump
	(09951–07200)	Handle 200	PS gear
	(09951–00360)	Replacer 36	PS gear
	09960–10010	Variable Pin Wrench Set	
	(09962–01000)	Variable Pin Wrench Arm Assy	PS vane pump
	(09963–01000)	Pin 10	PS vane pump

PP0AT–03

RECOMMENDED TOOLS

	09025–00010	Torque Wrench (30 <kgfcm>) .	PS vane pump PS gear
	09042–00010	Torx Socket T30 .	Tilt steering column
	09904–00010	Expander Set .	
	09905–00012	Snap Ring No.1 Expander .	
	09905–00013	Snap Ring Pliers .	

PP0AU–01

EQUIPMENT

Belt tension gauge	On–vehicle inspection
Caliper gauge	PS vane pump
Calipers	PS vane pump
Dial indicator	PS gear
Feeler gauge	PS vane pump
Micrometer	PS vane pump
Torque wrench	

PP0AV–01

LUBRICANT

Item	Capacity	Classification
Power steering fluid Total	0.8 liters (0.8 US qts, 0.7 lmp.qts)	ATF DEXRON® II or III

PP2XH–01

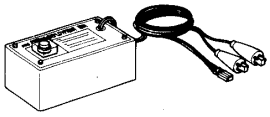
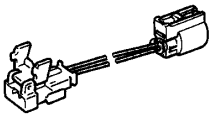
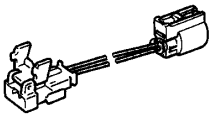
SSM (Special Service Materials)

08833–00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	PS gear

SUPPLEMENTAL RESTRAINT SYSTEM

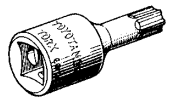
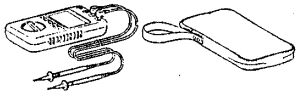
PP0BJ–02

SST (Special Service Tools)

	09082–00700	SRS Airbag Deployment Tool	
	09082–00750	Airbag Deployment Wire Sub–harness No.3	
	09082–00760	Airbag Deployment Wire Sub–harness No.4	
	09843–18020	Diagnosis Check Wire	

PP2XI–01

RECOMMENDED TOOLS

	09042–00020 Torx Socket T40 .	
	09082–00040 TOYOTA Electrical Tester.	

PP0BL–01

EQUIPMENT

Torque wrench	
Bolt: Length: 35 mm (1.38 in.) Pitch: 1.0 mm (0.039 in.) Diam: 6.0 mm (0.236 in.)	Airbag disposal
Tire Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Airbag disposal
Tire with disc wheel Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Airbag disposal
Vinyl bag	Airbag disposal

BODY ELECTRICAL

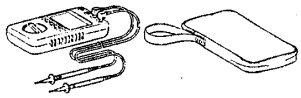
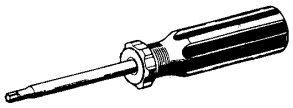
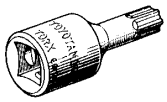
PP0B2–01

SST (Special Service Tools)

09843–18020 Diagnosis Check Wire	

PP0B3–01

RECOMMENDED TOOLS

	09082–00040	TOYOTA Electrical Tester.	
	09041–00030	Torx Driver T30 .	For removing and installing steering wheel pad
	09042–00010	Torx Socket T30 .	For removing and installing steering wheel pad

PP0B4–01

EQUIPMENT

Voltmeter	
Ammeter	
Ohmmeter	
Test lead	
Thermometer	Engine oil level warning switch, Seat heater
Syphon	Brake fluid level warning switch
Oil bath	Engine oil level warning switch
Bulb (3 W)	Fuel sender gauge
Bulb (3.4 W)	Seat belt warning relay
Bulb (21 W)	Turn signal flasher relay
Dry cell battery	Fuel sender gauge
Heat light	Seat heater
Torque wrench	
Masking tape	Rear window defogger wire
Tin foil	Rear window defogger wire

PP2XJ–01

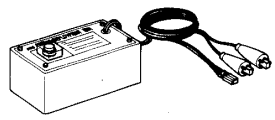
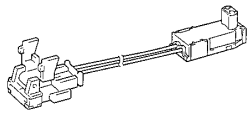
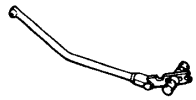
SSM (Special Service Materials)

08888–88888	DuPont Paste No. 4817 or equivalent	Rear window defogger

BODY

PP0AX–03

SST (Special Service Tools)

	09082–00700	SRS Airbag Deployment Tool	
	09082–00740	Airbag Deployment Wire Sub–harness No.2	
	09804–24010	Luggage Compartment Door Torsion Bar Tool	
	09812–00010	Door Hinge Set Bolt Wrench	

PP0AY–03

RECOMMENDED TOOLS

	09070–20010 Moulding Remover .	

PP0AZ–10

EQUIPMENT

Clip remover	
Torque wrench	
Hexagon wrench (6 mm)	
Torx driver	
Hog ring pliers	
Hand riveter	
Tape	To avoid surface damage
Adhesive tape	To avoid surface damage
Double–stick tape	
Adhesive	
Cleaner	
Shop rag	
Knife	
Sealer gun	
Brush	
Putty spatula	
Glass plate or similar object	
Wooden block or similar object	
Heat light	
Piano wire	
Rope (no projections, difficult to break)	Seat belt pretensioner
Tire Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Seat belt pretensioner
Tire with wheel Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Seat belt pretensioner
Vinyl bag	Seat belt pretensioner

PP0B0–01

LUBRICANT

Item	Capacity	Classification
MP grease	–	–

PP2XK–01

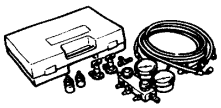
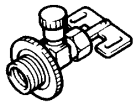
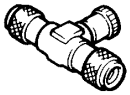
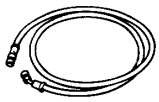
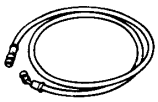
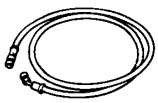
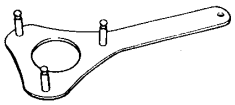
SSM (Special Service Materials)

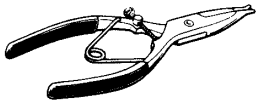
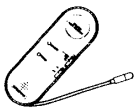
08833–00070	Adhesive 1324, THREE BOND 1324 or equivalent	
08833–00030	Three cement black or equivalent	
08850–00801	Windshield Glass Adhesive Set or equivalent	

AIR CONDITIONING

PP0B6–03

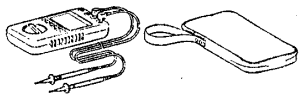
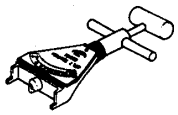
SST (Special Service Tools)

	07110–58060 Air Conditioner Service Tool Set	
	(07117–58060) Refrigerant Drain Service Valve	
	(07117–58070) T–Joint	
	(07117–58080) Quick Disconnect Adapter	Discharge (diam. 16 mm)
	(07117–58090) Quick Disconnect Adapter	Suction (diam. 13 mm)
	(07117–78050) Refrigerant Charging Gauge	
	(07117–88060) Refrigerant Charging Hose	Discharge (Red)
	(07117–88070) Refrigerant Charging Hose	Suction (Blue)
	(07117–88080) Refrigerant Charging Hose	Utility (Green)
	07112–66040 Magnetic Clutch Remover	
	07112–76060 Magnetic Clutch Stopper	
	07114–84010 Snap Ring Pliers	

	07114–84020 Snap Ring Pliers	
	07116–38360 Gas Leak Detector Assembly	

PP0B7–03

RECOMMENDED TOOLS

	09082–00040 TOYOTA Electrical Tester.	
	09216–00021 Belt Tension Gauge .	

PP0B8–01

EQUIPMENT

Voltmeter	
Ammeter	
Ohmmeter	
Test lead	
Thermometer	Sensor, ECT switch
Torque wrench	
Dial indicator	Magnetic clutch

PP0B9–01

LUBRICANT

Item	Capacity	Classification
Compressor oil	–	ND–OIL 8 or equivalent
When replacing receiver	20 cc (0.71 fl.oz.)	
When replacing condenser	40 – 50 cc (1.4 – 1.7 fl.oz.)	
When replacing evaporator	40 cc (1.4 fl.oz.)	
When replacing compressor	120 cc (4.1 fl.oz.)	

SFI SYSTEM

SF05M–03

PRECAUTION

1. BEFORE WORKINR ON FUEL SYSTEM, DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM BATTERY

HINT:

Any diagnostic trouble code retained by the computer will be erased when the negative (–) terminal cable is removed from the battery. Therefore, if necessary, read the diagnosis before removing the negative (–) terminal cable from the battery.

2. DO NOT SMOKE OR WORK NEAR AN OPEN FLAME WHEN WORKING ON FUEL SYSTEM

3. KEEP GASOLINE AWAY FROM RUBBER OR LEATHER PARTS

4. MAINTENANCE PRECAUTIONS

(a) In event of engine misfire, these precautions should be taken.
  (1) Check proper connection to battery terminals, etc.
  (2) After repair work, check that the ignition coil terminals and all other ignition system lines are reconnected securely.
  (3) When cleaning the engine compartment, be especially careful to protect the electrical system from water.

(b) Precautions when handling oxygen sensor.
  (1) Do not allow oxygen sensor to drop or hit against an object.
  (2) Do not allow the sensor to come into contact with water.

5. IF VEHICLE IS EQUIPPED WITH MOBILE RADIO SYSTEM (HAM, CB, ETC.)

If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.

6. AIR INDUCTION SYSTEM

(a) Separation of the engine oil dipstick, oil filler cap, PCV hose, etc. may cause the engine to run out of tune.

(b) Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will allow air suction and cause the engine to run out of tune.

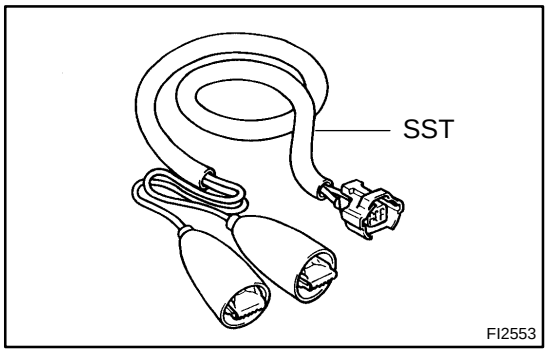
7. ELECTRONIC CONTROL SYSTEM

(a) Before removing SFI wiring connectors, terminals, etc., first disconnect the power by either turning the ignition switch to LOCK or disconnecting the negative (–) terminal cable from the battery.

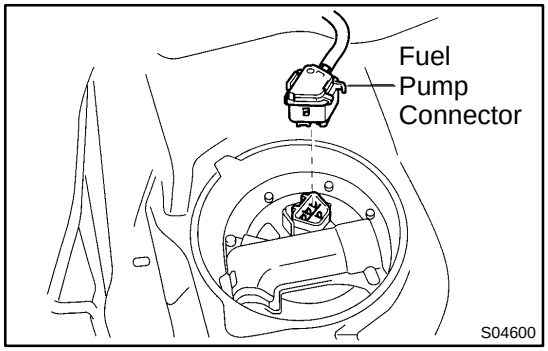
HINT:

Always check the diagnostic trouble code before disconnecting the negative (–) terminal cable from the battery.

(b) When installing the battery, be especially careful not to incorrectly connect the positive (+) and negative (–) cables.
(c) Do not permit parts to receive a severe impact during removal or installation. Handle all SFI parts carefully, especially the ECM.
(d) Be careful during troubleshooting as there are numerous transistor circuit, and even slight terminal contact can cause further troubles.
(e) Do not open the ECM cover.
(f) When inspecting during rainy weather, take care to prevent entry of water. Also, when washing the engine compartment, prevent water from getting on the SFI parts and wiring connectors.
(g) Parts should be replaced as an assembly.
(h) Care should be taken when pulling out and inserting wiring connectors.
  (1) Release the lock and pull out the connector, pulling on the connectors.
  (2) Fully insert the connector and check that it is locked.

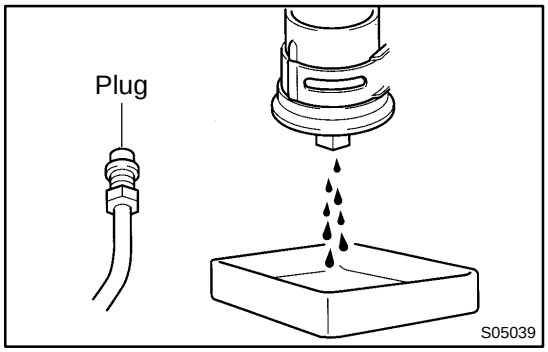


(i) Use SST for inspection or test of the injector or its wiring connector.
SST 09842–30070

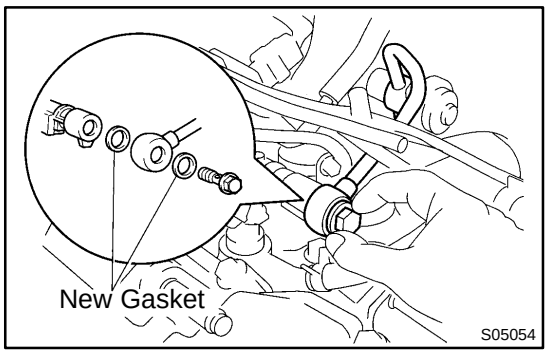


8. FUEL SYSTEM

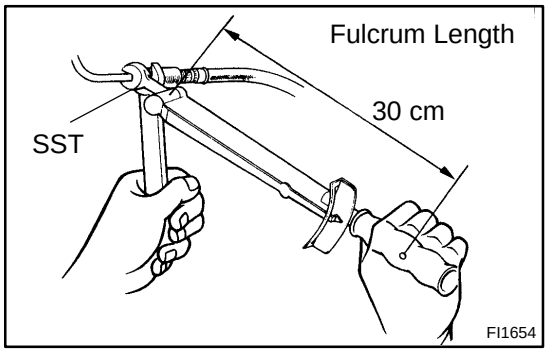
(a) When disconnecting the high fuel pressure line, a large amount of gasoline will spill out, so observe these procedures:
  (1) Disconnect the fuel pump connector.
  (2) Start the engine. After the engine has stopped on its own, turn the ignition switch to LOCK.



  (3) Put a container under the connection.
  (4) Slowly loosen the connection.
  (5) Disconnect the connection.
  (6) Plug the connection with a rubber plug.



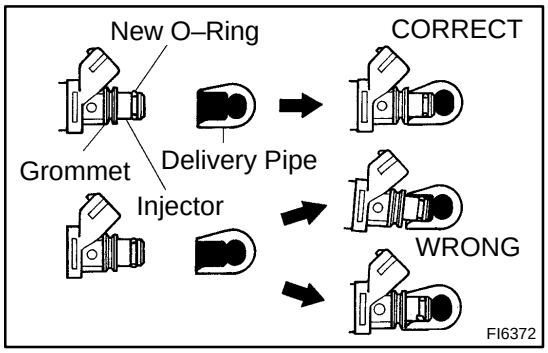
(b) When connecting the flare nut or union bolt on the high pressure pipe union, observe these procedures:
(1) (Union Bolt Type)
Always use 2 new gaskets.
(2) (Union Bolt Type)
Tighten the union bolt by hand.
(3) (Union Bolt Type)
Tighten the union bolt to the specified torque.
Torque: 32.5 N·m (330 kgf·cm, 24 ft·lbf)



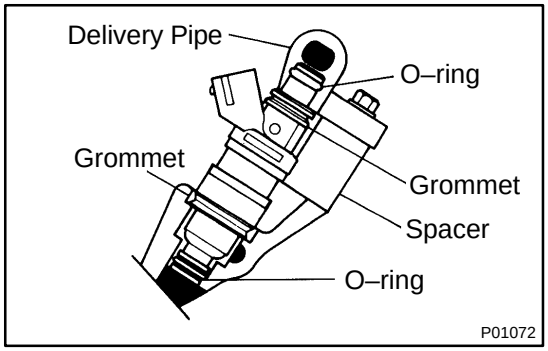
(4) (Flare Nut Type)
Apply a light coat of engine oil to the flare nut, and tighten the flare nut by hand.
(5) (Flare Nut Type)
Using SST, tighten the flare nut to specified torque.
SST 09631–22020

NOTICE:
Do not rotate the fuel pipe, when tightening the flare nut.
Torque: 28 N·m (285 kgf·cm, 21 ft·lbf) for using SST

HINT:
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

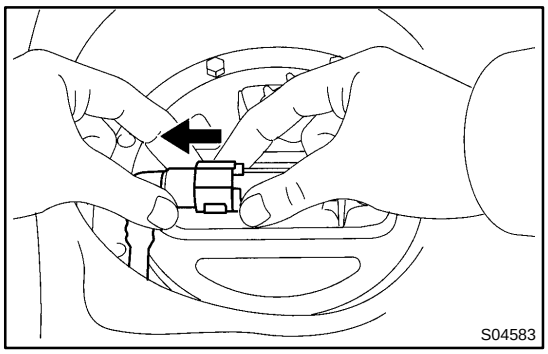


(c) Observe these precautions when removing and installing the injectors.
(1) Never reuse the O–ring.
(2) When placing a new O–ring on the injector, take care not to damage it in any way.
(3) Coat a new O–ring with spindle oil or gasoline before installing–never use engine, gear or brake oil.



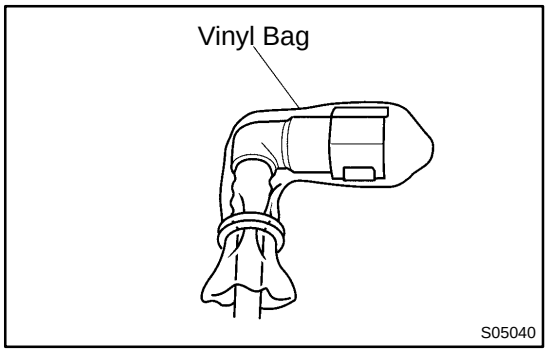
(d) Install the injector to the delivery pipe and intake manifold, as shown in the illustration.
Before installing the injector, must apply spindle oil or gasoline on the place where a delivery pipe or an intake manifold touches an O–ring of the injector.

(e) Observe these precautions when disconnecting the fuel tube connector (quick type).
(1) Check if there is any dirt like mud on the pipe and around the connector before disconnecting them and clean the dirt away.
(2) Be sure to disconnect with hands.

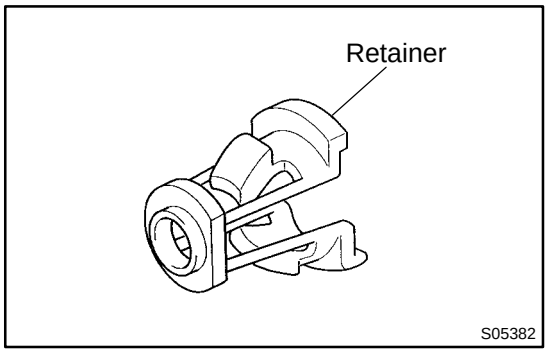


(3) When the connector and the pipe are stuck, pinch the retainer between the hands, push and pull the connector to free to disconnect and pull it out. Do not use any tool at this time.

(4) Inspect if there is any dirt or the likes on the seal surface of the disconnected pipe and clean it away.



(5) Prevent the disconnected pipe and connector from damaging and mixing foreign objects by covering them with a vinyl bag.

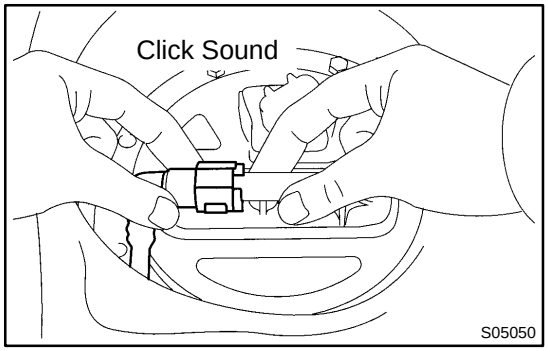


(f) Observe these precautions when disconnecting the fuel tube connector (quick type).

(1) Do not reuse the retainer removed from the pipe.

(2) Must use hands without using tools when to remove the retainer from the pipe.

(3) Check if there is any damage or foreign objects on the connected part of the pipe.



(4) Match the axis of the connector with axis of the pipe, and push in the connector until retainer makes a ”click” sound. In case that the connections is tight, apply little amount of new engine oil on the tip of the pipe.

(5) After having finished the connection, check if the pipe and the connector are securely connected by pulling them.

(6) Check if there is any fuel leakage.

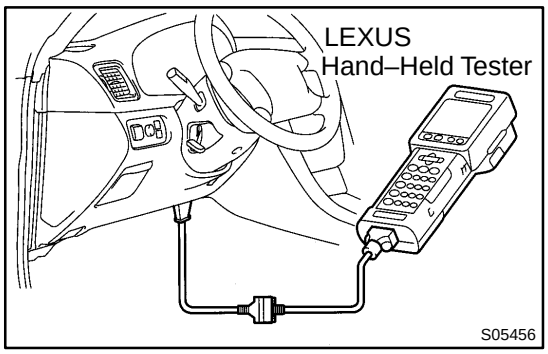
(g) Observe these precautions when handling nylon tube.

(1) Pay attention not to turn the connected part of the nylon tube and the quick connector with force when connecting them.

(2) Pay attention not to kink the nylon tube.

(3) Do not remove the EPDM protector on the outside of the nylon tube.

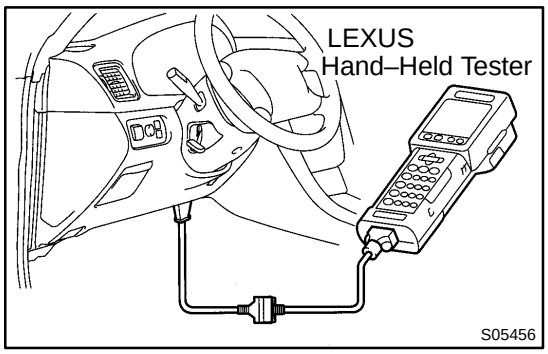
(4) Must not close the piping with the nylon tube by bending it.



(h) Check that there are no fuel leaks after doing maintenance anywhere on the fuel system.
(1) Connect the LEXUS hand–held tester to the DLC3.
(2) Turn the ignition switch ON and push LEXUS hand–held tester main switch ON.

NOTICE:
Do not start the engine.

(3) Select the active test mode on the LEXUS hand–held tester.
(4) Please refer to the LEXUS hand–held tester operator's manual for further details.
(5) If you have no LEXUS hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector.
(See page SF–6)
(6) Check that there are no leaks from any part of the fuel system.
(7) Turn the ignition switch to LOCK.
(8) Disconnect the LEXUS hand–held tester from the DLC3.



FUEL PUMP

SF05N–05

ON–VEHICLE INSPECTION

1. CHECK FUEL PUMP OPERATION

(a) Connect the LEXUS hand–held tester to the DLC3.

(b) Turn the ignition switch ON and LEXUS hand–held tester main switch ON.

NOTICE:

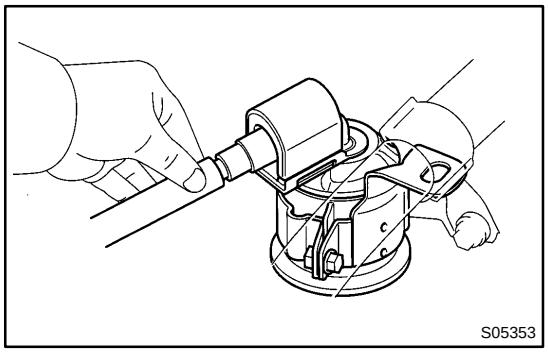
Do not start the engine.

(c) Select the active test mode on the LEXUS hand–held tester.

(d) Please refer to the LEXUS hand–held tester operator's manual for further details.

(e) If you have no LEXUS hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector. (See step 7)

(f) Check that there is pressure in the fuel inlet pipe from the fuel filter.



HINT:

If there is fuel pressure, you will hear the sound of fuel flowing.

If there is no pressure, check these parts:

- Fusible link
- Fuses (AM2 30A, IGN 5A)
- EFI main relay
- Fuel pump
- ECM
- Wiring connections

(g) Turn the ignition switch to LOCK.

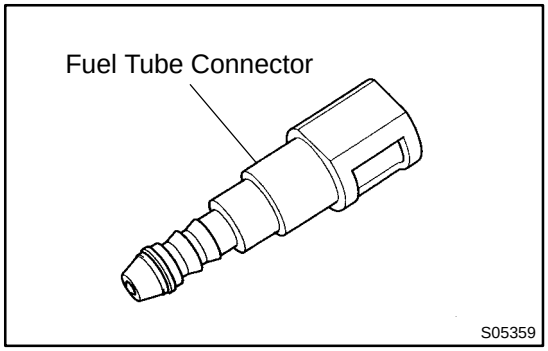
(h) Disconnect the LEXUS hand–held tester from the DLC3.

2. CHECK FUEL PRESSURE

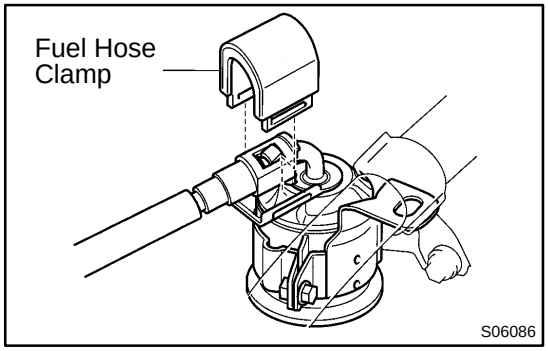
(a) Check the battery positive voltage is above 12 V.

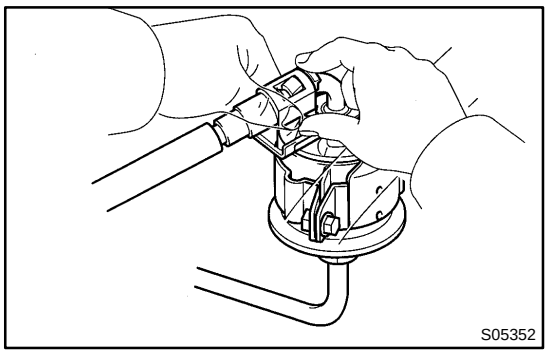
(b) Disconnect the negative (–) terminal cable from the battery.

(c) Purchase the new No.1 fuel pipe and take out the fuel tube connector from its pipe.
Part No. 23801–20040



(d) Remove the fuel hose clamp.

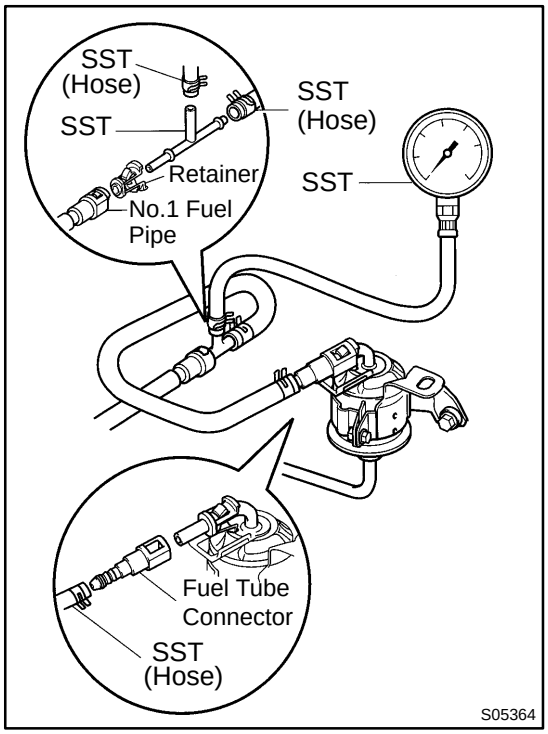




(e) Disconnect the No.1 fuel pipe (fuel tube connector) from the fuel filter outlet.

CAUTION:

- **Perform disconnecting operations of the fuel tube connector (quick type) after observing the precautions.**
- **As there is retained pressure in the fuel pipe line, prevent it from splashing inside the engine compartment.**



(f) Install SST (pressure gauge) as shown in the illustration by using SST and fuel tube connector.
SST 09268–41047, 09268–41250, 09268–45012

(g) Wipe off any splattered gasoline.

(h) Reconnect the negative (–) terminal cable to the battery.

(i) Connect the LEXUS hand–held tester to the DLC3. (See step 1.)

(j) Measure the fuel pressure.
Fuel pressure:
301 – 347 kPa (3.1 – 3.5 kgf/cm^2, 44 – 50 psi)

If pressure is high, replace the fuel pressure regulator.

If pressure is low, check these parts:

- Fuel hoses and connections
- Fuel pump
- Fuel filter
- Fuel pressure regulator

(k) Disconnect the LEXUS hand–held tester from the DLC3.

(l) Start the engine.

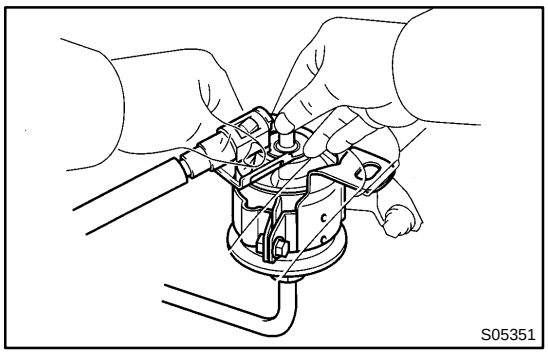
(m) Measure the fuel pressure at idle.
Fuel pressure:
301 – 347 kPa (3.1 – 3.5 kgf/cm^2, 44 – 50 psi)

(n) Stop the engine.

(o) Check that the fuel pressure remains as specified for 5 minutes after the engine has stopped.
Fuel pressure: 147 kPa (1.5 kgf/cm^2, 21 psi) or more

If pressure is not as specified, check the fuel pump, pressure regulator and/or injectors.

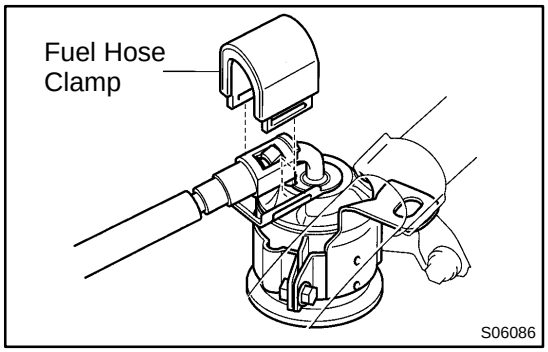
(p) After checking fuel pressure, disconnect the negative (–) terminal cable from the battery and carefully remove the SST and fuel tube connector to prevent gasoline from splashing.
SST 09268–41046, 09268–41250, 09268–45012



(q) Reconnect the No.1 fuel pipe (fuel tube connector).

CAUTION:

Perform connecting operations of the fuel tube connector (quick type) after observing the precautions.



(r) Surely install the fuel hose clamp to the fuel filter with "click" sound.

(s) After installing the clamp, check that the clamp is fixed by pulling up the clamp.

(t) Reconnect the negative (–) terminal cable to the battery.

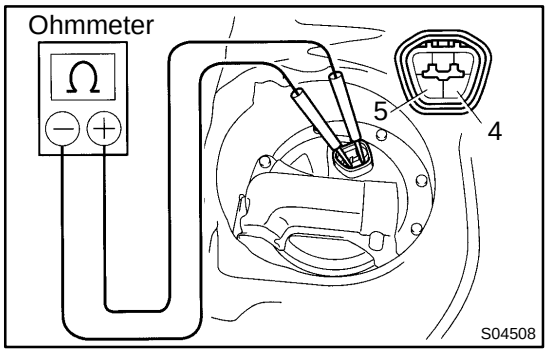
(u) Check for fuel leakage.

3. REMOVE REAR SEAT CUSHION

4. REMOVE FLOOR SERVICE HOLE COVER

5. DISCONNECT FUEL PUMP & SENDER GAUGE CONNECTOR

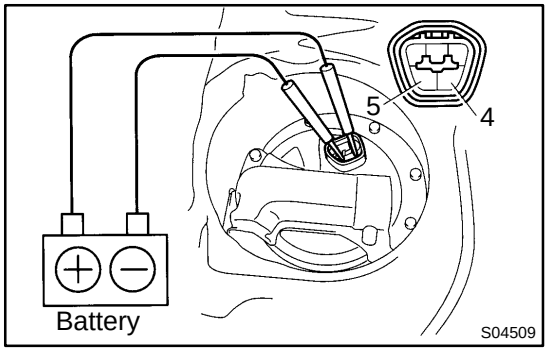
6. INSPECT FUEL PUMP RESISTANCE



Using an ohmmeter, measure the resistance between terminals 4 and 5.

Resistance: 0.2 – 3.0 Ω at 20˚C (68˚F)

If the resistance is not as specified, replace the fuel pump.



7. INSPECT FUEL PUMP OPERATION

Connect the positive (+) lead from the battery to terminal 4 of the connector, and the negative (–) lead to terminal 5. Check that the fuel pump operates.

NOTICE:

- **These tests must be done quickly (within 10 seconds) to prevent the coil burning out.**
- **Keep the fuel pump as far away from the battery as possible.**
- **Always do the switching at the battery side.**

If operation is not as specified, replace the fuel pump or lead wire.

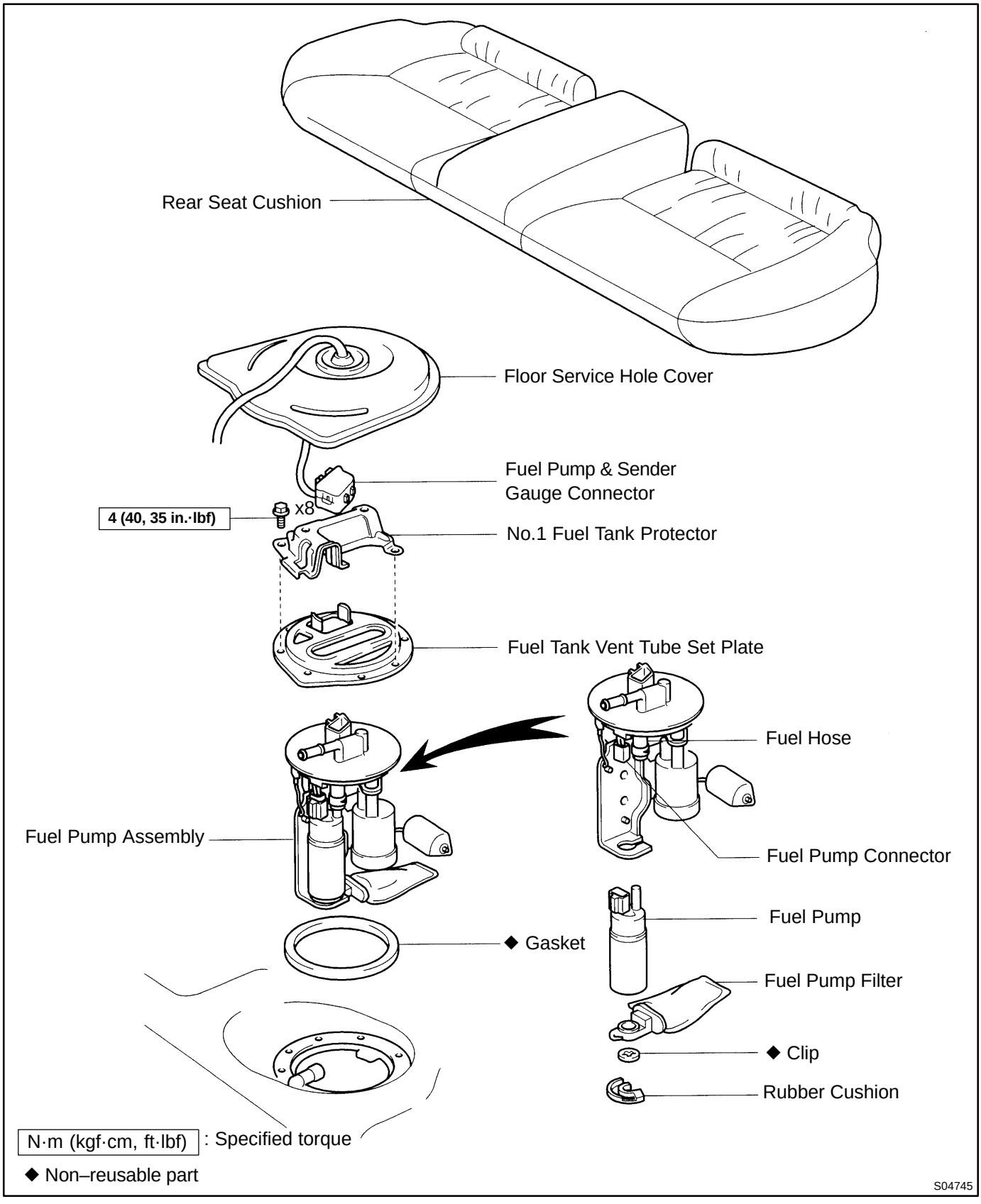
8. RECONNECT FUEL PUMP & SENDER GAUGE CONNECTOR

9. REINSTALL FLOOR SERVICE HOLE COVER

10. REINSTALL REAR SEAT CUSHION

SF05O–04

COMPONENTS



S04745

SF05P–04

REMOVAL

CAUTION:

Do not smoke or work near an open flame when working on the fuel pump.

1. REMOVE REAR SEAT CUSHION

2. REMOVE FLOOR SERVICE HOLE COVER

(a) Take out the floor carpet.

(b) Remove the service hole cover.

HINT:

At the time of installation, please refer to the following item.

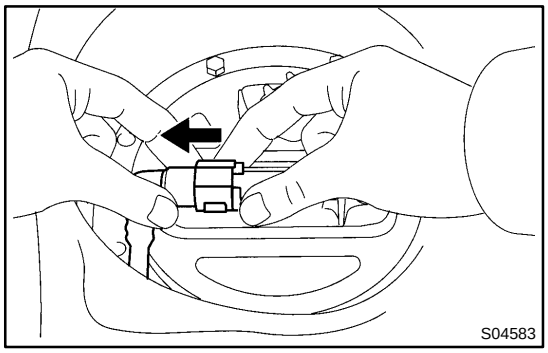
Check for fuel leakage.

3. DISCONNECT FUEL PUMP & SENDER GAUGE CONNECTOR

4. REMOVE NO.1 FUEL TANK PROTECTOR

Remove the 2 bolts and No.1 fuel tank protector.

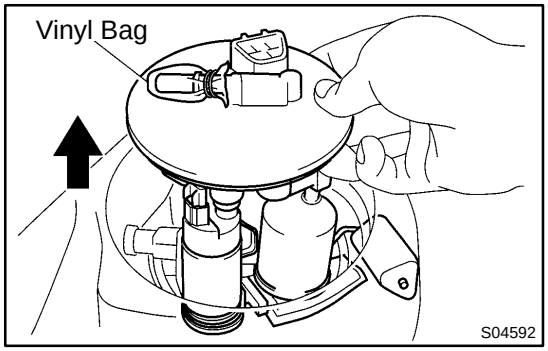
Torque: 4 N·m (40 kgf·cm, 35 in.·lbf)



5. DISCONNECT FUEL TUBE (FUEL TUBE CONNECTOR)

CAUTION:

- **Perform disconnecting and connecting operations of the fuel tube connector (quick type) after observing the precautions.**
- **As there is retained pressure in the fuel pipe line, prevent it from splashing inside the vehicle compartment.**



6. REMOVE FUEL PUMP ASSEMBLY FROM FUEL TANK

(a) Remove the 6 bolts and fuel tank vent tube set plate.
Torque: 4 N·m (40 kgf·cm, 35 in.·lbf)

(b) Pull out the fuel pump assembly.

(c) Remove the gasket from the pump assembly.

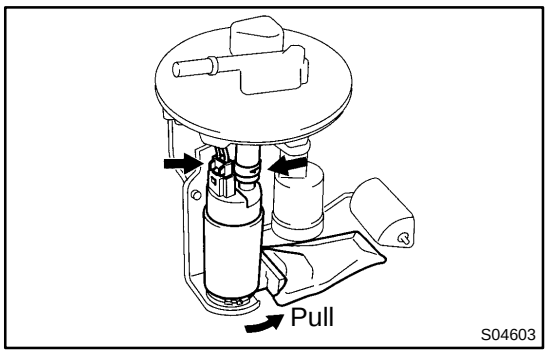
NOTICE:

- **Do not damage the fuel pump filter.**
- **Be careful that the arm of the sender gauge should not bent.**

HINT:

At the time of installation, please refer to the following item.

Install a new gasket to the pump assembly.



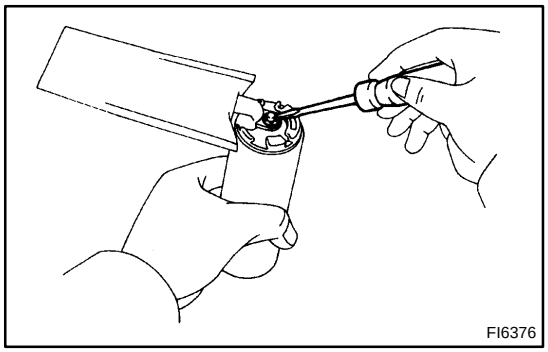
7. DISCONNECT FUEL PUMP CONNECTOR

8. REMOVE FUEL PUMP FROM FUEL PUMP BRACKET

(a) Pull off the lower side of the fuel pump from the pump bracket.

(b) Disconnect the fuel hose from the fuel pump, and remove the fuel pump.

(c) Remove the rubber cushion from the fuel pump.



9. REMOVE FUEL PUMP FILTER FROM FUEL PUMP

(a) Using a small screwdriver, remove the clip.

(b) Pull out the pump filter.

HINT:

At the time of installation, please refer to the following item.
Install the pump filter with a new clip.

SF05Q–01

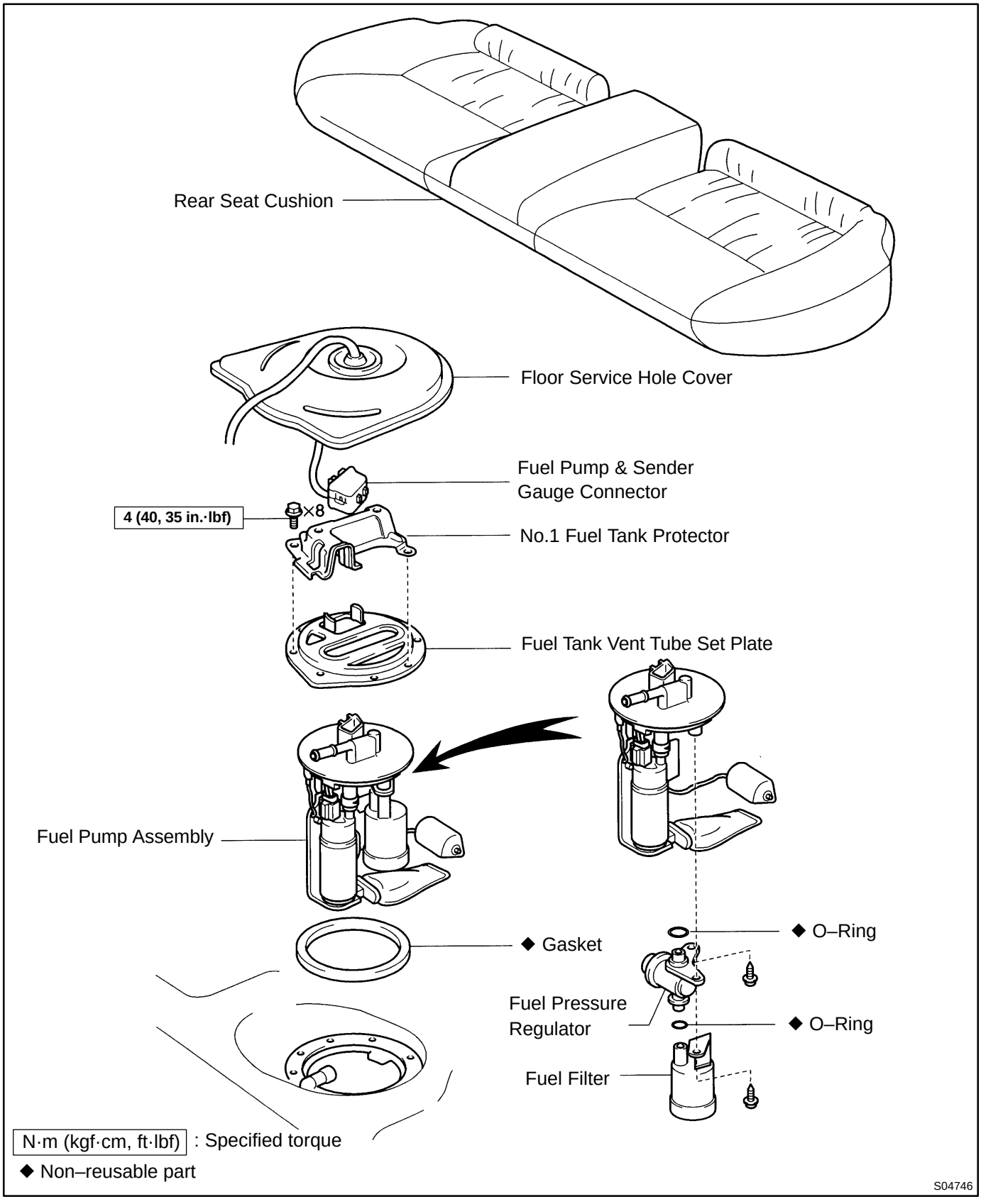
INSTALLATION

Installation is in the reverse order of removal (See page SF–10).

FUEL PRESSURE REGULATOR

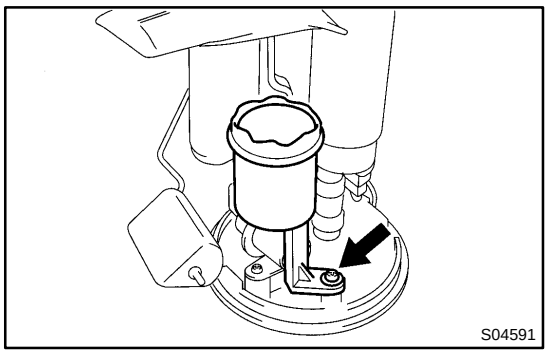
SF05R–05

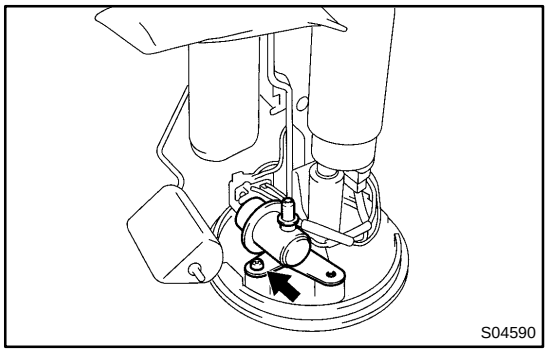
COMPONENTS



SF05S–03

REMOVAL





1. REMOVE FUEL PUMP ASSEMBLY FROM FUEL TANK (See page SF–10)

2. REMOVE FUEL FILTER

(a) Remove the screw, and pull out the fuel filter.

(b) Remove the O–ring from the fuel filter.

HINT:

At the time of installation, please refer to the following item.

Apply a light coat of gasoline to a new O–ring, and install it to the fuel filter.

Torque: 2.0 N·m (20 kgf·cm, 17 in.·lbf)

3. REMOVE FUEL PRESSURE REGULATOR

(a) Remove the screw, and pull out the pressure regulator.

Torque: 2.0 N·m (20 kgf·cm, 17 in.·lbf)

(b) Remove the O–ring from the pressure regulator.

HINT:

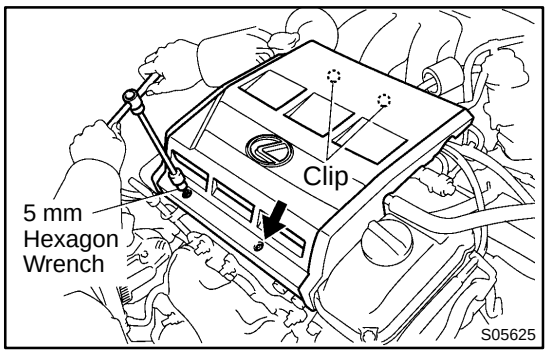
At the time of installation, please refer to the following item.

Apply a light coat of gasoline to a new O–ring, and install it to the pressure regulator.

SF05T–01

INSTALLATION

Installation is in the reverse order of removal (See page SF–14).



INJECTOR

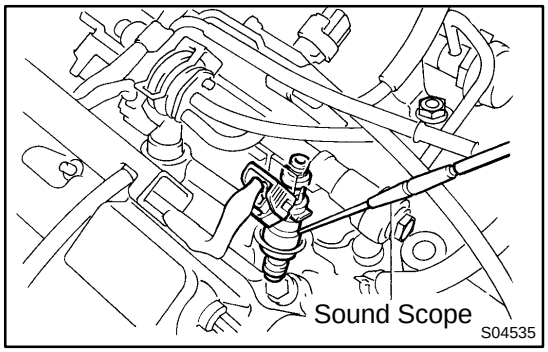
SF072–06

ON–VEHICLE INSPECTION

1. REMOVE V–BANK COVER

(a) Using a 5 mm hexagon wrench, remove the 2 cap nuts.

(b) Disconnect the 2 clips, and remove the V–bank cover.



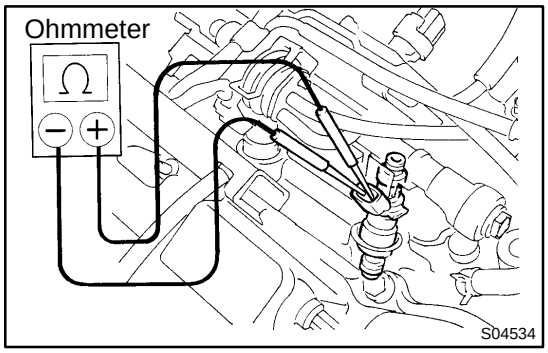
2. INSPECT INJECTOR OPERATION

Check operation sound from each injector.

(1) With the engine running or cranking, use a sound scope to check that there is normal operating noise in proportion to engine speed.

(2) If you have no sound scope, you can check the injector operating vibration with your finger.

If no sound or unusual sound is heard, check the wiring connector, injector or injection signal from the ECM.



3. INSPECT INJECTOR RESISTANCE

(a) Disconnect the injector connector.

(b) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 13.8 Ω at 20˚C (68˚F)

If the resistance is not as specified, replace the injector.

(c) Reconnect the injector connector.

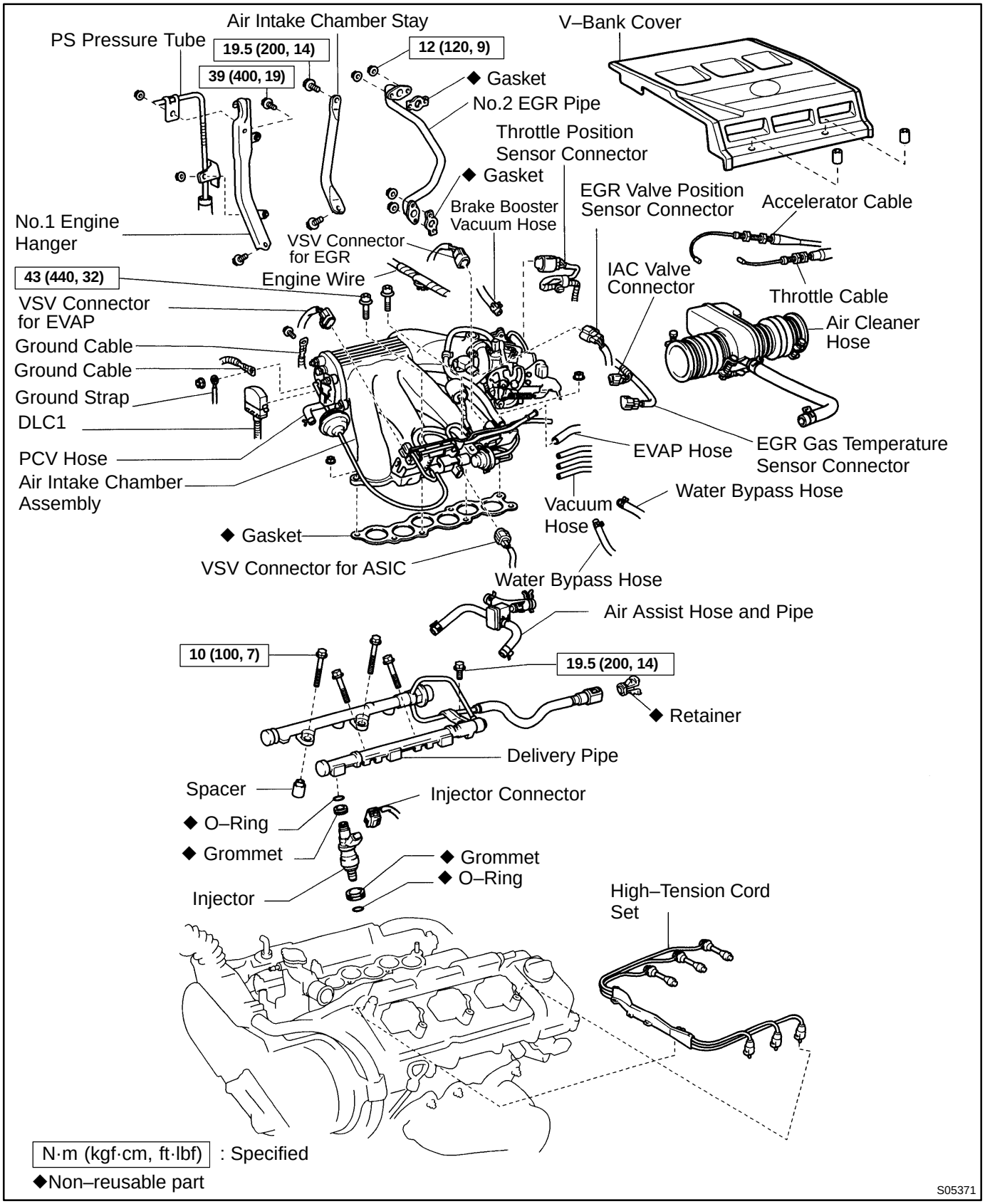
4. REINSTALL V–BANK COVER

HINT:

For fixing the V–bank cover, push on the cover until a ”click” is felt.

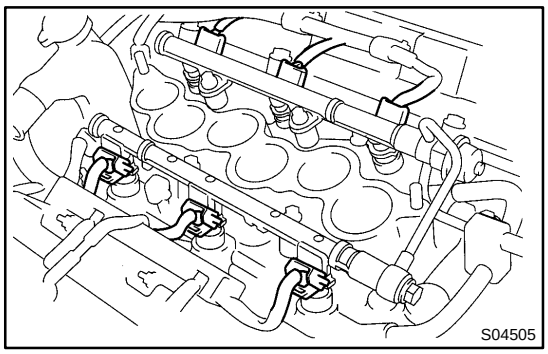
SF073–05

COMPONENTS

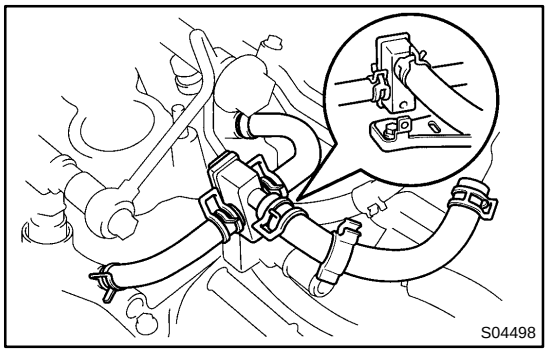


SF074–04

REMOVAL



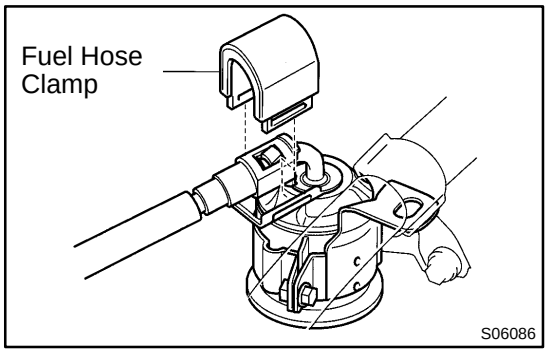
1. **REMOVE AIR CLEANER HOSE**
2. **REMOVE AIR INTAKE CHAMBER ASSEMBLY (See page EM–30)**
3. **DISCONNECT INJECTOR CONNECTORS**



4. **REMOVE AIR ASSIST HOSES AND PIPE**

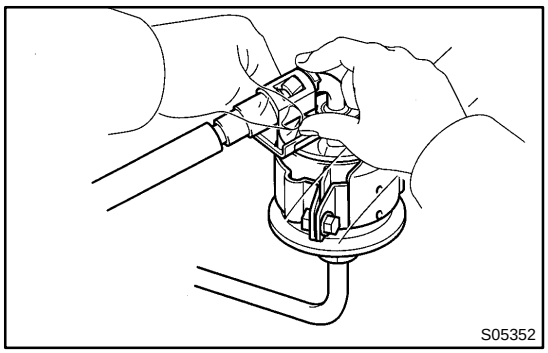
(a) Disconnect the air assist pipe from the bracket on the No.1 fuel pipe.

(b) Remove the air assist hoses from the intake manifold.



5. **DISCONNECT FUEL INLET PIPE**

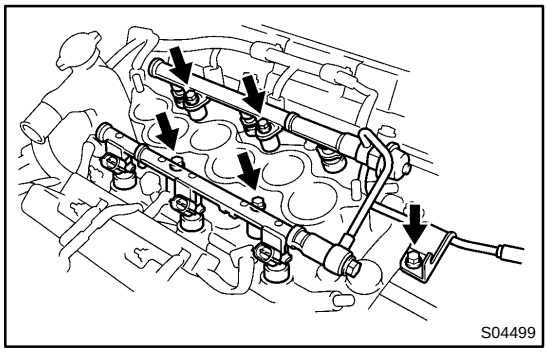
(a) Remove the fuel hose clamp.



(b) Disconnect the fuel inlet pipe (fuel tube connector) from the fuel filter.

CAUTION:

- **Perform disconnecting operations of the fuel tube connector (quick type) after observing the precautions.**
- **As there is retained pressure in the fuel pipe line, prevent it from splashing inside the engine compartment.**



6. **REMOVE DELIVERY PIPES AND INJECTORS**

NOTICE:

- **Be careful not to drop the injectors when removing the delivery pipes.**
- **Pay attention to put any hung load on the injector to and from the side direction.**

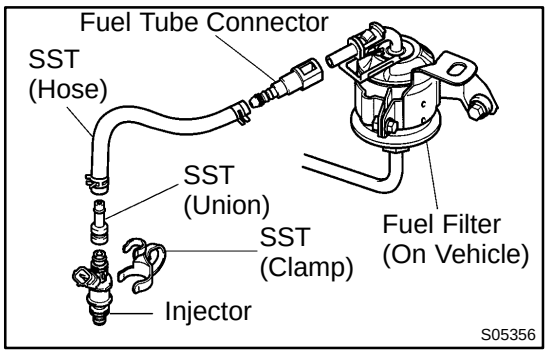
(a) Remove the 5 bolts and delivery pipes together with the 6 injectors and fuel pipe.

(b) Remove the 4 spacers from the intake manifold.

(c) Pull out the 6 injectors from the delivery pipes.

(d) Remove the 2 O–rings and 2 grommets from each injector.

SF075–06

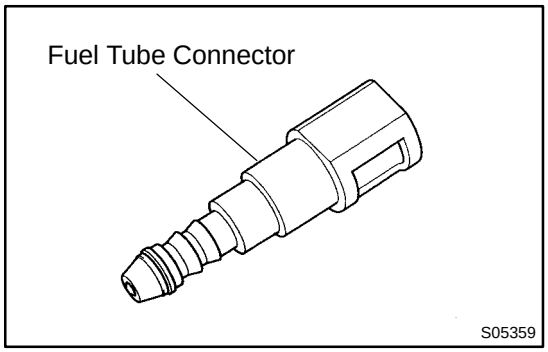


INSPECTION

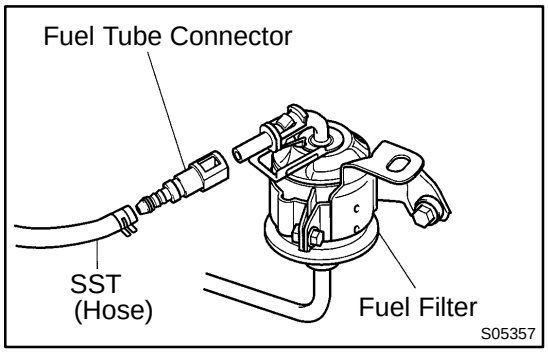
1. INSPECT INJECTOR INJECTION

CAUTION:

Keep injector clear of sparks during the test.



(a) Purchase the new No.1 fuel pipe and take out the fuel tube connector from its pipe.
Part No. 23801–20040



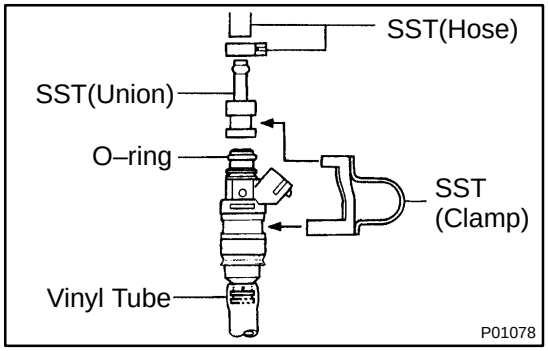
(b) Connect SST (hose) and fuel tube connector to the fuel filter outlet.
SST 09268–41046

CAUTION:

Perform connecting operations of the fuel tube connector (quick type) after observing the precautions.

HINT:

Use the vehicle's fuel filter.



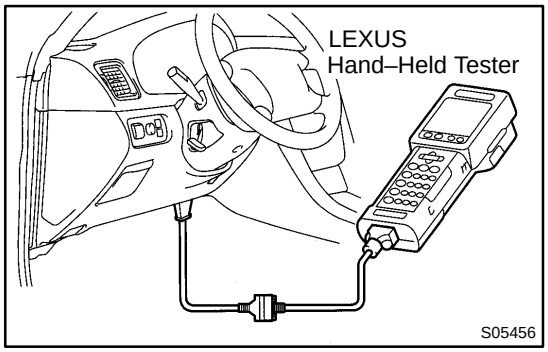
(c) Install the grommet and O–ring to the injector.

(d) Connect SST (union and hose) to the injector, and hold the injector and union with SST (clamp).
SST 09268–41046

(e) Put the injector into a graduated cylinder.

HINT:

Install a suitable vinyl hose onto the injector to prevent gasoline from splashing out.



(f) Connect the LEXUS hand–held tester to the DLC3.

(g) Turn the ignition switch ON and LEXUS hand–held tester main switch ON.

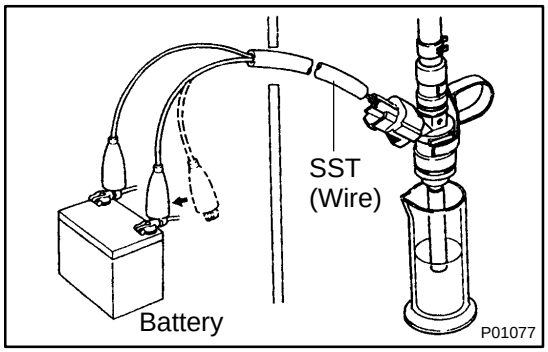
NOTICE:

Do not start the engine.

(h) Select the active test mode on the LEXUS hand–held tester.

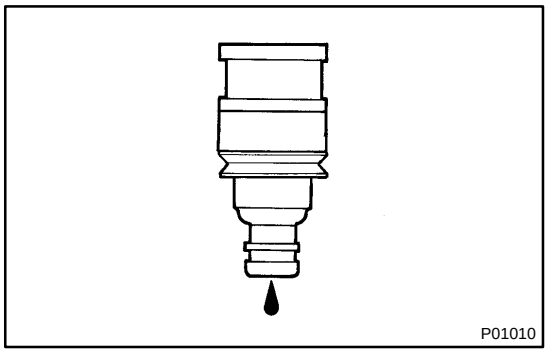
(i) Please refer to the LEXUS hand–held tester operator's manual for further details.

(j) If you have no LEXUS hand–held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector. (See page SF–6)



(k) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector 2 or 3 times.
SST 09842–30070
Volume: 56 – 69 cm^3 (3.4 – 4.2 cu in.) per 15 sec.
Difference between each injector:
6 cm^3 (0.4 cu in.) or less

If the injection volume is not as specified, replace the injector.



2. INSPECT LEAKAGE

(a) In the condition above, disconnect the test probes of SST (wire) from the battery and check the fuel leakage from the injector.
SST 09842–30070
Fuel drop: 1 drop or less per minute

(b) Turn the ignition switch to LOCK.

(c) Disconnect the negative (–) terminal cable from the battery.

(d) Remove the SST and fuel tube connector.
SST 09268–41046, 09842–30070

CAUTION:

- **Perform disconnecting operations of the fuel tube connector (quick type) after observing the precautions.**
- **As there is retained pressure in the fuel pipe line, prevent it from splashing inside the engine compartment.**

(e) Disconnect the LEXUS hand–held tester from the DLC3.

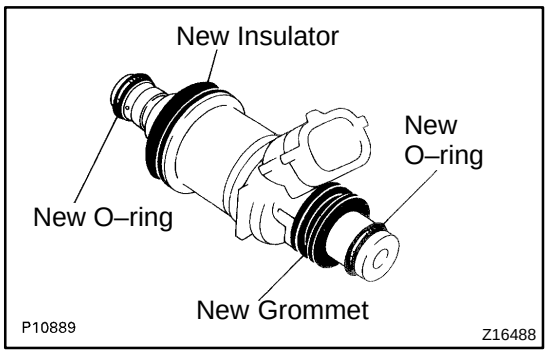
SF076–06

INSTALLATION

1. INSTALL INJECTORS AND DELIVERY PIPES

(a) Install new insulator and grommet to each injector.

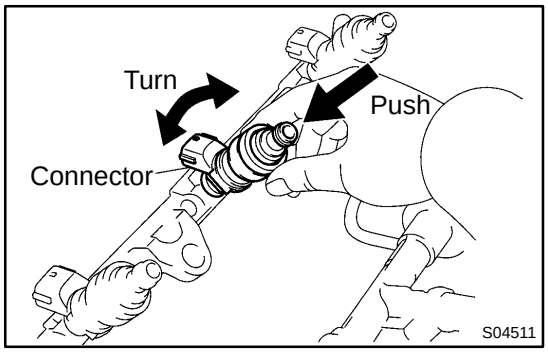
(b) Apply a light coat of spindle oil or gasoline to 2 new O–rings and install them to each injector.



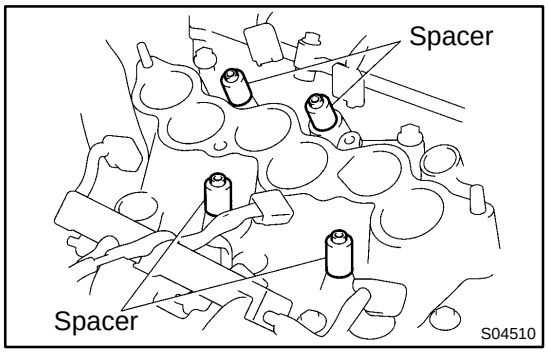
(c) Apply a light coat of spindle oil or gasoline on the place where a delivery pipe touches an O–ring of the injector.

(d) While turning the injector clockwise and counterclockwise, push it to the delivery pipes. Install the 6 injectors.

(e) Position the injector connector outward.



(f) Place the 4 spacers in position on the intake manifold.

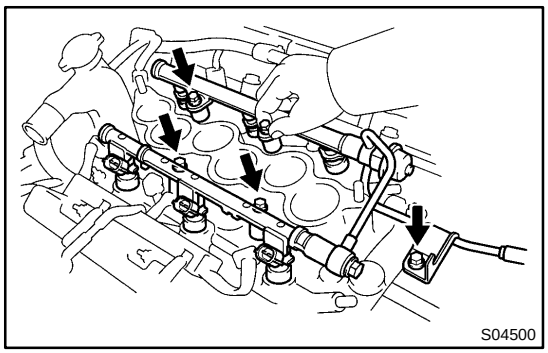


(g) Apply a light coat of spindle oil or gasoline on the place where a intake manifold touches an O–ring of the injector.

(h) Place the delivery pipes and fuel pipe together with the 6 injectors in position on the intake manifold.

(i) Temporarily install the 4 bolts holding the delivery pipes to the intake manifold.

(j) Temporarily install the bolt holding the fuel pipe to the intake manifold.

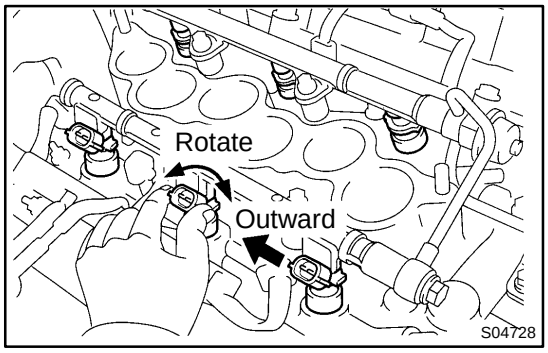


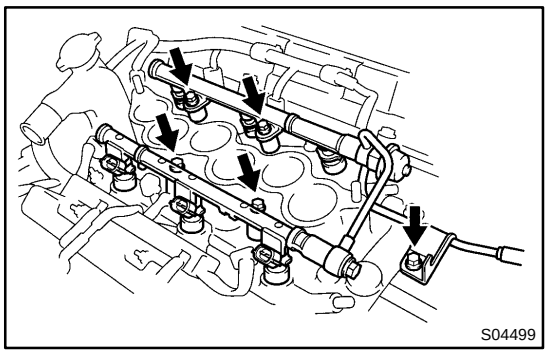
(k) Check that the injectors rotate smoothly.

HINT:

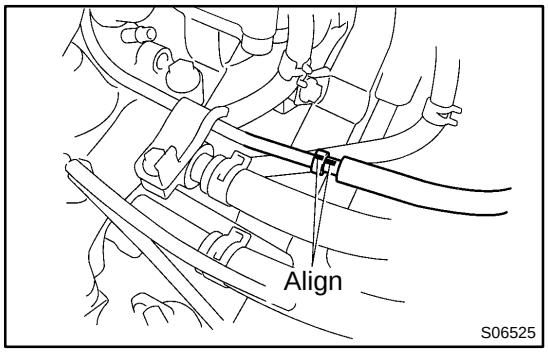
If injectors do not rotate smoothly, the probable cause is incorrect installation of O–rings. Replace the O–rings.

(l) Position the injector connector outward.

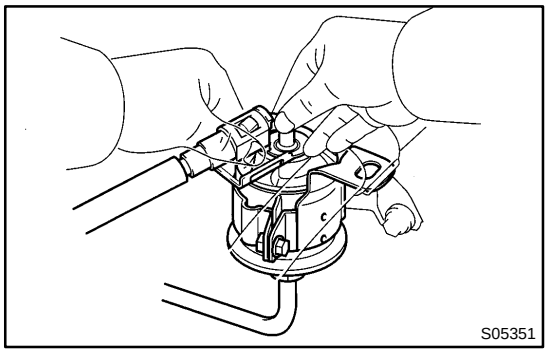




(m) Tighten the 4 bolts holding the delivery pipes to the intake manifold.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)
(n) Tighten the bolt holding the fuel pipe to the intake manifold.
Torque: 19.5 N·m (200 kgf·cm, 14 ft·lbf)

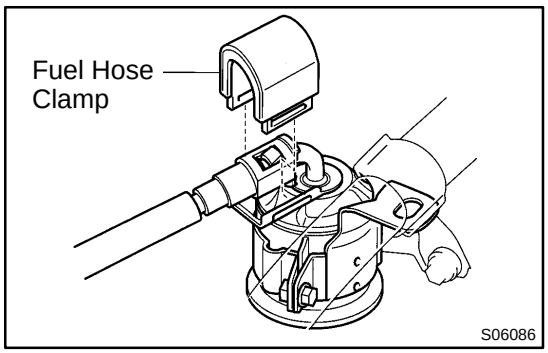


2. CONNECT FUEL INLET PIPE
(a) Align the alignment marks (white paint) on the fuel inlet pipe.

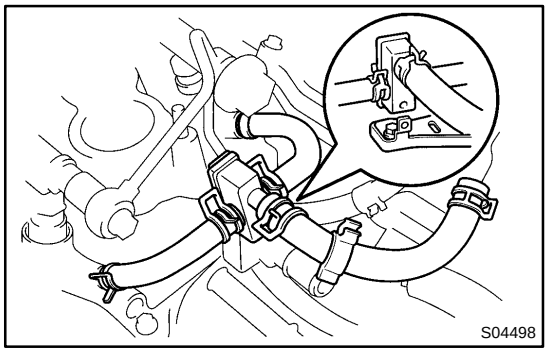


(b) Connect the fuel inlet pipe (fuel tube connector) to the fuel filter.

CAUTION:
Perform connecting operations of the fuel tube connector (quick type) after observing the precautions.



(c) Surely install the fuel hose clamp to the fuel filter with "click" sound.
(d) After installing the clamp, check that the clamp is fixed by pulling up the clamp.



3. INSTALL AIR ASSIST HOSES AND PIPE
(a) Connect the air assist hoses to the intake manifold.
(b) Install the air assist pipe to the bracket on the No.1 fuel pipe.
4. CONNECT INJECTOR CONNECTORS
5. INSTALL AIR INTAKE CHAMBER ASSEMBLY
(See page EM–52)
6. INSTALL AIR CLEANER HOSE
7. CHECK FOR FUEL LEAKS

FUEL TANK AND LINE

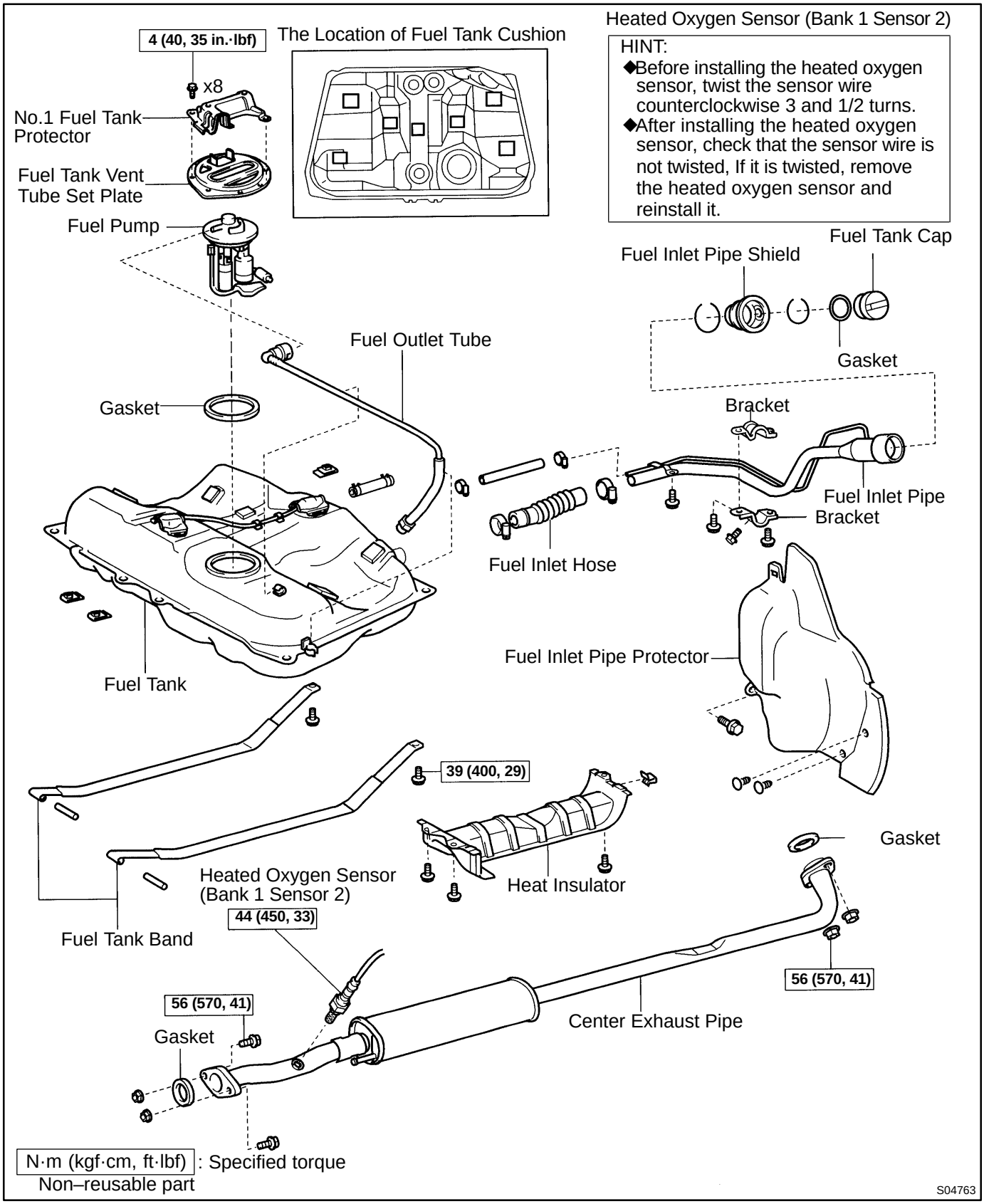
SF05U–01

PRECAUTION

1. **Always use new gaskets when replacing the fuel tank or component parts.**
2. **Apply the proper torque to all parts tightened.**

SF05V–04

COMPONENTS



SF05W–01

INSPECTION

INSPECT FUEL TANK AND LINE

(a) Check the fuel lines for cracks or leakage, and all connections for deformation.

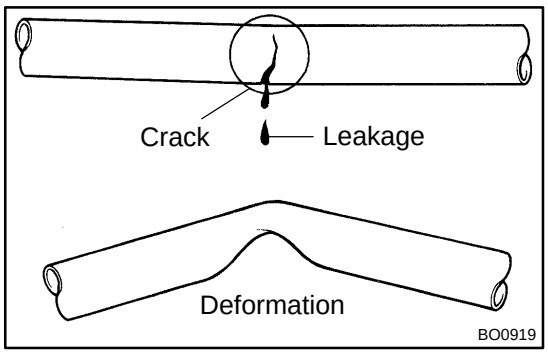
(b) Check the fuel tank vapor vent system hoses and connections for looseness, sharp bends or damage.

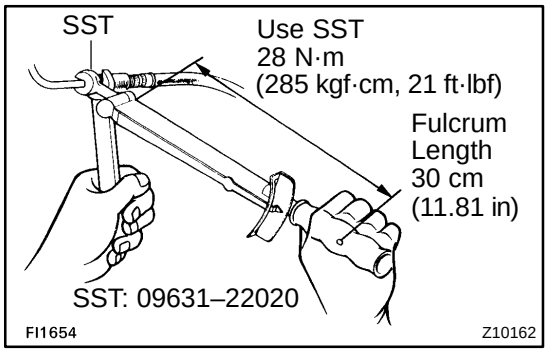
(c) Check the fuel tank for deformation, cracks, fuel leakage or tank band looseness.

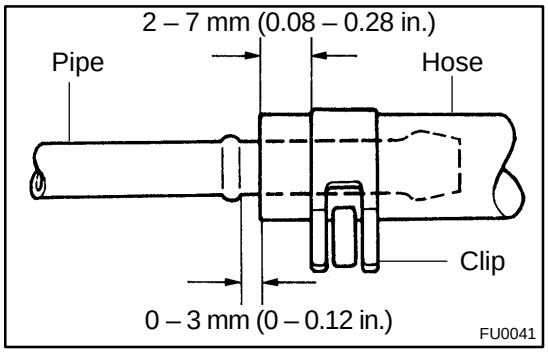
(d) Check the filler neck for damage or fuel leakage.

(e) Hose and pipe connections are as shown in the illustration.

If a problem is found, repair or replace the parts as necessary.



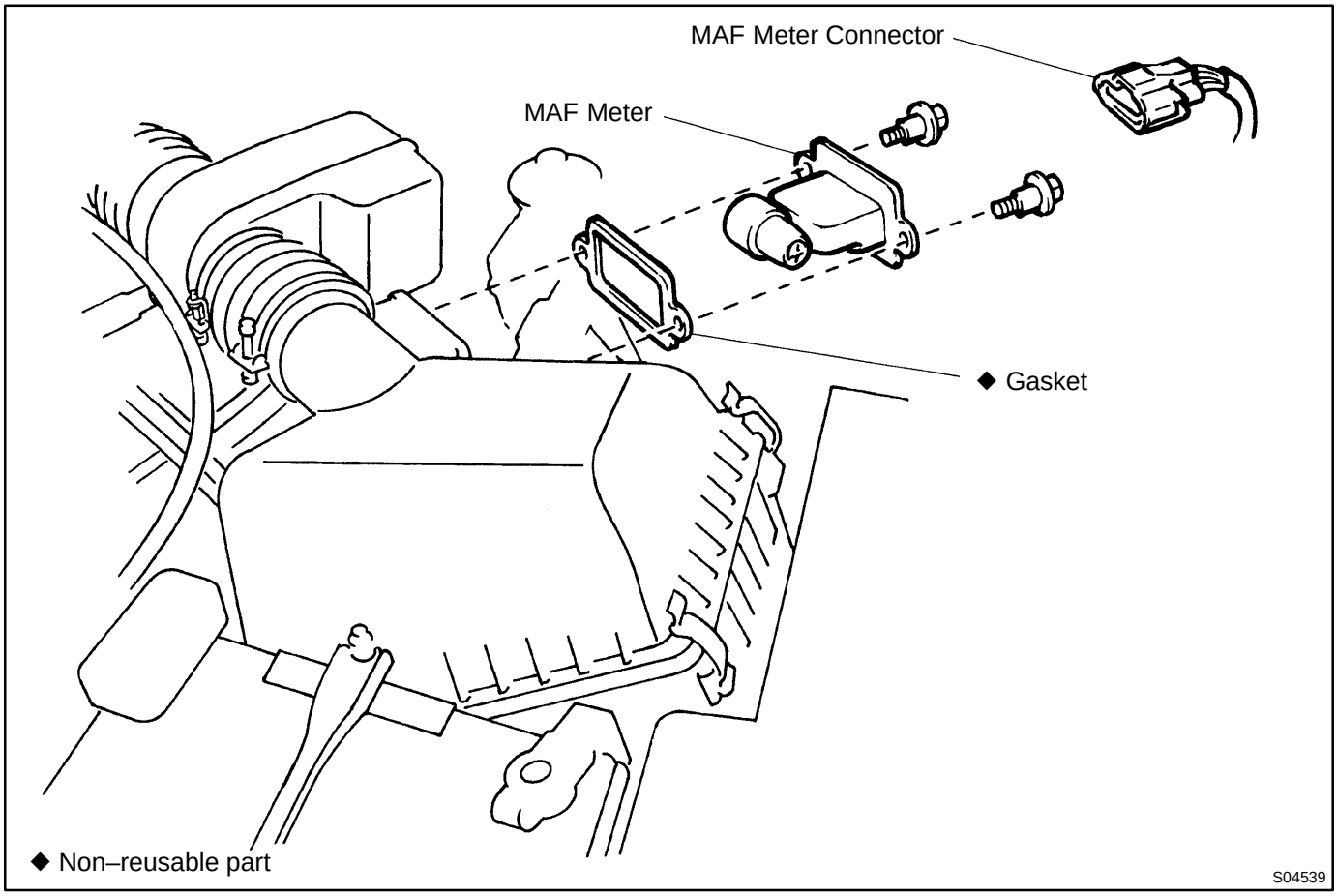




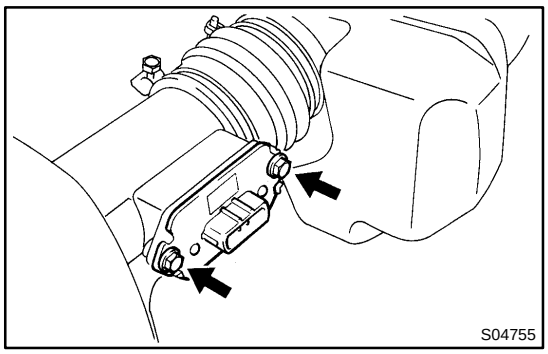
MASS AIR FLOW (MAF) METER

SF05X–01

COMPONENTS



SF05Y–06



REMOVAL

REMOVE MAF METER

(a) Disconnect the MAF meter connector.

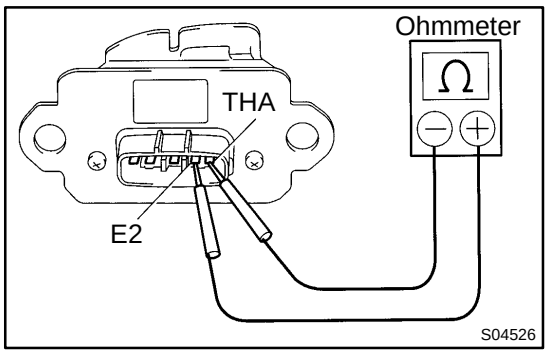
(b) Remove the 2 bolts, MAF meter and gasket.

HINT:

At the time of installation, please refer to the following item.

Use a new gasket.

SF05Z–04

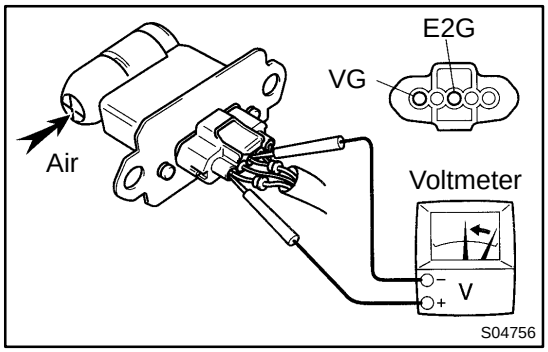


INSPECTION

1. INSPECT MAF METER RESISTANCE

Using an ohmmeter, measure the resistance between terminals THA and E2.

Terminals	Resistance	Temperature
THA – E2	13.6 – 18.4 kΩ	–20˚C (–4˚F)
THA – E2	2.21 – 2.69 kΩ	20˚C (68˚F)
THA – E2	0.49 – 0.67 kΩ	60˚C (140˚F)



If the resistance is not as specified, replace the MAF meter.

2. INSPECT MAF METER OPERATION

(a) Connect the MAF meter connector.
(b) Turn the ignition switch ON.
(c) Using a voltmeter, connect the positive (+) tester probe to terminal VG, and negative (–) tester probe to terminal E2G.
(d) Blow air into the MAF meter, and check that the voltage fluctuates.

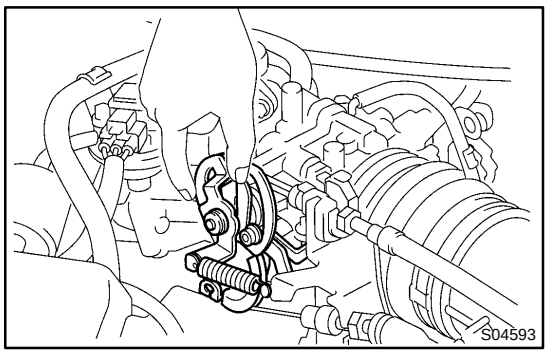
If operation is not as specified, replace the MAF meter.

(e) Turn the ignition switch LOCK.
(f) Disconnect the MAF meter connector.

SF060–01

INSTALLATION

Installation is in the reverse order of removal (See page SF–28).



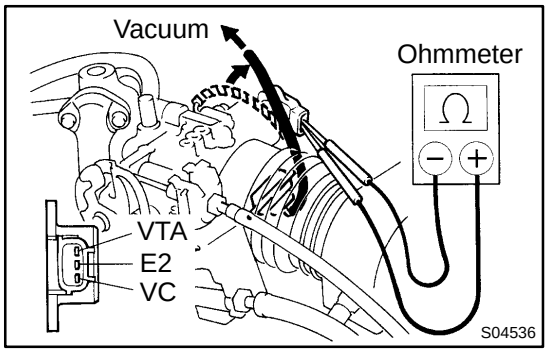
THROTTLE BODY

SF061–04

ON–VEHICLE INSPECTION

1. INSPECT THROTTLE BODY

Check that the throttle linkage moves smoothly.



2. INSPECT THROTTLE POSITION SENSOR

(a) Apply vacuum to the throttle opener.

(b) Disconnect the sensor connector.

(c) Using an ohmmeter, measure the resistance between each terminal.

Throttle valve condition	Between terminals	Resistance
Fully closed	VTA – E2	0.2 – 5.7 kΩ
Fully open	VTA – E2	2.0 – 10.2 kΩ
–	VC – E2	2.5 – 5.9 kΩ

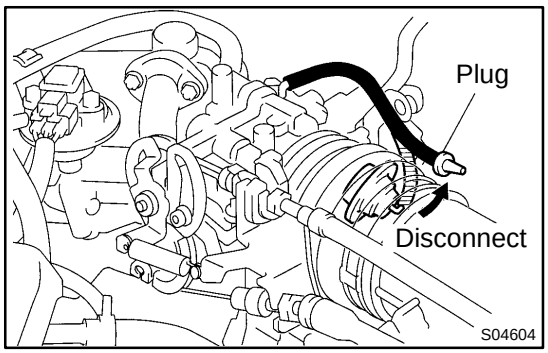
(d) Reconnect the sensor connector.

3. INSPECT THROTTLE OPENER

(a) Allow the engine to warm up to normal operating temperature.

(b) Check idle speed.

Idle speed: 700 ± 50 rpm



(c) Disconnect the vacuum hose from the throttle opener, and plug the hose end.

(d) Check the throttle opener setting speed.

Throttle opener setting speed: 900 – 1,950 rpm

If the throttle opener setting is not as specified, replace the throttle body.

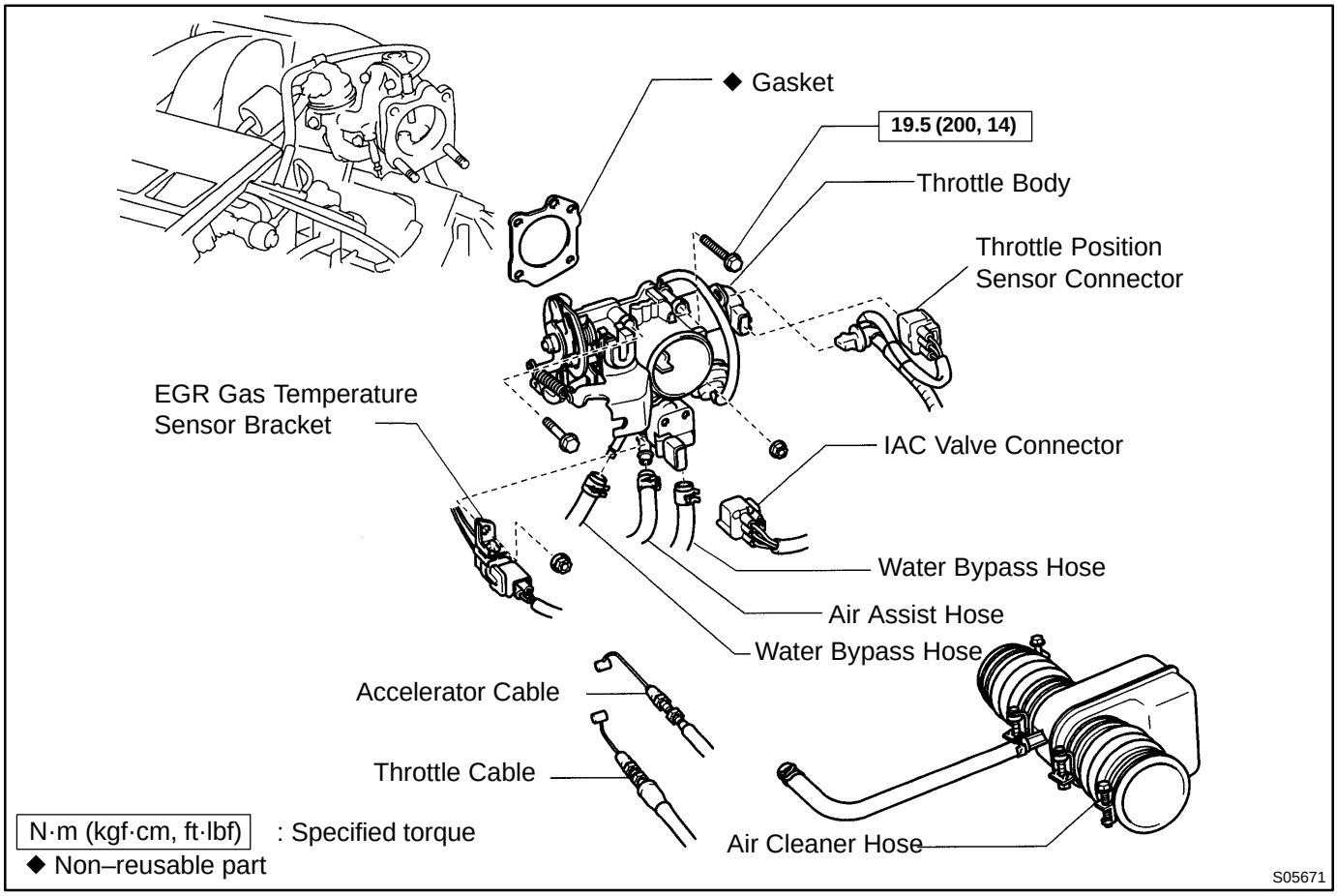
(e) Stop the engine.

(f) Reconnect the vacuum hose to the throttle opener.

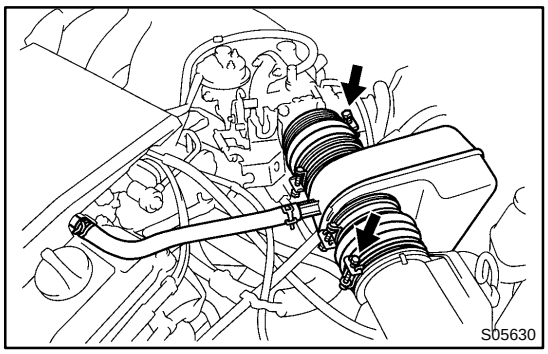
(g) Start the engine and check that the idle speed returns to the correct speed.

SF062–02

COMPONENTS



SF063–02



REMOVAL

1. DRAIN ENGINE COOLANT

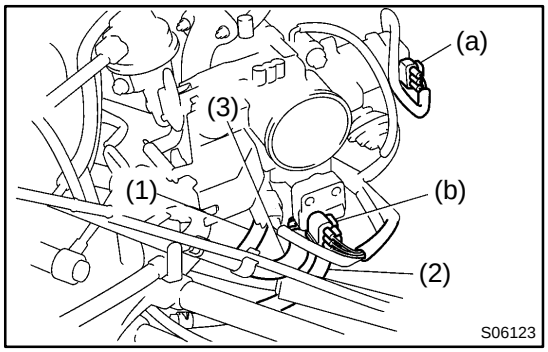
2. DISCONNECT ACCELERATOR CABLE

3. DISCONNECT THROTTLE CABLE

4. REMOVE AIR CLEANER HOSE

(a) Disconnect the PCV hose.

(b) Loosen the 2 hose clamps, and remove the air cleaner hose.



5. REMOVE THROTTLE BODY

(a) Disconnect the throttle position sensor connector.

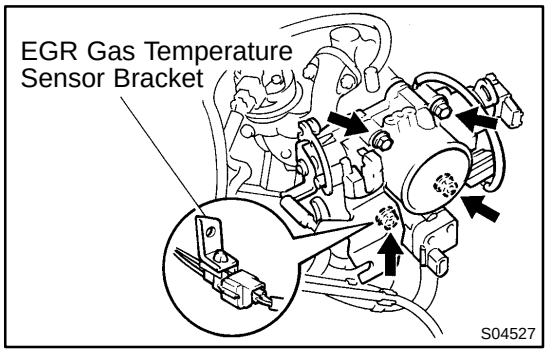
(b) Disconnect the IAC valve connector.

(c) Disconnect these hoses:

(1) Water bypass hose (from intake manifold)

(2) Water bypass hose (from water inlet housing)

(3) Air assist hose



(d) Remove the 2 bolts, 2 nuts, EGR gas temperature sensor bracket, throttle body and gasket.

HINT:

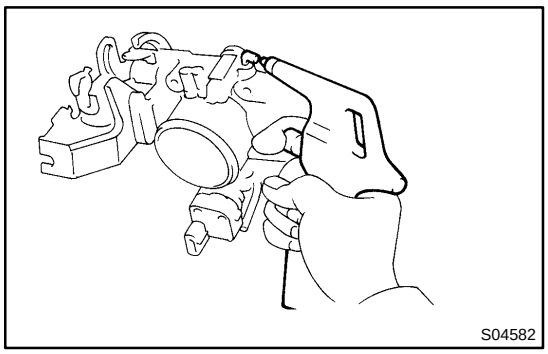
At the time of installation, please refer to the following item.

Place a new gasket on the air intake chamber.

Torque: 19.5 N·m (200 kgf·cm, 14 ft·lbf)

SF064–02

INSPECTION



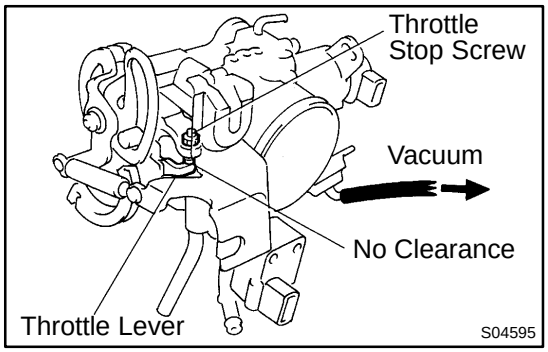
1. CLEAN THROTTLE BODY

(a) Using a soft brush and carburetor cleaner, clean the cast parts.

(b) Using compressed air, clean all the passages and apertures.

NOTICE:

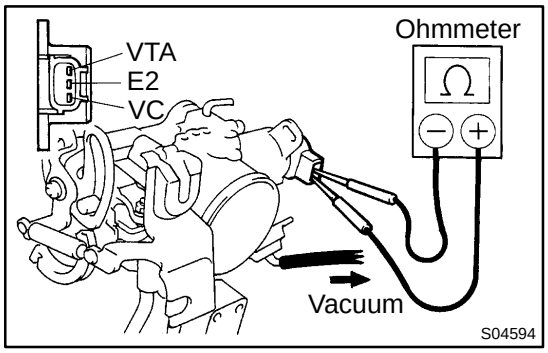
To prevent deterioration, do not clean the throttle position sensor and IAC valve.



2. INSPECT THROTTLE VALVE

(a) Apply vacuum to the throttle opener.

(b) Check that there is no clearance between the throttle stop screw and throttle lever when the throttle valve is fully closed.



3. INSPECT THROTTLE POSITION SENSOR

(a) Apply vacuum to the throttle opener.

(b) Using an ohmmeter, measure the resistance between each terminal.

Throttle valve condition	Between terminals	Resistance
Fully closed	VTA – E2	0.2 – 5.7 kΩ
Fully open	VTA – E2	2.0 – 10.2 kΩ
–	VC – E2	2.5 – 5.9 kΩ

SF065–01

INSTALLATION

Installation is in the reverse order of removal (See page SF–33).

IDLE AIR CONTROL (IAC) VALVE

SF066–01

ON–VEHICLE INSPECTION

1. INSPECT IAC VALVE OPERATION

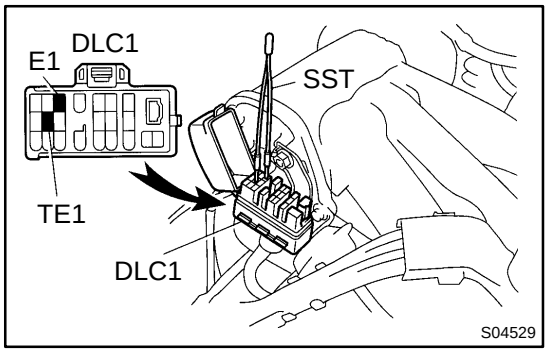
(a) Initial conditions:
- Engine at normal operating temperature
- Idle speed checked correctly
- Transmission in neutral position
- A/C switch OFF

(b) Using SST, connect terminals TE1 and E1 of the DLC1.
SST 09843–18020

(c) After engine speed is kept at approx. 1,000 rpm for 5 seconds, check that it returns to idle speed.

If the engine speed operation is not as specified, check the IAC valve, wiring and ECM.

(d) Remove the SST from the DLC1.
SST 09843–18020



2. INSPECT IAC VALVE RESISTANCE

NOTICE:

"Cold" and "Hot" in the following sentences express the temperature of the coils themselves. "Cold" is from –10˚C (14˚F) to 50˚C (122˚F) and "Hot" is from 50˚C (122˚F) to 100˚C (212˚F).

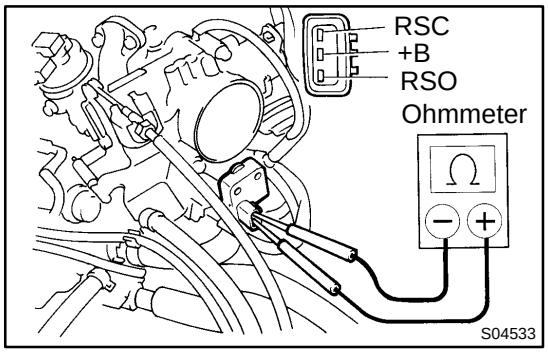
(a) Disconnect the IAC valve connector.

(b) Using an ohmmeter, measure the resistance between terminal +B and other terminals (RSC, RSO).

Resistance:

Cold: 17.0 – 24.5 Ω

Hot: 21.5 – 28.5 Ω



If resistance is not as specified, replace the IAC valve.

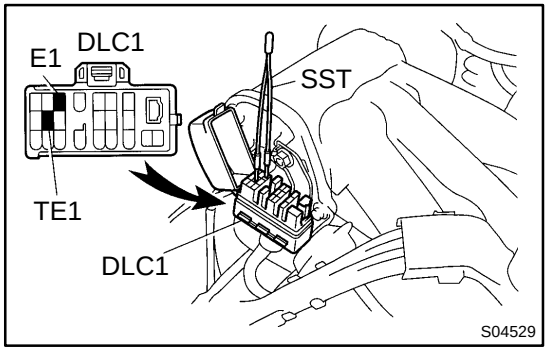
(c) Reconnect the IAC valve connector.

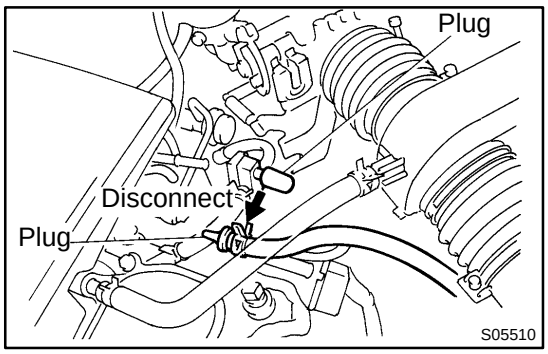
3. INSPECT AIR ASSIST SYSTEM

(a) Initial conditions:
- Engine at normal operating temperature
- Idle speed checked correctly
- Transmission in neutral position
- A/C switch OFF

(b) Using SST, connect terminals TE1 and E1 of the DLC1.
SST 09843–18020

(c) After engine speed is kept at 900 – 1,300 rpm for 10 seconds, check that it returns to idle speed.

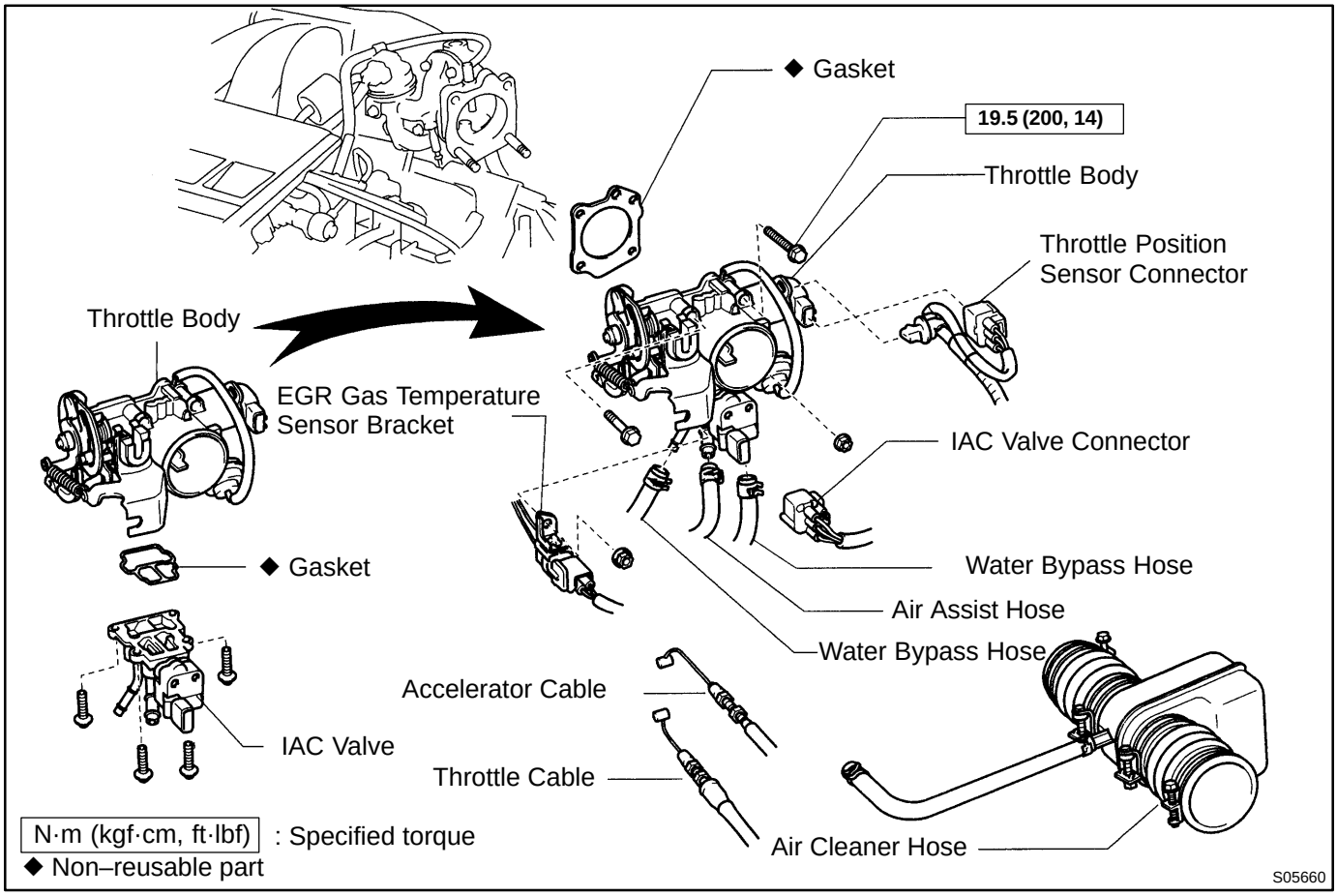




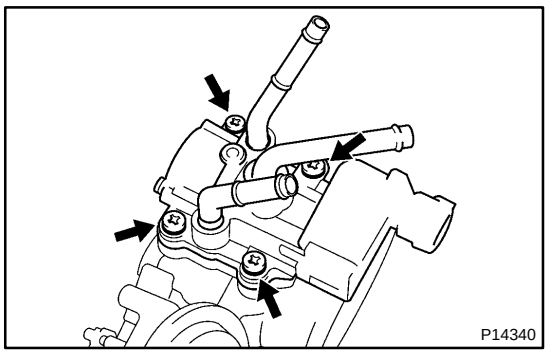
(d) Stop the engine.
(e) Disconnect the air assist hose from the air pipe, and block off the IAC valve exit and the entry to the pipe.
(f) Start the engine and check that the idle speed reaches 500 rpm or below (the engine may stall).
If the idle does not reach 500 rpm or below, check for a leak between the air assist hoses, pipe and injectors.
(g) Remove the SST from the DLC1.
SST 09843–18020
(h) Reconnect the air assist hose to the IAC valve.

SF067–06

COMPONENTS



SF068–05



REMOVAL

1. REMOVE THROTTLE BODY
(See page SF–33)

2. REMOVE IAC VALVE

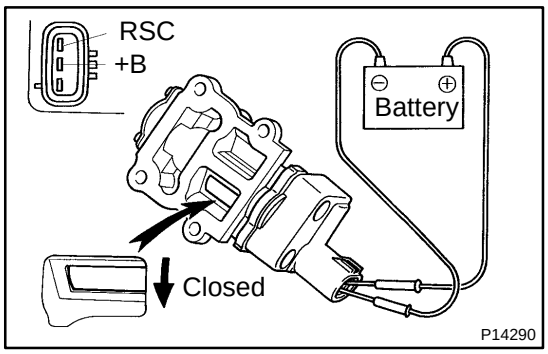
Remove the 4 screws, IAC valve and gasket.

HINT:

At the time of installation, please refer to the following item.

Place a new gasket on the throttle body.

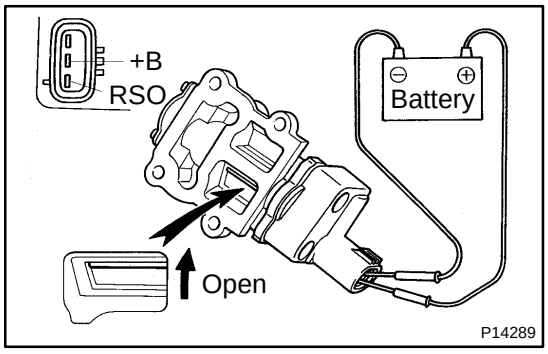
SF069–01



INSPECTION

INSPECT IAC VALVE OPERATION

(a) Connect the positive (+) lead from the battery to terminal +B and negative (–) lead to terminal RSC, and check that the valve is closed.



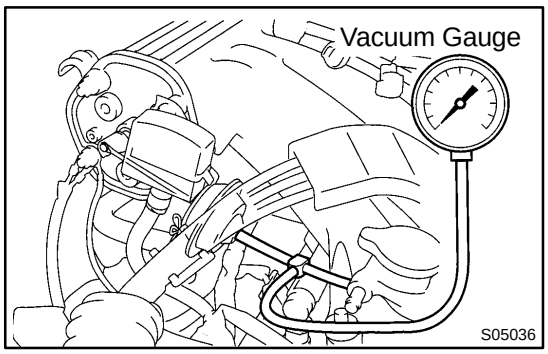
(b) Connect the positive (+) lead from the battery to terminal +B and negative (–) lead to terminal RSO, and check that the valve is open.

If operation is not as specified, replace the IAC valve.

SF06A–01

INSTALLATION

Installation is in the reverse order of removal (See page SF–39).



ACOUSTIC CONTROL INDUCTION SYSTEM (ACIS)

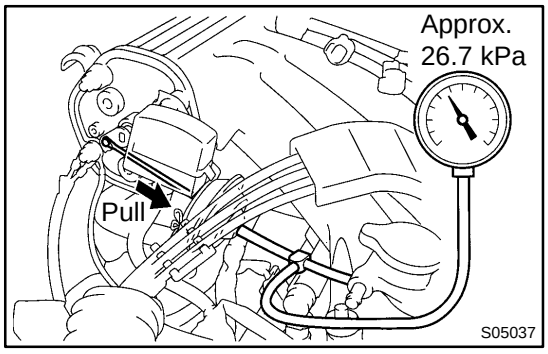
SF06B–01

ON–VEHICLE INSPECTION

INSPECT INTAKE AIR CONTROL VALVE

(a) Using a 3–way connector, connect vacuum gauge to the actuator hose.

(b) Start the engine.

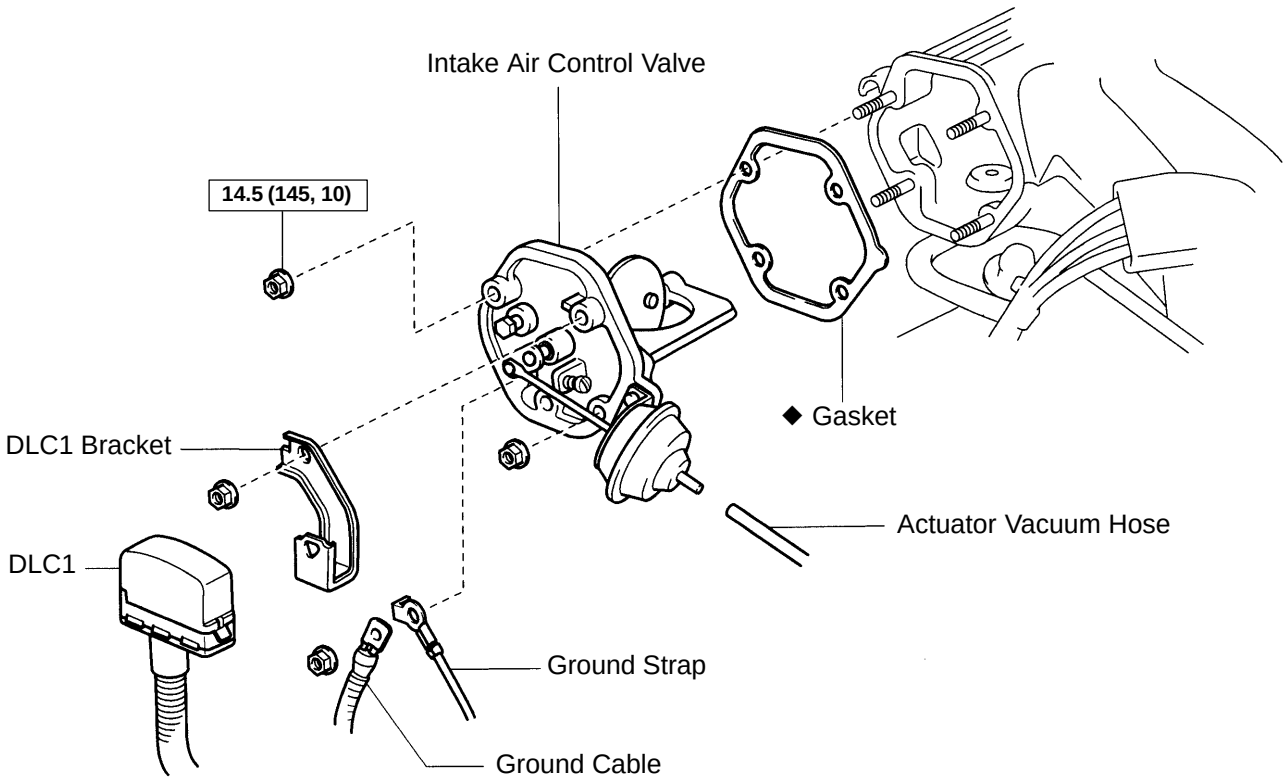


(c) While the engine is idling, check that the vacuum gauge needle does not move.

(d) Rapidly depress the accelerator pedal to fully open position and check that the vacuum gauge needle momentarily fluctuates up to approx. 26.7 kPa (200 mmHg, 7.9 in.Hg). (The actuator rod is pulled out.)

SF06C–04

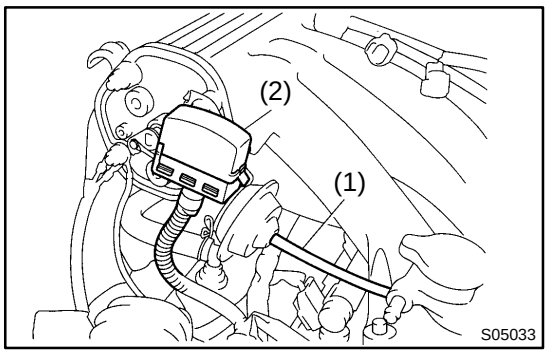
COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

S05108

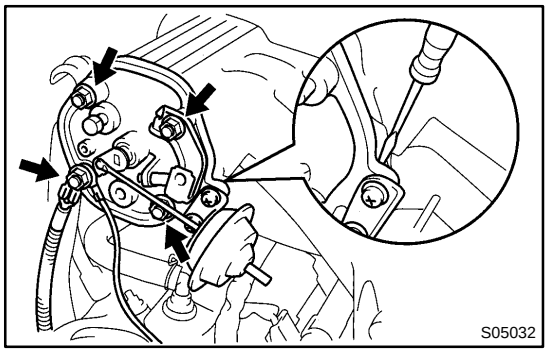
SF06D–01



REMOVAL

1. DISCONNECT ACTUATOR VACUUM HOSE

2. DISCONNECT DLC1 FROM DLC1 BRACKET



3. REMOVE INTAKE AIR CONTROL VALVE

(a) Remove the 4 nuts and DLC1 bracket, and disconnect the ground strap and cable.

(b) Remove the intake air control valve by prying a screwdriver between the intake air control valve and air intake chamber.

(c) Remove the gasket.

SF06E–01

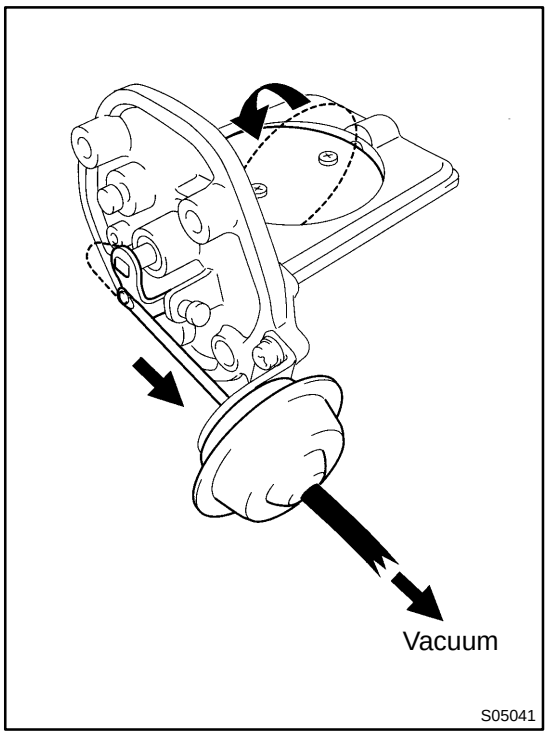
INSPECTION

1. INSPECT INTAKE AIR CONTROL VALVE

(a) With 26.7 kPa (200 mmHg, 7.9 in.Hg) of vacuum applied to the actuator, check that the actuator rod moves.

(b) One minute after applying the vacuum in (a), check that the actuator rod does not return.

If the operation is not as specified, replace the intake air control valve.

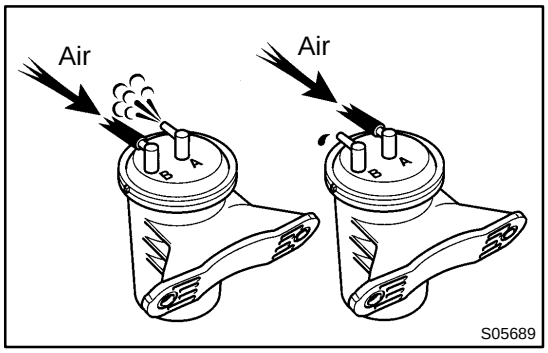


2. INSPECT VACUUM TANK

LOCATION: The LH side member under the battery tray.

(a) Check that air flows from port B to port A.

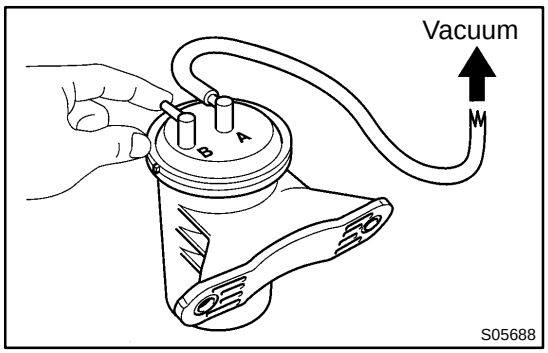
(b) Check that air does not flow from port A to port B.



(c) Plug port B with your finger, and apply 26.7 kPa (200 mmHg, 7.9 in.Hg) of vacuum to port A, and check that there is no change is vacuum after one minute.

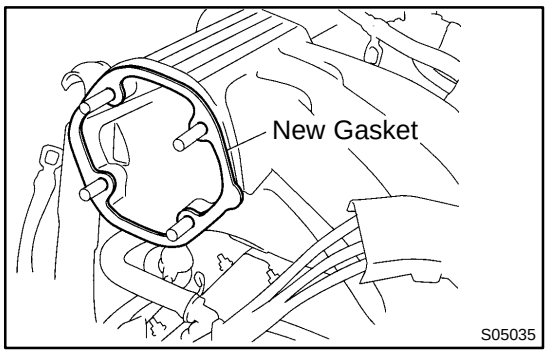
If the operation is not as specified, replace the vacuum tank.

3. INSPECT VSV (See page SF–54)



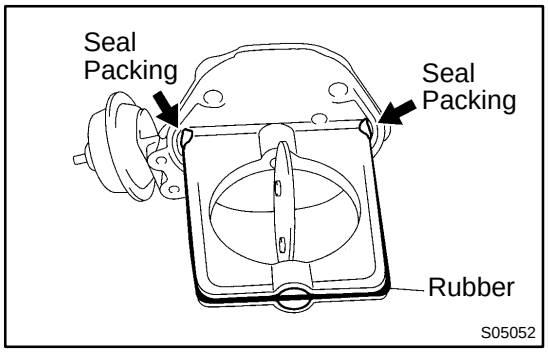
SF06F–01

INSTALLATION



1. INSTALL INTAKE AIR CONTROL VALVE

(a) Install a new gasket to the air intake chamber.



(b) Apply a light coat of engine oil to the rubber portions.

(c) Apply seal packing to the positions of the intake air control valve shown in the illustration.

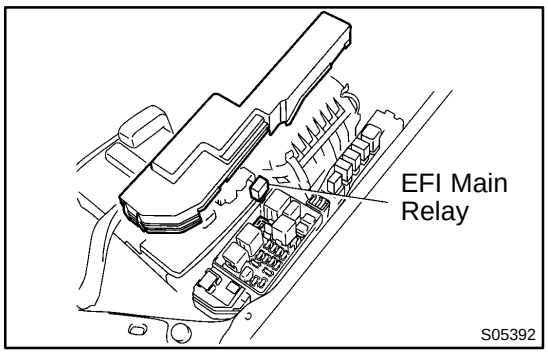
Seal packing: Part No. 08826–00080 or equivalent

(d) Install the intake air control valve, DLC1 bracket, ground strap and cable with the 4 nuts.

Torque: 14.5 N·m (145 kgf·cm, 10 ft·lbf)

2. CONNECT DLC1

3. CONNECT ACTUATOR VACUUM HOSE

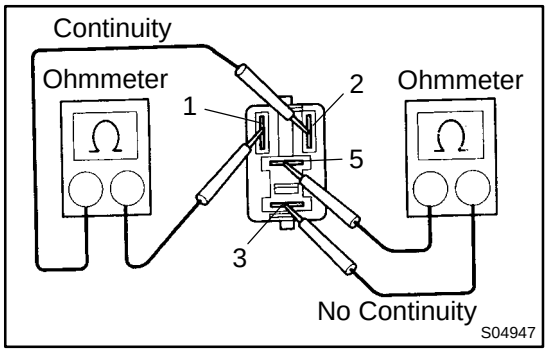


EFI MAIN RELAY

SF06G–01

INSPECTION

1. REMOVE EFI MAIN RELAY (Marking: EFI)



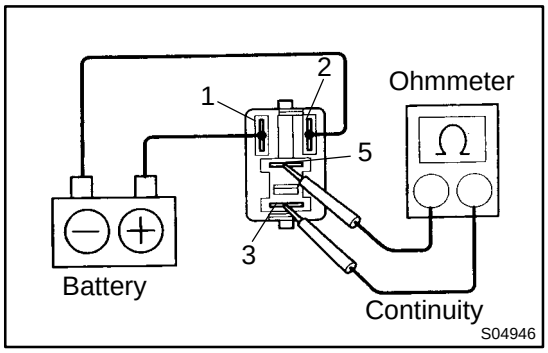
2. INSPECT EFI MAIN RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



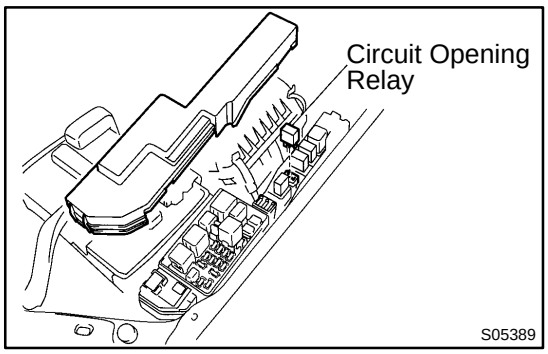
3. INSPECT EFI MAIN RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 2.

(b) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

4. REINSTALL EFI MAIN RELAY

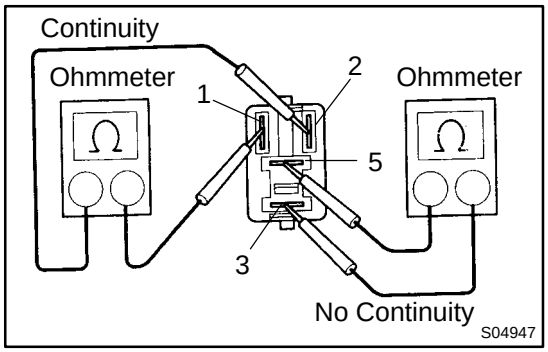


CIRCUIT OPENING RELAY

INSPECTION

SF06H–01

1. REMOVE CIRCUIT OPENING RELAY (Marking: CIR OPN)



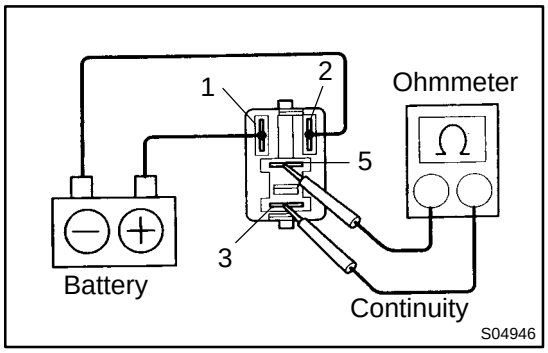
2. INSPECT CIRCUIT OPENING RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



3. INSPECT CIRCUIT OPENING RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 2.

(b) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

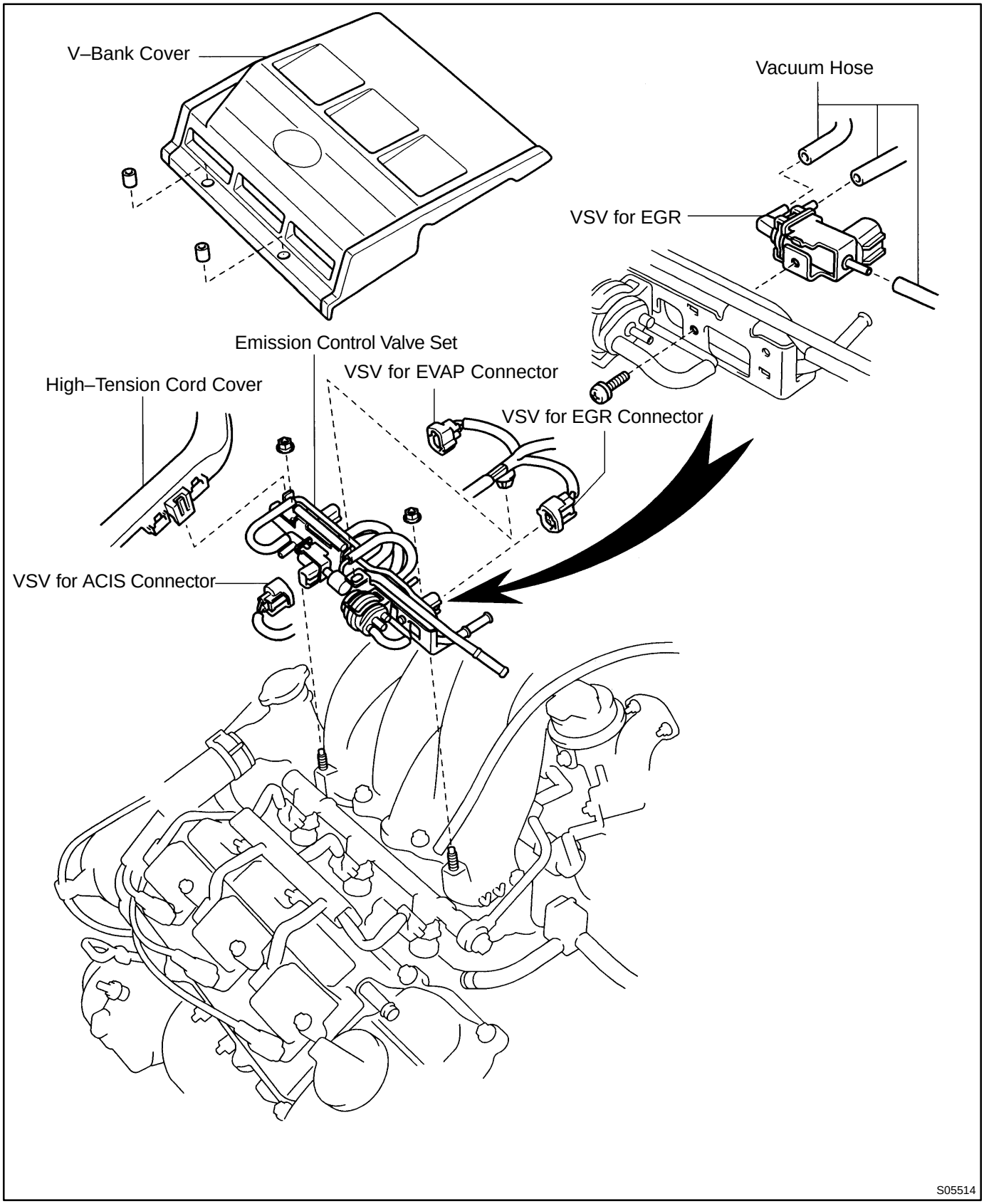
If there is no continuity, replace the relay.

4. REINSTALL CIRCUIT OPENING RELAY

VSV FOR EXHAUST GAS RECIRCULATION (EGR)

SF06I–01

COMPONENTS



SF06J–02

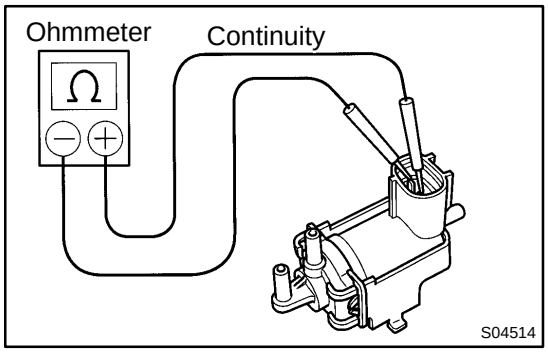
INSPECTION

1. REMOVE V–BANK COVER, EMISSION CONTROL VALVE SET AND HIGH–TENSION CORD COVER

2. REMOVE VSV

(a) Disconnect the 3 vacuum hoses from the VSV.

(b) Remove the screw and VSV.

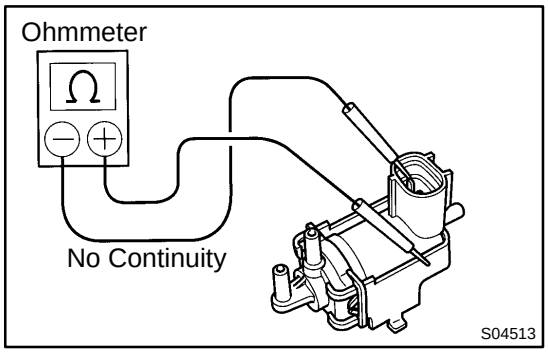


3. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 27 – 33 Ω at 20˚C (68˚F)

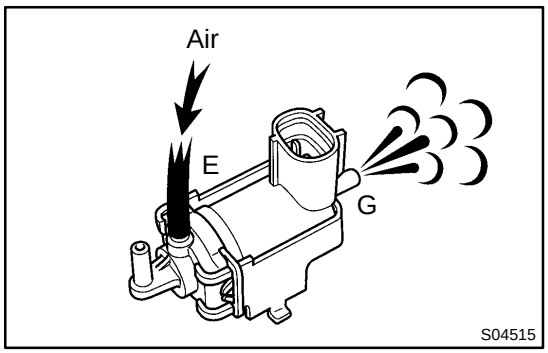
If there is no continuity, replace the VSV.



4. INSPECT VSV FOR GROUND

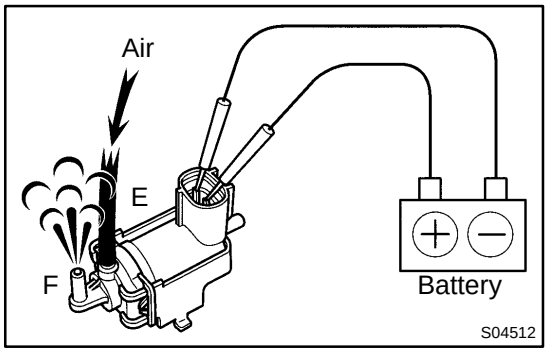
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



5. INSPECT VSV OPERATION

(a) Check that air flows from port E to port G.



(b) Apply battery voltage across the terminals.

(c) Check that air flows from port E to port F.

If operation is not as specified, replace the VSV.

6. REINSTALL VSV

(a) Install the VSV with the screw.

(b) Connect the 3 vacuum hoses to the VSV.

7. REINSTALL EMISSION CONTROL VALVE SET

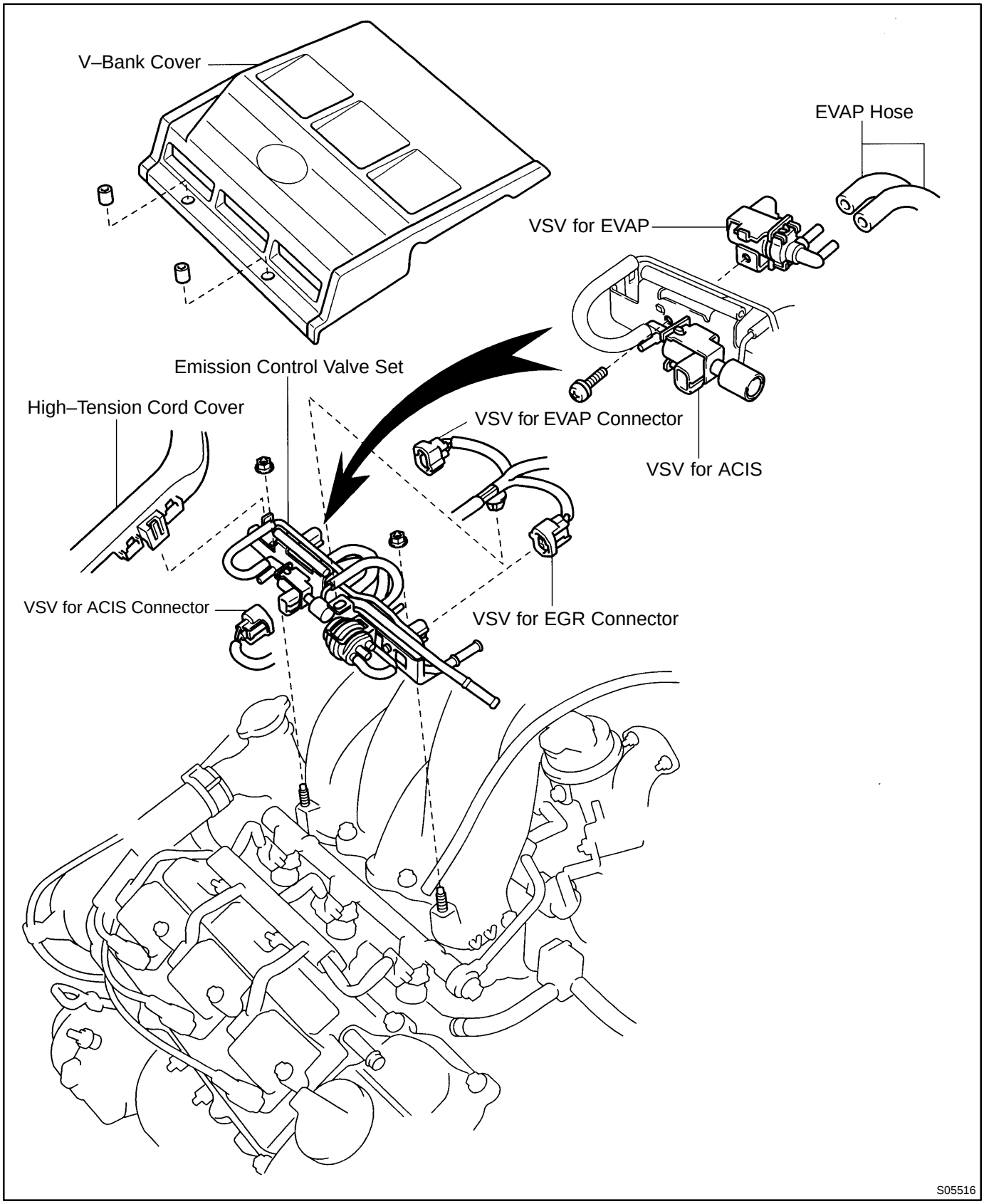
8. REINSTALL HIGH–TENSION CORD COVER

9. REINSTALL V–BANK COVER

VSV FOR EVAPORATIVE EMISSION (EVAP)

COMPONENTS

SF06K–01



SF06L–06

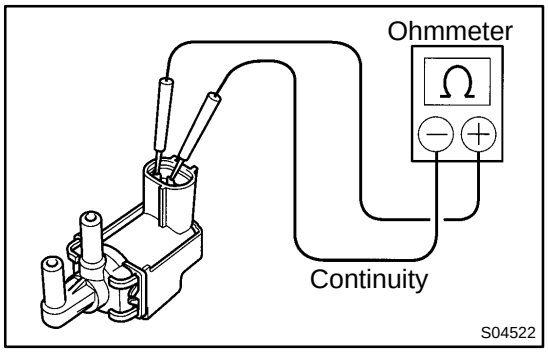
INSPECTION

1. REMOVE V–BANK COVER, EMISSION CONTROL VALVE SET AND HIGH–TENSION CORD COVER

2. REMOVE VSV

(a) Disconnect the 2 EVAP hoses from the VSV.

(b) Remove the screw and VSV.

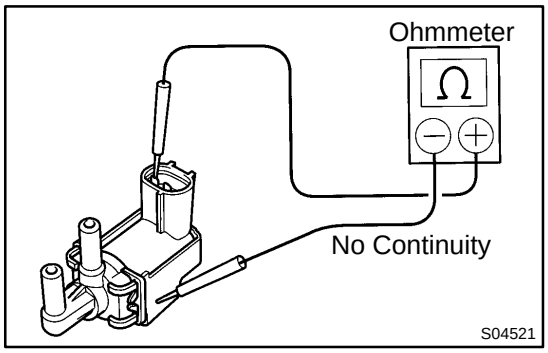


3. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 27 – 33 Ω at 20˚C (68˚F)

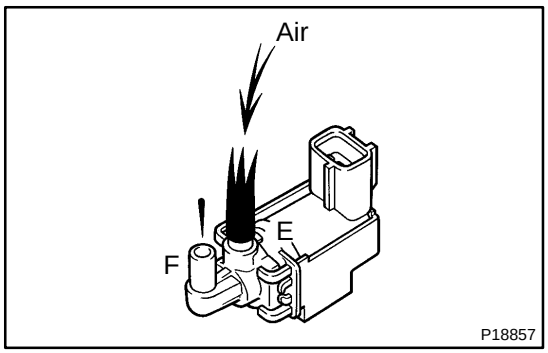
If there is no continuity, replace the VSV.



4. INSPECT VSV FOR GROUND

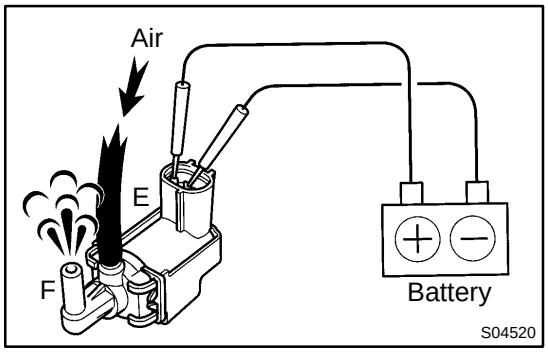
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



5. INSPECT VSV OPERATION

(a) Check that air flows with difficulty from port E to port F.



(b) Apply battery voltage across the terminals.

(c) Check that air flows from port E to port F.

If operation is not as specified, replace the VSV.

6. REINSTALL VSV

(a) Install the VSV with the screw.

(b) Connect the 2 EVAP hoses to the VSV.

7. REINSTALL EMISSION CONTROL VALVE SET

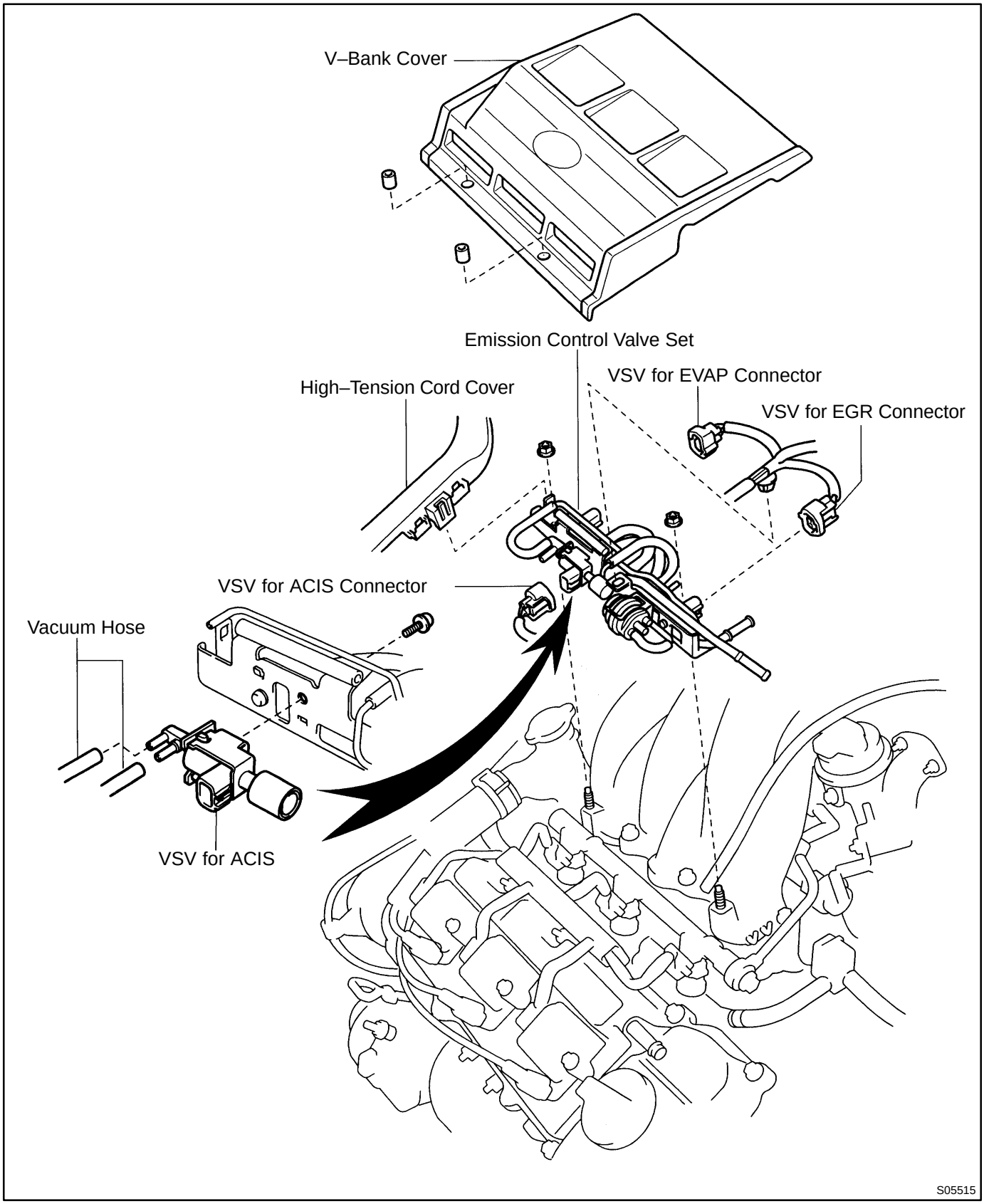
8. REINSTALL HIGH–TENSION CORD COVER

9. REINSTALL V–BANK COVER

VSV FOR ACOUSTIC CONTROL INDUCTION SYSTEM (ACIS)

SF06M–01

COMPONENTS



SF06N–04

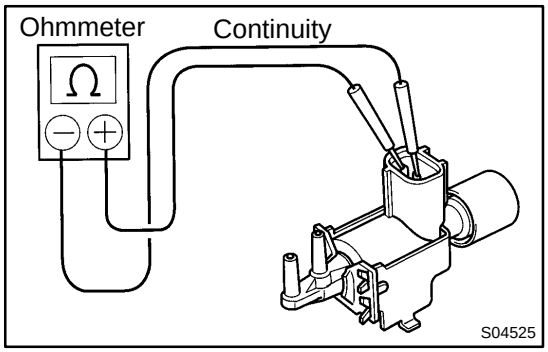
INSPECTION

1. REMOVE V–BANK COVER, EMISSION CONTROL VALVE SET AND HIGH–TENSION CORD COVER

2. REMOVE VSV

(a) Disconnect the 2 vacuum hoses from the VSV.

(b) Remove the screw and VSV.

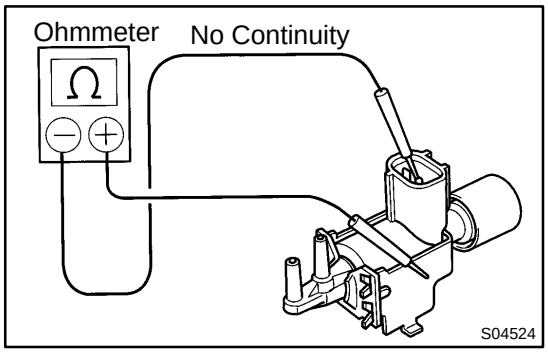


3. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between each terminals.

Resistance: 33 – 39 Ω at 20˚C (68˚F)

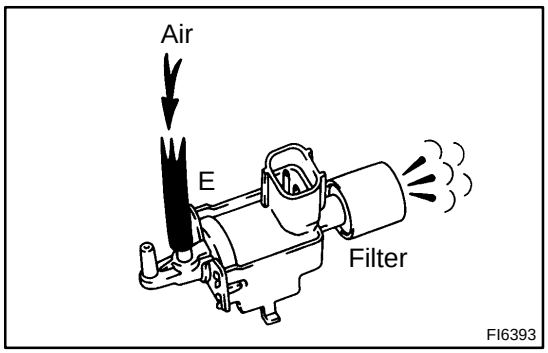
If there is no continuity, replace the VSV.



4. INSPECT VSV FOR GROUND

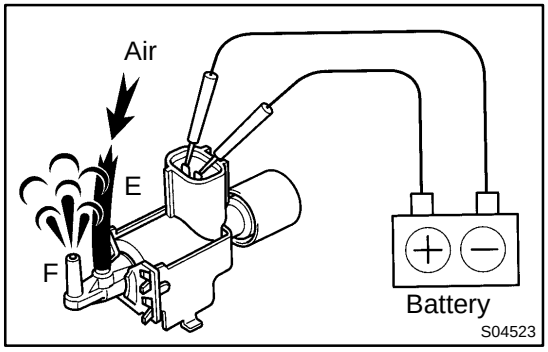
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



5. INSPECT VSV OPERATION

(a) Check that air flows from port E to the filter.



(b) Apply battery voltage across the terminals.

(c) Check that air flows from port E to port F.

If operation is not as specified, replace the VSV.

6. REINSTALL VSV

(a) Install the VSV with the screw.

(b) Connect the 2 vacuum to the VSV.

7. REINSTALL EMISSION CONTROL VALVE SET

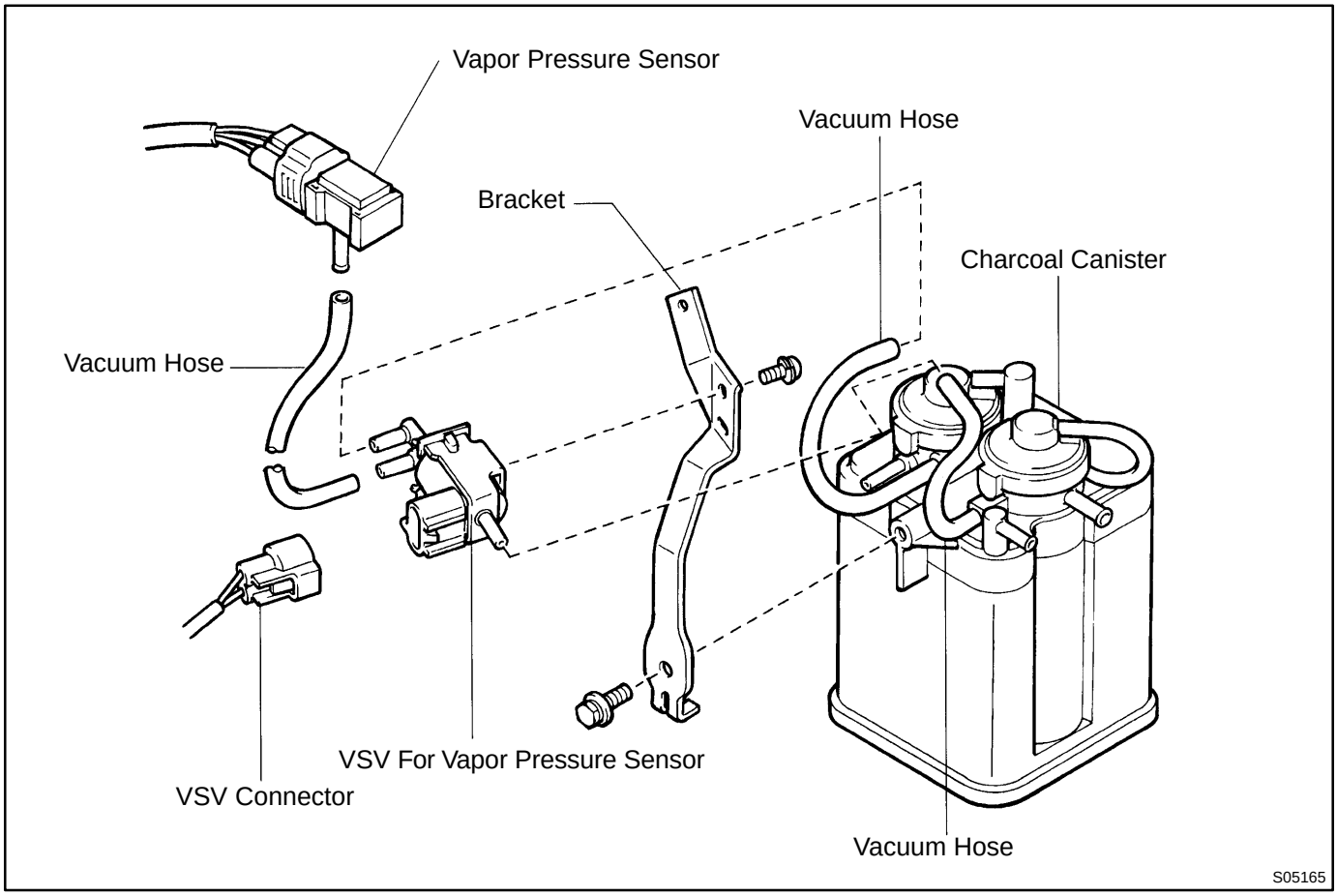
8. REINSTALL HIGH–TENSION CORD COVER

9. REINSTALL V–BANK COVER

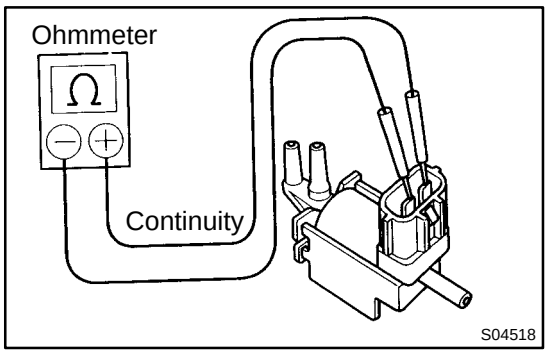
VSV FOR VAPOR PRESSURE SENSOR

COMPONENTS

SF06O–01



SF06P–01



INSPECTION

1. REMOVE VSV

(a) Disconnect the 3 vacuum hoses from the VSV.

(b) Remove the screw and VSV.

2. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

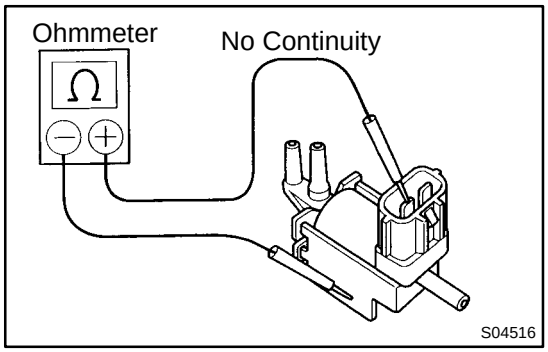
Resistance: 33 – 39 Ω at 20˚C (68˚F)

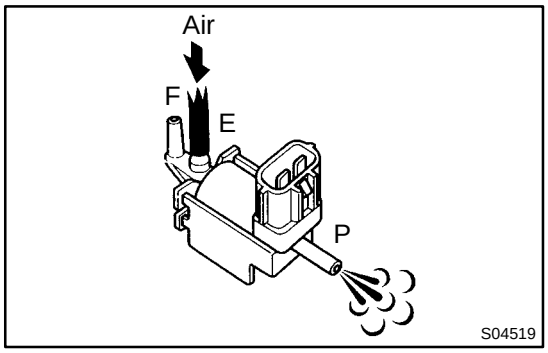
If there is no continuity, replace the VSV.

3. INSPECT VSV FOR GROUND

Using an ohmmeter, check that there is no continuity between each terminal and the body.

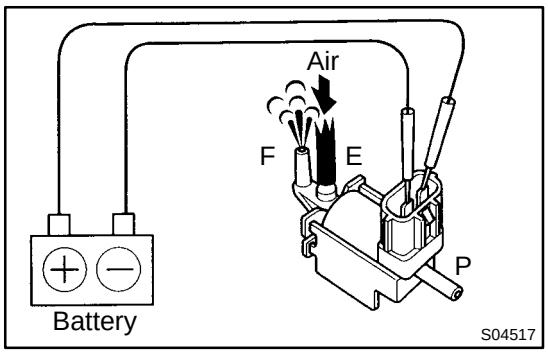
If there is continuity, replace the VSV.





4. INSPECT VSV OPERATION

(a) Check that the air flows from ports E to P.



(b) Apply battery voltage across the terminals.

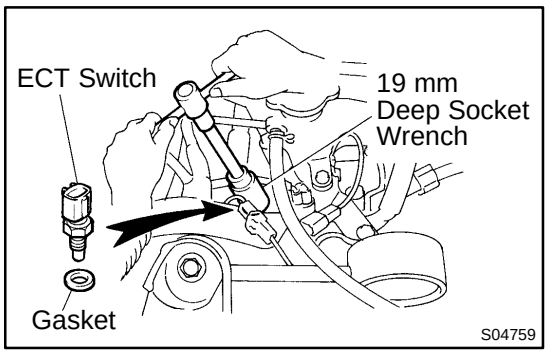
(c) Check that the air flows from ports E to F.

If operation is not as specified, replace the VSV.

5. REINSTALL VSV

(a) Install the VSV with the screw.

(b) Connect the 3 vacuum hoses to the VSV.



ENGINE COOLANT TEMPERATURE (ECT) SENSOR INSPECTION

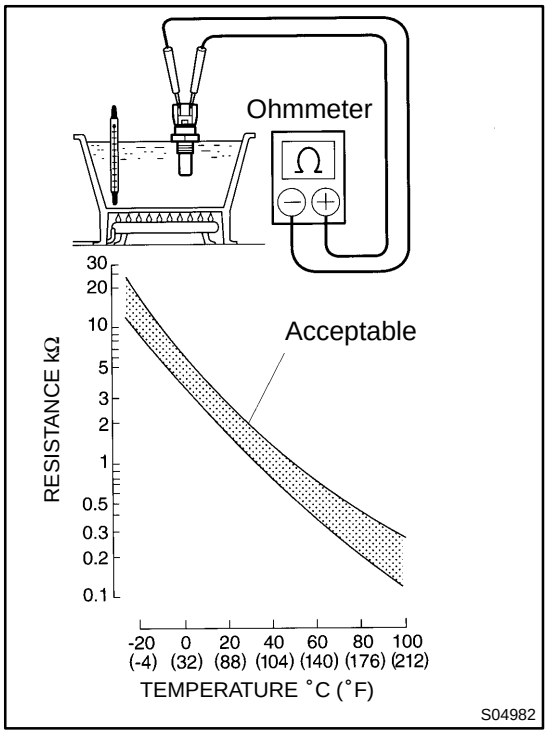
SF06Q–01

1. DRAIN ENGINE COOLANT

2. REMOVE ECT SENSOR

(a) Disconnect the ECT sensor connector.

(b) Using a 19 mm deep socket wrench, remove the ECT sensor and gasket.



3. INSPECT ECT SENSOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance: Refer to the graph

If the resistance is not as specified, replace the ECT sensor.

4. REINSTALL ECT SENSOR

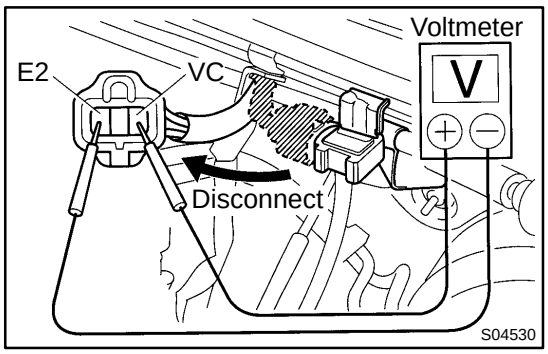
(a) Install a new gasket to the ECT sensor.

(b) Using a 19 mm deep socket, install the ECT sensor.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

(c) Connect the ECT sensor connector.

5. REFILL WITH ENGINE COOLANT



VAPOR PRESSURE SENSOR

SF06R–01

INSPECTION

1. INSPECT POWER SOURCE VOLTAGE OF VAPOR PRESSURE SENSOR

(a) Disconnect the vapor pressure sensor connector.

(b) Turn the ignition switch ON.

(c) Using a voltmeter, measure the voltage between connector terminals VC and E2 of the wiring harness side.

Voltage: 4.5 – 5.5 V

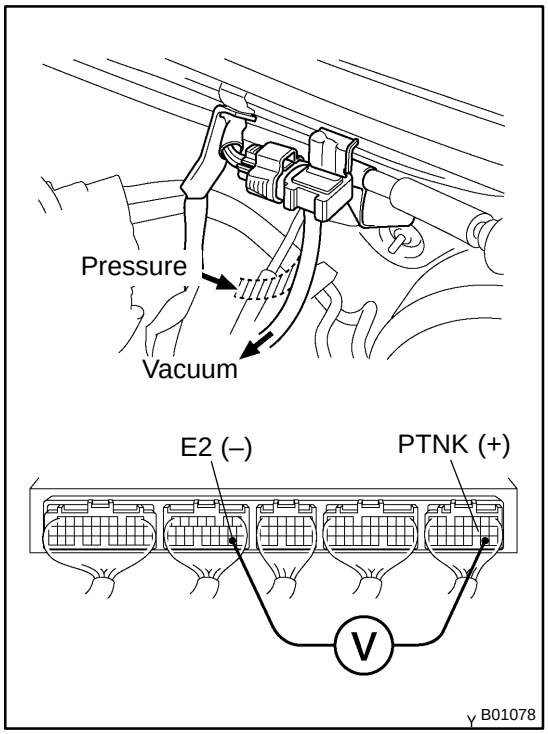
(d) Turn the ignition switch to LOCK.

(e) Reconnect the vapor pressure sensor connector.

2. INSPECT POWER OUTPUT OF VAPOR PRESSURE SENSOR

(a) Turn the ignition switch ON.

(b) Disconnect the vacuum hose from the vapor pressure sensor.



(c) Connect a voltmeter to terminals PTNK and E2 of the ECM, and measure the output voltage under the following conditions:

- Apply vacuum (2.0 kPa, 15 mmHg, 0.59 in.Hg) to the vapor pressure sensor.

Voltage: 1.3 – 2.1 V

- Release the vacuum from the vapor pressure sensor.

Voltage: 3.0 – 3.6 V

- Apply pressure (1.5 kPa, 15 gf/cm^2, 0.22 psi) to the vapor pressure sensor.

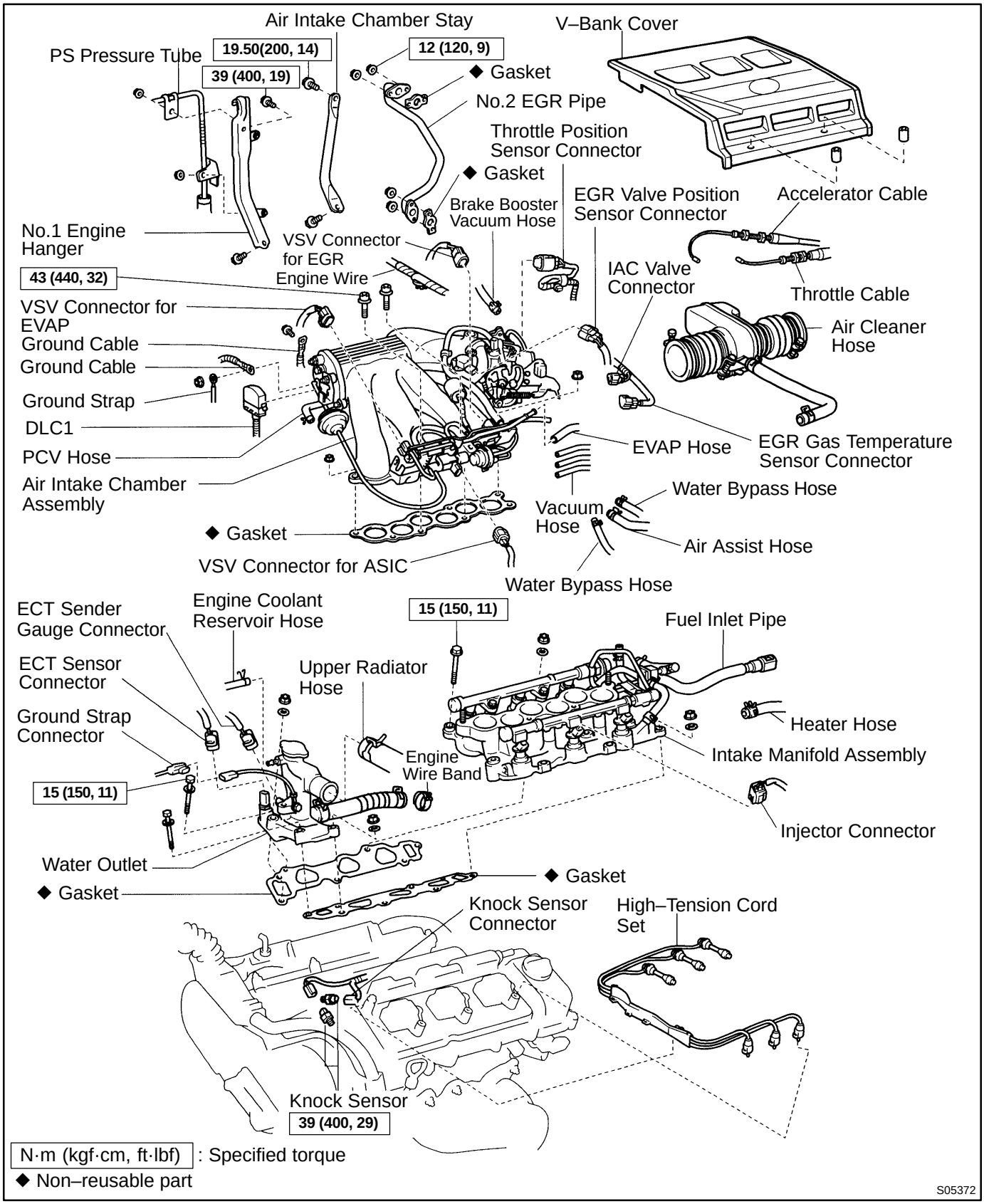
Voltage: 4.2 – 4.8 V

(d) Reconnect the vacuum hose to the vapor pressure sensor.

KNOCK SENSOR

COMPONENTS

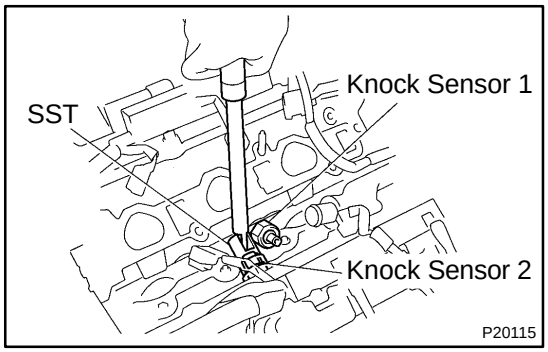
SF06S–04



SF06T–01

INSPECTION

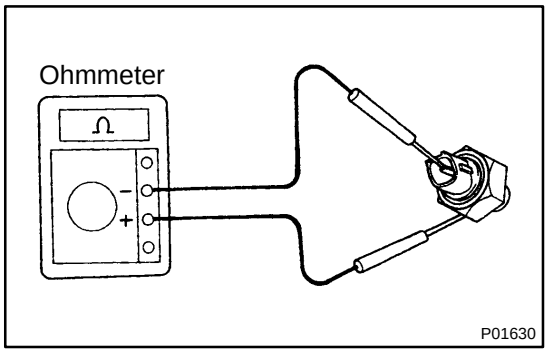
1. REMOVE AIR CLEANER HOSE
2. REMOVE RH ENGINE MOUNTING STAY
3. REMOVE INTAKE MANIFOLD ASSEMBLY AND WATER OUTLET (See page EM–30)



4. REMOVE KNOCK SENSORS

(a) Disconnect the knock sensor connector.

(b) Using SST, remove the knock sensor.
SST 09817–16011



5. INSPECT KNOCK SENSORS

Using an ohmmeter, check that there is no continuity between the terminal and body.
If there is continuity, replace the sensor.

6. REINSTALL KNOCK SENSORS

(a) Using SST, install the knock sensor.
SST 09817–16011
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

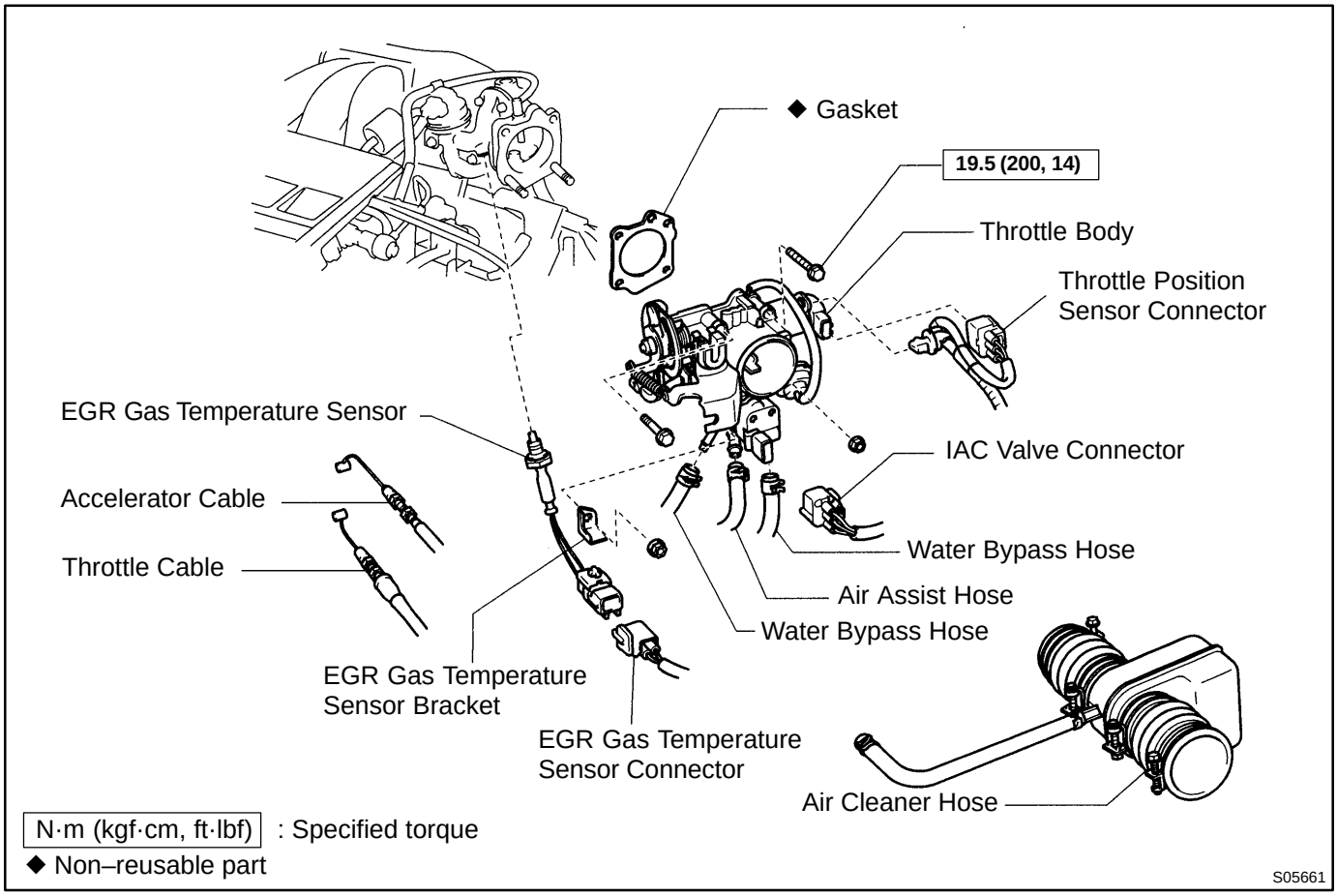
(b) Connect the knock sensor connector.

7. REINSTALL WATER OUTLET AND INTAKE MANIFOLD ASSEMBLY (See page EM–52)
8. REINSTALL RH ENGINE MOUNTING STAY
9. REINSTALL AIR CLEANER HOSE

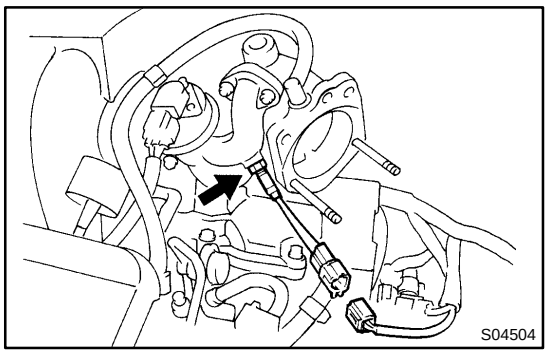
EXHAUST GAS RECIRCULATION (EGR) GAS TEMPERATURE SENSOR

COMPONENTS

SF06U–02

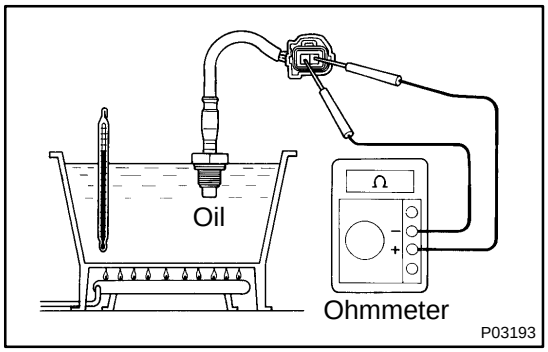


SF06V–01



INSPECTION

1. **REMOVE THROTTLE BODY**
   (See page SF–33)
2. **REMOVE EGR GAS TEMPERATURE SENSOR**



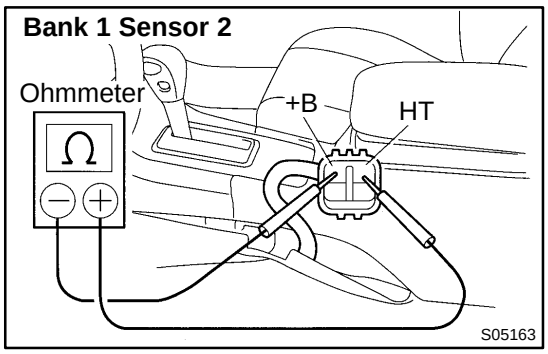
3. **INSPECT EGR GAS TEMPERATURE SENSOR**

Using an ohmmeter, measure the resistance between the terminals.

Resistance:
64 – 97 kΩ at 50˚C (122˚F)
11 – 16 kΩ at 100˚C (212˚F)
2 – 4 kΩ at 150˚C (302˚F)

If the resistance is not as specified, replace the sensor.

4. **REINSTALL EGR GAS TEMPERATURE SENSOR**
5. **REINSTALL THROTTLE BODY**
   (See page SF–35)



HEATED OXYGEN SENSOR (Bank 1 Sensor 2)

SF06Y–01

INSPECTION

INSPECT HEATER RESISTANCE OF HEATED OXYGEN SENSOR (Bank 1 Sensor 2)

(a) Remove the driver's seat.
(b) Take out the floor carpet.
(c) Disconnect the oxygen sensor connector.
(d) Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance: 11 – 16 Ω at 20˚C (68˚F)

If the resistance is not as specified, replace the sensor.

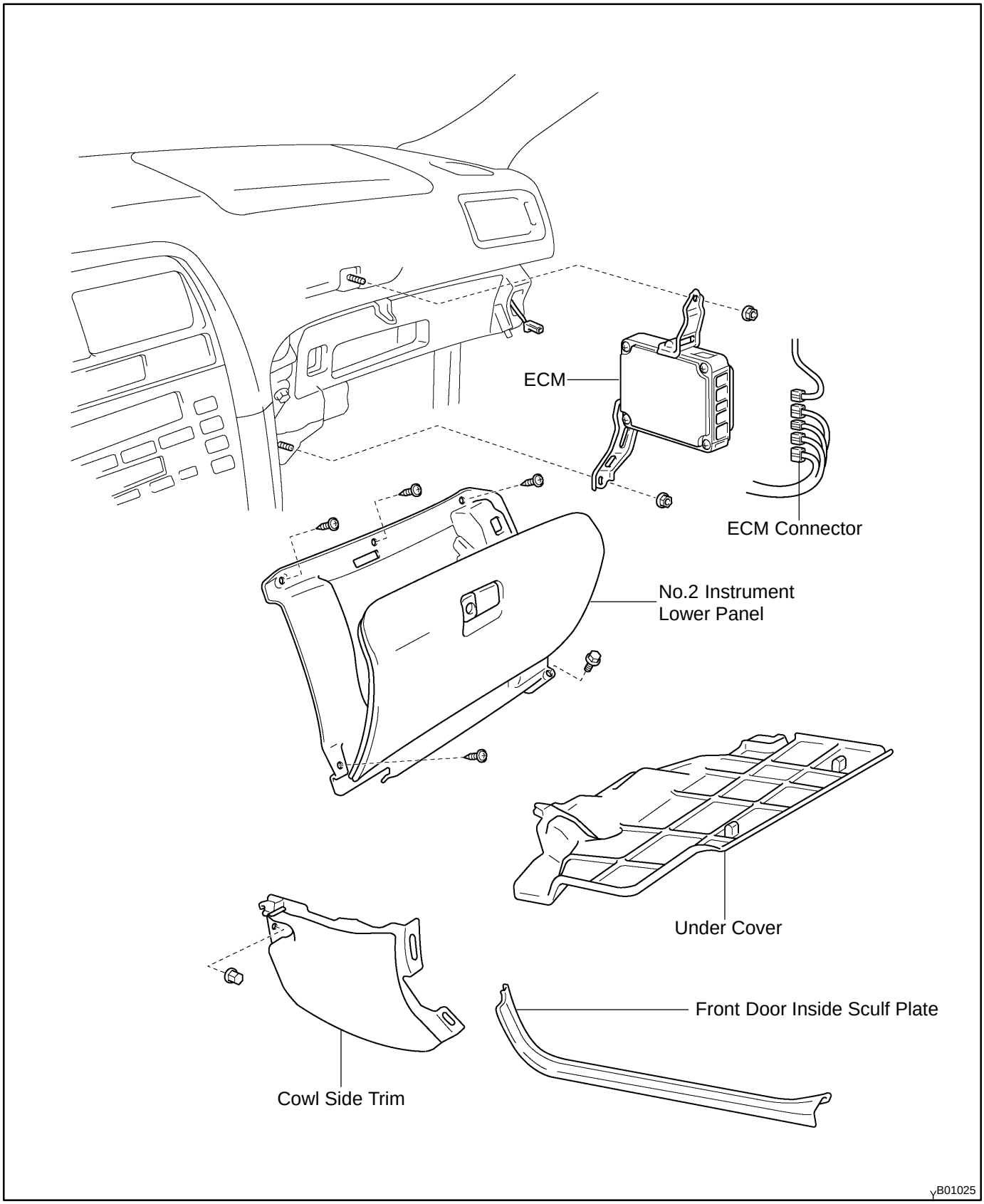
Torque: 44 N·m (440 kgf·cm, 31 ft·lbf)

(e) Reconnect the oxygen sensor connector.
(f) Reinstall the floor carpet.
(g) Reinstall the driver's seat.

ENGINE CONTROL MODULE (ECM)

COMPONENTS

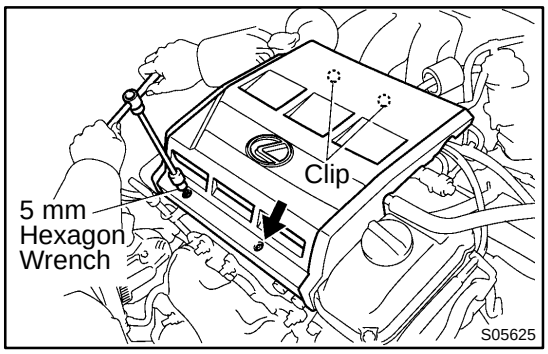
SF06Z–01



SF070–01

INSPECTION

1. REMOVE ECM
2. INSPECT ECM (See page DI–19)
3. REINSTALL ECM



FUEL CUT RPM

SF071–06

INSPECTION

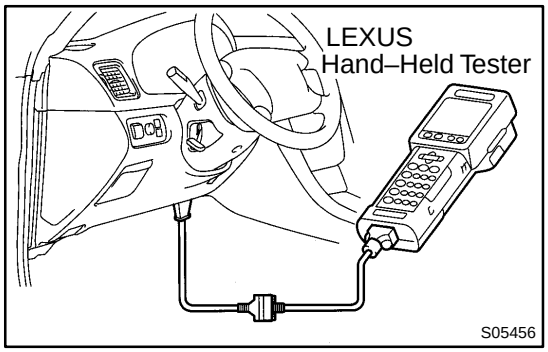
1. REMOVE V–BANK COVER

(a) Using a 5 mm hexagon wrench, remove the 2 cap nuts.

(b) Disconnect the 2 clips, and remove the V–bank cover.

2. WARM UP ENGINE

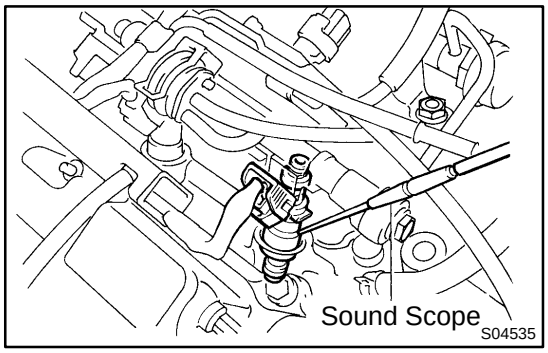
Allow the engine to warm up to normal operating temperature.



3. CONNECT LEXUS HAND–HELD TESTER OR OBDII SCAN TOOL

(a) Connect the LEXUS hand–held tester or OBDII scan tool to the DLC3.

(b) Please refer to the LEXUS hand–held tester or OBDII scan tool operator's manual for further details.



4. INSPECT FUEL CUT OFF PRM

(a) Increase the engine speed to at least 3,500 rpm.

(b) Use a sound scope to check for injector operating noise.

(c) Check that when the throttle lever is released, injector operation noise stops momentarily and then resumes.

HINT:

Measure with the A/C OFF.

Fuel return rpm: 1,200 rpm

5. DISCONNECT LEXUS HAND–HELD TESTER OR OBDII SCAN TOOL

6. REINSTALL V–BANK COVER

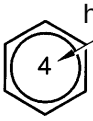
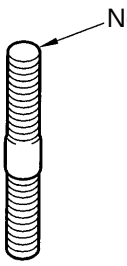
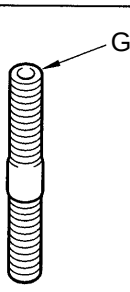
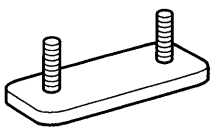
HINT:

For fixing the V–bank cover, push on the cover until a "click" is felt.

STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

SS00F–01

	Mark	Class		Mark	Class
Hexagon head bolt	 4– 5– 6– 7– 8– 9– 10– 11–	4T 5T 6T 7T 8T 9T 10T 11T	Hexagon flange bolt w/ washer hexagon bolt	4 Protruding lines	9T
			Hexagon flange bolt w/ washer hexagon bolt	5 Protruding lines	10T
	No mark	4T	Hexagon flange bolt w/ washer hexagon bolt	6 Protruding lines	11T
Hexagon flange bolt w/ washer hexagon bolt	No mark	4T	Stud bolt		4T
Hexagon head bolt	2 Protruding lines	5T			
Hexagon flange bolt w/ washer hexagon bolt	2 Protruding lines	6T			6T
Hexagon head bolt	3 Protruding lines	7T	Welded bolt		4T
Hexagon head bolt	4 Protruding lines	8T			

V06821

SS00G–01

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N·m	kgf·cm	ft·lbf	N·m	kgf·cm	ft·lbf
4T	6	1	5	55	48 in.·lbf	6	60	52 in.·lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	–	–	–
5T	6	1	6.5	65	56 in.·lbf	7.5	75	65 in.·lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	–	–	–
6T	6	1	8	80	69 in.·lbf	9	90	78 in.·lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	–	–	–
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	–	–	–
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

V00079

MAINTENANCE

SS03I–01

SERVICE DATA

Front axle and suspension		
Ball joint vertical play	Maximum	0 mm (0 in.)

SS03J–01

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Front seat mount bolts	37	375	27
Front suspension member x Body	181	1,850	134
Rear suspension member x Body	51	520	38

ENGINE MECHANICAL

SS03K–01

SERVICE DATA

Compression pressure		at 250 rpm STD	1,500 kPa (15.3 kgf/cm^2, 218 psi)
		Minimum	1,000 kPa (10.2 kgf/cm^2, 145 psi)
	Difference of pressure between each cylinder		100 kPa (1.0 kgf/cm^2, 15 psi) or less
Valve clearance		at cold Intake	0.15 – 0.25 mm (0.006 – 0.010 in.)
		Exhaust	0.25 – 0.35 mm (0.010 – 0.014 in.)
	Adjusting shim for repair part	Mark 2.500	2.500 mm (0.0984 in.)
		Mark 2.550	2.550 mm (0.1004 in.)
		Mark 2.600	2.600 mm (0.1024 in.)
		Mark 2.650	2.650 mm (0.1043 in.)
		Mark 2.700	2.700 mm (0.1063 in.)
		Mark 2.750	2.750 mm (0.1083 in.)
		Mark 2.800	2.800 mm (0.1102 in.)
		Mark 2.850	2.850 mm (0.1122 in.)
		Mark 2.900	2.900 mm (0.1142 in.)
		Mark 2.950	2.950 mm (0.1161 in.)
		Mark 3.000	3.000 mm (0.1181 in.)
		Mark 3.050	3.050 mm (0.1201 in.)
		Mark 3.100	3.100 mm (0.1220 in.)
		Mark 3.150	3.150 mm (0.1240 in.)
		Mark 3.200	3.200 mm (0.1260 in.)
		Mark 3.250	3.250 mm (0.1280 in.)
		Mark 3.300	3.300 mm (0.1299 in.)
Ignition timing	w/ Terminals TE1 and E1 connected of DLC1		8 – 12˚ BTDC @ idle
Idle speed	–		700 ± 50 rpm
Timing belt tensioner	Protrusion from housing side		10.0 – 10.8 mm (0.394 – 0.425 in.)
Cylinder head	Warpage	Maximum	0.10 mm (0.039 in.)
	Valve seat		
	Refacing angle		30˚, 45˚, 75˚
	Contacting angle		45˚
	Contacting width		1.0 – 1.4 mm (0.039 – 0.055 in.)
	Valve guide bushing bore diameter	STD	10.295 – 10.313 mm (0.4053 – 0.4080 in.)
		O/S 0.05	10.345 – 10.363 mm (0.4073 – 0.4080 in.)
	12 pointed head cylinder head bolt diameter		
		at tension portion STD	8.95 – 9.05 mm (0.3524 – 0.3563 in.)
		Minimum	8.75 mm (0.3445 in.)
Valve guide bushing	Inside diameter		5.510 – 5.530 mm (0.2169 – 0.2177 in.)
	Outside diameter for repair part	STD	10.333 – 10.344 mm (0.4068 – 0.4072 in.)
		O/S 0.05	10.383 – 10.394 mm (0.4088 – 0.4092 in.)
Valve	Valve overall length	STD Intake	95.45 mm (3.5779 in.)
		Exhaust	95.40 mm (3.7559 in.)
		Minimum Intake	94.95 mm (3.7382 in.)
		Exhaust	94.90 mm (3.7362 in.)
	Valve face angle		44.5˚
	Stem diameter	Intake	5.470 – 5.485 mm (0.2154 – 0.2159 in.)
		Exhaust	5.465 – 5.480 mm (0.2152 – 0.2157 in.)
	Stem oil clearance	STD Intake	0.025 – 0.060 mm (0.0010 – 0.0024 in.)
		Exhaust	0.030 – 0.065 mm (0.0012 – 0.0026 in.)
		Maximum Intake	0.08 mm (0.0031 in.)
		Exhaust	0.10 mm (0.0039 in.)
	Margin thickness	STD	1.0 mm (0.039 in.)
		Maximum	0.5 mm (0.020 in.)

Valve spring	Deviation	Maximum	2.0 mm (0.079 in.)
	Free length		45.50 mm (1.7913 in.)
	Installed tension at 33.8 mm (1.331 in.)		186 – 206 N (19.0 – 21.0 kgf, 41.9 – 46.3 lbf)
Valve lifter	Lifter diameter		30.966 – 30.976 mm (1.2191 – 2.2195 in.)
	Lifter bore diameter		31.000 – 31.016 mm (1.2205 – 1.2211 in.)
	Oil clearance	STD	0.024 – 0.050 mm (0.0009 – 0.0020 in.)
		Maximum	0.07 mm (0.0028 in.)
Camshaft	Thrust clearance	STD	0.040 – 0.090 mm (0.0016 – 0.0035 in.)
		Maximum	0.12 mm (0.0047 in.)
	Journal oil clearance	STD Intake	0.035 – 0.072 mm (0.0014 – 0.0028 in.)
		Exhaust	0.025 – 0.062 mm (0.0010 – 0.0024 in.)
		Maximum Intake	0.10 mm (0.0039 in.)
		Exhaust	0.09 mm (0.0035 in.)
	Journal diameter		26.949 – 26.965 mm (1.0610 – 1.0616 in.)
	Circle runout	Maximum	0.06 mm (0.0024 in.)
	Cam lobe height	STD Intake	42.11 – 42.21 mm (1.6579 – 1.6618 in.)
		Exhaust	41.96 – 42.06 mm (1.6520 – 1.6559 in.)
		Minimum Intake	41.96 mm (1.6520 in.)
		Exhaust	41.81 mm (1.6461 in.)
	Camshaft gear backlash	STD	0.020 – 0.200 mm (0.0008 – 0.0079 in.)
		Maximum	0.30 mm (0.0188 in.)
	Camshaft gear spring end free distance		18.2 – 18.8 mm (0.712 – 0.740 in.)
Air intake chamber	Warpage	Maximum	0.10 mm (0.0039 in.)
Intake manifold	Warpage		
	Air intake chamber side	Maximum	0.15 mm (0.0059 in.)
	Cylinder head side	Maximum	0.08 mm (0.0031 in.)
Exhaust manifold	Warpage	Maximum	0.50 mm (0.0196 in.)
Cylinder block	Cylinder head surface warpage	Maximum	0.07 mm (0.0028 in.)
	Cylinder bore diameter		87.500 – 87.512 mm (3.4449 – 3.4453 in.)
		Maximum	87.52 mm (3.4457 in.)
	12 pointed head main bearing cap bolt diameter		
		at tension portion STD	7.500 – 7.600 mm (0.2953 – 0.2992 in.)
		Minimum	7.20 mm (0.2835 in.)
Piston and piston ring	Piston diameter		87.406 – 87.416 mm (3.4412 – 3.4416 in.)
	Piston oil clearance	STD	0.084 – 0.106 mm (0.0033 – 0.0042)
		Maximum	0.13 mm (0.0051 in.)
	Piston ring groove clearance	No.1	0.020 – 0.070 mm (0.0008 – 0.0028 in.)
		No.2	0.020 – 0.060 mm (0.0008 – 0.0024 in.)
	Piston ring end gap	STD No.1	0.25 – 0.35 mm (0.0098 – 0.0138 in.)
		No.2	0.35 – 0.45 mm (0.0138 – 0.0177 in.)
		Oil	0.15 – 0.40 mm (0.0059 – 0.0157 in.)
		Maximum No.1	0.95 mm (0.0374 in.)
		No.2	1.05 mm (0.0413 in.)
		Oil	1.00 mm (0.0394 in.)

Connecting rod	Thrust clearance	STD	0.15 – 0.30 mm (0.0059 – 0.0118 in.)
		Maximum	0.35 mm (0.0138 in.)
	Connecting rod thickness		20.80 – 20.85 mm (0.8189 – 0.8209 in.)
	Connecting rod bearing center wall thickness		
	Reference	Mark 1	1.484 – 1.487 mm (0.0584 – 0.0585 in.)
		Mark 2	1.487 – 1.490 mm (0.0585 – 0.0587 in.)
		Mark 3	1.490 – 1.493 mm (0.0587 – 0.0588 in.)
		Mark 4	1.493 – 1.496 mm (0.0588 – 0.0589 in.)
	Connecting rod oil clearance	STD	0.038 – 0.064 mm (0.0015 – 0.0025 in.)
		Maximum	0.08 mm (0.0031 in.)
	Rod out–of–alignment	Maximum per 100 mm (3.94 in.)	0.05 mm (0.0020 in.)
	Rod twist	Maximum per 100 mm (3.94 in.)	0.15 mm (0.0059 in.)
	Bushing inside diameter		22.005 – 22.014 mm (0.8663 – 0.8667 in.)
	Piston pin diameter		21.997 – 22.006 mm (0.8660 – 0.8664 in.)
	Bushing oil clearance	STD	0.005 – 0.011 mm (0.0002 – 0.0004 in)
		Maximum	0.05 mm (0.0020 in.)
	Connecting rod bolt diameter		
		at tension portion STD	7.2 – 7.3 mm (0.284 – 0.287 in.)
		Minimum	7.0 mm (0.276 in.)
Crankshaft	Thrust clearance	STD	0.04 – 0.24 mm (0.0016 – 0.0095 in.)
		Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness		1.930 – 1.980 mm (0.0760 – 0.0780 in.)
	Main journal oil clearance	STD No.1 and No.4	0.014 – 0.034 mm (0.0006 – 0.0013 in.)
		No.2 and No.3	0.026 – 0.046 mm (0.0010 – 0.0018 in.)
		Maximum No.1 and No.4	0.05 mm (0.0020 in.)
		No.2 and No.3	0.06 mm (0.0024 in.)
	Main journal diameter		60.988 – 61.000 mm (2.4011 – 2.4016 in.)
	Main bearing center wall thickness		
	Reference	Mark 1	2.486 – 2.489 mm (0.0979 – 0.0980 in.)
		Mark 2	2.489 – 2.492 mm (0.0980 – 0.0981 in.)
		Mark 3	2.492 – 2.495 mm (0.0981 – 0.0982 in.)
		Mark 4	2.495 – 2.498 mm (0.0982 – 0.0983 in.)
		Mark 5	2.498 – 2.501 mm (0.0983 – 0.0985 in.)
		Mark 6	2.501 – 2.504 mm (0.0985 – 0.0986 in.)
		Mark 7	2.504 – 2.507 mm (0.0986 – 0.0987 in.)
	Crank pin diameter		52.992 – 53.000 mm (2.0863 – 2.0866 in.)
	Circle runout	Maximum	0.06 mm (0.0024 in.)
	Main journal taper and out–of–round	Maximum	0.02 mm (0.0008 in.)
	Crank pin taper and out–of–round	Maximum	0.02 mm (0.0008 in.)

SS03L–06

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Timing belt plate x Oil pump		8	80	69 in.·lbf
No.1 idler pulley x Oil pump		34	350	25
No.2 idler pulley x No.2 idler pulley bracket		43	440	32
Camshaft timing pulley x Camshaft		125	1,300	94
	for SST	88	900	65
Timing belt tensioner x Oil pump		27	280	20
RH engine mounting bracket x Cylinder block		28	290	21
No.2 timing belt cover x No.3 timing belt cover		8.5	85	74 in.·lbf
No.1 timing belt cover x Oil pump		8.5	85	74 in.·lbf
Crankshaft pulley x Crankshaft		215	2,200	159
No.2 generator bracket x Engine RH mounting bracket		28	290	21
Cylinder head x Cylinder block	12 pointed head 1st	54	550	40
	2nd	Turn 90°	Turn 90°	Turn 90°
	Recessed head	18.5	185	13
Camshaft bearing cap x Cylinder head		16	160	12
Cylinder head cover x Cylinder head		8	80	69 in.·lbf
Exhaust manifold x Cylinder head		49	500	36
Exhaust manifold stay x Exhaust manifold		20	200	15
Exhaust manifold stay x Transmission housing		20	200	15
No.1 EGR pipe x RH exhaust manifold		12	120	9
No.1 EGR pipe x EGR cooler		12	120	9
PS pump bracket x RH cylinder head		43	440	32
Oil dipstick guide x LH cylinder head		8	80	69 in.·lbf
Water inlet pipe x LH cylinder head		19.5	200	14
Cylinder head rear plate x LH cylinder head		8	80	69 in.·lbf
No.3 timing belt cover x Cylinder head		8.5	85	74 in.·lbf
Water outlet x Intake manifold		15	150	11
Fuel inlet hose x Fuel filter		29	300	21
Intake manifold x Cylinder head		15	150	11
Air intake chamber x Intake manifold		43	440	32
No.2 EGR pipe x Air intake chamber		12	120	9
No.2 EGR pipe x EGR cooler		12	120	9
No.1 engine hanger x Air intake chamber		39	400	29
No.1 engine hanger x RH cylinder head		39	400	29
Air intake chamber stay x Air intake chamber		19.5	200	14
Air intake chamber stay x RH cylinder head		19.5	200	14
Drive plate x Crankshaft		83	850	61
Transaxle x Engine	17 mm head	64	650	47
No.1 oil pan x Transaxle		37.2	380	27
Drive plate x Torque convertor clutch		41	420	30
Flywheel housing under cover x Transaxle		7.8	80	69 in.·lbf
Rear engine mounting insulator x Cylinder block		64	650	47
Front engine mounting insulator x Cylinder block		64	650	47
Engine moving control rod x RH engine mounting bracket		64	650	47

Engine moving control rod x RH fender apron	64	650	47
RH engine mounting stay x Water outlet	32	320	23
RH engine mounting stay x Engine moving control rod	32	320	23
RH engine mounting stay x No.2 RH engine mounting bracket	32	320	23
Front engine mounting insulator x Front frame	80	820	59
Engine mounting absorber x Front frame	48	490	35
Engine mounting absorber x Transaxle	48	490	35
Rear engine mounting insulator x Front frame	66	670	48
LH engine mounting insulator x Transaxle	64	650	47
PS pump x PS pump bracket	43	440	31
A/C compressor x Housing bracket	25.5	260	19
A/C compressor x No.1 oil pan	25.5	260	19
Generator adjusting bar x Drive belt adjusting bar bracket	18	185	13
Fuel inlet hose x Fuel filter	29	300	21
Main bearing cap x Cylinder block 12 pointed head 1st 2nd 6 pointed head	22 Turn 90° 27	225 Turn 90° 275	16 Turn 90° 20
Connecting rod cap x Connecting rod 1st 2nd	24.5 Turn 90°	250 Turn 90°	18 Turn 90°
Rear oil seal retainer x Cylinder block	8	80	69 in.·lbf
EGR cooler x Cylinder block	9	90	78 in.·lbf
Engine coolant drain union x Cylinder block	39	400	29
Water seal plate x Cylinder block	18	180	13
Oil filter union x Cylinder block	30	310	22
Water inlet housing x Cylinder block	8	80	69 in.·lbf
Knock sensor x Cylinder block	39	400	29
No.2 idler pulley bracket x Cylinder block	28	290	21
A/C compressor housing bracket x Cylinder block	25	250	18
Generator bracket x Cylinder block	43	440	32
Front exhaust pipe support bracket x No.1 oil pan	20.6	210	15
Front exhaust pipe x Exhaust manifold	62	630	46
Front exhaust pipe x Center exhaust pipe	56	570	41
Center exhaust pipe x Tailpipe	56	570	41
Front exhaust pipe bracket x Sub frame	33	330	24
Front exhaust pipe support bracket x Front exhaust pipe stay	33	330	24

EMISSION CONTROL

SS03M–01

SERVICE DATA

EGR valve position sensor	Resistance (VC – E2)	1.5 – 4.3 kΩ
	Power source voltage (VC– E2)	4.5 – 5.5 V
	Power output voltage (EGLS – E2)	
	at vacuum (17.3 kPa, 130 mmHg, 5.1 in.Hg)	3.2 – 5.1 V
	at no vacuum	0.4 – 1.6 V

SS03N–01

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
EGR valve position sensor x EGR valve	2	20	17 in.·lbf
EGR pipe x EGR valve	12	120	9
EGR pipe x EGR cooler	12	120	9
EGR valve x Air intake chamber	12	120	9
EGR gas temperature sensor x EGR valve	20	200	14
Front exhaust pipe x Exhaust manifold	62	630	46
Front exhaust pipe x Center exhaust pipe	56	570	41
Front exhaust pipe bracket x Sub frame	33	330	24
Front exhaust pipe support bracket x Front exhaust pipe stay	33	330	24

SEQUENTIAL MULTIPORT FUEL INJECTION

SS03O–01

SERVICE DATA

Fuel pressure regulator	Fuel pressure	at no vacuum	301 – 347 kPa (3.1 – 3.5 kgf/cm^2, 44 – 50 psi)
Fuel pump	Resistance	at 20˚C (68˚F)	0.2 – 3.0 Ω
Injector	Resistance Injection volume Difference between each cylinder Fuel leakage		13.4 – 14.2 Ω 60 – 73 cm^3 (3.7 – 4.5 cu in.) per 15 sec. 13 cm^3 (0.8 cu in.) or less 1 drop or less per minute
MAF meter	Resistance (THA – E2)	at –20˚C (–4˚F) at 20˚C (68˚F) at 60˚C (140˚F)	14.6 – 17.8 kΩ 2.21 – 2.69 kΩ 0.29 – 0.35 kΩ
Throttle body	Throttle opener setting speed		900 – 1,950 rpm
Throttle position sensor	Resistance Throttle valve fully closed Throttle valve fully open –	 VTA – E2 VTA – E2 VC – E2	 0.2 – 6.3 kΩ 2.0 – 10.2 kΩ 2.5 – 5.9 kΩ
IAC valve	Resistance (+B – RSO or RSC)	at cold at hot	17.0 – 24.5 Ω 21.5 – 28.5 Ω
VSV for EGR	Resistance	at 20˚C (68˚F)	27 – 33 Ω
VSV for EVAP	Resistance	at 20˚C (68˚F)	27 – 33 Ω
VSV for ACIS	Resistance	at 20˚C (68˚F)	33 – 39 Ω
VSV for Vapor Pressure Sensor	Resistance	at 20˚C (68˚F)	33 – 39 Ω
Vapor Pressure Sensor	Power source voltage		4.5 – 5.5 V
ECT sensor	Resistance	at –20˚C (–4˚F) at 0˚C (32˚F) at 20˚C (68˚F) at 40˚C (104˚F) at 60˚C (140˚F) at 80˚C (176˚F)	10 – 20 kΩ 4 – 7 kΩ 2 – 3 kΩ 0.9 – 1.3 kΩ 0.4 – 0.7 kΩ 0.2 – 0.4 kΩ
EGR gas temperature sensor	Resistance	at 50˚C (122˚F) at 100˚C (212˚F) at 150˚C (302˚F)	64 – 97 kΩ 11 – 16 kΩ 2 – 4 kΩ
Air fuel ratio (A/F) sensor	Heater coil resistance	at 20˚C (68˚F)	11 – 16 Ω
Heated oxygen sensor	Heater coil resistance	at 20˚C (68˚F)	11 – 16 Ω
Fuel cut rpm	Fuel return rpm		1,200 rpm

SS03P–01

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Fuel line (Union bolt type)	29	300	21
Fuel line (Flare nut type) using SST	28	285	21
Fuel pump assembly x Fuel tank	4	40	35 in.·lbf
Fuel filter x Fuel pump bracket	2	20	17 in.·lbf
Fuel pressure regulator x Fuel pump bracket	2	20	17 in.·lbf
Delivery pipe x Intake manifold	10	100	7
No.1 fuel pipe x Intake manifold	19.5	200	14
Fuel tank band x Body	39	400	29
Throttle body x Air intake chamber	19.5	200	14
Intake air control valve x Air intake chamber	14.5	145	10
ECT sensor x Water outlet	20	200	14
Knock sensor x Cylinder block	39	400	29
Air–fuel ratio (A/F) sensor (Bank 1, 2 sensor 1) x Exhaust manifold	44	440	31
Heated oxygen sensor (Bank 1, 2 sensor 1) x Exhaust manifold	44	440	31
Heated oxygen sensor (Bank 1 sensor 2) x Exhaust pipe	44	440	31

COOLING

SERVICE DATA

SS03Q–01

Thermostat	Valve opening pressure		80 – 84˚C (176 – 183˚F)
	Valve lift	at 95˚C (203˚F)	10.0 mm (0.394 in.) or more
Radiator cap	Relief valve opening pressure	STD	83 – 113 kPa (0.85 – 1.15 kgf/cm^2, 12.1 – 16.4 psi)
		Minimum	69 kPa (0.7 kgf/cm^2, 10.0 psi)
Radiator	Plate height		7.4 – 7.8 mm (0.2959 – 0.3119 in.)
Cooling fan	Rotating amperage	at 20˚C (68˚F) No.1	8.3 – 11.3 A
		No.2	8.3 – 11.3 A

SS03R–01

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
RH engine drain plug x EGR cooler	7	70	61 in.·lbf
LH engine drain plug x Union on cylinder block	13	130	9
Water pump x Cylinder block	6	60	53 in.·lbf
Water inlet x Water inlet housing	8	80	69 in.·lbf
Water inlet pipe x LH cylinder head	19.5	200	14
Radiator support x Body	12.8	130	9
No.1 cooling fan shroud x Radiator	5.0	50	44 in.·lbf
No.2 cooling fan shroud x Radiator	5.0	50	44 in.·lbf
Radiator oil cooler x Radiator lower tank	8.3	85	74 in.·lbf
Radiator inlet pipe x Radiator lower tank	14.7	150	11

LUBRICATION

SS03S–01

SERVICE DATA

Oil pressure		at idle speed	29 kPa (0.3 kgf/cm^2, 43 psi) or more
		at 3,000 rpm	294 – 539 kPa (3.0 – 5.5 kgf/cm^2, 43 – 78 psi)
Oil pump	Side clearance	STD	0.030 – 0.090 mm (0.0012 – 0.0035 in.)
		Maximum	0.15 mm (0.0059 in.)
	Body clearance	STD	0.100 – 0.175 mm (0.0039 – 0.0069 in.)
		Maximum	0.30 mm (0.0118 in.)
	Tip clearance	STD	0.110 – 0.240 mm (0.0043 – 0.0094 in.)
		Maximum	0.35 mm (0.0138 in.)

SS03T–01

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Oil pressure switch x Cylinder block		13	130	9
No.2 oil pan x Drain plug		45	460	33
Oil pump x Relief valve plug		36.8	375	37
Oil pump x Cylinder block	10 mm head 12 mm head	8 19.5	80 200	69 in.·lbf 14
Crankshaft position sensor x Oil pump		8	80	69 in.·lbf
Oil pan baffle plate x No.1 oil pan		8	80	69 in.·lbf
No.1 oil pan x Cylinder block		19.5	200	14
No.1 oil pan x Oil pump	10 mm head 12 mm head	8 19.5	80 200	69 in.·lbf 14
No.1 oil pan x Rear oil seal retainer		8	80	69 in.·lbf
No.1 oil pan x Transaxle		37.2	380	27
Oil strainer x Main bearing cap		8	80	69 in.·lbf
Oil strainer x Oil pump		8	80	69 in.·lbf
No.2 oil pan x No.1 oil pan		8	80	69 in.·lbf
Oil level sensor x No.1 oil pan		8	80	69 in.·lbf
Flywheel housing under cover x Transaxle		7.8	80	69 in.·lbf
A/C compressor housing bracket x Cylinder block		25	250	18
PS pump x PS pump bracket		43.1	440	32
PS pump drive belt adjusting strut x PS pump		43.1	440	32
PS pump drive belt adjusting strut x Oil pump		43.1	440	32
Exhaust pipe bracket x No.1 oil pan		21	210	15

IGNITION

SS03U–06

SERVICE DATA

Firing order	–		1 – 2 – 3 – 4 – 5 – 6
Spark plug	Recommended spark plug	DENSO	PK20TR11
		NGK	BKR6EKPB11
	Correct electrode gap for new plug		1.1 mm (0.043 in.)
	Maximum electrode gap for used plug		1.3 mm (0.051 in.)
Ignition coil	Primary coil resistance	at cold	0.70 – 0.94 Ω
		at hot	0.85 – 1.10 Ω
	Secondary coil resistance	at cold	10.8 – 14.9 kΩ
		at hot	13.1 – 17.5 kΩ
Camshaft position sensor	Resistance	at cold	835 – 1,400 Ω
		at hot	1,060 – 1,645 Ω
Crankshaft position sensor	Resistance	at cold	1,630 – 2,740 Ω
		at hot	2,065 – 3,225 Ω

SS03V–01

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head	18	180	13
Ignition coil x Cylinder head	8	80	69 in.·lbf
Camshaft position sensor x Cylinder head	8	80	69 in.·lbf
Crankshaft position sensor x Oil pump	8	80	69 in.·lbf

STARTING

SS03W–01

SERVICE DATA

Starter	Rated voltage and output power		12 V 1.4 kW
	No–load characteristics	Current	90 A or less at 11.5 V
		rpm	3,000 rpm or more
	Brush length	STD	15.5 mm (0.610 in.)
		Minimum	10.0 mm (0.394 in.)
	Spring installed load	STD	17.6 – 23.5 N (1.8 – 2.4 kgf, 3.9 – 5.3 lbf)
		Minimum	11.8 N (1.2 kgf, 2.6 lbf)
	Commutator		
	Diameter	STD	30.0 mm (1.181 in.)
		Minimum	29.0 mm (1.142 in.)
	Undercut depth	STD	0.6 mm (0.024 in.)
		Minimum	0.2 mm (0.008 in.)
	Circle runout	Maximum	0.05 mm (0.0020 in.)
	Magnetic switch		
	Contact plate for wear	Maximum	0.9 mm (0.035 in.)

SS03X–01

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Starter mounting bolt	37	380	27
End cover x Field frame	1.5	15	13 in.·lbf
Starter housing x Magnetic switch	5.9	60	52 in.·lbf
Field frame x Armature assembly	5.9	60	52 in.·lbf
Lead wire x Terminal C of starter	5.9	60	52 in.·lbf
Terminal nut x Terminal C of starter	17	170	12
Terminal nut x Terminal 30 of starter	17	170	12
Magnetic switch end cover x Magnetic switch	2.5	26	23 in.·lbf

CHARGING

SS03Y–03

SERVICE DATA

Battery	Voltage	at 20˚C (68˚F)	12.5 – 12.9 V
Drive belt	Tension		
	New belt		175 ± 5 lbf
	Used belt		115 ± 20 lbf
Generator	Rated output		12 V 80 A
	Rotor coil resistance	at 20˚C (68˚F)	2.1 – 2.5 Ω
	Slip ring diameter	STD	14.2 – 14.4 mm (0.559 – 0.567 in.)
		Limit	12.8 mm (0.504 in.)
	Brush exposed length	STD	10.5 mm (0.413 in.)
		Limit	1.5 mm (0.059 in.)
Voltage regulator	Regulating voltage		13.5 – 15.1 V

SS03Z–01

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Bearing retainer x Drive end frame		3.0	31	27 in.·lbf
Rectifier end frame x Drive end frame		4.5	46	40 in.·lbf
Cord clip x Rectifier end frame		5.4	55	48 in.·lbf
Generator pulley x Rotor		110.5	1,125	81
Rectifier holder x Coil lead on rectifier end frame		2.9	30	26 in.·lbf
Voltage regulator and brush holder x Rectifier end frame		2.0	20	18 in.·lbf
Plate terminal x Rectifier holder	Nut	4.4	45	39 in.·lbf
	Screw	3.9	39	35 in.·lbf
Rear end cover x Rectifier holder		4.4	45	39 in.·lbf
Terminal insulator x Rectifier holder		4.1	42	36 in.·lbf
Generator x Generator bracket		56	570	41
Generator x Adjusting bar		18	180	13

AUTOMATIC TRANSAXLE

SS05X–02

SERVICE DATA

Line pressure (wheel locked)	Engine idling	
	D position	401 – 461 kPa (4.1 – 4.7 kgf/cm^2, 58 – 66 psi)
	R position	804 – 882 kPa (8.2 – 9.0 kgf/cm^2, 117 – 128 psi)
	at stall (Throttle valve fully opened)	
	D position	1,138 – 1,236 kPa (11.6 – 12.6 kgf/cm^2, 165 – 179 psi)
	R position	1,716 – 1,854 kPa (17.5 – 18.9 kgf/cm^2, 249 – 269 psi)
Engine stall revolution		2,600 ± 150 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (A/C OFF)		
	N position	700 ± 50 rpm
Throttle cable adjustment (Throttle valve fully opened)		Between boot and face and inner cable stopper 0 – 1 mm (0 – 0.04 in.)
Drive plate runout	Max.	0.3 mm (0.0118 in.)
Torque converter clutch runout	Max.	0.20 mm (0.0079 in.)
Torque converter clutch installation distance		More than 13.7 mm (0.539 in.)
Lock–up point	(Throttle valve opening 5%)	
3rd gear (O/D main switch OFF)	Lock–up ON	60 – 65 km/h (37 – 40 mph)
	Lock–up OFF	53 – 57 km/h (33 – 35 mph)
O/D gear	Lock–up ON	60 – 64 km/h (37 – 40 mph)
	Lock–up OFF	53 – 57 km/h (33 – 35 mph)
Shift schedule		
D position		
(Throttle valve fully opened)	1 → 2	60 – 66 km/h (37 – 41 mph)
	2 → 3	113 – 121 km/h (70 – 75 mph)
	3 → O/D	174 – 182 km/h (108 – 113 mph)
	O/D → 3	168 – 176 km/h (104 – 109 mph)
	3 → 2	104 – 112 km/h (65 – 70 mph)
	2 → 1	50 – 54 km/h (31 – 34 mph)
(Throttle valve fully closed)	3 → O/D	35 – 39 km/h (22 – 24 mph)
	O/D → 3	20 – 24 km/h (12 – 15 mph)
2 position		
(Throttle valve fully opened)	1 → 2	60 – 66 km/h (37 – 41 mph)
	3 → 2	122 – 130 km/h (76 – 81 mph)
	2 → 1	50 – 54 km/h (31 – 34 mph)
L position		
(Throttle valve fully opened)	3 → 2	107 – 114 km/h (66 – 71 mph)
	2 → 1	55 – 59 km/h (34 – 37 mph)

SS05Y–02

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Front engine front mounting insulator x Front frame assembly		80	820	59
Rear engine mounting insulator x Front frame assembly		66	670	48
LH transaxle mounting insulator x Transaxle		64	650	47
Engine mounting absorber x Front frame assembly		48	490	35
Transaxle x Engine	17 mm bolt	66	670	48
Transaxle x Engine	12 mm bolt	48	490	35
Torque converter clutch x Drive plate		27	280	20
Valve body x Transaxle case		11	110	8
Oil strainer x Valve body		11	110	8
Oil pan x Transaxle case		4.9	50	43 in.·lbf
Oil pan drain plug		49	500	36
Park/Neutral position switch x Transaxle case (bolt)		5.4	55	48 in.·lbf
Park/Neutral position switch (nut)		6.9	70	61 in.·lbf
B_3 apply pipe retainer		11	110	8
Manual valve body x Transaxle case		11	110	8
Detent spring x Manual valve body		11	110	8
Oil pipe bracket		10	100	7
Steering gear housing x Front suspension member		181	1,850	134
Stabilizer bar bracket		19	195	14
Vehicle speed sensor x Transaxle case		16	160	12
Direct clutch speed sensor x Transaxle case		5.4	55	48 in.·lbf
Transfer lubrication apply pipe retainer		11	110	8
Exhaust manifold bracket x Transaxle case		20	200	14
Front frame x Body	19 mm	181	1,850	134
Front frame x Body	14 mm	32	330	24
Front frame x Body	Nut	36	370	27
Exhaust front pipe x Exhaust center pipe		56	570	41
Exhaust manifold x Exhaust front pipe		62	630	46
Exhaust front pipe support stay x Exhaust front pipe support bracket		33	330	24
Exhaust pipe support x Front frame		33	330	24
Starter x Torque converter clutch housing		39	400	29
Throttle cable adjusting nut		15	150	11
Drive plate x Crankshaft		83	850	61
Shift control cable x Transaxle control shaft lever		15	150	11
Shift solenoid valve No.1, No.2, SL, SLN x Valve body		6.6	67	58 in.·lbf
Front wheel nut		103	1,050	76
Exhaust front pipe support bracket x Body		21	210	15
Steering return pipe x Front frame		10	100	7

SUSPENSION AND AXLE

SS05P–05

SERVICE DATA

Cold tire inflation Pressure	Tire size P205/65R15 92H — Front*1	180 kPa (1.8 kgf/cm2 or bar, 26 psi)
	Rear*1	180 kPa (1.8 kgf/cm2 or bar, 26 psi)
	Front*2	220 kPa (2.2 kgf/cm2 or bar, 32 psi)
	Rear*2	220 kPa (2.2 kgf/cm2 or bar, 32 psi)
Front wheel alignment	Vehicle height — Front*3	213 mm (8.39 in.)
	Rear*4	259 mm (10.20 in.)
	Camber	–0°37' ± 45' (–0.62° ± 0.75°)
	Left–right error	45' (0.75°) or less
	Caster	2°18' ± 45' (2.30° ± 0.75°)
	Left–right error	45' (0.75°) or less
	Steering axis inclination	13°04' ± 45' (13.07° ± 0.75°)
	Left–right error	45' (0.75°) or less
	Toe–in (total)	0° ± 12' (0° ± 0.2°, 0 ± 2 mm, 0 ± 0.08 in.)
	Tie rod end length difference	1.5 mm (0.059 in.) or less
	Wheel angle — Inside wheel	35°47' ± 2°
	Outside wheel	31°25'
Rear wheel alignment	Camber	–0°48' ± 45' (–0.80° ± 0.75°)
	Left–right error	45' (0.75°) or less
	Toe–in (total)	0°24' ± 12' (0.4° ± 0.2°, 4 ± 2 mm, 0.16 ± 0.08 in.)
	No.2 lower suspension arm length difference	1.0 mm (0.04 in.) or less
Front axle	Axle bearing backlash	0.05 mm (0.0020 in.) or less
	Axle hub deviation	0.05 mm (0.0020 in.) or less
Front drive shaft	Drive shaft standard length — LH	586.0 ± 2.0 mm (23.071 ± 0.079 in.)
	RH	881.6 ± 2.0 mm (34.709 ± 0.079 in.)
Front suspension	Lower ball joint turning torque	1.0 – 3.4 N·m (10 – 35 kgf·cm, 8.7 – 30 in.·lbf)
	Stabilizer bar link turning torque	0.05 – 1.0 N·m (0.5 – 10 kgf·cm, 0.4 – 8.7 in.·lbf)
Rear axle	Axle bearing backlash	0.05 mm (0.0020 in.) or less
	Axle hub deviation	0.07 mm (0.0028 in.) or less
Rear suspension	No.2 lower suspension arm length	512.3 mm (20.169 in.)
	Stabilizer bar link turning torque	0.05 – 1.0 N·m (0.5 – 10 kgf·cm, 0.4 – 8.7 in.·lbf)

*1: For all load including full rated loads

*2: For reduced loads (1 to 4 passengers)

*3: Measure from the ground to the center of the front side lower suspension arm mounting bolt.

*4: Measure from the ground to the center of the front side strut rod mounting bolt.

SS05Q–04

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
FRONT			
Hub nut	103	1,050	76
Tie rod end lock nut	74	750	54
Steering knuckle x Shock absorber	211	2,150	156
Steering knuckle x Brake caliper	107	1,090	79
Steering knuckle x Tie rod end	49	500	36
Axle hub x Drive shaft	294	3,000	217
Lower ball joint x Lower suspension arm	127	1,300	94
Lower ball joint x Steering knuckle	123	1,250	90
Steering knuckle x Disc brake dust cover	8.3	85	74 in.·lbf
Drive shaft center bearing lock bolt	32	330	24
Inboard joint shaft x Outboard joint shaft	65	660	48
Shock absorber cap x Suspension support	14	140	9
Suspension support x Body	80	820	59
Suspension support x Piston rod	49 (36)	500 (365)	36 (26)
ABS speed sensor set bolt	7.8	80	69 in.·lbf
Flexible hose x Shock absorber	29	300	22
ABS speed sensor wire harness x Shock absorber	29	300	22
Lower suspension arm set bolt	206	2,100	152
Stabilizer bar bracket x Suspension member	19	195	14
Stabilizer bar link set nut	39	400	29

( ): For use with SST

Part tightened	N·m	kgf·cm	ft·lbf
REAR			
Hub bolt	103	1,050	76
No.2 lower suspension arm lock nut	56	570	41
Brake caliper x Rear axle carrier	47	475	34
Axle hub bearing set bolt	80	820	59
Shock absorber x Axle carrier New nut	255	2,600	188
Reused nut (apply engine oil the threads)	196	2,000	145
Flexible hose x Shock absorber	29	300	22
ABS speed sensor set bolt	7.8	80	69 in.·lbf
ABS speed sensor wire harness x Shock absorber	5.4	55	48 in.·lbf
Rear seatback set bolt	18	185	13
Rear seat belt set bolt	41	420	30
Suspension support x Body	39	400	29
Suspension support x Piston rod	49 (36)	500 (365)	36 (26)
Parking brake cable set bolt	5.4	55	48
Lower suspension arm x Suspension member	181	1,850	134
Lower suspension arm x Rear axle carrier	181	1,850	134
Strut rod x Body	113	1,150	83
Strut rod x Rear axle carrier	113	1,150	83
Suspension member x Body	51	520	38
Suspension member lower stopper sub–assembly x Body	38	390	28
Stabilizer bar bracket x Suspension member	19	195	14
Stabilizer bar link set nut	39	400	29

( ): For use with SST

BRAKE

SS062–14

SERVICE DATA

Brake pedal height (from asphalt sheet)		152.0 – 162.0 mm (5.984 – 6.378 in.)
Brake pedal freeplay		1 – 6 mm (0.04 – 0.24 in.)
Brake pedal reserve distance at 490 N (50 kgf, 110.2 lbf)		More than 70 mm (2.76 in.)
Brake booster push rod to piston clearance (w/ SST)		0 mm (0 in.)
Front brake pad thickness	STD	11.0 mm (0.433 in.)
Front brake pad thickness	Minimum	1.0 mm (0.039 in.)
Front brake disc thickness	STD	28.0 mm (1.102 in.)
Front brake disc thickness	Minimum	26.0 mm (1.024 in.)
Front brake disc runout	Maximum	0.05 mm (0.0020 in.)
Rear brake pad thickness	STD	10.0 mm (0.394 in.)
Rear brake pad thickness	Minimum	1.0 mm (0.039 in.)
Rear brake disc thickness	STD	10.0 mm (0.394 in.)
Rear brake disc thickness	Minimum	9.0 mm (0.354 in.)
Rear brake disc runout	Maximum	0.15 mm (0.0059 in.)
Rear brake disc inside diameter	STD	170 mm (6.69 in.)
Rear brake disc inside diameter	Maximum	171 mm (6.73 in.)
Parking brake lining thickness	STD	2.0 mm (0.079 in.)
Parking brake lining thickness	Minimum	1.0 mm (0.039 in.)
Parking brake pedal travel at 294 N (30 kgf, 66 lbf)		3 – 6 clicks
Parking brake clearance between rear shoe and lever		Less than 0.35 mm (0.0138 in.)
Parking brake adjusting shim thickness for rear disc brake		0.3 mm (0.012 in.) 0.6 mm (0.024 in.) 0.9 mm (0.035 in.)

SS063–01

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Master cylinder x Piston stopper bolt		10	100	7
Master cylinder x Reservoir		1.7	18	16 in.·lbf
Master cylinder x Brake booster		13	130	9
Brake line union nut	10 mm nut	15	155	11
	12 mm nut	20	200	14
Brake booster clevis lock nut		25	260	19
Brake booster x Pedal bracket		13	130	9
Front brake caliper installation bolt		34	350	25
Bleeder plug		8.3	85	74 in.·lbf
Front disc brake torque plate x Steering knuckle		107	1,090	79
Front disc brake caliper x Flexible hose		29	300	21
Flexible hose x Shock absorber		29	300	21
Rear disc brake caliper installation bolt		20	200	14
Rear disc brake cariper main pin installation bolt		26	270	20
Rear disc brake caliper x Flexible hose		29	300	21
Rear disc brake torque plate x Rear axle carrier		47	475	34
Parking brake pedal assembly x Body		36	370	27
ABS (& TRAC) actuator x Actuator bracket		5.4	55	48 in.·lbf
ABS (& TRAC) actuator bracket x Body		19	195	14
Front speed sensor installation bolt		7.8	80	69 in.·lbf
Front speed sensor harness clamp bolt		5.4	55	48 in.·lbf
Rear speed sensor installation bolt		7.8	80	69 in.·lbf
Rear speed sensor harness clamp bolt		5.4	55	48 in.·lbf

STEERING

SERVICE DATA

SS05R–01

ON–VEHICLE INSPECTION		
Steering wheel freeplay	Maximum	30 mm (1.18 in.)
Drive belt tension	New belt	150 – 185 lbf
Drive belt tension	Used belt	95 – 135 lbf
Fluid level rise	Maximum	5 mm (0.20 in.)
Fluid pressure at idle speed with valve closed	Minimum	7,845 kPa (80 kgf/cm^2, 1,138 psi)
Steering effort at idle speed	Maximum	5.9 N·m (60 kgf·cm, 52 in.·lbf)
PS VANE PUMP		
Vane pump rotating torque	Maximum	0.3 N·m (2.8 kgf·cm, 2.4 in.·lbf)
Oil clearance between pump shaft and bushing	STD	0.03 – 0.05 mm (0.0012 – 0.0020 in.)
Oil clearance between pump shaft and bushing	Maximum	0.07 mm (0.0028 in.)
Vane plate height	Minimum	8.6 mm (0.339 in.)
Vane plate thickness	Minimum	1.397 mm (0.0550 in.)
Vane plate length	Minimum	14.991 mm (0.5902 in.)
Clearance between the rotor groove and plate	Maximum	0.035 mm (0.0014 in.)
Vane plate length	Pump rotor and cam ring mark	
	NONE	14.999 – 15.001 mm (0.59051 – 0.59059 in.)
	1	14.997 – 14.999 mm (0.59043 – 0.59051 in.)
	2	14.995 – 14.997 mm (0.59035 – 0.59043 in.)
	3	14.993 – 14.995 mm (0.59027 – 0.59035 in.)
	4	14.991 – 14.993 mm (0.59020 – 0.59027 in.)
Spring free length	Minimum	32.3 mm (1.272 in.)
PS GEAR		
Steering rack runout	Maximum	0.30 mm (0.0118 in.)
Total preload (Control valve rotating torque)		0.8 – 1.4 N·m (8 – 14 kgf·cm, 6.9 – 12.2 in.·lbf)

SS05S–01

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
STEERING COLUMN			
Steering wheel pad set screw (Torx screw)	7.1	72	63 in.·lbf
Steering wheel set nut	35	360	26
Intermediate shaft assembly x Control valve shaft	35	360	26
Steering column assembly x Intermediate shaft assembly	35	360	26
Steering column assembly set nut	25	260	19
Turn signal bracket x Column tube	7	70	31 in.·lbf
Lower column tube attachment x Column tube	19	195	14
PS VANE PUMP			
Pressure feed tube x Pressure feed tube	20 (25)	203 (250)	15 (18)
Clamp plate set nut	7.8	80	69 in.·lbf
Pump assembly set bolt A bolt	29 (43)	293 (440)	21 (32)
Pump assembly set bolt B bolt	43	440	32
Oil pressure switch x Union bolt	21	210	15
Union bolt x Pressure feed tube	52	525	38
Vane pump pulley set nut	43	440	32
Front bracket x Rear bracket	43	440	32
Suction port union set bolt	13	130	9
Pressure port union	83	850	62
Rear housing set bolt	24	240	17
PS GEAR			
Pressure feed clamp plate set nut	10	100	7
Pressure feed and return tubes x Control valve housing	32 (25)	326 (250)	24 (18)
Stabilizer bar set bolt	19	195	14
PS gear assembly set bolt and nut	181	1,850	134
Turn pressure tube union nut	10 (13)	102 (130)	7 (9)
Tie rod end lock nut	74	750	54
Rack x Rack end	60 (83)	615 (850)	45 (62)
Rack guide spring cap lock nut	50 (69)	513 (700)	37 (51)
Rack housing cap	59	600	43
Selt–locking nut	25	250	18
Control valve housing set bolt	18	185	13

( ): For use without SST

SUPPLEMENTAL RESTRAINT SYSTEM

SS061–40

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Steering wheel	35	360	26
Steering wheel pad	7.1	72	63 in.·lbf
Front passenger airbag assembly x Instrument panel	21	210	15
Airbag sensor assembly	21	210	15

BODY ELECTRICAL

SS05U–10

SERVICE DATA

INTEGRATION RELAY (Relay Circuit)	
(Junction Block Side)	
1 – Ground (Constant)	Battery positive voltage
7 – Ground (Ignition switch LOCK or ACC)	No voltage
7 – Ground (Ignition switch ON)	Battery positive voltage
9 – Ground (Ignition switch LOCK or ACC)	No voltage
9 – Ground (Ignition switch ON)	Battery positive voltage
11 – Ground (Ignition switch LOCK)	No voltage
11 – Ground (Ignition switch ACC or ON)	Battery positive voltage
(Wire Harness Side)	
A1 – Ground (Constant)	Battery positive voltage
B1 – Ground (Light control switch OFF)	No voltage
B1 – Ground (Light control switch TAIL or HEAD)	Battery positive voltage
B4 – Ground (Light control switch OFF or TAIL)	No voltage
B4 – Ground (Light control switch HEAD)	Battery positive voltage
B2 – Ground (Constant)	Battery positive voltage
B3 – Ground (Constant)	Battery positive voltage
DAYTIME RUNNING LIGHT RELAY (MAIN) (Wire Harness Side)	
1 – Ground (Ignition switch position LOCK or ACC)	No voltage
1 – Ground (Ignition switch position ON or START)	Battery positive voltage
5 – Ground (Engine Running)	No voltage
5 – Ground (Engine Stop)	Battery positive voltage
7 – Ground (Constant)	Battery positive voltage
9 – Ground (Constant)	Battery positive voltage
AUTOMATIC LIGHT CONTROL SENSOR	
(Connector disconnected)	
1 – Ground (Ignition switch position LOCK or ACC)	No voltage
1 – Ground (Ignition switch position ON)	Battery positive voltage
2 – Ground (Constant)	Battery positive voltage
(Connector connected)	
1 – Ground (Ignition switch position ON)	10 V or more
1 – Ground (Ignition switch position OFF)	1 V or less
3 – Ground (Door courtesy switch ON)	1 V or less
3 – Ground (Door courtesy switch OFF)	9 V or more
5 – Ground (Vehicle's surroundings are dark)	1.8 V or less
5 – Ground (Dimmer switch position Flash)	0.3 V or less
6 – Ground (Vehicle's surroundings are dark)	1.5 V or less
8 – Ground (Vehicle's is under the direct sun light) (Sensor is not covered)	3.7 V or more
8 – Ground (Vehicle's surroundings are dim) (Sensor is covered and taillights are ON)	1.32 ~ 2.32 V
8 – Ground (Vehicle's surroundings are dark) (Sensor is covered and headlights are ON)	0.42 V

TURN SIGNAL FLASHER	
Flashes/ Minute	60 – 120

LIGHT FAILURE RELAY (Wire Harness Side)	
3 – Ground (Light control switch OFF)	No voltage
3 – Ground (Light control switch TAIL or HEAD)	Battery positive voltage
4 – Ground (Ignition switch LOCK or ACC)	No voltage
4 – Ground (Ignition switch ON)	Battery positive voltage
7 – Ground (Stop light switch OFF)	No voltage
7 – Ground (Stop light switch ON)	Battery positive voltage
8 – Ground (Ignition switch LOCK or ACC)	No voltage
8 – Ground (Ignition switch ON)	Battery positive voltage
SPEEDOMETER (ON–VEHICLE)	
USA:	
Standard indication (mph)	Allowable range (mph)
20	18 – 24
40	38 – 44
60	56 – 66
80	78 – 88
100	98 – 110
120	118 – 132
CANADA:	
Standard indication (km/h)	Allowable range (km/h)
20	17 – 24
40	38 – 46
60	57.5 – 67
80	77 – 88
100	96 – 109
120	115 – 130
140	134 – 151.5
160	153 – 173
TACHOMETER (ON–VEHICLE)/ DC 13.5 V 25 ˚C at (77 ˚F)	
Standard indication	Allowable range
700	630 – 770
1,000	900 – 1,100
2,000	1,850 – 2,150
3,000	2,800 – 3,200
4,000	3,800 – 4,200
5,000	4,800 – 5,200
6,000	5,750 – 6,250
7,000	6,700 – 7,300
FUEL RECEIVER GAUGE	
A – B	Approx. 270.8 Ω
A – C	Approx. 91.3 Ω
B – C	Approx. 179.5 Ω

FUEL SENDER GAUGE	
Float position mm (in.)	Resistance (Ω)
F: Approx. 91.1 (3.587)	Approx. 3.0
1/2: Approx. 34.2 (1.346)	Approx. 31.7
E: Approx. 30.8 (1.213)	Approx. 110.0
ENGINE COOLANT TEMPERATURE RECEIVER GAUGE (Resistance)	
A – B	Approx. 54.0 Ω
A – C	Approx. 175.7 Ω
B – C	Approx. 229.7 Ω
ENGINE COOLANT TEMPERATURE SENDER GAUGE (Resistance)	
Temperature ˚C (˚F)	Resistance (Ω)
50 (122.0)	160 – 240
120 (248.0)	17.1 – 21.2
SLIDING ROOF CONTROL RELAY AND SWITCH (Wire Harness Side)	
4 – Ground (Ignition switch LOCK or ACC)	* No voltage
4 – Ground (Ignition switch ON)	Battery positive voltage

*: Exceptions: For 60 seconds after the ignition switch ON→OFF (ACC) or until driver or passenger door is opened after the ignition switch ON→OFF (ACC).

BODY

TORQUE SPECIFICATION

SS05T–05

Part tightened	N·m	kgf·cm	ft·lbf
FRONT BUMPER	–	–	–
Reinforcement x Body	34	350	25
REAR BUMPER	–	–	–
Reinforcement x Body	34	350	25
HOOD	–	–	–
Hood x Hood hinge	26	265	19
HOOD SUPPORT	–	–	–
Hood support x Hood	17.5	178	13
Hood support x Body	17.5	178	13
HOOD LOCK CONTROL	–	–	–
Hood lock x Body (A bolt)	8.0	82	71 in.·lbf
Hood lock x Body (B bolt)	11	112	8
FRONT DOOR	–	–	–
Upper stop x Door panel	14	143	10
Window regulator x Door panel	5.0	51	44 in.·lbf
Window guide lower plate x Window regulator	5.0	51	44 in.·lbf
Door glass guide x Door panel	7.0	71	62 in.·lbf
Door lock x Door panel	5.0	51	44 in.·lbf
Outside handle x Door panel	5.5	56	49 in.·lbf
Door hinge x Body	30	306	22
Door hinge x Door	43	440	32
REAR DOOR	–	–	–
Upper stop x Door panel	14	143	10
Rear window guide x Door panel	5.5	56	49 in.·lbf
Front window guide x Door panel	7.0	71	62 in.·lbf
Window regulator x Door panel	5.0	51	44 in.·lbf
Window guide lower plate x Window regulator	5.0	51	44 in.·lbf
Door lock x Door panel	5.0	51	44 in.·lbf
Outside handle x Door panel	5.5	56	49 in.·lbf
Door hinge x Body	26	265	19
Door hinge x Door	43	440	32
FUEL LID	–	–	–
Fuel lid lock assembly x Body	5.5	56	49 in.·lbf
Fuel lid opening lid lock retainer x Fuel filler opening lid	5.5	56	49 in.·lbf
OUTSIDE REAR VIEW MIRROR	–	–	–
Outside rear view mirror x Door panel	5.5	56	49 in.·lbf
LUGGAGE COMPARTMENT DOOR AND HINGE	–	–	–
Luggage compartment door x Luggage compartment door hinge	5.5	56	49 in.·lbf
Door lock striker x Body	5.5	56	49 in.·lbf
Door lock x Door panel	5.5	56	49 in.·lbf
Door lock cylinder x Door panel	5.5	56	49 in.·lbf

Part tightened	N·m	kgf·cm	ft·lbf
FRONT WIPER AND WASHER	–	–	–
Wiper link assembly x Body	7.0	71	62 in.·lbf
Wiper arm and blade x Wiper link assembly	24	245	18
INSTRUMENT PANEL	–	–	–
Front passenger airbag assembly x Reinforcement	20	204	15
Steering wheel set nut	35	360	26
FRONT SEAT	–	–	–
Seat adjuster x Body	37	375	27
REAR SEAT	–	–	–
Seatback pad with frame x Body	18	185	13
SEAT BELT	–	–	–
Front Seat Belt	–	–	–
Shoulder anchor x Adjustable anchor	42	430	31
Floor anchor x Body	42	430	31
Retractor x Body (Upper bolt)	7.5	76	66 in.·lbf
Retractor x Body (Lower bolt)	42	430	31
Inner belt x Seat	42	430	31
Rear Seat Belt	–	–	–
Floor anchor x Body	42	430	31
Retractor x Body	42	430	31
Inner belt x Seat	42	430	31
Inner with center belt	42	430	31

AIR CONDITIONING

SS05V–01

SERVICE DATA

Refrigerant charge volume	800 ± 50 g (28.22 ± 1.76 oz.)
Drive belt tension	–
New belt	165 ± 26 lbf
Used belt	110 ± 11 lbf
Idle–up speed	–
Magnetic clutch not engaged	700 ± 50 rpm
Magnetic clutch engaged	700 ± 50 rpm
Magnetic clutch clearance	0.5 ± 0.15 mm (0.020 ± 0.0059 in.)

SS05W–10

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Compressor x Discharge hose	10	100	7
Compressor x Suction hose	10	100	7
Condenser x Disaharge hose	22	225	16
Condenser x Liquid tube	14	140	10
Receiver x Liquid tube	5.4	55	48 in.·lbf
A/C unit x Liquid tube and suction tube	10	100	7
Expansion valve x Evaporator	5.4	55	48in.·lbf
Compressor x Engine	25	250	18
Compressor x Compressor bracket	25	250	18
Drive belt adjusting bar bracket x Compressor	25	250	18
Drive belt adjusting bar bracket x Adjusting bar	18	185	13
Pivot bolt	56	570	41
Adjusting lock bolt	18	185	13
Pressure switch x Liquied tube	10	100	7
Pressure plate x Compressor	13.2	135	9
Suction line (Piping joint)	32	330	24
Suction line (Block joint)	10	100	7
Liquid line (Block joint)	10	100	7

ES 300
Brake Vacuum Hose
Special Service Campaign VL-1

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Lexus ES 300

Overview

Lexus will be initiating a Special Service Campaign ("SSC" VL1) for certain 1997 ES 300 vehicles. This booklet provides all the details necessary to plan and implement the SSC at your dealership. The key points of this Special Service Campaign are summarized below.

Condition

If a vehicle is operated in extremely cold conditions (below –18°F), moisture can accumulate and freeze in the vacuum brake hose. Should extremely cold weather persist for an extended period of time, the amount of ice in the hose could increase. In the worst case, it may block the vacuum in the hose, eliminate vacuum assist, and possibly lead to increased stopping distances.

Repair

This campaign involves replacing the brake vacuum hose. Refer to the attached technical instructions and accompanying video.

Approximately 26,000 1997 ES 300 vehicles are involved: 5,191 vehicles in the 19 designated cold–weather states, 20,973 vehicles in non–designated states.

The 19 designated cold–weather states are: Alaska, Colorado, Idaho, Illinois, Iowa, Kansas, Maine, Michigan, Minnesota, Montana, Nebraska, Nevada, New Hampshire, New York, North Dakota, South Dakota, Vermont, Wisconsin, and Wyoming.

Customer Notifications

Notification letters will be sent to vehicle owners in October, 1997. Two different owner letters will be used. The first, mailed to owners in the 19 designated cold–weather states, will encourage owners to contact their dealers and have the campaign modification performed as soon as possible. A second letter will be concurrently mailed to owners in non–designated states. This will advise them of the need to have the modification performed only if their vehicles will be operated in cold weather for an extended period.

The SSC and Customer Satisfaction

Throughout this Special Service Campaign, please make every effort to ensure a positive experience for each and every Lexus owner. This situation provides us all an opportunity to demonstrate Lexus' commitment to customer satisfaction. Please be sure our customers realize that we are genuinely interested in resolving this matter in a timely fashion.

Special Service Campaign

Determine Your Demand

This Special Service Campaign only applies to 1997 ES 300s within the VIN range shown below. No other vehicles before or after this range are to be repaired under the provisions of this SSC.

Model	Model Year	VDS	Involved VIN Range
ES 300	97	BF22G	V0001075–V0046672

NOTE: Canadian vehicles falling within this VIN range qualify under the same guidelines.The enclosed SSC summary report lists vehicles sold by your dealership.

The enclosed SSC summary report lists vehicles sold by your dealership.

From this list, determine the actual number of customers who should come back to your dealership for the Special Service Campaign.

Manpower and Facility Requirements

When reviewing your dealership's manpower and facility requirements for this Special Service Campaign, there are several items you need to consider.

- The repair time to replace the brake vacuum hose is 0.3 hours per vehicle.
- Fill the vehicle's gas tank with premium unleaded fuel.
- Wash the vehicle after the repair is completed.

Replacing the brake vacuum hose, filling the vehicle with fuel, and washing the vehicle should take approximately 45 minutes to one hour. Lexus will reimburse you via a warranty claim. You will be credited with 0.3 hours for replacing the brake vacuum hose, $23.52[1] for refueling the vehicle, and $26.50 for washing the vehicle and for campaign administration. See Work Order Closing/Claim Submission for the correct operation code.

[1]Based on the 1998 Full Tank Fuel Program for pre–delivery of the ES 300.

It is important that every effort be made to minimize the impact that this Special Service Campaign has on your other service customers. Estimate the number of SSC–related repairs your service department will perform, and then take the following actions to ensure adequate service capacity:

- Determine if you have sufficient manpower and facility space to process the number of involved vehicles for your dealership.
- Determine if you need to provide extended service hours (a second shift and/or Saturday appointments) to accommodate the number of vehicles to be serviced.

Tools and Equipment

Performance of this campaign can be accomplished with standard tools. No Lexus Special Service Tools are required.

Technical Training

- Along with this booklet, your dealership was sent a video tape copy of the repair procedures to help with training and for future reference.
- We recommend that key customer contact personnel such as the Sales Manager and General Manager view this video tape to better understand the nature of this Special Service Campaign.
- We also recommend that one person at your dealership be designated as the campaign coordinator. All inquiries about this campaign should be directed to this person to avoid dissemination of incorrect or inappropriate information.
- Your District Service and Parts Manager or District Sales Manager will follow up to answer your questions and to monitor the progress of the campaign.

Special Service Campaign

Parts Availability/ Ordering

Part Number	Part Name	Qty Per Vehicle
44773–33040	Hose, union to check valve	One

- This part number is not shared with Toyota vehicles.
- All dealers will have a quantity of these hoses installed on their DEALER STOCKING GUIDE (D.S.G.). This will ensure automatic ordering to your facing Parts Distribution Center (P.D.C.) when you sell or obligate inventory. The quantities assigned will be based upon the number of vehicles at your dealership requiring the campaign.
- There is sufficient inventory in the P.D.C. to complete this campaign. You are encouraged to order only those parts you'll need to repair the vehicles with service appointments. Individual dealer tracking will be made and irregularities in quantity ordering will be passed on to the Lexus Area Offices for their follow–up and correction.

TDN System

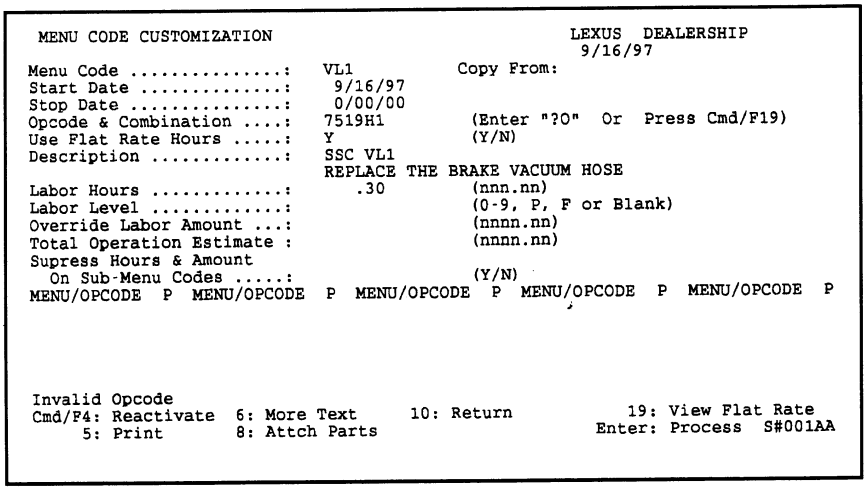
The following steps must be taken to prepare your TDN system for processing the SSC claims.

- The labor operation code has been transmitted to your dealership. If you have not received this code, call the TDN hotline (800–421–8154).
- Create a menu code using the new labor operation code established for this SSC.

Lexus ES 300

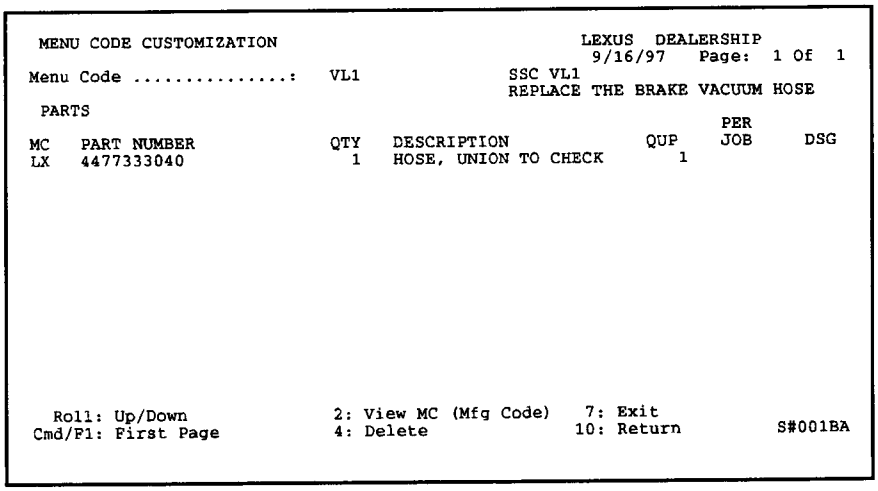
Menu Code: VL1
Labor Op. Code: 7519H1

Menu Option SC–2



Attach part numbers to Menu Code VL1

Command SC–8



Special Service Campaign

Planning Your Communication Strategy

It is important that you develop a strategy to communicate effectively. The following are some general statements that can be used when explaining the Special Service Campaign to customers.

Q1. What is the condition?
A1. If the affected vehicles are driven in extremely cold climates (below –18°F) for an extended period, vehicles may encounter a condition where frozen moisture accumulates in the brake vacuum hose. This can result in the elimination of vacuum assist that may cause an increase in stopping distances.

Q2. What is the cause of this condition?
A2. When vehicles are driven at extremely cold temperatures (below –18°F) without frequent brake application, it is possible for moisture to enter the brake vacuum hose from engine surge tanks and freeze. If extremely cold temperatures persist for many days, the amount of frozen moisture will increase. In the worst case, this may result in the brake vacuum hose being obstructed by ice.

Q3. Which and how many vehicles are involved?
A3. 1997 model year Avalon produced between 7/23/96 and 2/11/97, 1997 model year Camry V6 produced between 7/29/96 and 2/11/97, and 1997 model year ES300 produced between 8/19/96 and 2/10/97. There are approximately 5,191 Lexus vehicles affected in the 19 cold states of the United States.

Q4. Which are the 19 affected cold States?
A4. Alaska, Colorado, Idaho, Illinois, Iowa, Kansas, Maine, Michigan, Minnesota, Montana, Nebraska, Nevada, New Hampshire, New York, North Dakota, South Dakota, Vermont, Wisconsin, and Wyoming.

Lexus ES 300

Q5. Isn't it necessary to recall the vehicles driven in States other than the 19 identified States in the U.S.?

A5. This problem occurs only under such extreme severe weather conditions where very cold temperatures remain for many days. Therefore, the subject areas have been defined to be where this very cold temperature lasts for long periods. However, if customers living in other States want the recall, they will be advised to bring their vehicle to a Lexus dealer and have the brake vacuum hose replaced.

Q6. Why are you limiting the production range?

A6. On production vehicles after 2/11/97, the brake vacuum hose and routing of the hose are different, and moisture does not accumulate.

Q7. Why did it take over eight months to announce a recall?

A7. Since the problem only occurs under extreme cold conditions, it took a long time to duplicate the problem, understand the issue and confirm a corrective measure.

Q8. Will all the involved vehicles experience this condition?

A8. No. This condition will only be experienced under extreme weather conditions where cold temperatures remain for a long period of time. Therefore, almost none of the involved vehicles will develop this condition.

Q9. Do any other models experience same condition?

A9. No. There are no other models affected by this condition.

Q10. How many cases have been reported?

A10. Three cases have been reported in Canada, none in the United States.

Special Service Campaign

Q11. Are there any accidents reported?
A11. No.

Q12. What is Lexus going to do?
A12. Owners of involved vehicles will receive a Recall notification during October, 1997. Lexus dealers will modify the vehicles with a new design brake vacuum hose. This modification will be performed at no cost to the vehicle owners.

Q13. What should owners of involved vehicles do?
A13. Owners who receive the notification should contact any authorized Lexus dealer and make an appointment to have the new design brake vacuum hose installed.

Q14. How long will the repair take?
A14. It will take approximately 15 minutes, however, washing and refueling each vehicle will add additional time.

Q15. Do we have parts?
A15. Yes, we have 6,200 in inventory.

You will have two general types of communications with customers concerning this Special Service Campaign:

- Calls to Your Customers
  These are ES 300 customers that your dealership will be calling.
  - ES300 owners involved in the SSC.
    You may want to use the list provided in this package to begin calling your customers as soon as your preparations are completed.
  - ES300 owners not involved.
    Assure any customers with vehicles outside of the involved VIN range that this repair is not needed.

- Calls from Your Customers
  It is important to institute a system to respond to customers calling your dealership for more information regarding the SSC. We recommend designating an individual or individuals to answer these inquiries to assure that callers get accurate, consistent information.

Calls from the Media

We ask that you refer *any* calls from the media or government agencies directly to Lexus headquarters in Torrance. The contact person is:

- Mike Michels, Lexus Public Relations Manager
  (310) 781–3282

Service Loaners

Ease of servicing is a critical aspect of the customer's perception of how well the SSC is handled. It is extremely important that every effort be made to conduct the SSC with minimal inconvenience to the customer.

- After determining the number of vehicles per day you will be scheduling, verify that you have an adequate supply of service loaners available for customers.
- Because of the relatively short amount of time it takes to complete the service, you may want to develop a while–you–wait–program. (Note: You need to ensure a sufficient supply of parts is readily available.)

It is important to recognize that customers must know how long they will be required to wait. Every effort must be made to have the vehicle finished when promised.

- Consider a pick–up and delivery service at the customer's home or place of business.

Special Service Campaign

Contacting Customers

- Check each vehicle's service history before you contact the customer to see if any routine maintenance services are needed. Coordinating routine maintenance along with this SSC will minimize the customer's perception of being inconvenienced.
- Begin contacting the customers on your SSC lists to schedule appointments and reserve parts using the TDN system.
- Make sure you schedule appointments to coincide with the receipt of all necessary parts.

Remote Area Service Plan

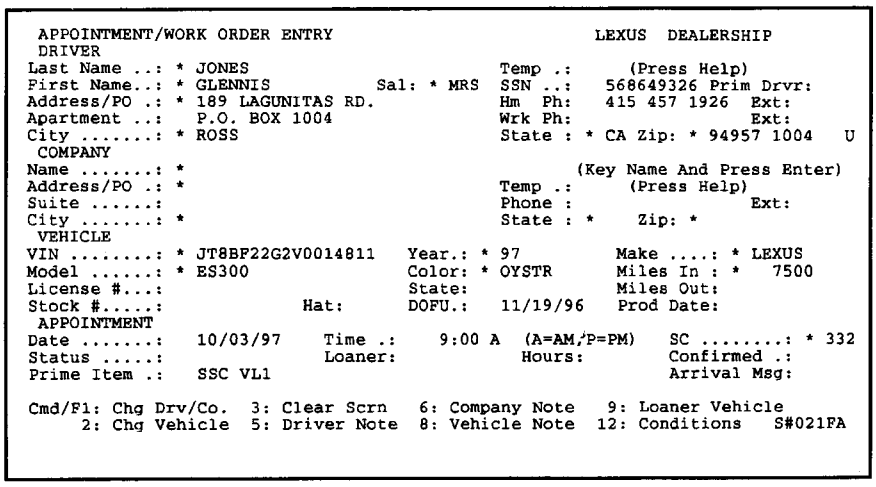
- "Remote" is defined as those distances where a customer is 75 or more miles from the nearest Lexus dealership.
- Your DSPM will work with you to develop an action plan. Alternatives include:
    - Pick–up and re–delivery of remotely located vehicles.
    - Personnel performing repairs at remote locations (i.e., customer's home or place of business).

  NOTE: Repairs at independent shops will not be necessary under this campaign.
- Guidelines to be used in performing remote repairs are:
    - If the customer is 75–200 miles from the nearest Lexus dealership, the closest Lexus dealership will perform the repair provided that prior authorization for related expenses has been approved by the DSPM.
    - If the customer is more than 200 miles from the nearest Lexus dealership, Lexus area associates or, if needed, Lexus national associates will perform the repair.
- Each situation will be handled on a case–by–case basis.
- Lexus will pay for authorized costs that have been approved by the DSPM or area office.

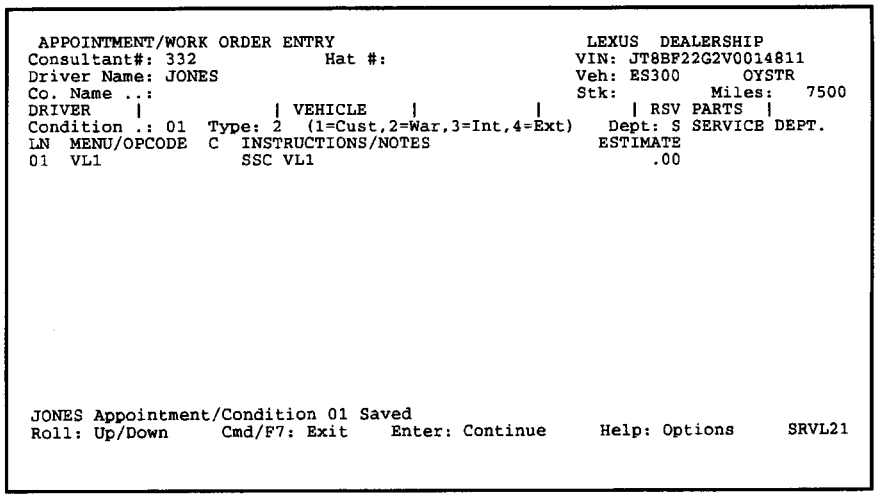
Lexus ES 300

CREATE APPOINTMENT

SI–1



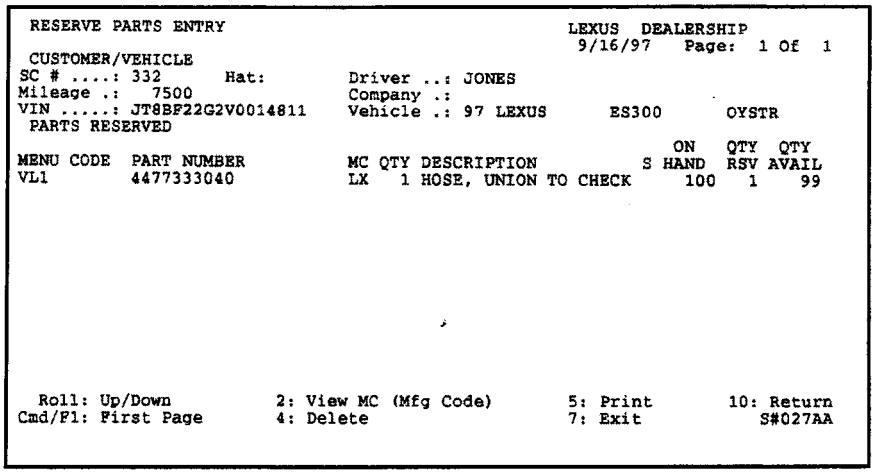
SI–1
CMD–12



Special Service Campaign

RESERVE PARTS

SI–1
CMD–23



The Write–Up Listed below are some general guidelines to use when the customer arrives at your dealership for the Special Service Campaign:

- Explain that the complete service will take about 45 minutes to one hour.
- Explain the type of repair involved.
- If the customer does not have an SSC notice:
    - Check the VIN against the National Service History File to see if the vehicle has been previously repaired under this campaign.
    - Check the left front door hinge post for an SSC completion label.
    - If there is no label, check the VIN against the SSC list.
    - If the vehicle is eligible, explain the campaign to the customer. Describe the procedure and the amount of time needed for the repair.
- If the customer has an appointment, pull up the work order, otherwise, create a work order reflecting the need to complete the SSC VL1 repair.
- Issue the work order to the technician and include job instructions for the SSC.

Lexus ES 300

Preparing for the Delivery After SSC Completion

- Wash/clean each vehicle inside and out.
- Fill the gas tank with premium unleaded fuel. This cost will be charged as an SSC expense.
- Notify the customer of completion.

Delivery of the Vehicle After SSC Completion

The delivery of the vehicle is a very important part of ensuring a high level of customer satisfaction.

- Explain all SSC repairs to the customer.
- Explain any additional service and/or maintenance work that was performed and any related charges.
- Thank the customer for his or her time and continued patronage. Also apologize for the inconvenience.

Follow–Up

100% after–service follow–up is critical to ensure complete customer satisfaction with the repairs performed and the service provided.

Work Order Closing/Claim Submission

The following information explains the policies and procedures for preparation and submission of a warranty claim for reimbursement of a repair performed under SSC VL1.

Operation Code	Description	Labor Hours
7519H1	Replace brake vacuum hose	0.3 hr./vehicle

NOTE: Lexus warranty will only accept one claim per vehicle under the terms of this Special Service Campaign. Please ensure that your dealership checks the National History File to see if the vehicle has been repaired under this campaign prior to servicing the vehicle.

Recap of Claims Submission and General Provisions of the SSC

- Lexus will pay for gas tank fill–up.
- Lexus will pay for costs associated with remote repairs, remote pick–up and delivery, and loaner cars—with DSPM authorization only.

Special Service Campaign

Claiming Reimbursement for Special Services

You must use sublet to claim any special services required in conjunction with the special service campaign repair.

- Issue “GA” (Gas Tank Fill–up)
  - Applicable to every vehicle.
  - Amount claimed is $23.52.
- Issue “CW” (Car Wash/Administration Time)
  - Applicable to every vehicle.
  - Amount claimed is $26.50.
- Issue “RT” (Rental Car)
  - Applicable only under extenuating circumstances.
  - Must be authorized by a DSPM.
- Issue “DE” (Pick–up and Delivery/Remote Repair)
  - Applicable only under special circumstances (e.g., more than 75 miles from the nearest Lexus dealer).
  - Claimed at actual dealer cost.
  - Applicable only under special circumstances (e.g., more than 75 miles from the nearest Lexus dealer).
  - Claimed at actual dealer cost.
  - DSPM authorization is always required for this expense.

TDN Claim Preparation Instructions

NOTE: Each sublet must be a separate entry with:

- Unique Invoice Number
- Description
- Sublet Type
- $ Amount

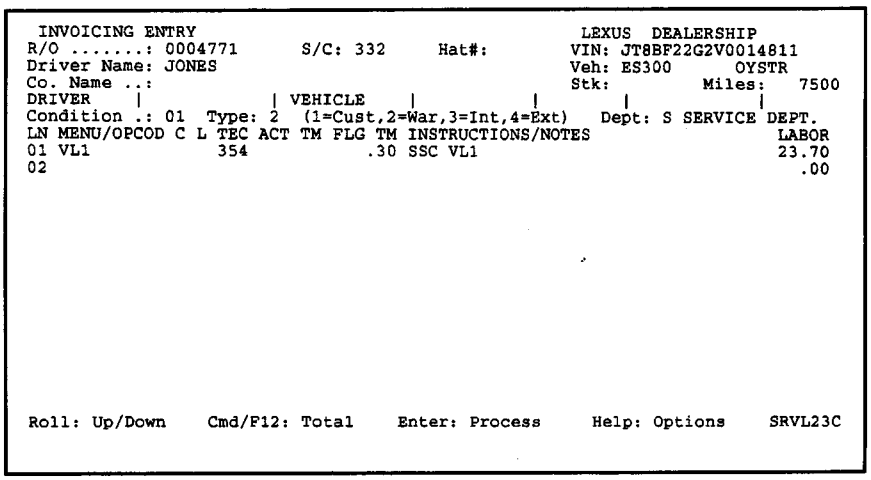
In Repair Order Management, select claim type “SC” (Special Service Campaign).

Lexus ES 300

INVOICING

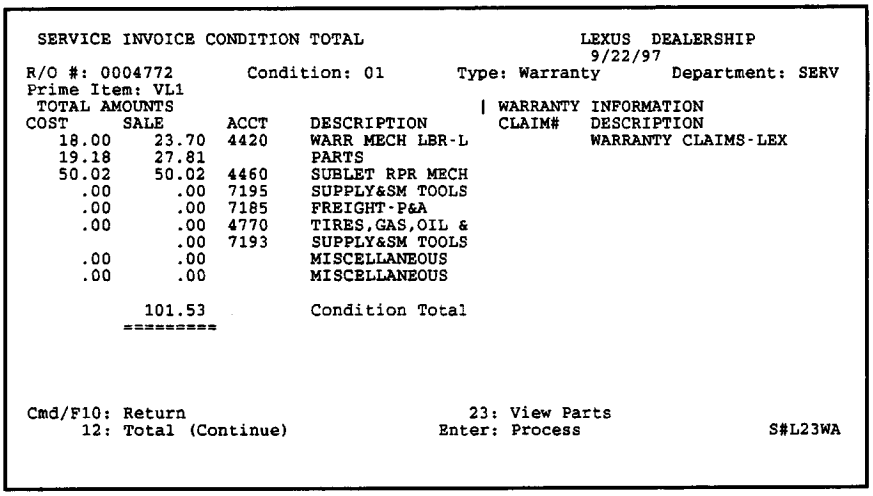
Create Invoice

SI–3



Condition Total

SI–3
CMD–12

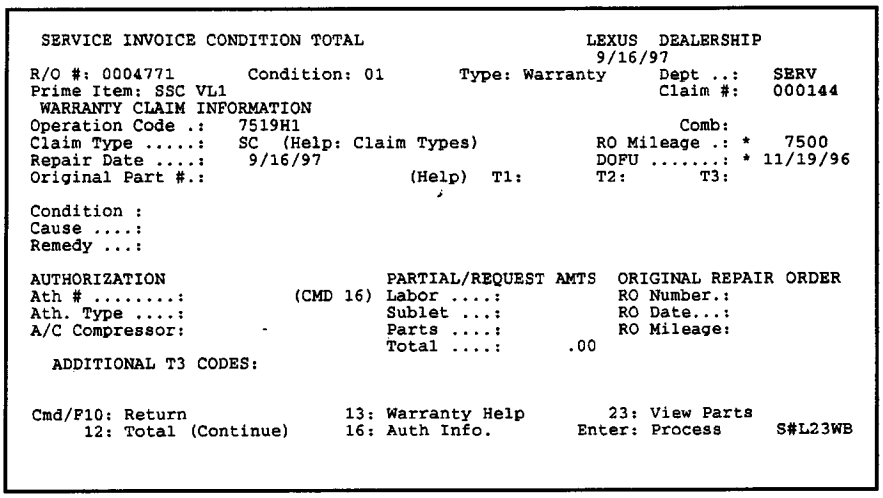


Special Service Campaign

INVOICING

Claim Information

SI–3
CMD–12



Lexus ES 300

SUBLET INFORMATION – Example of Transportation Costs to Make Remote Repairs

Condition Total

SI–3
CMD–22 (from Condition screen)

```
 INVOICING ENTRY                                          LEXUS  DEALERSHIP
R/O .......: 0004771      S/C: 332     Hat#:          VIN: JT8BF22G2V0014811
                FLUIDS
  DESCRIPTION     UNITS COST    SALE
  OIL 5-30          .00     .00     .00
  OIL 20-50         .00     .00     .00
  DIFF FLUID80-90   .00     .00     .00
  DEXTRON III       .00     .00     .00
  MISC CHARGE       .00     .00     .00
  TIRE TAX          .00     .00     .00
          SUBLET REPAIRS FOR R/O# 0004771  -  CONDITION 01
  P.O. # INVOICE #  TYPE VENDOR/DESCRIPTION       COST        % SALE
  23454  23454       DE  TRANSPORTATION COSTS      125.00       125.00
                         TO SEND TECH
                                                     .00          .00
                                                     .00          .00
                                                     .00          .00
                                                     .00          .00

 Cmd/F2: View Sublet Types  6: Move Fluid  8: Move Sublet  10: Return  S#023BA
```

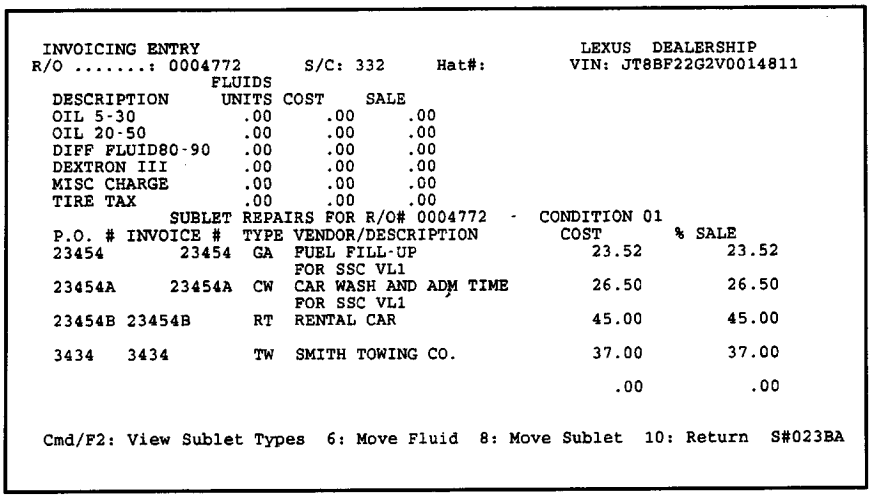
SI–3
CMD–12

```
 SERVICE INVOICE CONDITION TOTAL                          LEXUS  DEALERSHIP
                                                           9/22/97
R/O #: 0004772       Condition: 01       Type: Warranty       Department: SERV
Prime Item: VL1
 TOTAL AMOUNTS                                | WARRANTY INFORMATION
COST     SALE      ACCT    DESCRIPTION        CLAIM#   DESCRIPTION
  18.00    23.70  4420    WARR MECH LBR-L              WARRANTY CLAIMS-LEX
  19.18    27.81           PARTS
 125.00   125.00  4460    SUBLET RPR MECH
    .00      .00  7195    SUPPLY&SM TOOLS
    .00      .00  7185    FREIGHT-P&A
    .00      .00  4770    TIRES,GAS,OIL &
               .00  7193    SUPPLY&SM TOOLS
    .00      .00           MISCELLANEOUS
    .00      .00           MISCELLANEOUS

         176.51            Condition Total
        =========


Cmd/F10: Return                          23: View Parts
     12: Total (Continue)              Enter: Process                  S#L23WA
```

Special Service Campaign

SUBLET INFORMATION – Example of Remote Area Service

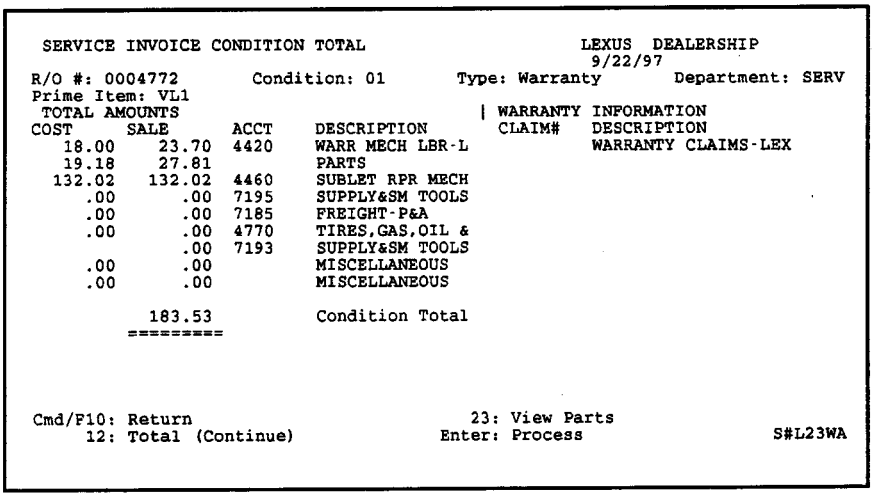
SI–3
CMD–22
(from Condition screen)



```
 INVOICING ENTRY                                          LEXUS  DEALERSHIP
R/O .......: 0004772      S/C: 332     Hat#:          VIN: JT8BF22G2V0014811
                FLUIDS
  DESCRIPTION     UNITS COST    SALE
  OIL 5-30          .00     .00     .00
  OIL 20-50         .00     .00     .00
  DIFF FLUID80-90   .00     .00     .00
  DEXTRON III       .00     .00     .00
  MISC CHARGE       .00     .00     .00
  TIRE TAX          .00     .00     .00
          SUBLET REPAIRS FOR R/O# 0004772  -  CONDITION 01
  P.O. # INVOICE #  TYPE VENDOR/DESCRIPTION      COST       % SALE
  23454       23454  GA  FUEL FILL-UP              23.52        23.52
                         FOR SSC VL1
  23454A     23454A  CW  CAR WASH AND ADM TIME     26.50        26.50
                         FOR SSC VL1
  23454B 23454B      RT  RENTAL CAR                45.00        45.00

  3434   3434        TW  SMITH TOWING CO.          37.00        37.00

                                                     .00          .00

 Cmd/F2: View Sublet Types  6: Move Fluid  8: Move Sublet  10: Return  S#023BA
```

Condition Total

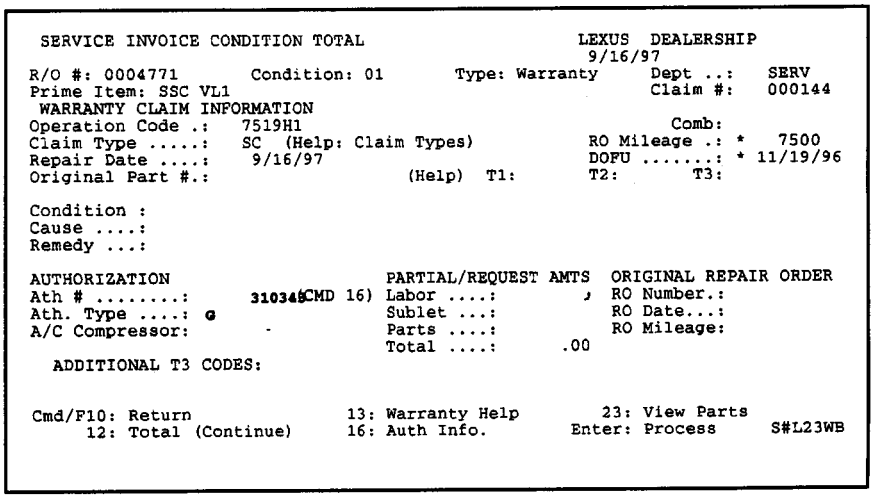
SI–3
CMD–12



```
 SERVICE INVOICE CONDITION TOTAL                          LEXUS  DEALERSHIP
                                                             9/22/97
R/O #: 0004772       Condition: 01       Type: Warranty       Department: SERV
Prime Item: VL1
 TOTAL AMOUNTS                              | WARRANTY INFORMATION
COST     SALE      ACCT    DESCRIPTION      CLAIM#   DESCRIPTION
   18.00    23.70  4420    WARR MECH LBR-L           WARRANTY CLAIMS-LEX
   19.18    27.81          PARTS
  132.02   132.02  4460    SUBLET RPR MECH
     .00      .00  7195    SUPPLY&SM TOOLS
     .00      .00  7185    FREIGHT-P&A
     .00      .00  4770    TIRES,GAS,OIL &
              .00  7193    SUPPLY&SM TOOLS
     .00      .00          MISCELLANEOUS
     .00      .00          MISCELLANEOUS

          183.53           Condition Total
         =========


Cmd/F10: Return                          23: View Parts
     12: Total (Continue)              Enter: Process                S#L23WA
```

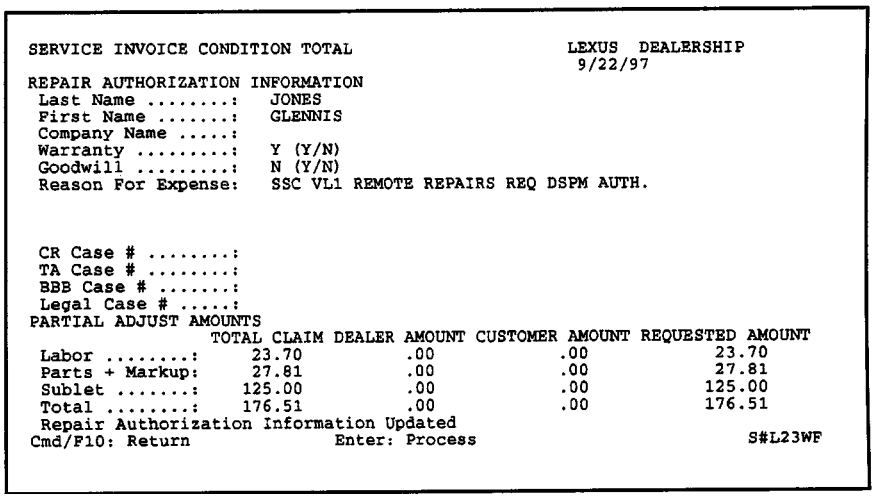
Lexus ES 300

WARRANTY INFORMATION SCREEN



```
 SERVICE INVOICE CONDITION TOTAL                        LEXUS  DEALERSHIP
                                                          9/16/97
R/O #: 0004771       Condition: 01       Type: Warranty      Dept ..:   SERV
Prime Item: SSC VL1                                          Claim #:   000144
 WARRANTY CLAIM INFORMATION
Operation Code .:   7519H1                                        Comb:
Claim Type .....:   SC  (Help: Claim Types)          RO Mileage .: *   7500
Repair Date ....:    9/16/97                         DOFU .......: * 11/19/96
Original Part #.:                    (Help)  T1:     T2:       T3:

Condition :
Cause ....:
Remedy ...:

AUTHORIZATION                      PARTIAL/REQUEST AMTS  ORIGINAL REPAIR ORDER
Ath # ........:      310345(CMD 16) Labor ....:         ,  RO Number.:
Ath. Type ....: G                   Sublet ...:            RO Date...:
A/C Compressor:       -             Parts ....:            RO Mileage:
                                    Total ....:      .00
  ADDITIONAL T3 CODES:

Cmd/F10: Return              13: Warranty Help        23: View Parts
     12: Total (Continue)    16: Auth Info.       Enter: Process     S#L23WB
```

NOTE: Authorization is required for expenses incurred for remote service or for pick–up and delivery in remote locations.

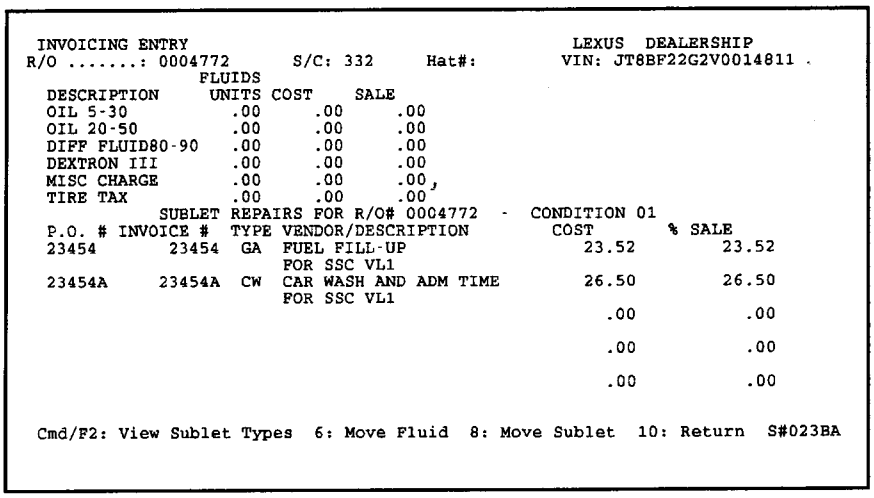


```
SERVICE INVOICE CONDITION TOTAL                        LEXUS  DEALERSHIP
                                                         9/22/97
REPAIR AUTHORIZATION INFORMATION
 Last Name ........:   JONES
 First Name .......:   GLENNIS
 Company Name .....:
 Warranty .........:   Y (Y/N)
 Goodwill .........:   N (Y/N)
 Reason For Expense:   SSC VL1 REMOTE REPAIRS REQ DSPM AUTH.


 CR Case # ........:
 TA Case # ........:
 BBB Case # .......:
 Legal Case # .....:
PARTIAL ADJUST AMOUNTS
                TOTAL CLAIM DEALER AMOUNT CUSTOMER AMOUNT REQUESTED AMOUNT
 Labor ........:     23.70          .00            .00             23.70
 Parts + Markup:     27.81          .00            .00             27.81
 Sublet .......:    125.00          .00            .00            125.00
 Total ........:    176.51          .00            .00            176.51
 Repair Authorization Information Updated
Cmd/F10: Return              Enter: Process                      S#L23WF
```

Special Service Campaign

REPAIR ORDER MANAGEMENT – Adding Fuel Costs

CW–1
CMD–22



```
 INVOICING ENTRY                                          LEXUS  DEALERSHIP
R/O .......: 0004772      S/C: 332     Hat#:             VIN: JT8BF22G2V0014811 .
                FLUIDS
  DESCRIPTION     UNITS COST    SALE
  OIL 5-30          .00     .00     .00
  OIL 20-50         .00     .00     .00
  DIFF FLUID80-90   .00     .00     .00
  DEXTRON III       .00     .00     .00
  MISC CHARGE       .00     .00     .00,
  TIRE TAX          .00     .00     .00
          SUBLET REPAIRS FOR R/O# 0004772  -  CONDITION 01
  P.O. # INVOICE #  TYPE VENDOR/DESCRIPTION      COST       % SALE
  23454       23454  GA  FUEL FILL-UP               23.52        23.52
                         FOR SSC VL1
  23454A      23454A CW  CAR WASH AND ADM TIME       26.50        26.50
                         FOR SSC VL1
                                                      .00          .00

                                                      .00          .00

                                                      .00          .00

 Cmd/F2: View Sublet Types  6: Move Fluid  8: Move Sublet  10: Return  S#023BA
```

Lexus ES 300

Paper Claim Submission

Please use the following instructions in the event that a paper claim must be submitted. The following claim instructions list required information, field by field, corresponding to the format of the Lexus Warranty Paper Claim Form. If information is not required for SSC claim submission, it will be noted.

Dealer Number: Enter the 5–digit number assigned to your dealership by Lexus.

Claim Number: Enter the 6–digit claim number that your dealership has assigned to the claim. The claim number must be unique. It must begin with the letter “A” followed by numeric characters.

Repair Order Number: Enter the repair order number from the invoice created at the time of the repair.

In–Service Date: Enter the date the vehicle was first put into service (enter in MM–DD–YY format).

Vehicle Identification Number: Enter the complete 17–digit VIN number from the vehicle that was repaired.

Repair Date: Enter the date the vehicle was repaired (MM–DD–YY format).

Repair Miles: Enter the vehicle mileage at the time of repair (do not enter tenths of a mile).

Original Part Number: Not required on an SSC Claim.

Operation Code: Enter operation code 7519H1 for this SSC.

Combination Code: Not allowed for this SSC.

Total Hours: Enter the total labor hours allowed for this SSC. (Total hours allowed is 0.3.)

Sublet Invoice Number: Enter only if a special service was provided to the customer as per the guidelines on the previous pages of this manual.

Special Service Campaign

Sublet Type: Enter the 2–digit sublet–type code only if a special service was provided to the customer as per the guidelines on the previous pages of this manual.

Sublet Description: Enter a brief description of the sublet only if a special service was provided to the customer as per the guidelines on the previous pages of this manual.

T–1 Code: Not required for an SSC claim.
T–2 Code: Not required for an SSC claim.
T–3 Codes: Not required for an SSC claim.

Replacement Part Number: Enter the part number for the brake vacuum hose (44773–33040).

Replacement Parts Quantity: Enter “1” in this field.

Original R.O./Installed Date/Installed Miles: Not required for an SSC claim.

Authorization Number: Enter an authorization number if authorization is required as per the guidelines on the previous pages of this manual.

Authorization Type: Enter authorization type “G” only if an authorization number has also been entered and is required as per the guidelines on the previous pages of this manual.

Labor Amount: Enter the total dollar amount to be claimed for the labor portion of the repair. This figure is calculated as the dealer’s authorized warranty labor rate multiplied by the allowable labor hours for the repair performed.

Sublet Amount: Enter the total dollar amount to be claimed for the sublet. Paper claims only allow one sublet code entry. Therefore, enter notation “Car Wash” and “Administration” separately.

Parts Amount: Enter the total dollar amount to be claimed for the replacement part. This figure is calculated as the dealer cost of the part replaced.

Parts Mark–up: Enter the total dollar amount to be claimed for parts mark–up. This figure is calculated as the total parts amount claimed multiplied by 45%.

Claim Total: Enter the total amount to be claimed for the repair. This figure is calculated as the total of labor, sublet, parts, and parts mark–up.

Battery Ship Code/Cell Readings: Not used at this time. Partial Adj. Labor/Sublet/Parts: Not required for an SSC claim.

Condition/Cause/Remedy: Enter a description of the repair and the conditions requiring use of the “Pick–up and Delivery” or “Remote Repair” special services. If a C/C/R is entered, something must be written in all three lines of the field.

Special Service Campaign

Brake Vacuum Hose Replacement

LEXUS

WARRANTY CLAIM

DEALER NO.	CLAIM NO.
61234	A12525

R.O. NUMBER	SERVICE DATE	VEHICLE IDENTIFICATION NUMBER	REPAIR DATE	REPAIR MILEAGE	ORIGINAL PART NUMBER
0312525	11/19/96	JT8BF22G2V0014811	10-16-97	7501	

OPERATION NO.	COMBINATION CODES	TOTAL HOURS	INVOICE NUMBER	TYPE	DESCRIPTION
7519H1		0.3	76031	GA	Fuel Fill Up

T1	T2	T3

NON-ACCIDENT PART NO.	QUAN.	REPLACEMENT PART NO.	QUAN.	REPLACEMENT PART NO.	QUAN.

ORIG. R.O. NO.	PART. DATE	PART. MILES	AUTHORIZATION NO.	AUTH. TYPE

BATTERY SHIP CODE ____ ____

CELL READINGS

____ ____ ____ ____ ____ ____

LABOR	
SUBLETS	
PARTS	

	DEALER AMOUNTS
LABOR	19.50
SUBLET	50.02
PARTS	19.18
PARTS MARK-UP	8.63
CLAIM TOTAL	97.33

CONDITION:

CAUSE:

REMEDY:

DEALER SIGNATURE K. E. Trawly DATE 10-17-97

89-LEX-250

5M 00240-30007 9/89

Lexus ES 300

SAFETY RECALL NOTICE - VL1
Lexus ES300 - USA: Recall States

Dear Lexus Owner:

This notice is being sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act. Lexus has decided that a defect which relates to motor vehicle safety exists in certain 1997 model year ES300 vehicles. If your vehicle is used in extremely cold climates for an extended period, a condition may be encountered where accumulated moisture may temporarily freeze in the brake vacuum hose. This will eliminate vacuum assist to the brakes, possibly leading to increased stopping distances. This could result in an accident.

What is the problem?

When these vehicles are driven at extremely cold temperatures without frequent brake application, it is possible for moisture to enter the brake vacuum hose from engine surge tanks and freeze. If extremely cold temperatures exist for many days, the amount of frozen moisture will increase. In the worst case, this may result in a brake vacuum hose blocked by ice. This will eliminate vacuum assist to the brakes, possibly leading to increased stopping distances. This could result in an accident.

What will Lexus do?

Any Lexus dealer will install a new design brake vacuum hose to prevent this condition at NO COST to you.

What Should You Do?

Contact any authorized Lexus dealer and make an appointment to have a new design brake vacuum hose installed as soon as possible.

The labor time for installation of the new design brake vacuum hose is approximately 15 minutes. However, depending upon the dealer's work schedule, it may be necessary to make your vehicle available for a longer period of time.

Please present this notice to the dealer when you bring the vehicle in for the repair.

If you no longer own the vehicle, please indicate so on the enclosed postage-paid form, providing us with the name and address of the new owner.

What if you have other questions?

Please contact any Lexus dealer or call:

Lexus Customer Satisfaction Department at
1-800-25-LEXUS (1-800-255-3987)

If you believe that the dealer or Lexus has failed or is unable to remedy the defect within a reasonable time, you may submit a complaint to the Administrator, National Highway Traffic Safety Administration, 400 Seventh Street S.W., Washington, D.C. 20590, or call the toll free Auto Safety Hot Line at 800-424-9393 (Washington, D.C. area residents may call 366-0123).

We have sent this notice in the interest of your continued satisfaction with our products and we sincerely regret any inconvenience this condition may have caused you.

Thank you for driving a Lexus.
Sincerely,

LEXUS DIVISION
Toyota Motor Sales, U.S.A., Inc.

Special Service Campaign

PRODUCT UPDATE NOTICE - VL1
Lexus ES300 - USA: Non-Recall States

Dear Lexus Owner:

This notice is being sent to advise you that Lexus is conducting a recall on 1997 model year ES300 vehicles in the following 19 States of the U.S.

Alaska	Michigan	North Dakota
Colorado	Minnesota	South Dakota
Idaho	Montana	Vermont
Illinois	Nebraska	Wisconsin
Iowa	Nevada	Wyoming
Kansas	New Hampshire	
Maine	New York	

What is the problem?

When these vehicles are driven at extremely cold temperatures without frequent brake application, it is possible for moisture to enter the brake vacuum hose from engine surge tanks and freeze. If extremely cold temperatures exist for many days, the amount of frozen moisture will increase. In the worst case, this may result in a brake vacuum hose blocked by ice. This will eliminate vacuum assist to the brakes, possibly leading to increased stopping distances. This could result in an accident.

What Should You Do?

If you believe that there is a possibility for your vehicle to be operated under the conditions described above, please contact any authorized Lexus dealer and make an appointment to have a new design brake vacuum hose installed.

The labor time for installation of the new design brake vacuum hose is approximately 15 minutes. However, depending upon the dealer's work schedule, it may be necessary to make your vehicle available for a longer period of time.

Please present this notice to the dealer when you bring the vehicle in for the repair.

If you no longer own the vehicle, please indicate so on the enclosed postage-paid form, providing us with the name and address of the new owner.

What if you have other questions?

Please contact any Lexus dealer or call:

Lexus Customer Satisfaction Department at
1-800-25-LEXUS (1-800-255-3987)

We have sent this notice in the interest of your continued satisfaction with our products and we sincerely regret any inconvenience this condition may have caused you.

Thank you for driving a Lexus.
Sincerely,

LEXUS DIVISION
Tovota Motor Sales. U.S.A., Inc.

Technical Instructions
Table of Contents

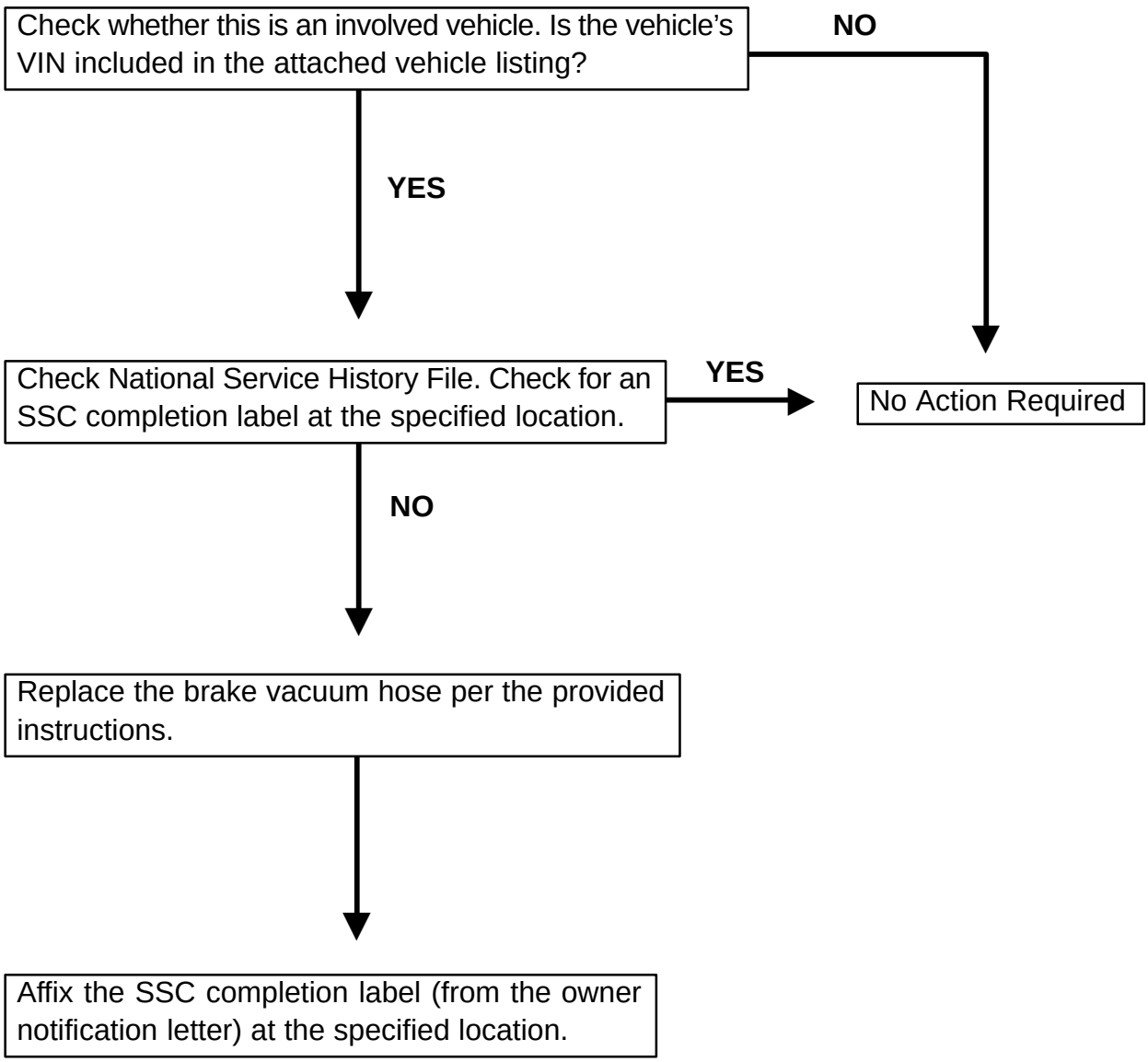
REPAIR PROCEDURES FLOW CHART 29

VIN LOCATION 30

BRAKE VACUUM HOSE REPLACEMENT PROCEDURE . . 32

SSC COMPLETION LABEL INSTALLATION 34

Repair Procedures Flow Chart



VIN Location

1. Check the Vehicle Identification Number (VIN).

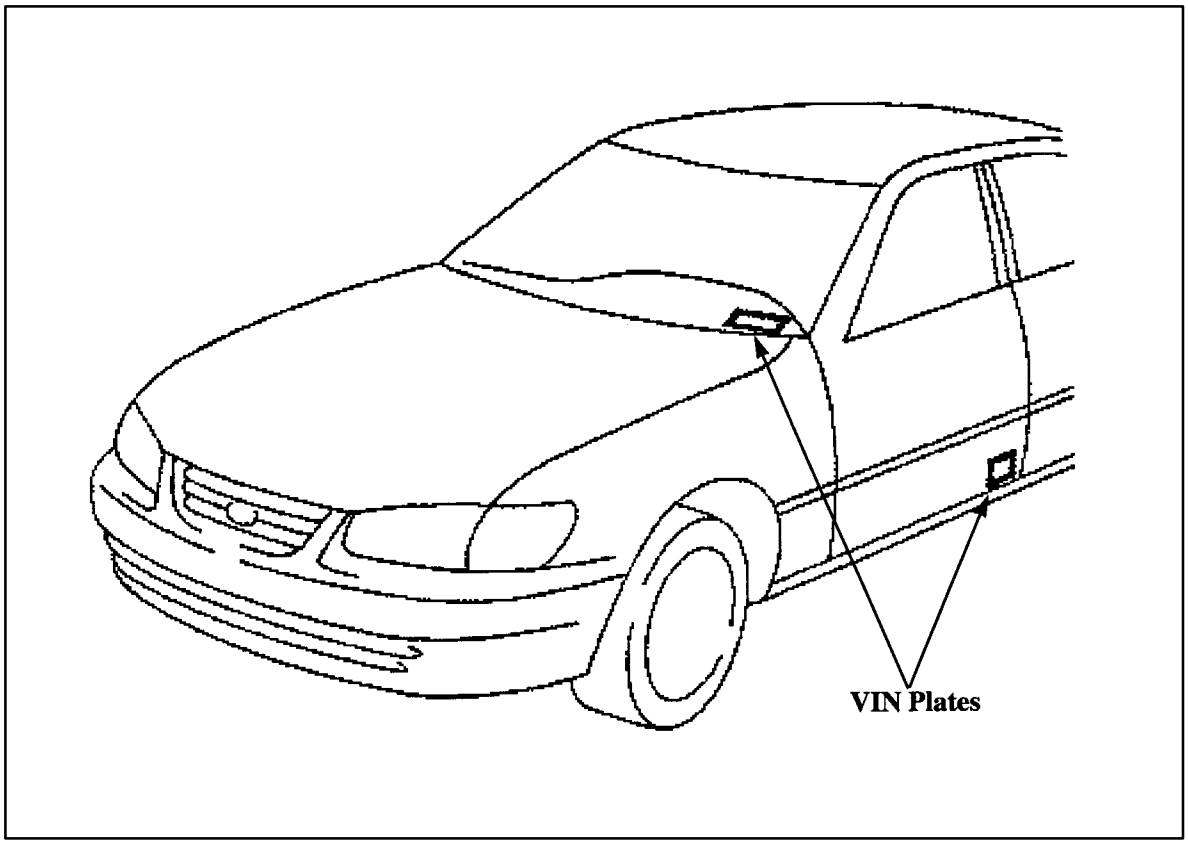
   (a) Locate one of the Vehicle Identification Number (VIN) plates.

   (b) Are the last eight digits within the following range: V0001075 – V00046672

NOTE: ES 300s with VINs V5000001 and up are NOT included in this campaign.

NO: Assure the customer that the brake vacuum hose on his or her ES 300 is okay and is not involved in the SSC. No further action is necessary.

YES: Check for an SSC–VL1 Completion Label affixed to the left door hinge post near the door check.

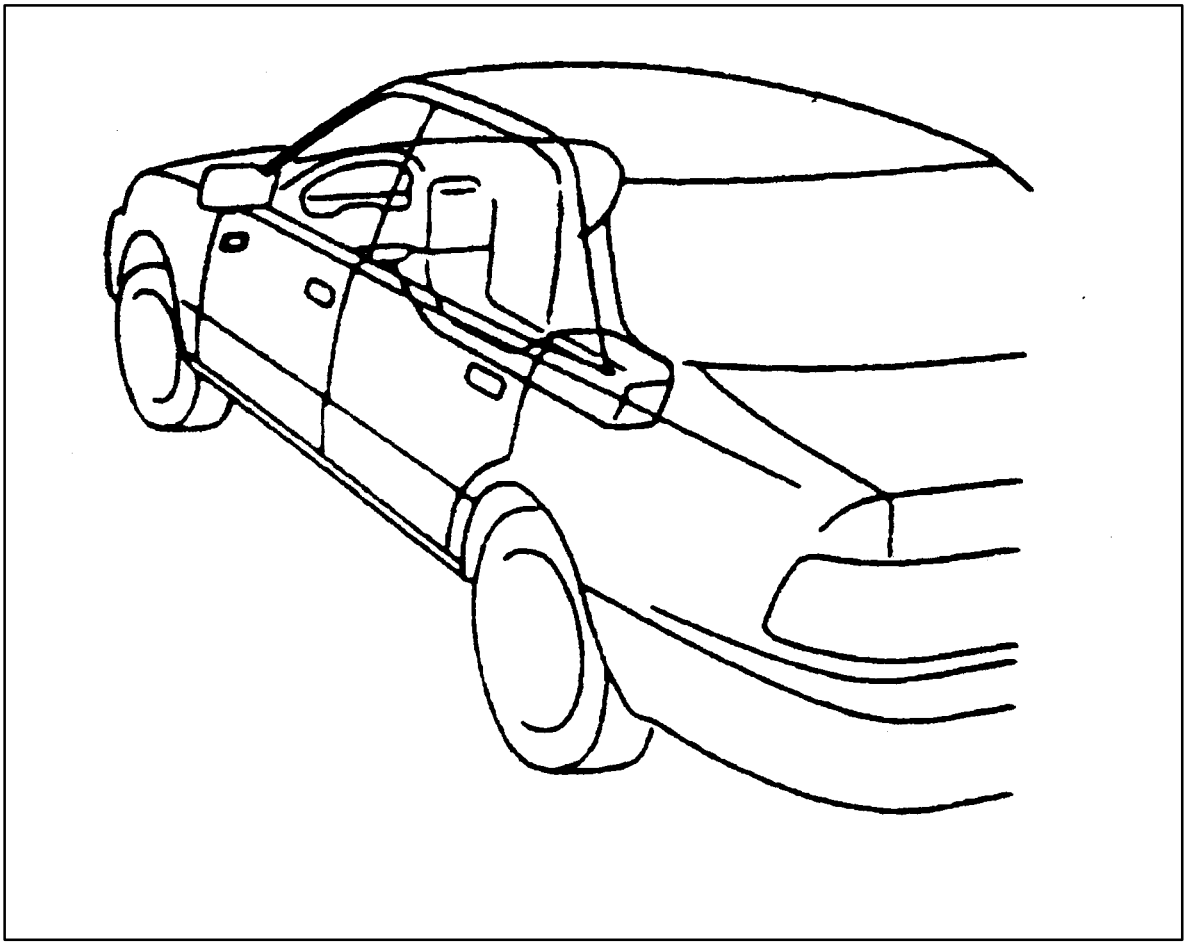


VIN Location

2. Is an SSC VL1 Completion Label present?

YES: The Special Service Campaign has already been performed on the vehicle. No further action is necessary.

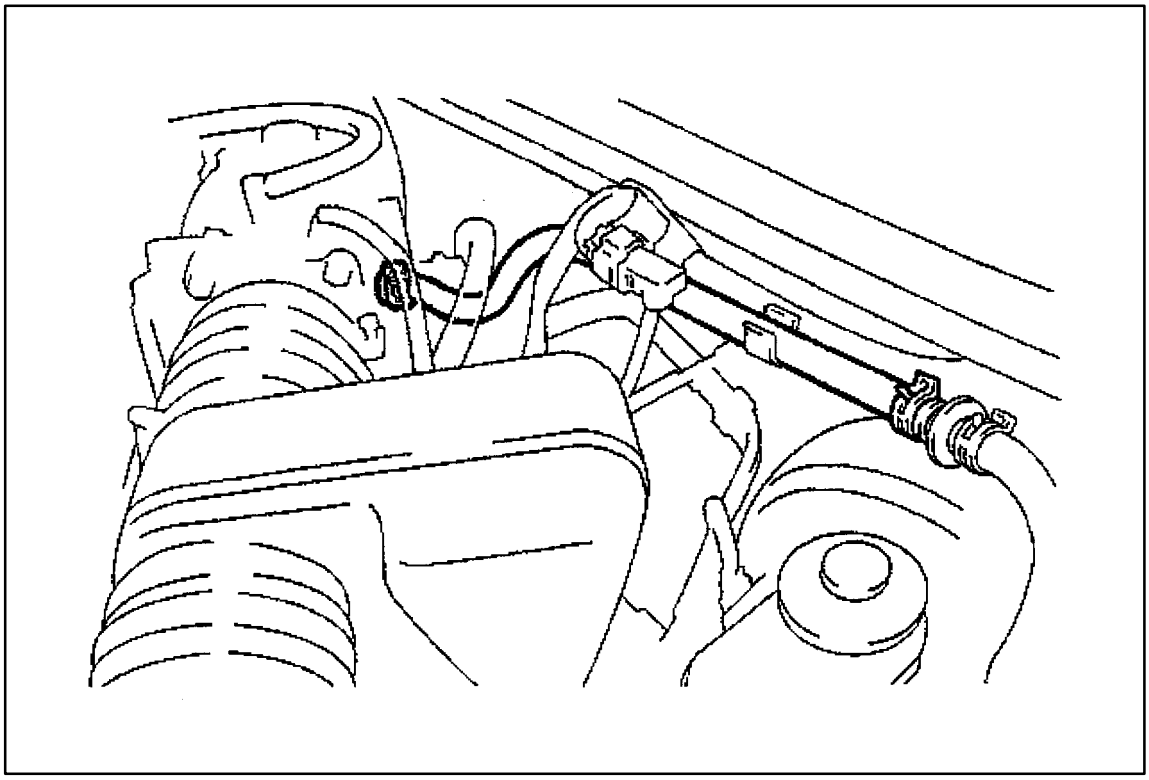
NO: Continue with SSC VL1 as outlined on the following pages.



Brake Vacuum Hose Replacement Procedure

REMOVAL

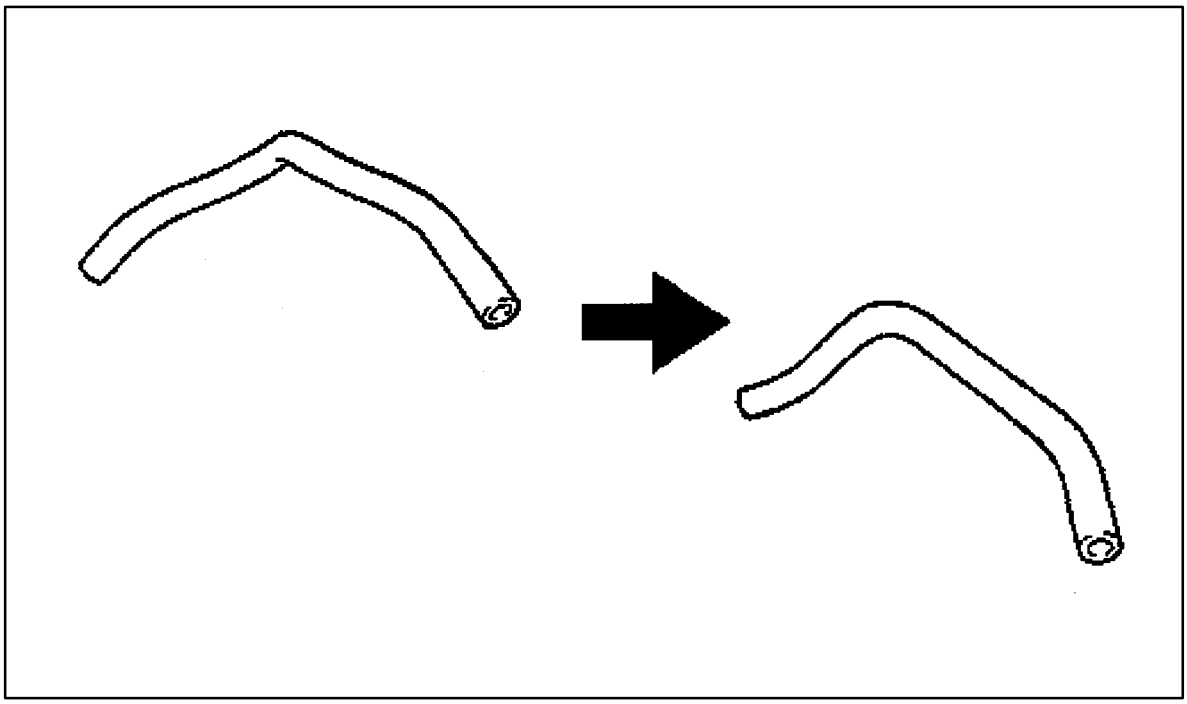
1. Use pliers to slide the 2 vacuum hose clamps off the fittings at the plenum union and at the check valve.
2. Remove the vacuum hose from the clamp on the firewall.
3. Disconnect the vacuum hose from the plenum and check valve. Remove the hose from the vehicle.
4. Remove the 2 hose clamps from the old brake vacuum hose, and discard the old hose.



Brake Vacuum Hose Replacement Procedure

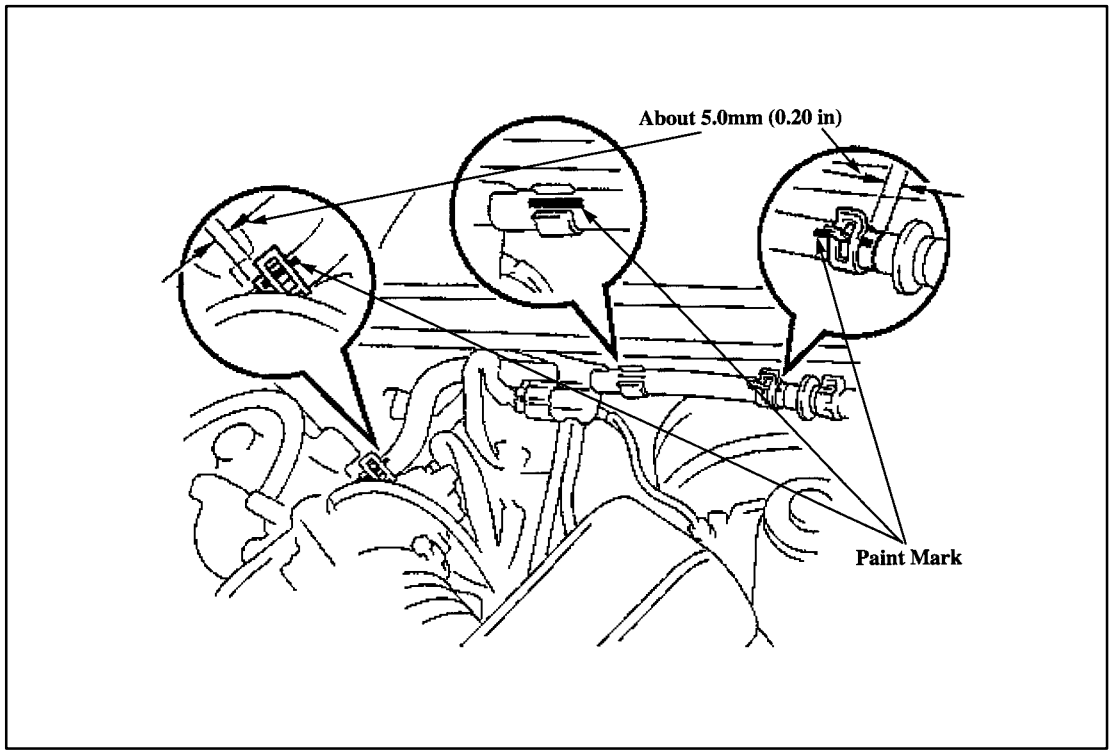
INSTALLATION

1. Obtain the new brake vacuum hose, part number 44773–33040.
2. Slide the 2 hose clamps onto the ends of the new hose.



Brake Vacuum Hose Replacement Procedure

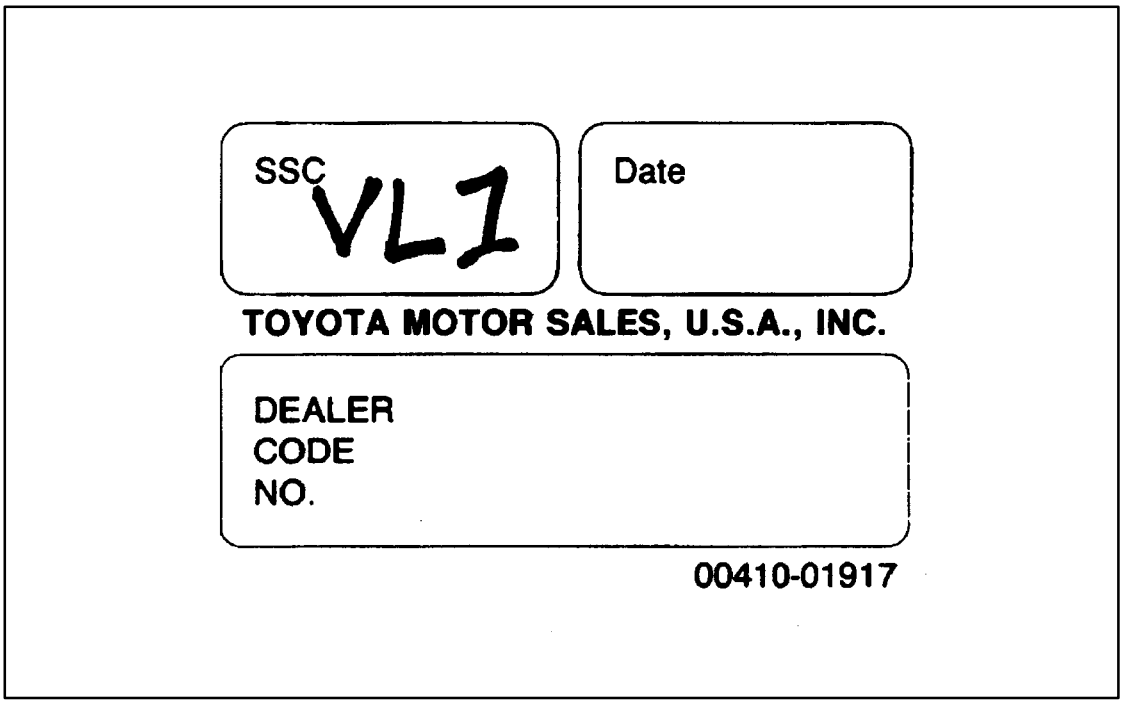
3. Connect the vacuum hose to the plenum and to the check valve. Install the vacuum hose so the paint marks face upward as shown in the illustration.
4. Press the vacuum hose into place in the clamp on the firewall.
5. Slide a hose clamp over the plenum union fitting and over the check valve fitting.



SSC Completion Label Installation

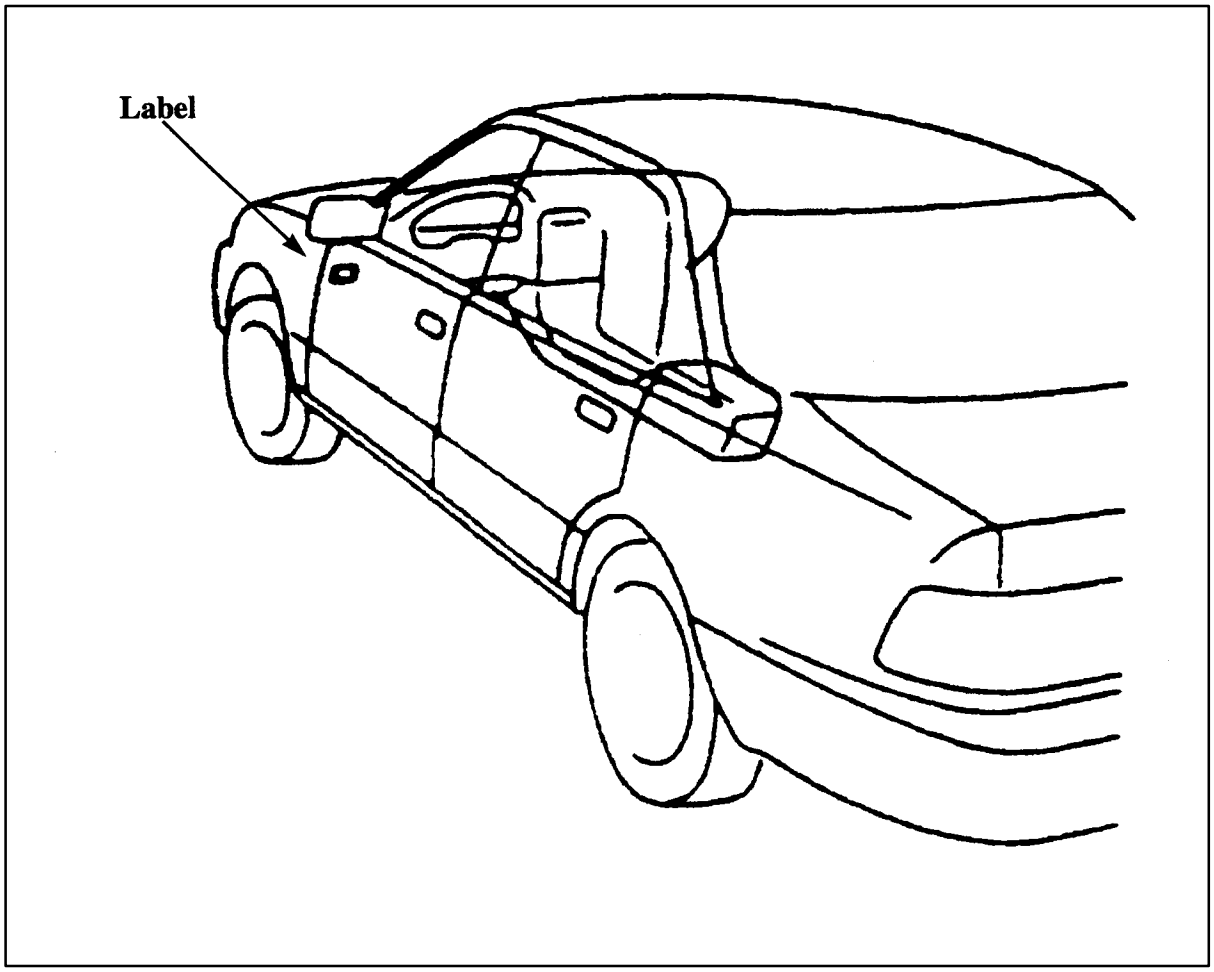
1. After completing the Special Service Campaign, fill out the SSC completion label. Write in VL1, the date of the repair, and your dealer code.

NOTE: An SSC completion label is enclosed in the owner's letter. Additional labels, in sheets of 50, can be ordered through the TDN system (P/N 00410–01917).



SSC Completion Label Installation

2. Affix the label to the left front door hinge post near the door check.



1994 ¡ 1998 ES 300

Steering Wheel Set Nut

(Tsutsumi Built Vehicles Only)

Special Service Campaign XL−7

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PREPARING FOR THE SSC

Overview

Lexus is initiating a Special Service Campaign (SSC). The XL−7 SSC is for 1994 through 1998 model year ES 300s built at the Tsutsumi plant. It is important to note that ES 300s built in the Kyushu plant are not involved in this SSC. This SSC is an opportunity to strengthen the relationships we have established with our valued customers and demonstrate the Lexus service experience to customers who may not have visited your dealership recently. This handbook provides all the details necessary to plan and implement the SSC at your dealership. Key points on the SSC are summarized below.

XL−7 Condition

The steering wheel set nut may not be sufficiently tight in certai n 1994 through 1998 model year Tsutsumi built ES 300 vehicles. This may cause an abnormal steering vibration and looseness. If the owner continues to operate the vehicle with this condition, in the worst case, the nut may eventually come off and the steering wheel may separate from the steering shaft. This can result in a loss of vehicle control, increasing the risk of an accident.

XL−7 Repair

The XL−7 SSC involves tightening the steering wheel set nut to the specified torque.

Customer Notification

Notification letters will be sent in phases to the owners of affected vehicles beginning in late November 1999. This letter will advise owners of the need to have the vehicle repair performed.

SSC & Customer Satisfaction

The Special Service Campaign provides us with an opportunity to demonstrate the Lexus commitment to total customer satisfaction. By implementing the XL−7 SSC in an organized and efficient manner, we can nurture our relationships and strengthen these associations. Throughout the campaign, we need to let our customers know that we are genuinely interested in resolving the matter in a timely fashion with as little inconvenience to them as possible.

Determine Your Demand

SSC XL−7

The XL−7 Special Service Campaign only applies to 1994 through 1998 ES 300s built at Tsutsumi within the VIN ranges below. It is important to note that ES 300s built at Kyushu are not involved in this SSC. No other vehicles before or after these ranges are to be repaired under the provisions of this SSC.

Model	Year	VIN Range	
		VDS	Ranges
ES 300	1994	GK13T	R0001027 ¿ R0074672
	1995	GK13T	S0055163 ¿ S0129614
	1996	BF12G	T0128626 ¿ T0186198
	1997	BF22G	V0001020 ¿ V0083880
	1998	BF28G	W0082398 ¿ W0141594

The enclosed SSC summary report lists vehicles sold by your dealership. From this list, please determine the actual number of customers who should come back to your dealership for this SSC.

Manpower and Facility Requirements

Your dealership must plan ahead to accommodate the additional service volume generated as a result of this SSC. It is the intent of Lexus to have 100% of SSC repairs completed by the end of April 2000.

In reviewing your dealership¿s manpower and facility requirements for this Special Service Campaign, there are several items you need to consider.

- Do you need to develop ways to increase your service capacity?
- Do you need to hire additional support staff for pick−up/delivery, car washes and fuel tank fill−ups?
- The special Enterprise Rent−A−Car arrangement that started with SSC WL−1 is also in effect for XL−7. See page 10 for further details.

You will need to hold a meeting with all dealership associates to discuss:

⇒ Importance of Lexus customer care for each SSC customer.

⇒ Various procedures such as phone inquiries, pick up and delivery, loaners, etc.

⇒ Campaign specifics including your dealership¿s assigned quantity, completion objectives, and technical details.

Tools and Equipment

No special tools or equipment are required for this SSC.

Technical Training

The back of this handbook contains the repair procedures for this SSC.

We suggest that all service department staff who will be directly involved in completing the repair or supporting the SSC should review the repair procedures to prepare for this SSC.

We also recommend that one person at your dealership be designated as the Campaign Coordinator.

Your District Operations Manager will meet with you to answer your questions and monitor the progress of the SSC.

TDN System

The following steps must be taken to prepare your TDN System for processing SSC claims:

- The labor operation code has been transmitted to your dealership. Remember that each dealership must request and apply it to the dealer system. If your dealership has not received the code, call the TDN hotline at (**800−421−8154**

- Create a menu code in TDN Menu Option SC−2 using the new labor operation code established for this SSC.

  Menu Code: XL7
  Labor Op. Code: 9525K1

Planning Your Communication Strategy

It is important that you develop a strategy to communicate effectively. The following are some general statements that can be used when explaining the SSC.

Q1: What is the condition?

A1: The steering wheel set nut may not be sufficiently tight in certain 1994 − 1998 model year, Tsutsumi built, ES300 vehicles. This may cause an abnormal steering vibration and looseness. If the owner continues to operate the vehicle with this condition, in the worst case, the nut may eventually come off and the steering wheel may separate from the steering shaft. This can result in a loss of vehicle control, increasing the risk of an accident.

Q2: Are there any warnings that this condition has occurred?

A2: Yes. A vehicle with this condition may experience an abnormal steering vibration or looseness of the steering wheel.

Q3: What can an owner do if they experience an abnormal steering vibration or looseness of the steering wheel?

A3: Owners of the involved vehicles should contact their local Lexus dealer to have the steering wheel set nut inspected.

Q4: Which and how many vehicles are involved?

A4: 1994 through 1998 model year, Tsutsumi built, ES300 vehicles are involved. Approximately 177,000 vehicles were sold in the United States. ES300□s built at the Kyushu, Japan plant are not affected.

Q5: What is the production period of the affected vehicles?

A5: The affected vehicles were produced from July 1993 through July 1998.

Q6: Are there any other Toyota or Lexus vehicles involved?

A6: Yes, certain 1995 through 1998 model year Tsutsumi built, Camry vehicles are also involved in this recall.

Q7: How many cases of this condition have been reported?

A7: There have been no reported cases of this condition in Lexus vehicles. Nine Toyota cases (which may be related to this condition) have been reported for the vehicles involved.

Q8: Have there been any accidents reported?

A8: There have been no reported cases of accidents for the vehicles involved in this recall.

Q9: What is Lexus going to do?

A9: Owners of the involved vehicles will receive a recall notification by first class mail. Lexus dealers will tighten the steering wheel set nut to the proper torque setting. This repair will be preformed at **NO COST** to the vehicle owners.

Q10: How long will the repair take?

A10: The repair will take approximately 30 minutes, however, depending upon the dealer¿s work schedule, it may be necessary to make your vehicle available for a longer period of time.

Q11: If an affected vehicle experienced a previous steering looseness problem, which has been corrected, is it necessary to bring the vehicle to a Lexus dealer?

A11: Yes, although the repair was conducted, any Lexus dealer will tighten the steering wheel set nut to the proper torque setting. This repair will be performed at **NO COST** to the vehicle owner.

Calls to Your Customers

- Customers **involved** in the SSC
  - ⇒ Although each affected vehicle owner will receive a notification letter, we would like your dealership to use the customer list provided in the SSC package to help manage your service volume. *Note: The customer list provided is based on Lexus ¿ owner database. SSC notices will be mailed to owners identified by using R.L. Polk registration data.* We strongly suggest that your dealership¿s service management and consulting staff review the list and proactively contact customers for prompt

service. Also let them know how valuable a customer they are and that this Special Service Campaign is being undertaken by Lexus to keep their confidence in the Lexus brand.

- Customers **not involved** in the SSC
  ⇒ Assure any customers with vehicles outside of the involved VIN range that this repair is not needed.

Calls from Your Customers

- It is important to institute a system to respond to customers calling for more information regarding the SSC. We recommend designating an individual to answer these inquiries to ensure that callers get accurate, consistent information.

- The Lexus Website (www.lexus.com) will also address customer concerns. A special section will help answer questions regarding procedures and affected vehicles.

Calls from the Media

We ask that you refer any calls from the media or government agencies directly to Lexus headquarters in Torrance, California. The contacts at Lexus are:

Nancy Hubbell, Lexus Public Relations Manager
(310) 781−3282
Holly Ferris, Lexus Public Relations Administrator
(310) 781−3279

Implementing the XL−7 SSC

Car Rental and Service Loaners

One of the ways we can demonstrate that Lexus cares is by honoring loaner car requests with the best loaner available.

{Preferred}

Lexus Customer Confidence System (LCCS)
Officially enrolled LCCS vehicles may be claimed at a rate of $44.00 per day. (Lexus vehicles only.)

{Preferred}

Lexus Dealer Fleet (Lexus vehicles only)
A rate of $44.00 per day may be claimed if using this option. Be sure to follow customer supplied insurance guidelines.

Enterprise Rent−A−Car
Recognizing that loaner car capacity may become an issue, Lexus is continuing **special arrangements with Enterprise Rent−A−Car** to supplement the demand. The specially negotiated price includes a $35.00 per day charge for premium cars and an $11.99 per day rate, plus applicable taxes, for full collision protection (C.D.W.). The total is $46.99, plus tax, in all 48 contiguous states except for New York where the rate structure is different due to state laws covering the sale of a Collision Damage Waiver.

An important feature to this preferred rental arrangement is that this rate entitles your customers to any available Enterprise vehicle including luxury vehicles. So please provide them with a selection of the best available vehicles. Also please employ the strategy (where practical) that SSC customers receive Lexus vehicles and Enterprise vehicles are reserved for regular service customers.

Lexus Dealer Fleet (non−Lexus vehicles)
A rate of $35.00 per day may be claimed if using this option.

Other Car Rental Agencies (Other than Enterprise)

In most cases, a rate of $35.00 plus tax per day may be claimed if using this option.

The motivating factor for any of these options is the customer ¿s convenience and consideration. Again please provide the best available vehicle. If extraordinary customer requests are made, please contact your DOM. In addition, loaner car requests that exceed two days must carry proper DOM authorization.

Remote Area Service Plan

¿Remote¿ is defined as those distances where a customer is 100 or more miles from the nearest Lexus dealership.

Your DOM will work with you to develop and authorize an action plan.

Guidelines to be used in performing remote repairs are:

- If the customer is within 100 miles of the nearest Lexus dealership, the closest Lexus dealership will perform the repair provided that prior authorization for related expenses has been approved by the DOM.

- If the customer is more than 100 miles from the nearest Lexus dealership, Lexus area associates or, Lexus national associates may perform the repair. Dealerships may also make these repairs but only with the authorization of the Area Coordinator (most likely the F.T.S.).

- Each situation will be handled on a case−by−case basis.

- Lexus will only pay for authorized costs that have been approved by DOM or area offices.

- Alternatives include pick−up and redelivery of remotely located vehicles.

The Service Write−Up

Listed below are some general guidelines to use when the customer arrives at your dealership for the SSC:

- Explain that the actual service will take about half an hour and that the special services (refueling, car wash) will require additional time at your dealership.

- Explain the type of repair involved.

- If the customer does not have an SSC notice:

  ⇒ Check the VIN against the national Service History File to see if the vehicle has been previously repaired under this Campaign.

  ⇒ Check the left front door hinge post for an SSC completion label.

  ⇒ If there is no label, check the VIN against the SSC list.

  ⇒ If the vehicle is outside the affected VIN range, explain that the vehicle does not require the Campaign repairs.

  ⇒ If the vehicle is eligible, explain the SSC to the customer; describe the procedure and the amount of time needed for the repair.

- If the customer has an appointment, pull the work order, otherwise, create a work order reflecting the need to complete the SSC XL−7 repair.

- Issue the work order to the technician and include job instructions for the SSC.

Preparing for the Delivery After SSC Completion

- Because this service requires the vehicle¿s battery to be disconnected, make sure that the clock has been reset, seat number one memory reset and that any preset stations have been programmed back into the audio system.

- Wash/clean the vehicle inside and out.

- Fill the gas tank with premium unleaded fuel. (This actual fill−up cost will be charged as a SSC expense.)

- Notify customer of completion and arrange for re−delivery or return of rental vehicle.

- Remind those customers with optional memory seat that the number two seat memory will need to be reset.

Delivery of the Vehicle After the SSC Completion

The delivery of the vehicle is a very important part of ensuring a high level of customer satisfaction:

- Explain all SSC repairs to the customer.

- Apologize for any inconveniences and emphasize desire to protect the relationship.

- Thank the customer for his or her time and their continuing patronage.

Follow−Up

Complete 100% after−service follow−up is critical to ensure complete customer satisfaction with the repairs performed and the service provided.

Work Order Closing/ Claim Submission

The following information explains the policies and procedures for preparation and submission of a warranty claim for reimbursement of a repair performed under the SSC XL−7.

Repair	Claim Type	Opcode	Labor Hours*	Sublet
Tighten Nut to Specific Torque	SC	9525K1	0.5	GA (fuel), TW (tow), RT (loaner vehicle), DE (pick−up and delivery or remote repair) or CW (car wash) as required and substantiated by invoices.

* Includes 0.1 labor hours for administrative time.

NOTE: Lexus warranty will only accept one claim per vehicle under the terms of the SSC. Please ensure that your dealership checks the National History File to see if the vehicle has been repaired under this SSC prior to servicing the vehicle.

Recap of Claim Submission and General Provisions of the SSC

- Lexus will pay for gas tank fill−up (actual cost)
- Lexus will provide a loaner vehicle
- Lexus will pay for costs associated with remote repairs
- Lexus will pay for remote pick−up and delivery (DOM authorization only)

Claiming Reimbursement for Special Services

You must use sublet to claim any special services required in conjunction with the SSC repair.

- Issue ¿**TW**¿ (Tow Vehicle)
  - ⇒ Applicable to every vehicle
  - ⇒ Claim actual receipt amount as a sublet
  - ⇒ You may utilize Amoco or any agency providing Lexus type service
- Issue ¿**RT**¿ (Rental Car)
  - ⇒ Applicable to every vehicle
  - ⇒ Special Service Campaign customers may also be given dealer owned Lexus or L.C.C.S. vehicles at the normal reimbursement rate of $44.00 per day
  - ⇒ Lexus has negotiated a special day rate of $46.99 plus tax per day with Enterprise Rent−A−Car as an option (includes C.D.W., Collision Damage Waiver insurance)
  - ⇒ Dealer loaner vehicles or other car rental agencies will be reimbursed at the rate of $35.00 per tax per day
  - ⇒ The loaner vehicle reimbursement rate cap is two days per repair unless otherwise authorized by DOM
- Issue ¿**GA**¿ (Gas Tank Fill−Up)
  - ⇒ Applicable to every vehicle
  - ⇒ Claim actual fill−up amount
- Issue ¿**CW**¿ (Car Wash/Administrative Time)
  - ⇒ Applicable to every vehicle
  - ⇒ Claim $20.00 per vehicle
- Issue ¿**DE**¿ (Pick−Up and Delivery/**Remote Repairs**)
  - ⇒ Applicable only under special circumstances (e.g. more than 100 miles from the nearest Lexus dealership)
  - ⇒ Claim actual dealer cost

⇒ **F.T.S**/**A.O.M.** authorization is required for this expense

- Issue ¿**DE**¿ (Pick−Up and Delivery/**Remote Repairs**
  ⇒ Applicable at dealer discretion
  ⇒ Claim actual dealer cost

TDN Claim Preparation Instructions

NOTE: Each sublet must be a separate entry with:

- Unique invoice number
- Description
- Sublet Type
- Dollar Amount
- In Repair Order Management, select claim type ¿SC¿ (Special Service Campaign)

SSC-XL7 1994-1998 ES300 STEERING WHEEL SET NUT SAFETY RECALL NOTICE

Dear Lexus Customer:

This notice is being sent to you in accordance with the requirements of the National Traffic and Motor Vehicle Safety Act. Lexus has determined that a defect, which relates to motor vehicle safety exists in certain 1994 − 1998 model year ES300 vehicles manufactured in one of two ES300 assembly plants. Your vehicle has been identified as requiring this recall.

WHAT IS THE PROBLEM?

The steering wheel set nut is not sufficiently tight in certain 1994−1998 model year ES300 vehicles. If you continue to operate the vehicle with this condition, you may experience an abnormal steering vibration or looseness of the steering wheel. In the worst case, the nut could eventually come off and the steering wheel may separate from the steering shaft. This can result in a loss of vehicle control, increasing the risk of an accident.

WHAT WILL LEXUS DO?

Any Lexus Dealer will torque the steering wheel set nut to the proper specification a**NO COST** to you.

WHAT SHOULD YOU DO?

Contact any authorized Lexus dealer and make an appointment to inspect the steering wheel set nut as soon as possible.

The labor time for inspecting the set nut is approximately 30 minutes. However, depending upon the dealer's work schedule, it may be necessary to make your vehicle available for a longer period of time.

Please present this notice to the dealer when you bring the vehicle in for the repair.

If you no longer own the vehicle, please indicate so on the enclosed postage paid form, providing us with the name and address of the new owner.

WHAT IF YOU HAVE OTHER QUESTIONS?

Please contact any Lexus dealer or call the Lexus Customer Assistance Center at 1−800−255−3987.

If you believe that the dealer or Toyota has failed or is unable to remedy the defect within a reasonable time, you may submit a complaint to the Administrator, National Highway Traffic Safety Administration, 400 Seventh Street S.W., Washington, D.C. 20590, or call the toll free Auto Safety Hot Line at 800−424−9393 (Washington, D.C. area residents may call 366−0123).

We have sent this notice in the interest of your continued satisfaction with our products and we sincerely regret any inconvenience this condition may have caused you.

Thank you for driving a Lexus.

Sincerely,

LEXUS DIVISION
TOYOTA MOTOR SALES, U.S.A., INC.

Technical Instructions

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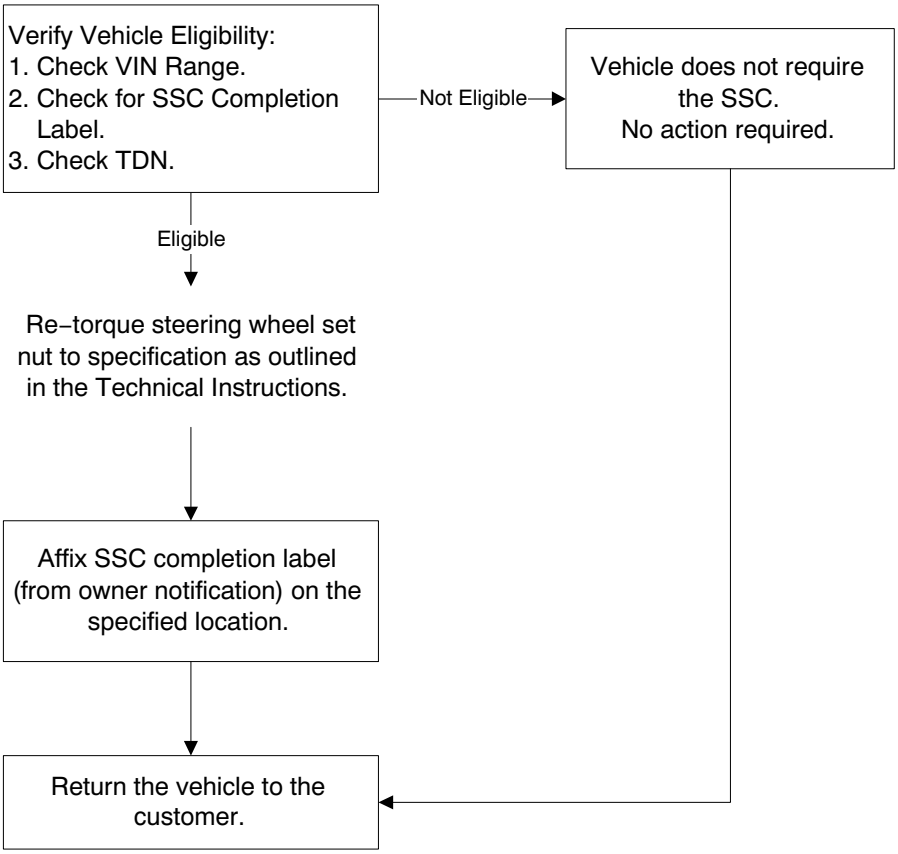
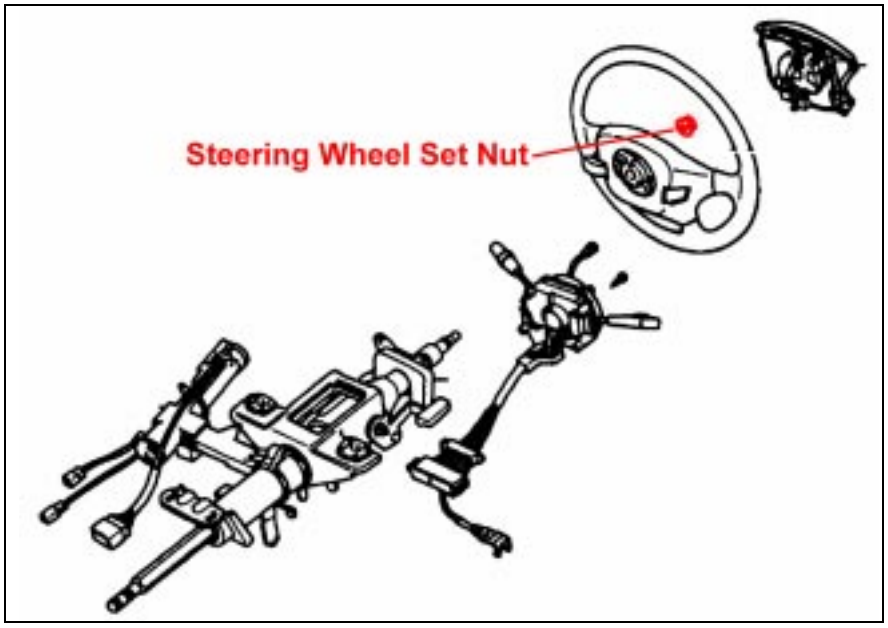
1. OPERATION FLOW CHART



2. LOCATION OF AFFECTED PART



3. AFFECTED VIN RANGE

Model	Year	VIN Range*	
		VDS	Ranges
ES300	1994	GK13T	R0001027 through R0074672
	1995	GK13T	S0055163 through S0129614
	1996	BF12G	T0128626 through T0186198
	1997	BF22G	V0001020 through V0083880
	1998	BF28G	W0082398 through W0141594

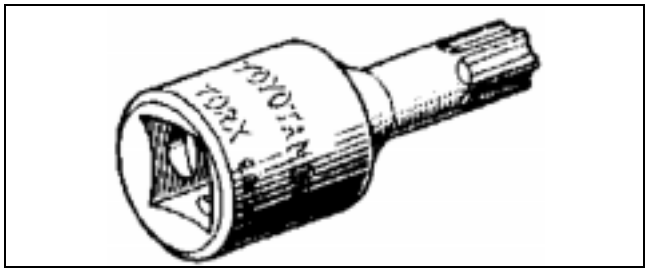
*Please note that Kyushu built ES300s are not affected and are not included in the above VIN range. As always confirm Lexus Service History to verify vehicle eligibility.

4. PREPARATION

Parts

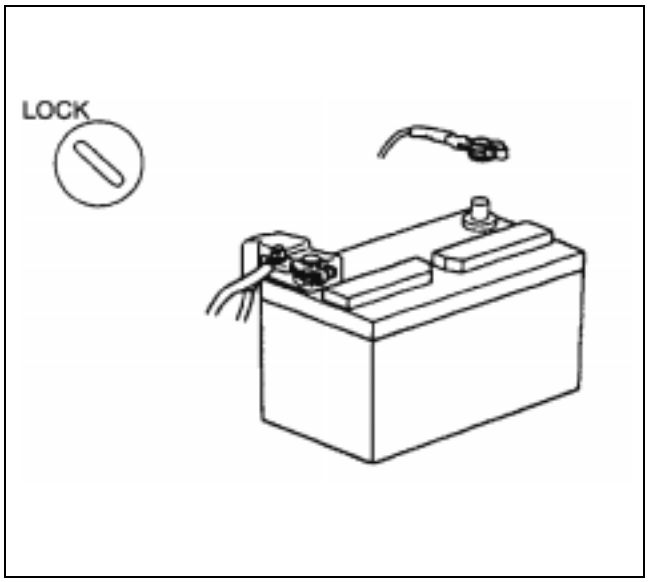
No replacement parts are necessary.

Tools



- 09042–00010 Torx Socket T30
- Torque Wrench
- Standard Tools

5. WORK PROCEDURE

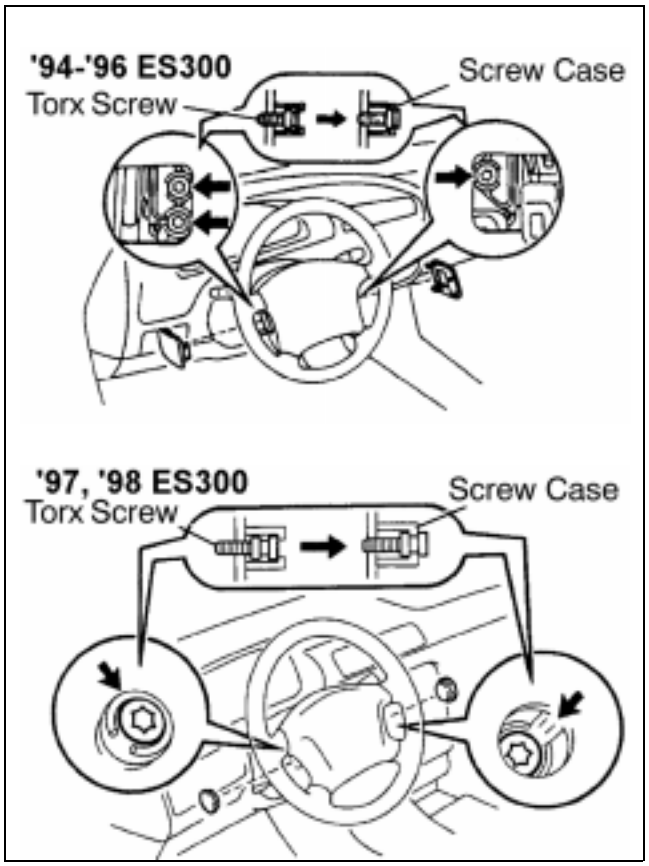


1. DISCONNECT NEGATIVE (−) BATTERY TERMINAL

(a) Record radio station presets.
(b) Set memory seat to position 1.(If equipped)
(c) Turn the ignition key to the ¿LOCK¿ position.
(d) Disconnect negative (−) battery terminal.

CAUTION:

Do not remove the Steering Wheel Pad until a minimum of 90 seconds has passed since the ignition key was set in the ¿LOCK¿ position and the battery had been disconnected.



2. REMOVE STEERING WHEEL PAD

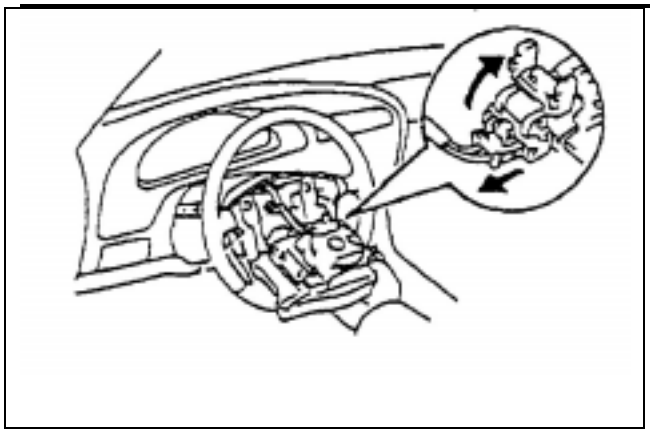
NOTE:

If the airbag is disconnected with the ignition in the ¿**ON**¿ or¿**ACC**¿ position, a **DTC** will be recorded.

(a) Turn the steering wheel so the front wheels face straight ahead.
(b) Remove the two covers behind the steering wheel to expose the Torx□ screws.
(c) Using a T30 Torx□ socket, loosen the screws.

NOTE:

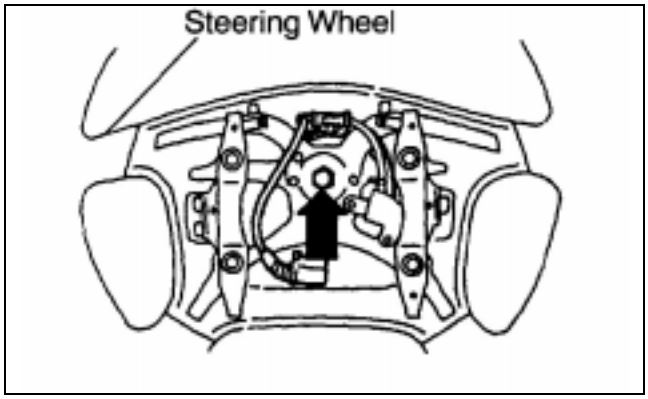
- Loosen the Torx□ screws until the groove, along the screw circumference, catches on the screw case.
- Be careful not to damage the cruise control switch, if equipped.



(d) Pull the steering wheel pad out from the steering wheel and disconnect the SRS connector.

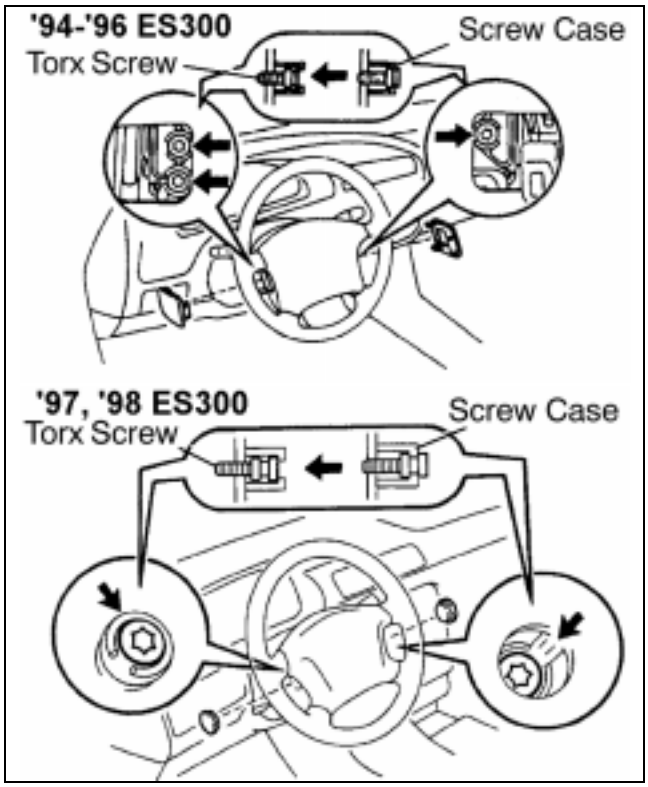
NOTE:
When removing the wheel pad, take care not to damage the airbag harness.

CAUTION:
When storing the airbag, keep the upper surface of the airbag facing up.



3. TIGHTEN THE STEERING WHEEL SET NUT

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



4. REINSTALL THE STEERING WHEEL PAD

(a) Reconnect the airbag connector.
(b) Reinstall the steering wheel pad after confirming that the circumference groove of the Torx® screws are caught in the screw case.
(c) Using a T30 Torx® socket, tighten the screws.

Torque:

1994–1996 MY
8.8 N·m (90 kgf·cm, 78 in·lbf)

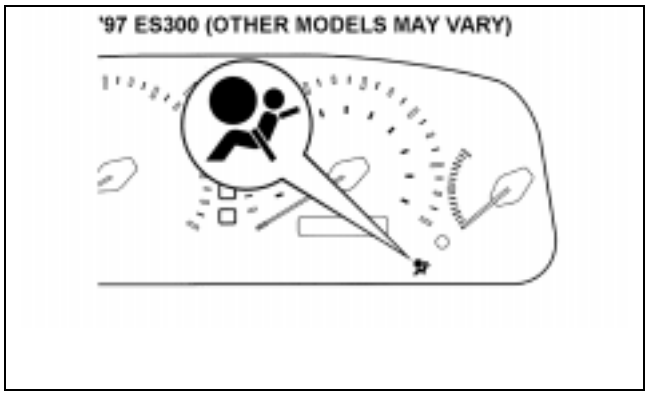
1997–1998 MY
7.1 N·m (72 kgf·cm, 63 in·lbf)

(d) Reinstall the Torx® bolt covers on the steering wheel.

NOTES:

- If the airbag has been dropped or if there are cracks, dents, or other defects to the case or connector, **replace** the airbag.
- When reinstalling the airbag, take care not to pinch the wiring between other parts.

5. RECONNECT THE NEGATIVE (−) BATTERY TERMINAL



6. CHECK SRS WARNING LIGHT

(a) Turn ignition to ¿ON¿ or¿ACC¿ and check that the SRS warning light illuminates.

(b) Verify that the SRS warning light goes out after approximately 6 seconds.

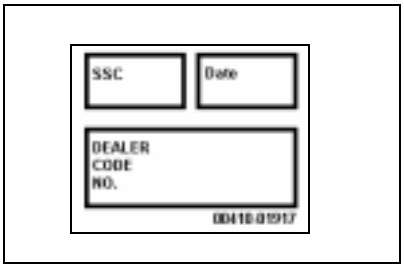
7. REPROGRAM THE RADIO PRESETS, RESET MEMORY SEAT POSITION 1 (IF EQUIPPED), AND RESET THE CLOCK

6. SSC COMPLETION LABEL INSTALLATION

a) After completing repair and before returning the vehicle to the owner, a SSC completion label, that is enclosed in the owner¿s notification must be affixed to the left front door hinge post, near the check strap.

b) The label is to be filled out as follows:

- Write in SSC XL7.
- Write in date of repair.
- Write in your dealer code.



c) Additional SSC completion labels, in sheets of 50 (P/N 00410−01917), may be ordered through the non−parts system on a 1450 order form or through the TDN system.

Special Service Campaign (SSC) and Limited Service Campaign (LSC) General Procedures

April 2005

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PREPARING FOR AN SSC/LSC

Overview

This handbook contains the general procedures dealers should follow for each and every Special Service Campaign (SSC) or Limited Service Campaign (LSC) Lexus initiates. Campaign-specific details will be included in the dealer notification package sent to each dealer at the launch of a campaign.

Customer Notification

The customer notification schedule and sample letter will be included in the dealer notification package sent to each dealer at the launch of a campaign.

SSC/LSC and Customer Satisfaction

Each Special Service Campaign or Limited Service Campaign provides us with an opportunity to demonstrate the Lexus commitment to total customer satisfaction. Lexus requests that dealers use the fundamental principals embodied in the Lexus Covenant when servicing these owners and their vehicles. By implementing new campaigns in an organized and efficient manner, we can nurture our on-going relationships with these customers and strengthen these associations. Throughout each campaign, we need to let our customers know that we are genuinely interested in resolving the matter in a timely fashion with as little inconvenience to them as possible.

Identifying Affected Vehicles

Specific vehicle model, model year and VIN range applications will be included with the campaign-specific dealer notification package sent to all dealers at the launch of a campaign.

Always consult Dealer Daily or TIS to confirm eligibility and to assure the SSC/LSC is applicable. This will verify the vehicle is involved and has not already been completed by another dealer. TMS warranty will not reimburse dealers for repairs conducted on vehicles that are not affected.

Manpower and Facility Requirements

Your dealership must plan carefully to accommodate the additional service volume generated as a result of an SSC/LSC. In reviewing your dealership's manpower and facility requirements for a campaign, there are several items you need to consider.

- Do you need to develop ways to increase your service capacity?
- Do you need to hire additional support staff for pick-up/delivery, car washes and fuel tank fill-ups?

You will need to hold a meeting with all dealership associates to discuss:

- Importance of Lexus customer care for each SSC/LSC customer.
- Various procedures such as phone inquiries, pick up and delivery, loaners, etc.
- Campaign specifics including your dealership's assigned quantity, completion objectives, and technical details.

We recommend that one person at your dealership be designated as the campaign coordinator.

Your District Service and Parts Manager will meet with you to answer your questions and monitor the progress of each SSC/LSC.

Tools and Equipment

Each dealer notification package will include information on the tools and equipment required to perform the campaign repairs.

Technical Training

Lexus suggests that all service department staff who will be directly involved in completing a repair or supporting an SSC/LSC should review the repair procedures in the dealer notification package to prepare for a campaign.

Parts

Each dealer notification package will contain specific part number information and order procedures. Your

dealership is requested to **order only those parts needed to repair vehicles with service appointments**. Individual dealer tracking will be done and irregularities in quantity ordering will be passed on to Lexus Area Offices for follow-up and correction. Lexus will ensure there will be sufficient inventory to accommodate an SSC/LSC but there will be only enough supply to cover the affected vehicle population. Please only order based upon **true demand**.

DMS Systems

Labor operation codes will be transmitted to your dealership. (See dealer notification package for specific campaign opcode and labor hour information). DMS dealer files are automatically updated and no further action should be required.

Planning Your Communication Strategy

It is important that you develop a strategy to communicate effectively. Each dealer notification package will contain a series of Questions and Answers (Q&A) that can be used when explaining an SSC/LSC.

Calls to Your Customers

- Customers **involved** in the SSC/LSC

  ⇒ Each affected vehicle owner will receive a notification letter. Please let them that the campaign is being undertaken by Lexus to keep their confidence in the Lexus brand.

- Customers **not involved** in the SSC/LSC

  ⇒ Assure any customers with vehicles outside of the involved VIN ranges that this repair is not needed.

Calls from Your Customers

It is important to institute a system to respond to customers calling for more information regarding an SSC/LSC. We recommend designating an individual to answer these inquiries to ensure that callers get accurate, consistent information.

Calls from the Media

We ask that you refer any calls from the media or government agencies directly to Lexus headquarters in Torrance, California. The contact at Lexus is:

Bill Ussery, Lexus Public Relations Manager

IMPLEMENTING AN SSC/LSC

Car Rental and Service Loaners

One of the ways we can demonstrate that Lexus cares is by honoring loaner car requests with the best loaner available for those customers unable or unwilling to wait for this repair.

Lexus Customer Convenience System (LCCS)
Officially enrolled LCCS vehicles may be claimed at a rate of $44.00 per day. (Lexus vehicles only)

Lexus Dealer Fleet (Lexus vehicles only)
A rate of $44.00 per day may be claimed if using this option. Be sure to follow customer supplied insurance guidelines.

The motivating factor for any of these options is the customer's convenience and consideration. Again please provide the best available vehicle. If extraordinary customer requests are made, please contact your DSPM. In addition, **loaner car requests that exceed one day must carry proper DSPM authorization.**

Remote Area Service Plan

"Remote" is defined as those distances where a customer is 100 or more miles from the nearest Lexus dealership. Your DSPM will work with you to develop and authorize an action plan.

Guidelines to be used in performing remote repairs are:

- If the customer is within 100 miles of the nearest Lexus dealership, the closest Lexus dealership will perform the repair provided that prior authorization for related expenses has been approved by the DSPM.
- If the customer is more than 100 miles from the nearest Lexus dealership, Lexus area associates or, Lexus national associates may perform the repair. Dealerships may also make these repairs but only with the authorization of the Area Coordinator (most likely the F.T.S.).
- Each situation will be handled on a case-by-case basis.
- Lexus will only pay for authorized costs that have been approved by DSPM or area offices.
- Alternatives include pick-up and redelivery of remotely located vehicles.

The Service Write-Up

Listed below are some general guidelines to use when the customer arrives at your dealership for an SSC/LSC:

- Explain how long the repair will take. Inform the customer that the special services (refueling, car wash) will require additional time at your dealership.
- Explain the type of repair involved.
- If the customer does not have an SSC/LSC notice:
  - Check the VIN against the national Service History File or TIS to see if the vehicle has been previously repaired under the Campaign.
  - Check the left front door hinge post for an SSC/LSC completion label.
  - If the vehicle falls outside of the above guidelines, explain that the vehicle does not require the Campaign repairs.
  - If the vehicle is eligible, explain the SSC/LSC repair procedure to the customer.
- If the customer has an appointment, pull the work order; otherwise, create a work order reflecting the need to complete the campaign.
- Issue the work order to the technician and include job instructions for the SSC/LSC.

Preparing for the Delivery after SSC/LSC Completion

- Wash/clean the vehicle inside and out.
- Fill the gas tank with the specified unleaded fuel
- Notify customer of completion and arrange for re-delivery or return of rental vehicle.

Delivery of the Vehicle After SSC/LSC Completion

The delivery of the vehicle is a very important part of ensuring a high level of customer satisfaction. Explain all SSC/LSC repairs to the customer and apologize for any inconveniences. Thank the customer for his or her time and their continuing patronage.

Follow-Up

Complete 100% after-service follow-up is critical to ensure complete customer satisfaction with the repairs performed and the service provided.

Work Order Closing/ Claim Submission

Each SSC/LSC dealer notification package will include information that explains the policies and procedures for preparation and submission of a warranty claim for reimbursement of a repair performed under the SSC/LSC.

NOTE: Lexus warranty will only accept one claim per vehicle under the terms of an SSC/LSC. Please ensure that your dealership checks the National History File to see if the vehicle has been repaired under an SSC/LSC prior to servicing the vehicle.

Recap of Claim Submission and General Provisions of an SSC/LSC

- Lexus will pay for gas tank fill-up (actual cost)
- Lexus will pay for washing the vehicle (not to exceed $20 per vehicle)

- Lexus will provide a loaner vehicle if required (DSPM authorization required for more than one day)
- Lexus will pay for costs associated with remote repairs if required
- Lexus will pay for remote pick-up and delivery if required (DSPM authorization only)

Claiming Reimbursement for Special Services

You must use sublet to claim any special services required in conjunction with an SSC/LSC repair.

- Issue **"TW"** (Tow Vehicle)
  - Applicable if the nature of the SSC/LSC requires the vehicle to be towed to the dealership
  - Claim actual receipt amount as a sublet
- Issue **"RT"** (Rental)
  - Applicable to every vehicle if required
  - The loaner vehicle reimbursement rate cap is **one day** per repair unless otherwise authorized by DSPM
- Issue **"GA"** (Gas Tank Fill-Up)
  - Applicable to every vehicle
  - Claim actual fill-up amount
- Issue **"CW"** (Car Wash/Administrative Time)
  - Applicable to every vehicle
  - Amount not to exceed $20.00 per vehicle
- Issue **"DE"** (Pick-Up and Delivery/**Remote Repairs**)
  - Applicable only under special circumstances (e.g. more than 100 miles from the nearest Lexus dealership)
  - Claim actual dealer cost
  - **F.T.S/C.S.O.M.** authorization is required for this expense
- Issue **"DE"** (**Pick-Up and Delivery**/Remote Repairs)
  - Applicable at dealer discretion

- Claim actual dealer cost

Claim Preparation Instructions

NOTE: Each sublet must be a separate entry with:

- Unique invoice number
- Description
- Sublet Type
- Dollar Amount

STARTING SYSTEM

ST017–01

ON–VEHICLE INSPECTION

NOTICE:

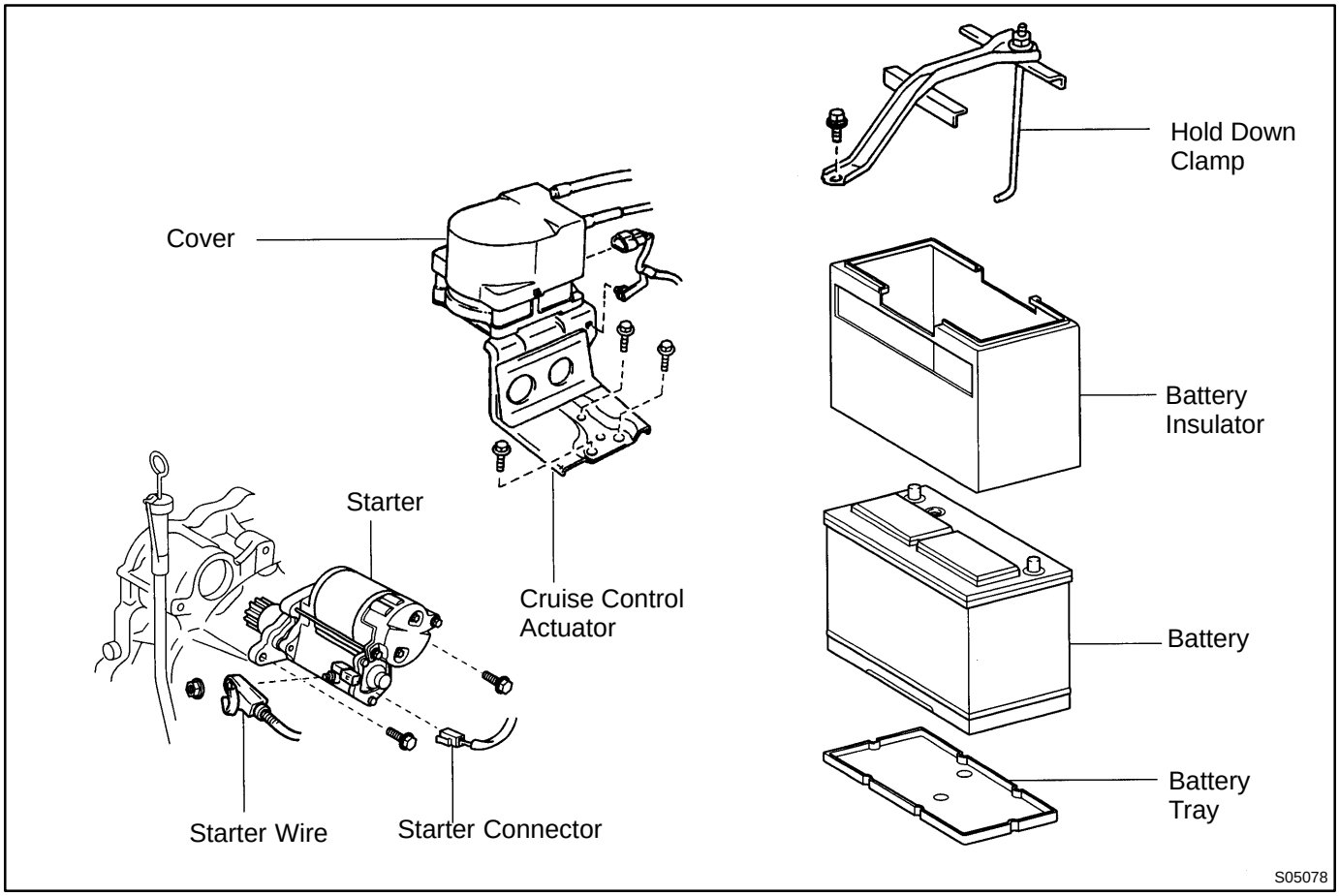
Before changing the starter, check the following items again:

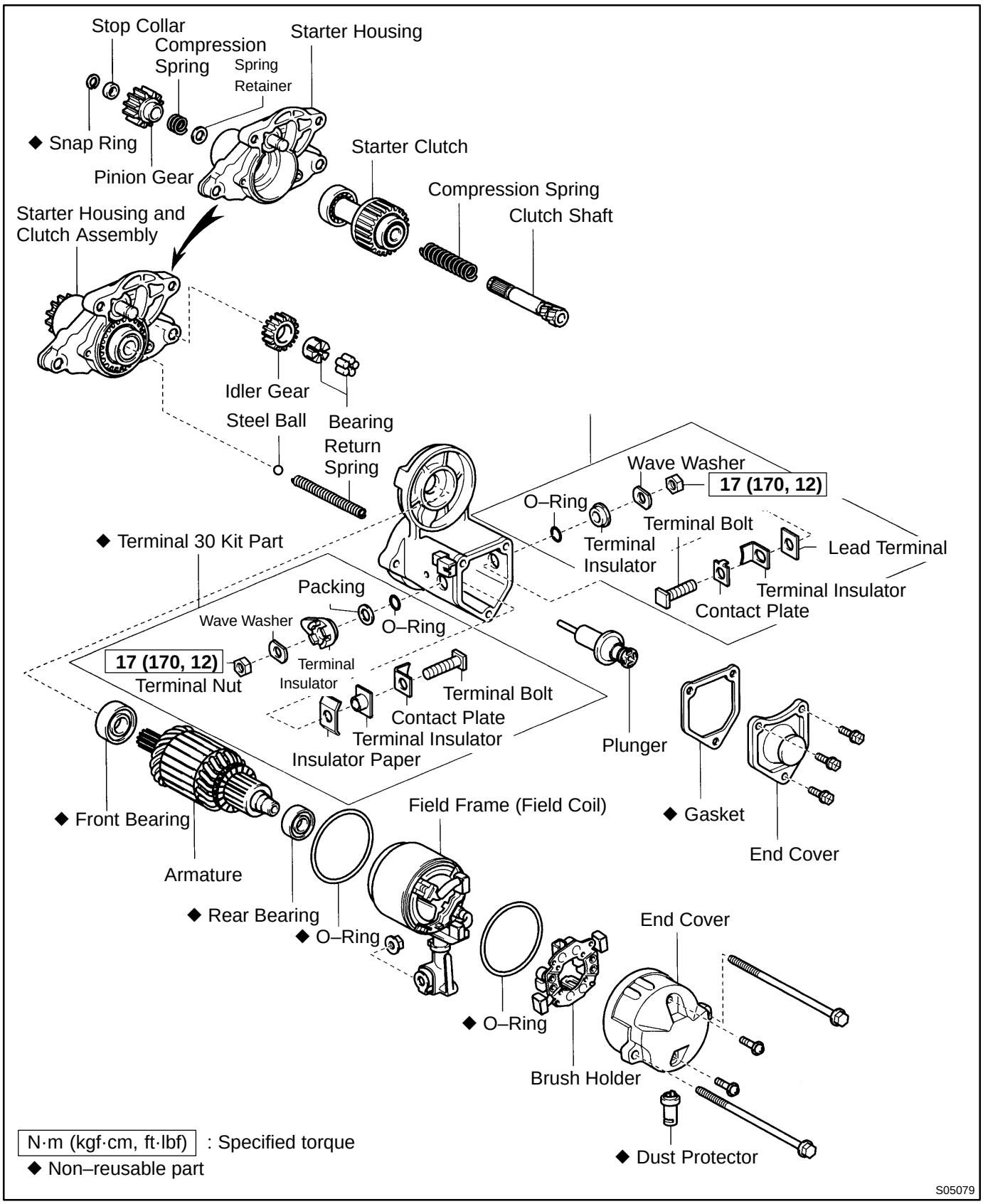
- **Connector connection**
- **Accessory installation, e.g.: theft deterrent system**

STARTER

COMPONENTS

ST0L7–01




Stop Collar
Compression Spring
Spring Retainer
Starter Housing
◆ Snap Ring
Pinion Gear
Starter Clutch
Compression Spring
Clutch Shaft
Starter Housing and Clutch Assembly
Idler Gear
Steel Ball
Bearing
Return Spring
Wave Washer
17 (170, 12)
O–Ring
Terminal Bolt
Terminal Insulator
Lead Terminal
Terminal Insulator
Contact Plate
◆ Terminal 30 Kit Part
Packing
O–Ring
Wave Washer
17 (170, 12)
Terminal Nut
Terminal Insulator
Terminal Bolt
Contact Plate
Terminal Insulator
Insulator Paper
Plunger
◆ Front Bearing
Armature
Field Frame (Field Coil)
◆ Gasket
End Cover
◆ Rear Bearing
◆ O–Ring
End Cover
◆ O–Ring
Brush Holder
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
◆ Dust Protector
S05079

ST019–02

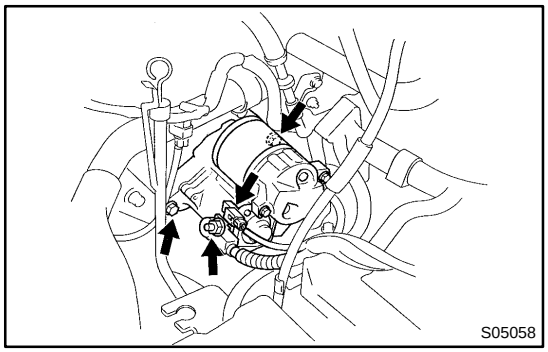
REMOVAL

1. REMOVE BATTERY AND TRAY

2. w/ CRUISE CONTROL SYSTEM:
REMOVE CRUISE CONTROL ACTUATOR

(a) Disconnect the actuator connector and clamp.

(b) Remove the 3 bolts, and disconnect the actuator with the bracket.



3. REMOVE STARTER

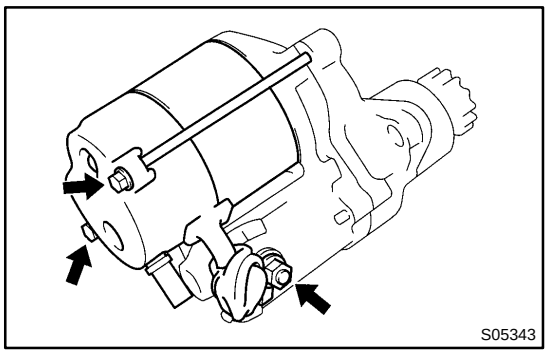
(a) Disconnect the starter connector.

(b) Remove the nut, and disconnect the starter wire.

(c) Remove the 2 bolts and starter.
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

ST01A–03

DISASSEMBLY

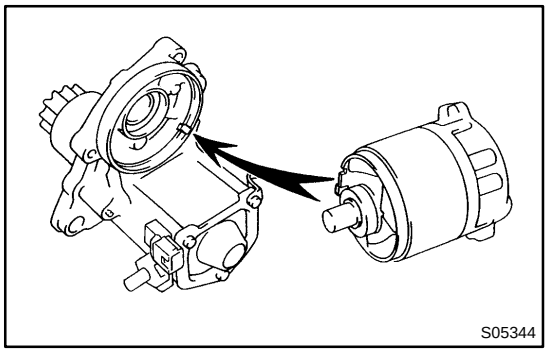


1. REMOVE DUST PROTECTOR

2. REMOVE FIELD FRAME AND ARMATURE

(a) Remove the nut, and disconnect the lead wire from the magnetic switch terminal.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

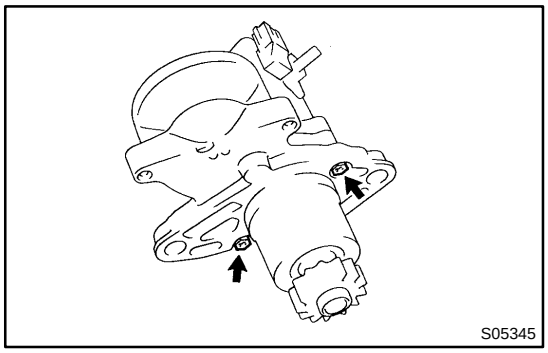
(b) Remove the 2 through bolts.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)



(c) Pull out the field frame together with the armature.

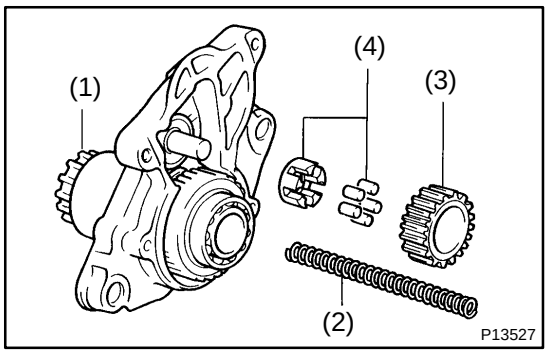
NOTICE:
At the time of assembly, please refer to the following item. Align the protrusion of the field frame with the groove of the magnetic switch.

(d) Remove the O–ring from the field frame.

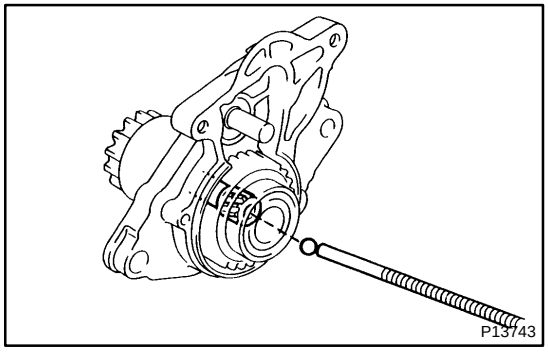


3. REMOVE STARTER HOUSING, CLUTCH ASSEMBLY AND GEAR

(a) Remove the 2 screws.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

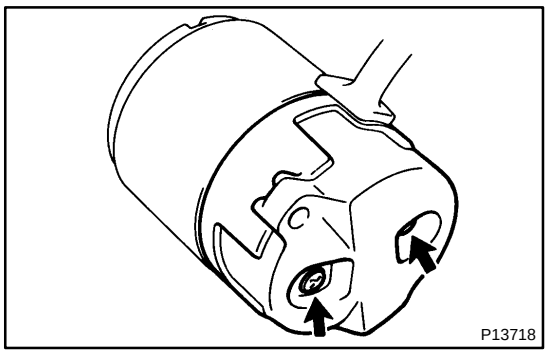


(b) Remove these parts from the magnetic switch:
(1) Starter housing and clutch assembly
(2) Return spring
(3) Idler gear
(4) Bearing



4. REMOVE STEEL BALL

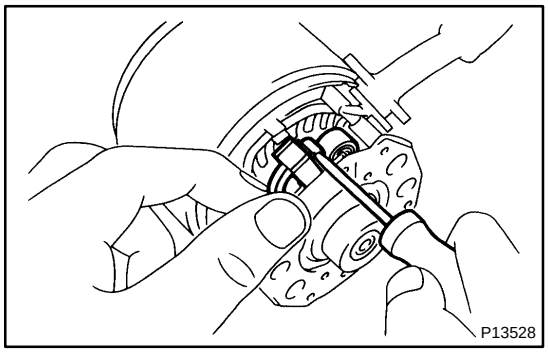
Using a magnetic finger, remove the steel ball from the clutch shaft hole.



5. REMOVE BRUSH HOLDER

(a) Remove the 2 screws and end cover from the field frame.
Torque: 1.5 N·m (15 kgf·cm, 13 in.·lbf)

(b) Remove the O–ring from the field frame.



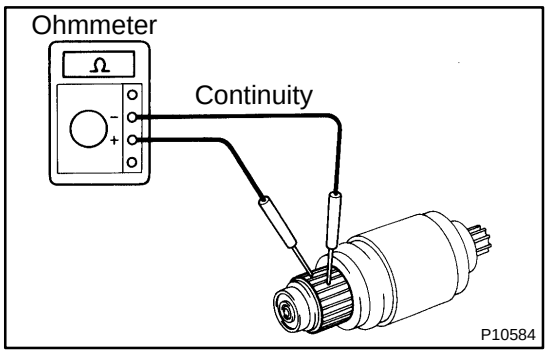
(c) Using a screwdriver, hold the spring back and disconnect the brush from the brush holder.
Disconnect the 4 brushes, and remove the brush holder.

NOTICE:
At the time of assembly, please refer to the following item. Check that the positive (+) lead wires are not grounded.

6. REMOVE ARMATURE FROM FIELD FRAME

ST01B–05

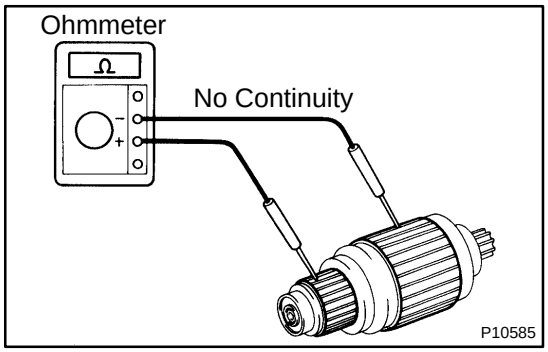
INSPECTION



1. INSPECT COMMUTATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the segments of the commutator.

If there is no continuity between any segment, replace the armature.



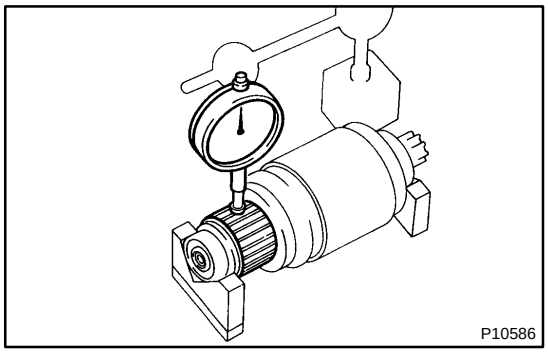
2. INSPECT COMMUTATOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the commutator and armature coil core.

If there is continuity, replace the armature.

3. INSPECT COMMUTATOR FOR DIRTY AND BURNT SURFACES

If the surface is dirty or burnt, correct it with sandpaper (No.400) or on a lathe.



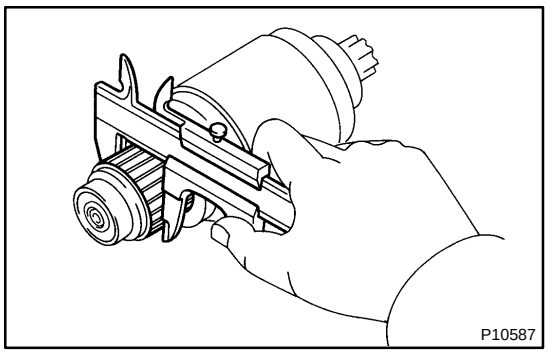
4. INSPECT COMMUTATOR CIRCLE RUNOUT

(a) Place the commutator on V–blocks.

(b) Using a dial gauge, measure the circle runout.

Maximum circle runout: 0.05 mm (0.0020 in.)

If the circle runout is greater than maximum, correct it on a lathe.



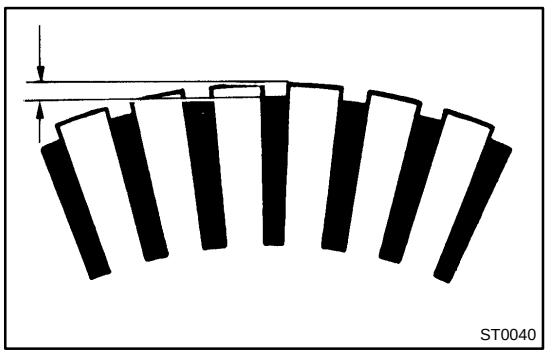
5. INSPECT COMMUTATOR DIAMETER

Using a vernier caliper, measure the commutator diameter.

Standard diameter: 30.0 mm (1.181 in.)

Minimum diameter: 29.0 mm (1.142 in.)

If the diameter is less than minimum, replace the armature.



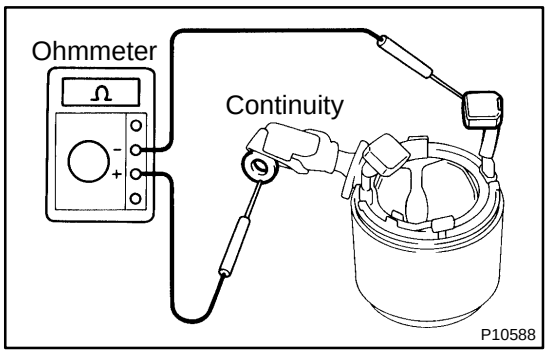
6. INSPECT UNDERCUT DEPTH

Check that the undercut depth is clean and free of foreign materials. Smooth out the edge.

Standard undercut depth: 0.6 mm (0.024 in.)

Minimum undercut depth: 0.2 mm (0.008 in.)

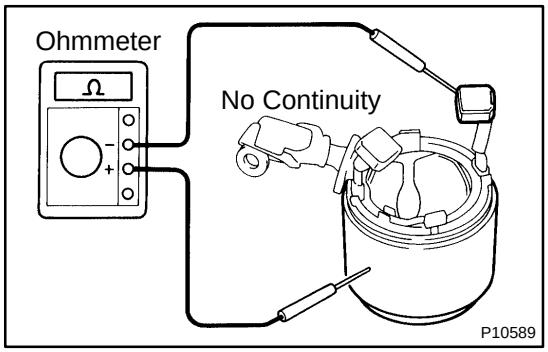
If the undercut depth is less than minimum, correct it with a hacksaw blade.



7. INSPECT FIELD COIL FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

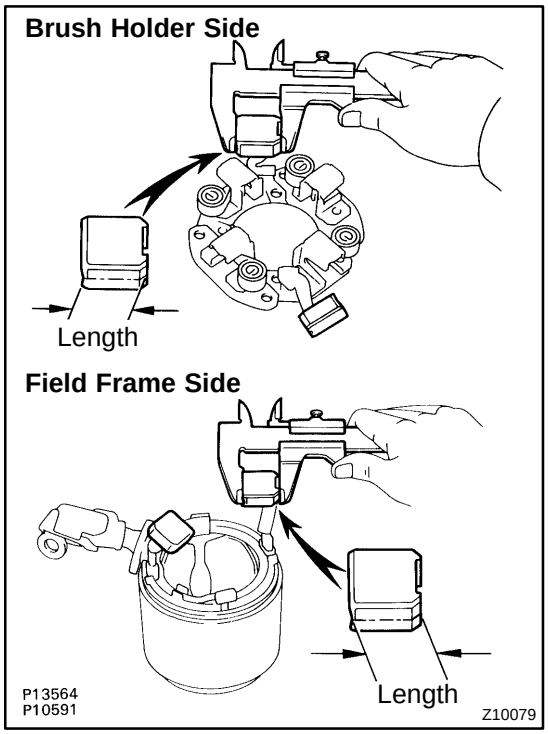
If there is no continuity, replace the field frame.



8. INSPECT FIELD COIL FOR GROUND

Using an ohmmeter, check that there is no continuity between the field coil end and field frame.

If there is continuity, repair or replace the field frame.



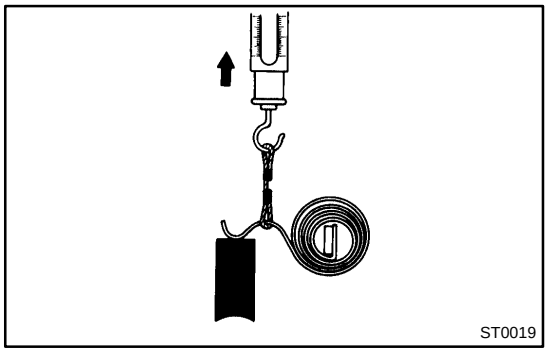
9. INSPECT BRUSH LENGTH

Using a vernier caliper, measure the brush length.

Standard length: 15.5 mm (0.610 in.)

Minimum length: 10.0 mm (0.394 in.)

If the length is less than minimum, replace the brush holder and field frame.



10. INSPECT BRUSH SPRING LOAD

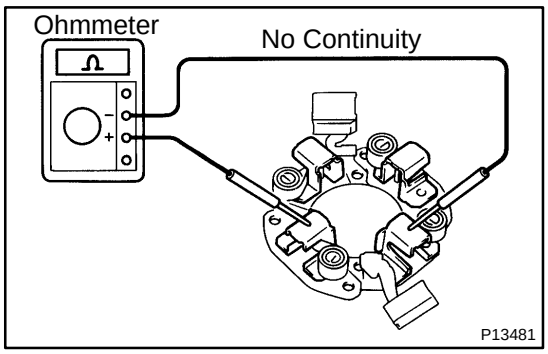
Take the pull scale reading the instant the brush spring separates from the brush.

Standard spring installed load:

17.6 – 23.5 N (1.8 – 2.4 kgf, 3.9 – 5.3 lbf)

Minimum spring installed load: 11.8 N (1.2 kgf, 2.6 lbf)

If the installed load is less than minimum, replace the brush springs.



11. INSPECT BRUSH HOLDER INSULATION

Using an ohmmeter, check that there is no continuity between the positive (+) and negative (–) brush holders.

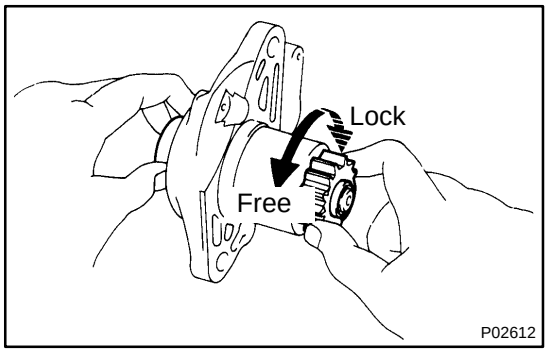
If there is continuity, repair or replace the brush holder.

12. INSPECT GEAR TEETH

Check the gear teeth on the pinion gear, idler gear and clutch assembly for wear or damage.

If damaged, replace the gear or clutch assembly.

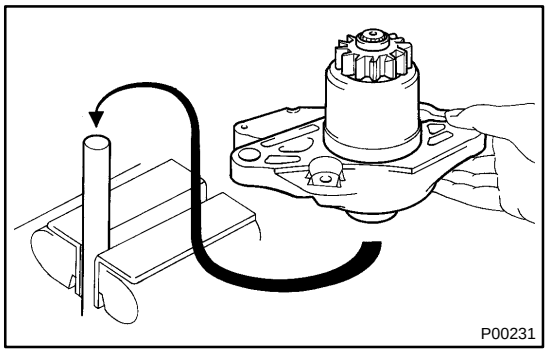
If damaged, also check the drive plate ring gear for wear or damage.



13. INSPECT CLUTCH PINION GEAR

Hold the starter clutch and rotate the pinion gear counterclockwise, and check that it turns freely. Try to rotate the pinion gear clockwise and check that it locks.

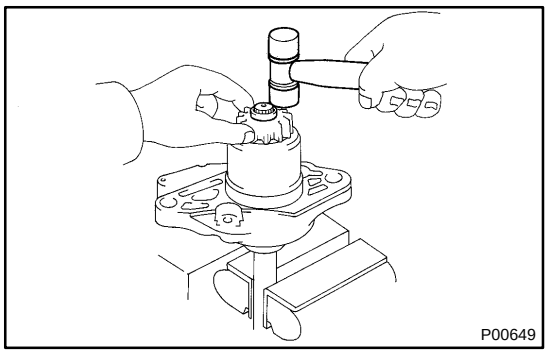
If necessary, replace the clutch assembly.



14. IF NECESSARY, REPLACE CLUTCH ASSEMBLY

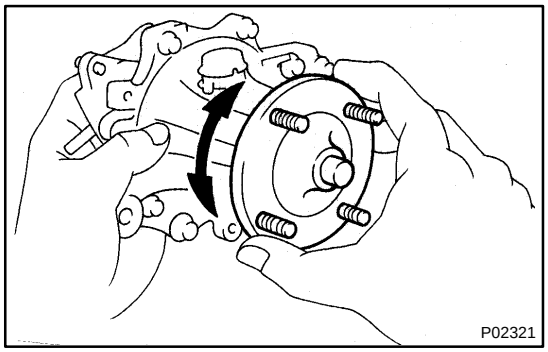
(a) Disassembe the starter housing and clutch assembly.

(1) Mount a brass bar in a vise, and install the starter housing and clutch assembly to the brass bar.

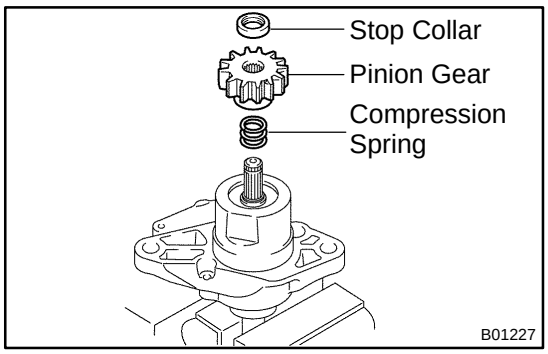


(2) Push down the pinion gear.

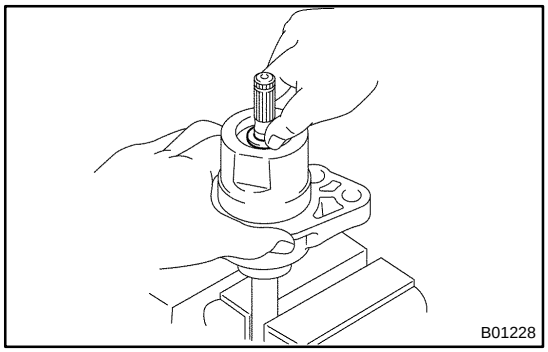
(3) Using a plastic–faced hammer, tap down the stop collar.



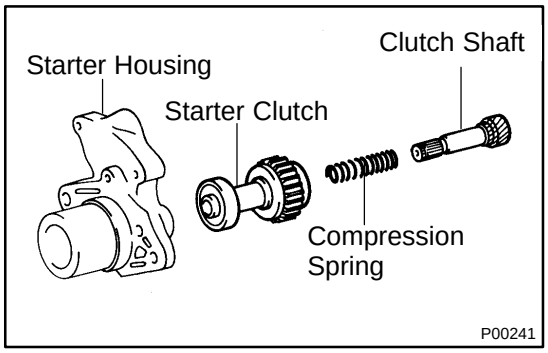
(4) Using a screwdriver, pry out the snap ring.



(5) Remove these parts:
- Stop collar
- Pinion gear
- Compression spring



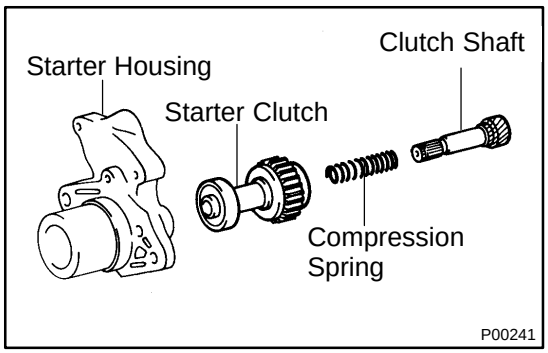
(6) Push down the starter housing, and remove the spring retainer.

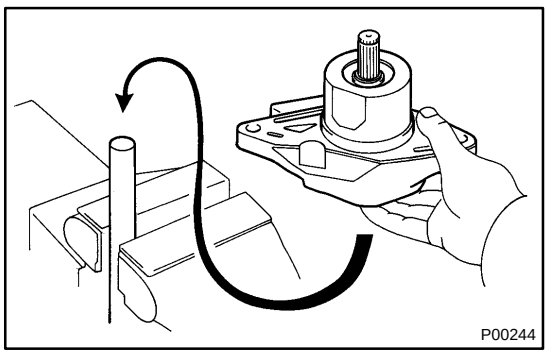


(7) Disassemble these parts:
- Starter housing
- Starter clutch
- Compression spring
- Clutch shaft

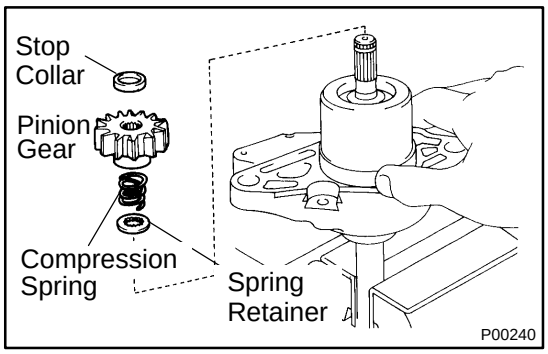
(b) Assemble the starter housing and clutch assembly.

(1) Assemble these parts:
- Starter housing
- Starter clutch
- Compression spring
- Clutch shaft

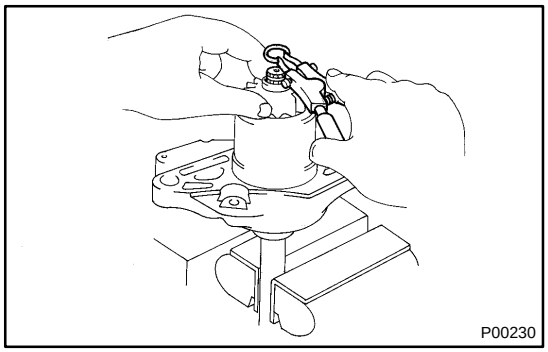




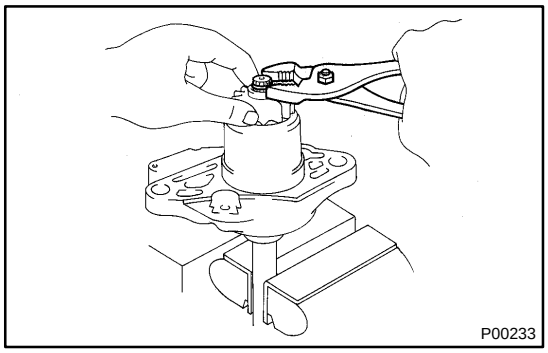
(2) Mount a brass bar in a vise, install the starter housing and clutch assembly to the brass bar.



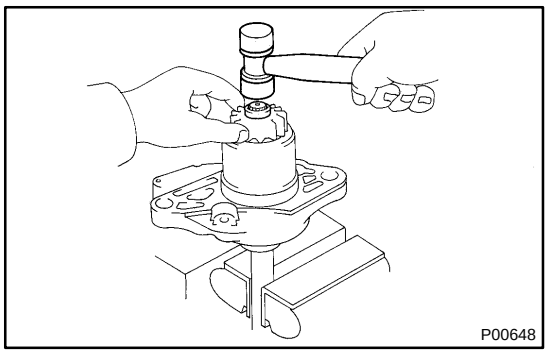
(3) Push down the starter housing, and install these parts:
- Spring retainer
- Compression spring
- Pinion gear
- Stop collar



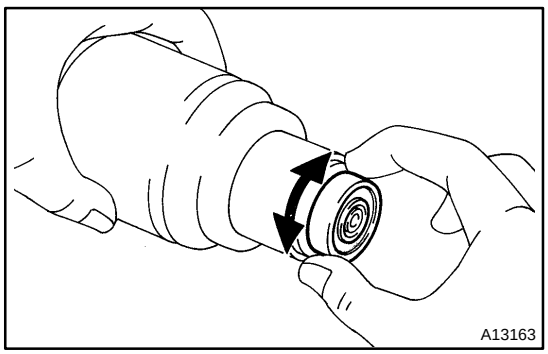
(4) Push down the pinion gear.
(5) Using snap ring pliers, install a new snap ring.



(6) Using pliers, compress the snap ring.
(7) Check that the snap ring fits correctly.

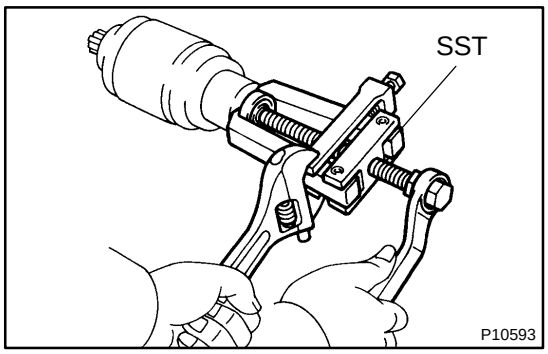


(8) Remove the starter housing and clutch assembly from the brass bar.
(9) Using a plastic–faced hammer, tap the clutch shaft and install the stop collar onto the snap ring.



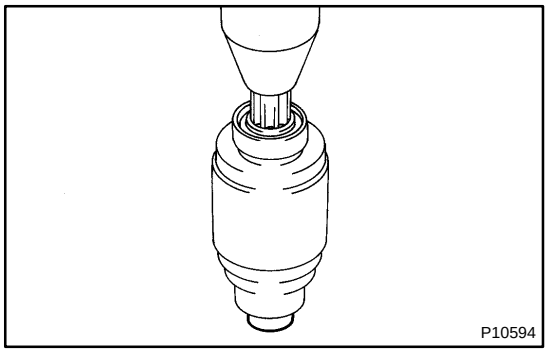
15. INSPECT REAR BEARING

Turn each bearing by hand while applying inward force.
If resistance is felt or the bearing sticks, replace the bearing.

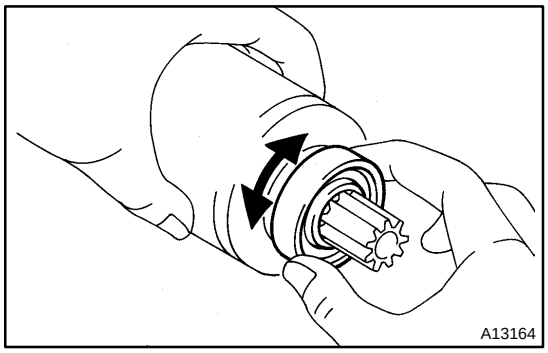


16. IF NECESSARY, REPLACE REAR BEARING

(a) Using SST, remove the bearing.
SST 09286–46011

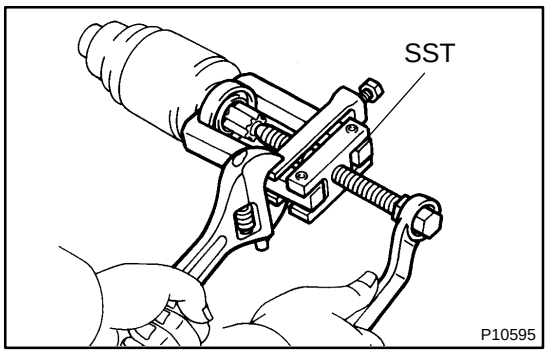


(b) Using a press, press in a new bearing.



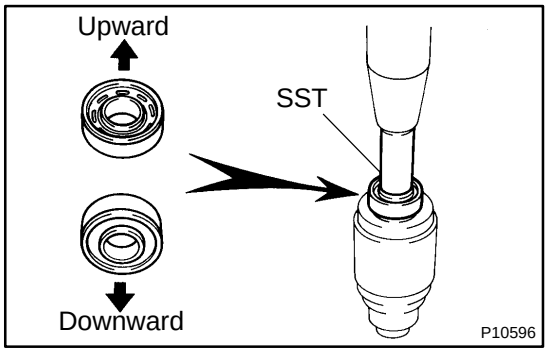
17. INSPECT FRONT BEARING

Turn each bearing by hand while applying inward force.
If resistance is felt or the bearing sticks, replace the bearing.



18. IF NECESSARY, REPLACE FRONT BEARING

(a) Using SST, remove the bearing.
SST 09286–46011

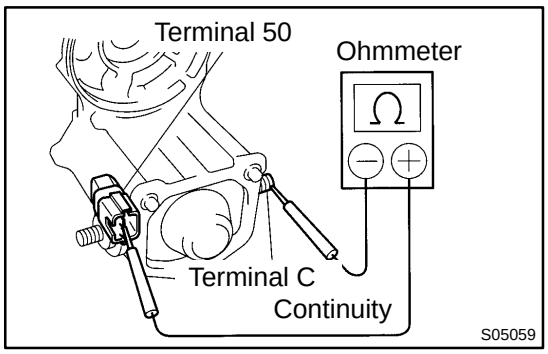


(b) Using SST and a press, press in a new bearing.

NOTICE:

Be careful of the bearing installation direction.

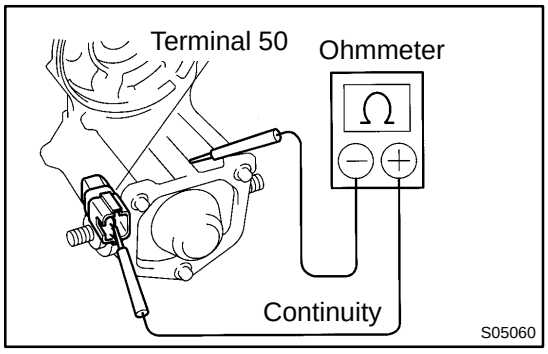
SST 09820–00030



19. INSPECT MAGNETIC SWITCH PULL–IN COIL OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, check and replace the magnetic switch.



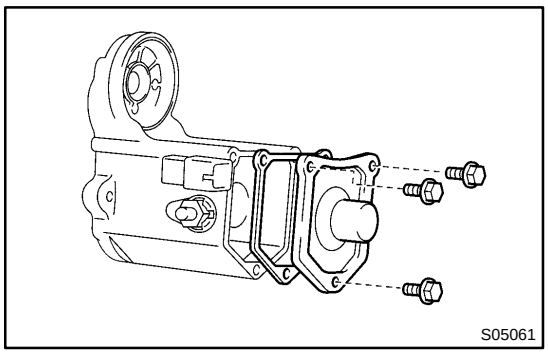
20. INSPECT MAGNETIC SWITCH HOLD–IN COIL OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

If there is no continuity, replace the magnetic switch.

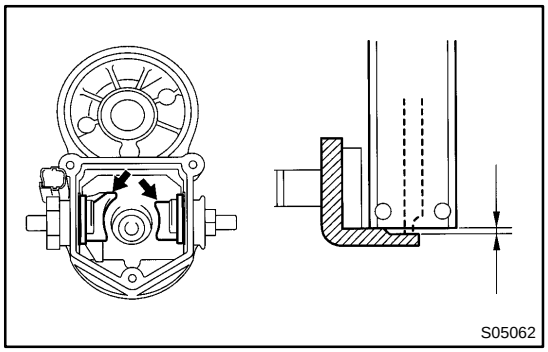
ST01C–04

REPLACEMENT



1. REMOVE MAGNETIC SWITCH END COVER

Remove the 3 bolts, end cover, gasket and plunger.

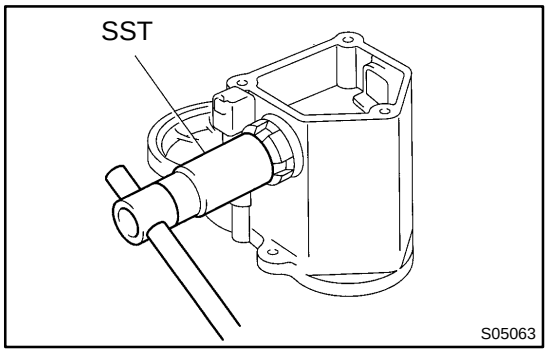


2. INSPECT CONTACT PLATE FOR WEAR

Using vernier calipers, measure the contact plate for depth of wear.

Maximum wear: 0.9 mm (0.035 in.)

If the depth of wear is greater than the maximum, replace the contact plate.

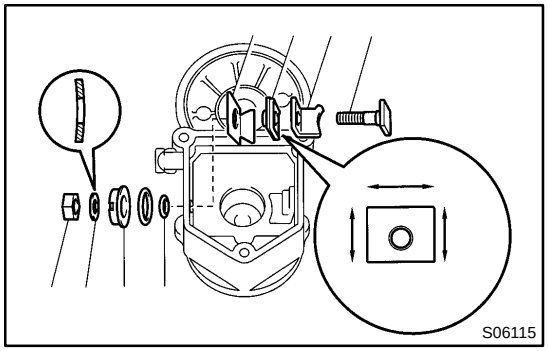


3. REMOVE TERMINAL KIT PARTS

(a) Using SST, loosen the terminal nuts.
SST 09810–38140

(b) Terminal C:
Remove the terminal nut, wave washer, terminal insulator (outside), O–ring, terminal bolt, contact plate and terminal insulator (inside).

(c) Terminal 30:
Remove the terminal nut, wave washer, terminal insulator (outside), packing, O–ring, terminal bolt, contact plate, terminal insulator (inside) and insulation paper.



4. REINSTALL TERMINAL KIT PARTS

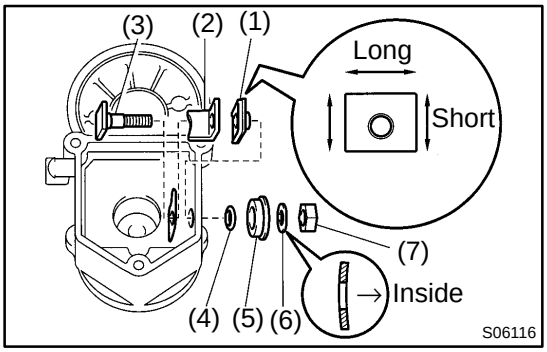
(a) Terminal 30:
Install these new parts:
(1) Insulation paper
(2) Terminal insulator (inside)
(3) Contact plate
(4) Terminal bolt
(5) O–ring
(6) Packing and terminal insulator (outside):
Install the packing to the terminal insulator, and install them.

HINT:
Match the protrusion of the insulator with the indentation of the housing.

(7) Wave washer
(8) Terminal nut

NOTICE:

Be careful to install the terminal insulators (inside) and wave washers in the correct direction.

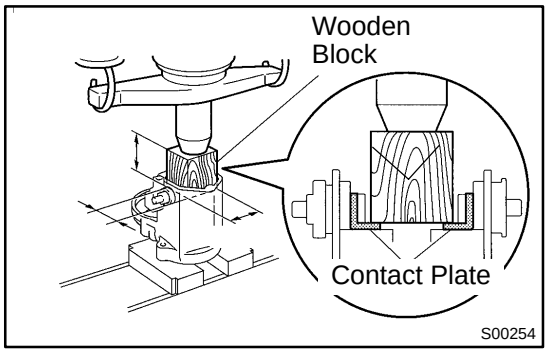


(b) Terminal C:
Install these new parts:
(1) Terminal insulator (inside)
(2) Contact plate
(3) Terminal bolt
(4) O–ring
(5) Terminal insulator (outside)
(6) Wave washer
(7) Terminal nut

NOTICE:

Be careful to install the terminal insulators (inside) and wave washers in the correct direction.

(c) Temporarily tighten the terminal nuts.



5. TIGHTEN TERMINAL NUT

(a) Put a wooden block on the contact plate and press it down with a hand press.

Dimensions of wooden block:
20 x 37 x 40 mm (0.79 x 1.46 x 1.57 in.)
Press force:
981 N (100 kgf, 221 lbf)

NOTICE:

- **Check the diameter of the hand press ram. Then calculate the gauge pressure of the press when 981 N (100 kgf, 221 lbf) of force is applied.**

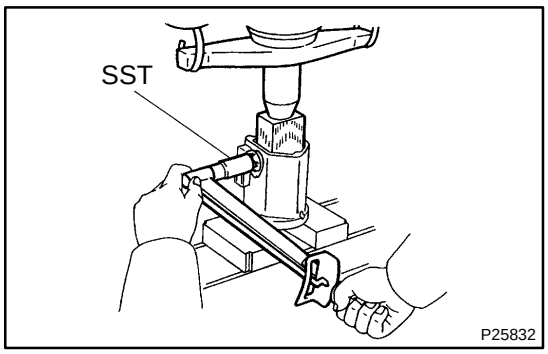
Gauge pressure:

$$(\text{kgf/cm}^2) = \frac{100\ \text{kgf}}{\left(\frac{\text{Ram diameter (cm)}}{2}\right)^2 \times 3.14\ (\pi)}$$

$$(\text{psi}) = \frac{221\ \text{lbf}}{\left(\frac{\text{Ram diameter (in.)}}{2}\right)^2 \times 3.14\ (\pi)}$$

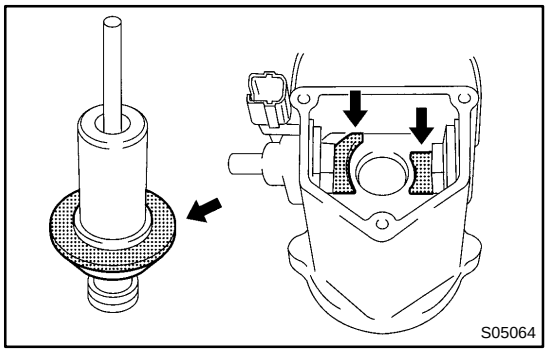
(kpa) = (kgf/cm^2) x 98.1
(kpa) = (psi) x 6.9

- **If the contact plate is not pressed down with the specified pressure, the contact plate may tilt due to coil deformation or the tightening of the nut.**



(b) Using SST, tighten the nuts to the specified torque.
SST 09810–38140
Torque: 17 N·m (170 kgf·cm, 12 ft·lbf)

NOTICE:
If the nut is over tightened, it may cause cracks on the inside of the insulator.



6. CLEAN CONTACT SURFACES OF CONTACT PLATE AND PLUNGER

Clean the contact surfaces of the remaining contact plate and plunger with a dry shop rag.

7. REINSTALL MAGNETIC SWITCH END COVER

Install the plunger, new gasket, end cover with 3 bolts.
Torque: 2.5 N·m (26 kgf·cm, 23 in.·lbf)

ST01D–02

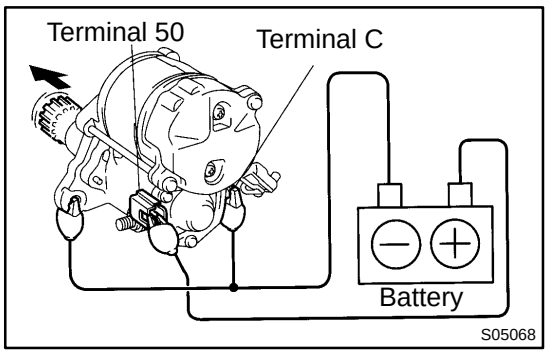
REASSEMBLY

Reassembly is in the reverse order of disassembly (See page ST–5).

HINT:

Before reassembling, use high–temperature grease to lubricate the bearings and gears.

ST01E–03



TEST

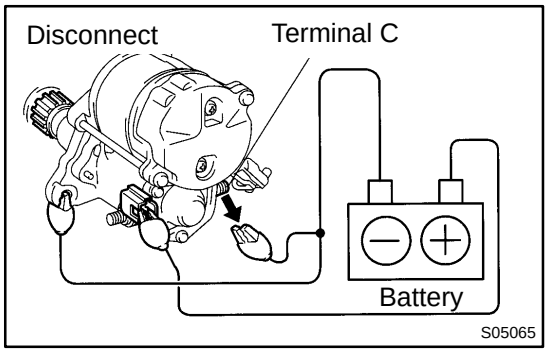
NOTICE:

These tests must be done within 3 to 5 seconds to avoid burning out the coil.

1. DO PULL–IN TEST

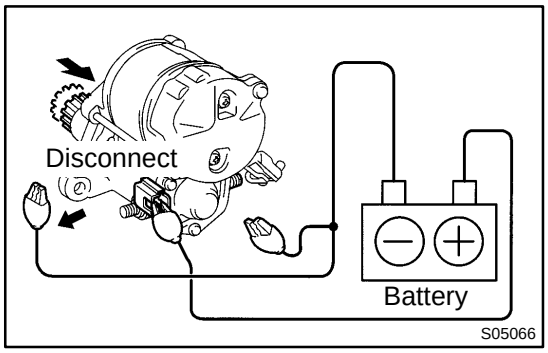
(a) Disconnect the field coil lead wire from terminal C.

(b) Connect the battery to the magnetic switch as shown. Check that the clutch pinion gear moves outward.



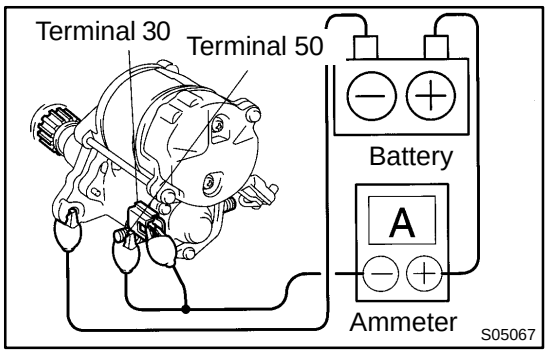
2. DO HOLD–IN TEST

With battery connected as above with the clutch pinion gear out, disconnect the negative (–) lead from terminal C. Check that the pinion gear remains out.



3. INSPECT CLUTCH PINION GEAR RETURN

Disconnect the negative (–) lead from the switch body. Check that the clutch pinion gear returns inward.



4. DO NO–LOAD PERFORMANCE TEST

(a) Connect the battery and ammeter to the starter as shown.

(b) Check that the starter rotates smoothly and steadily with the pinion gear moving out. Check that the ammeter reads the specified current.

Specified current: 90 A or less at 11.5 V

ST01F–02

INSTALLATION

Installation is in the reverse order of removal (See page ST–19).

STARTER RELAY

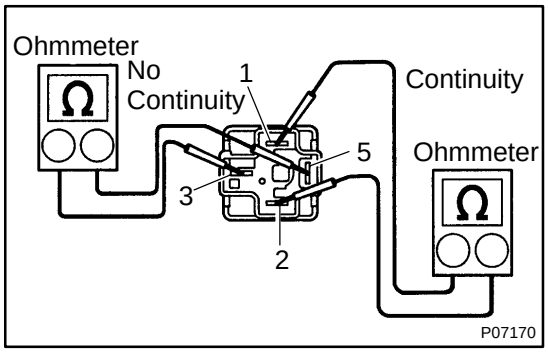
ST0L8–01

INSPECTION

1. REMOVE STARTER RELAY (Marking: ”ST”)

LOCATION: In the engine compartment relay box.

Remove the relay box cover and starter relay.



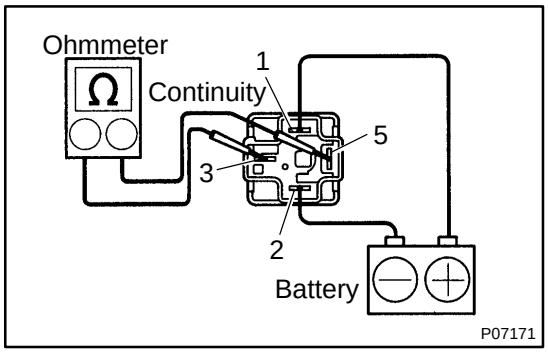
2. INSPECT STARTER RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



3. INSPECT STARTER RELAY OPERATION

(a) Apply battery positive voltage across terminals 1 and 2.

(b) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

4. REINSTALL STARTER RELAY

STEERING SYSTEM

SR05M–01

PRECAUTION

★ **Care must be taken to replace parts properly because they could affect the performance of the steering system and result in a driving hazard.**

★ **The LEXUS ES300 is equipped with SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deployed during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.**

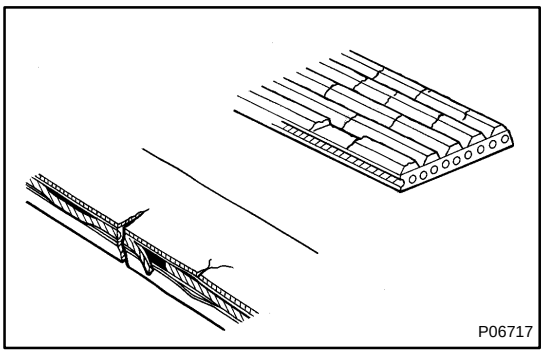
TROUBLESHOOTING

SR05N–01

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in the order shown. If necessary, repair or replace these parts.

Symptom	Suspect Area	See page
Hard steering	1. Tires (Improperly inflated)	SA–2
	2. Power steering fluid level (Low)	SR–5
	3. Drive belt (Loose)	SR–3
	4. Front wheel alignment (Incorrect)	SA–4
	5. Steering system joints (Worn)	–
	6. Suspension arm ball joints (Worn)	SA–39
	7. Steering column (Binding)	–
	8. Power steering vane pump	SR–18
	9. Power steering gear	SR–29
Poor return	1. Tires (Improperly inflated)	SA–2
	2. Front wheel alignment (Incorrect)	SA–4
	3. Steering column (Binding)	–
	4. Power steering gear	SR–29
Excessive play	1. Steering system joints (Worn)	–
	2. Suspension arm ball joints (Worn)	SA–39
	3. Intermediate shaft, Sliding yoke (Worn)	–
	4. Front wheel bearing (Worn)	SA–9
	5. Power steering gear	SR–29
Abnormal noise	1. Power steering fluid level (Low)	SR–5
	2. Steering system joints (Worn)	–
	3. Power steering vane pump	SR–18
	4. Power steering gear	SR–29



DRIVE BELT

SR05O–05

INSPECTION

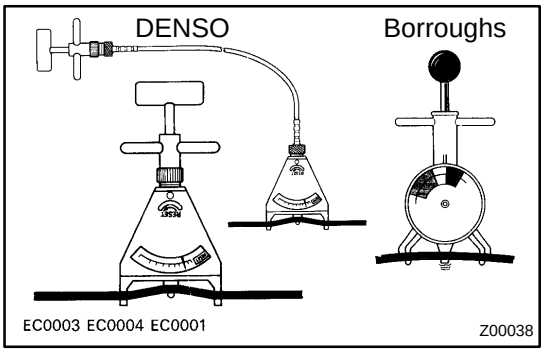
INSPECT DRIVE BELT

(a) Visually check the belt for excessive wear, frayed cords etc.

If any defect has been found, replace the drive belt.

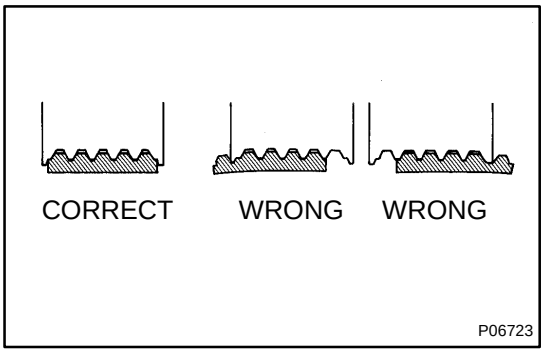
HINT:

Cracks on the rib side of a belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.



(b) Using a belt tension gauge, measure the belt tension.
Belt tension gauge:
DENSO BTG–20 (95506–00020)
Borroughs No. BT–33–73F
Drive belt tension:
New belt: 150 – 185 lbf
Used belt: 95 – 135 lbf

If the belt tension is not as specified, adjust it.



HINT:

- ★ "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- ★ "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- ★ After installing a belt, check that it fits properly in the ribbed grooves.
- ★ Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.
- ★ After installing a new belt, run the engine for about 5 minutes and recheck the belt tension.

POWER STEERING FLUID

SR05P–01

BLEEDING

1. CHECK FLUID LEVEL

(See page SR–5)

2. JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS

3. TURN STEERING WHEEL

With the engine stopped, turn the wheel slowly from lock to lock several times.

4. LOWER VEHICLE

5. START ENGINE

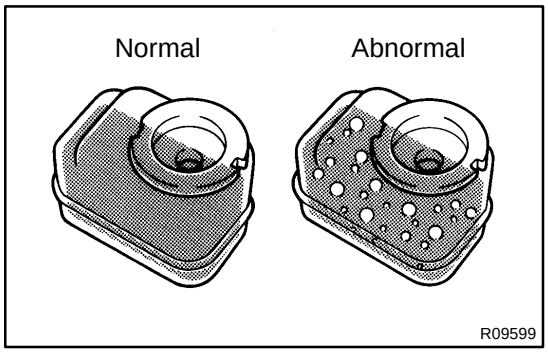
Run the engine at idle for a few minutes.

6. TURN STEERING WHEEL

(a) With the engine idling, turn the wheel to left or right full lock and keep it there for 2–3 seconds, then turn the wheel to the opposite full lock and keep it there for 2–3 seconds.

(b) Repeat (a) several times.

7. STOP ENGINE



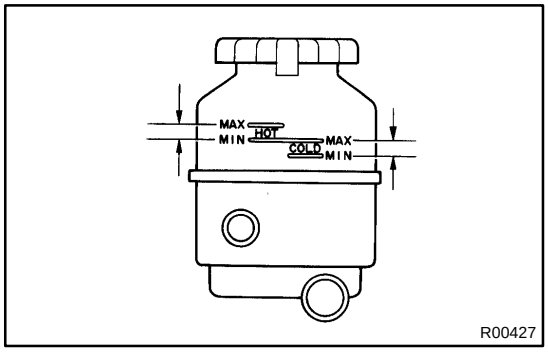
8. CHECK FOR FOAMING OR EMULSIFICATION

If the system has to be bled twice specifically because of foaming or emulsification, check for fluid leaks in the system.

9. CHECK FLUID LEVEL

(See page SR–5)

SR05Q–10



INSPECTION

1. CHECK FLUID LEVEL

(a) Keep the vehicle level.

(b) With the engine stopped, check the fluid level in the oil reservoir.

If necessary, add fluid.

Fluid: ATF DEXRON® II or III

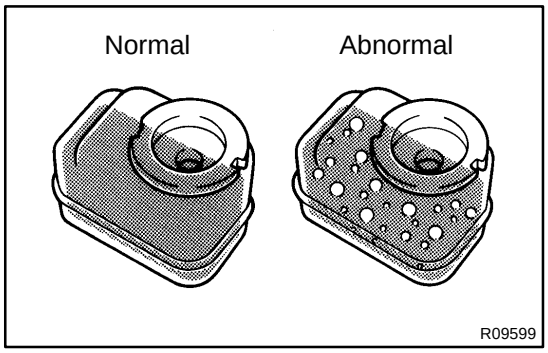
HINT:

Check that the fluid level is within the HOT LEVEL range on the reservoir. If the fluid is cold, check that it is within the COLD LEVEL range.

(c) Start the engine and run it at idle.

(d) Turn the steering wheel from lock to lock several times to boost fluid temperature.

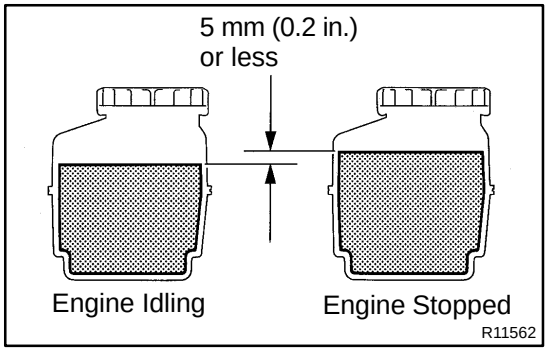
Fluid temperature: 80˚C (176˚F)



(e) Check for foaming or emulsification.

If there is foaming or emulsification, bleed power steering system.

(See page SR–4)



(f) With the engine idling, measure the fluid level in the oil reservoir.

(g) Stop the engine.

(h) Wait a few minutes and remeasure the fluid level in the oil reservoir.

Maximum fluid level rise: 5 mm (0.20 in.)

If a problem is found, bleed power steering system.

(See page SR–4)

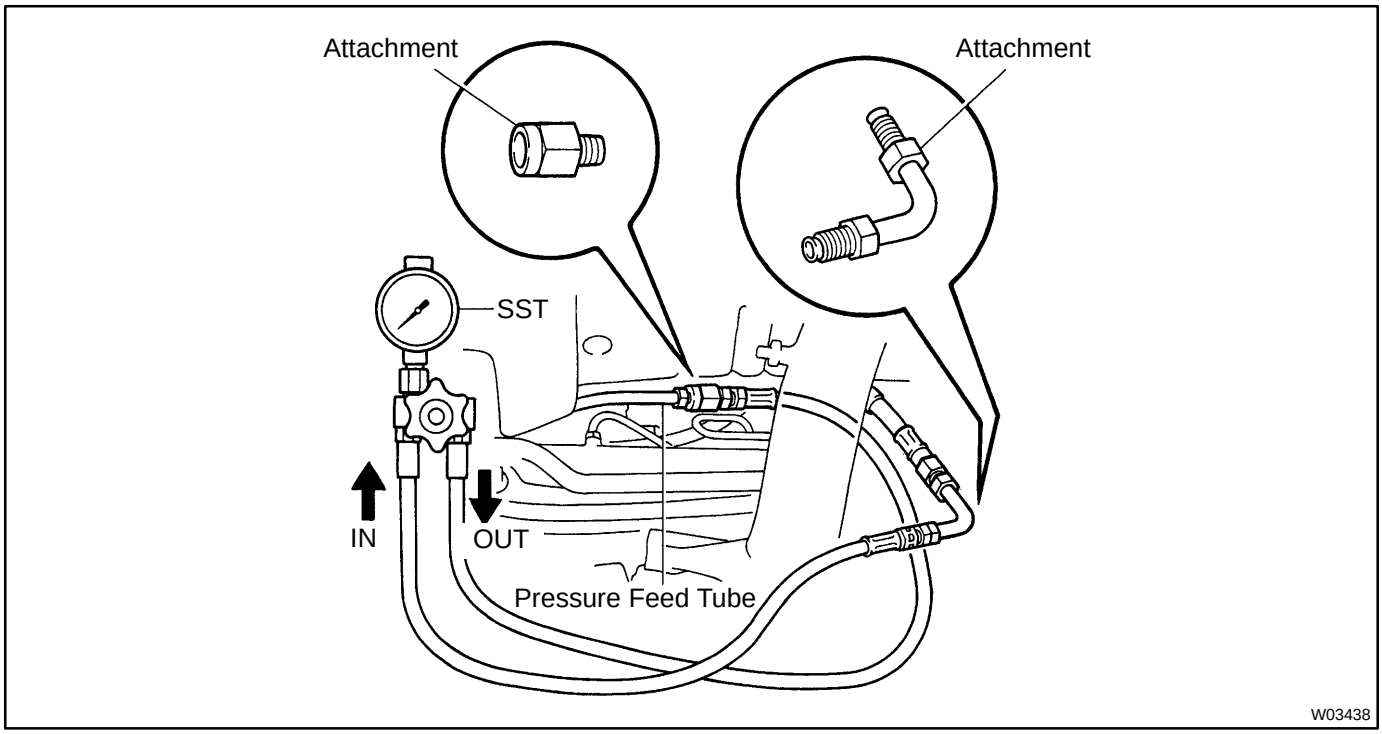
(i) Check the fluid level.

2. CHECK STEERING FLUID PRESSURE

(a) Disconnect the pressure feed tube.
(See page SR–20)

(b) Connect SST, as shown below.
SST 09640–10010 (09641–01010, 09641–01030, 09641–01060)

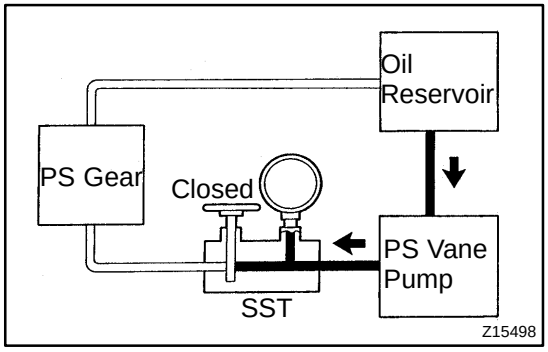
NOTICE:
Check that the valve of the SST is in the open position.



(c) Bleed the power steering system.
(See page SR–4)

(d) Start the engine and run it at idle.

(e) Turn the steering wheel from lock to lock several times to boost fluid temperature.
Fluid temperature: 80 ˚C (176 ˚F)

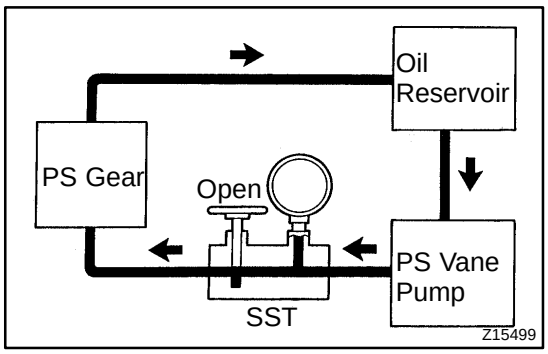


(f) With the engine idling, close the valve of the SST and observe the reading on the SST.
Minimum fluid pressure:
7,845 kPa (80 kgf·cm^2, 1,138 psi)

NOTICE:

★ **Do not keep the valve closed for more than 10 seconds.**

★ **Do not let the fluid temperature become too high.**

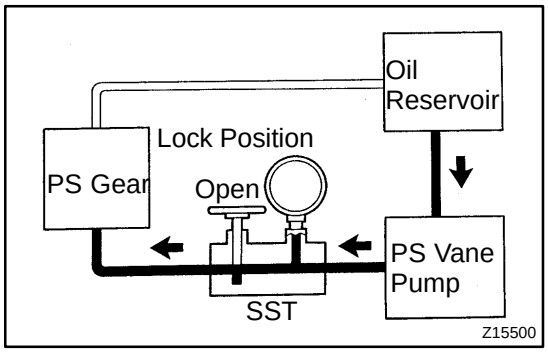


(g) With the engine idling, open the valve fully.

(h) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.

Difference fluid pressure:
490 kPa (5 kgf·cm^2, 71 psi) or less

NOTICE:
Do not turn the steering wheel.



(i) With the engine idling and valve fully opened, turn the steering wheel to full lock.

Minimum fluid pressure:
7,845 kPa (80 kgf·cm^2, 1,138 psi)

NOTICE:

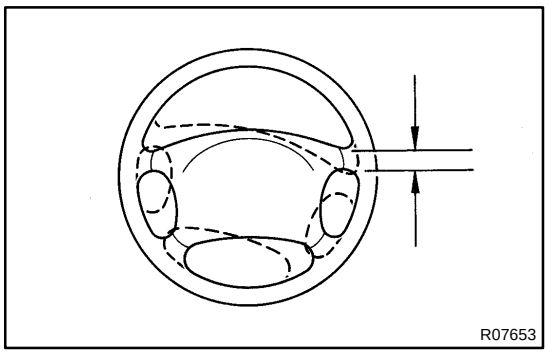
★ **Do not maintain lock position for more than 10 seconds.**

★ **Do not let the fluid temperature become too high.**

(j) Disconnect the SST.

(k) Connect the pressure feed tube.
(See page SR–27)

(l) Bleed the power steering system.
(See page SR–4)



STEERING WHEEL

SR05R–10

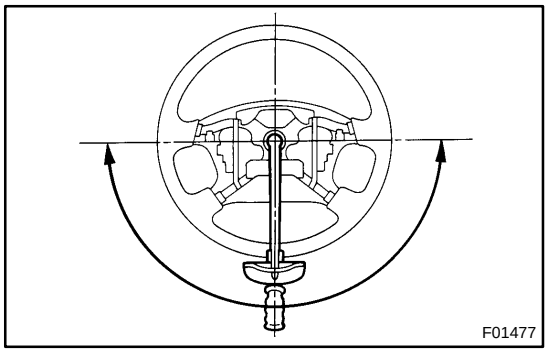
INSPECTION

1. CHECK STEERING WHEEL FREEPLAY

With the vehicle stopped and tires facing straight ahead, rock the steering wheel gently back and forth with light finger pressure.

Freeplay should not exceed the maximum.

Maximum freeplay: 30 mm (1.18 in.)



2. CHECK STEERING EFFORT

(a) Center the steering wheel.

(b) Remove the steering wheel pad.
(See page SR–11)

(c) Start the engine and run it at idle.

(d) Measure the steering effort in both directions.

Reference: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

HINT:

Be sure to consider the tire type, pressure and contact surface before making your diagnosis.

(e) Torque the steering wheel set nut.

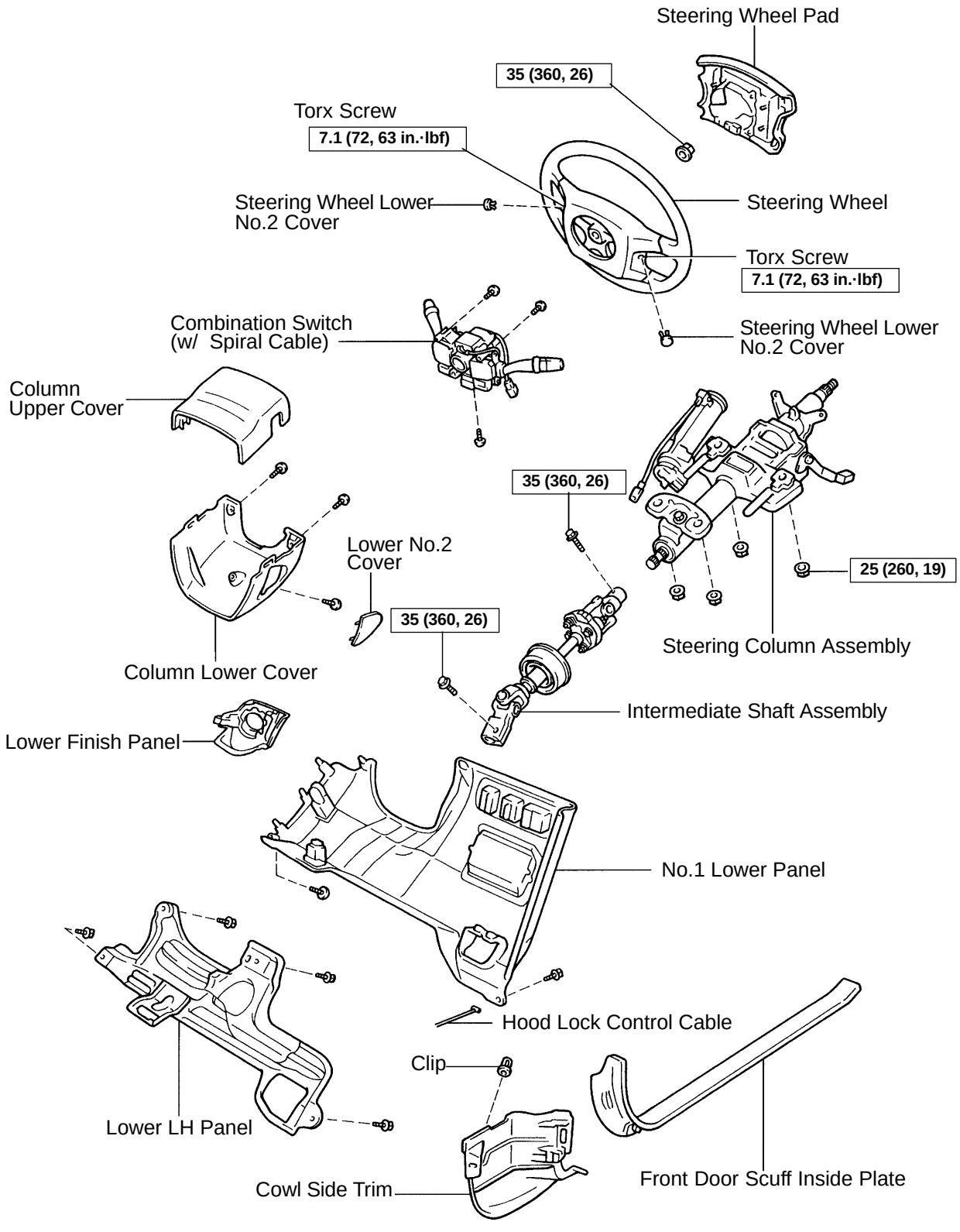
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

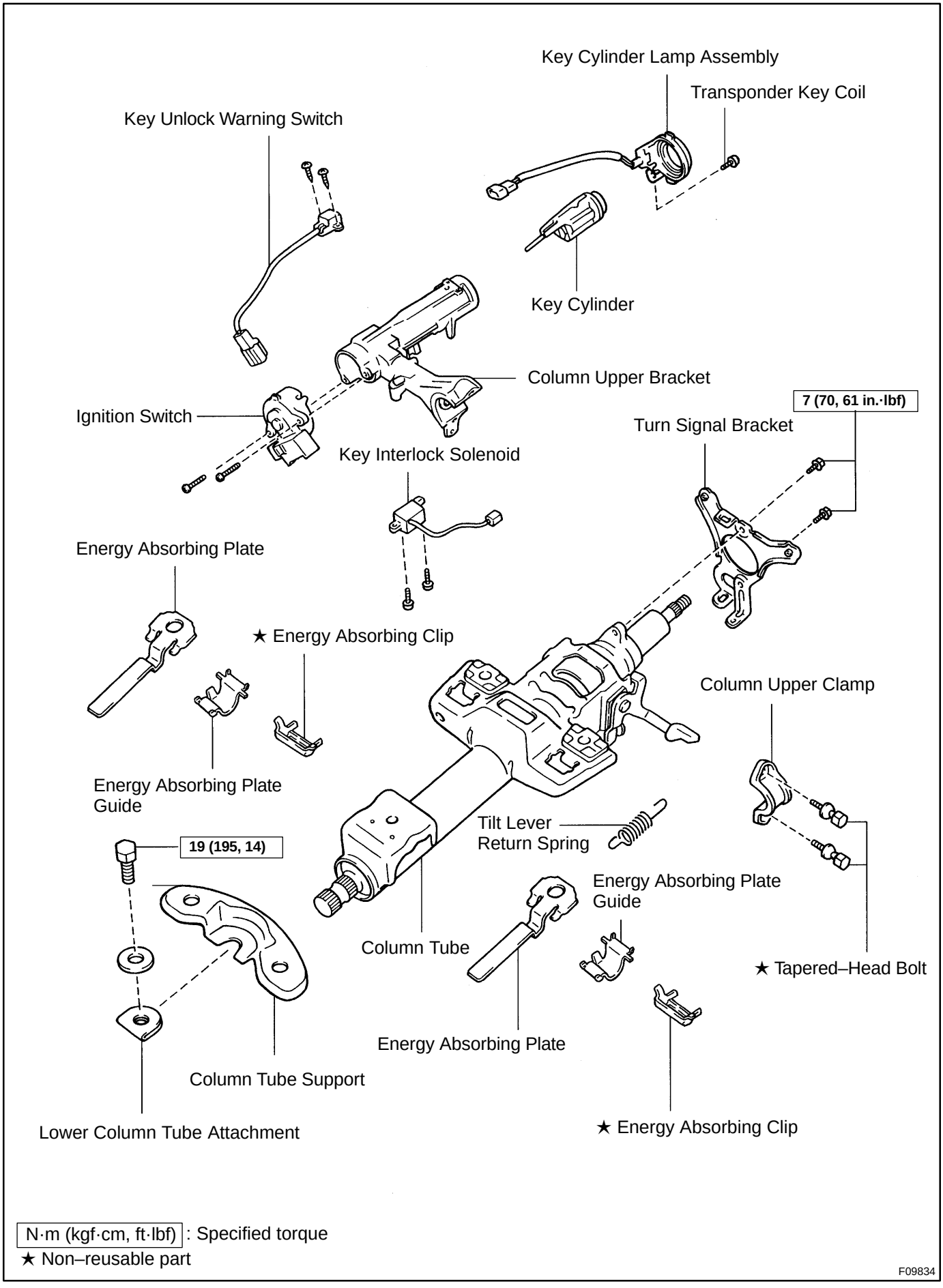
(f) Install the steering wheel pad.
(See page SR–16)

TILT STEERING COLUMN

COMPONENTS

SR05S–05





N·m (kgf·cm, ft·lbf) : Specified torque

★ Non–reusable part

F09834

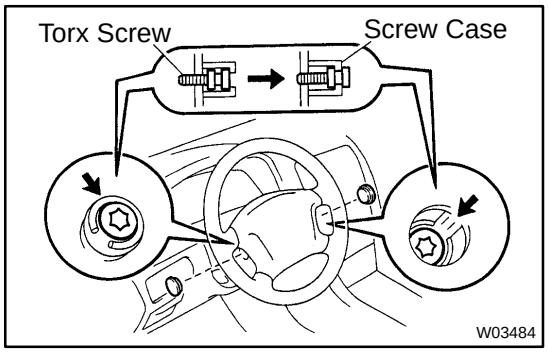
SR05T–01

REMOVAL

1. REMOVE STEERING WHEEL PAD

NOTICE:

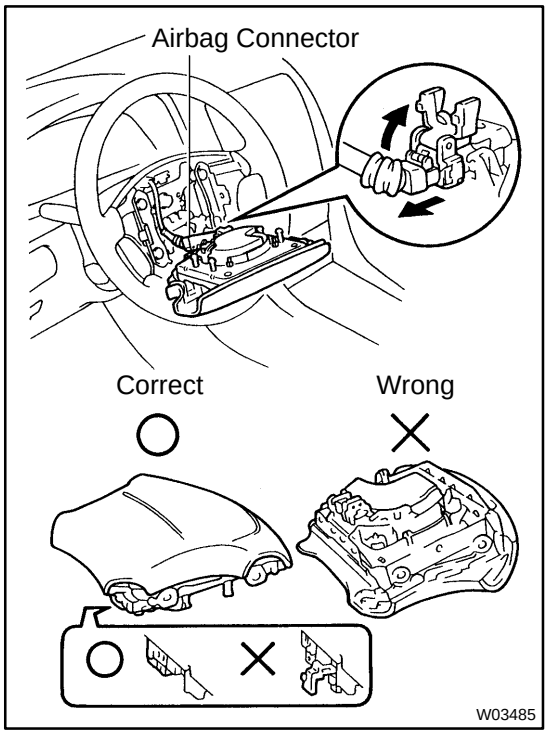
- ★ **If the airbag connector is disconnected with the ignition switch at ON or ACC, DTCs will be recorded.**
- ★ **Never use airbag parts from another vehicle. When replacing parts, replace with new ones.**



(a) Place the front wheels facing straight ahead.
(b) Remove the 2 steering wheel lower No.2 covers.
(c) Using a torx socket wrench, loosen the 2 torx screws.

HINT:

Loosen the 2 screws until the groove along the screw circumference catches on the screw case.



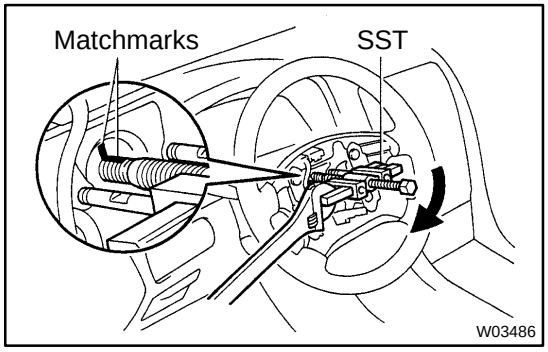
(d) Pull the pad out from the steering wheel and disconnect the airbag connector.

CAUTION:

- ★ **When storing the wheel pad, keep the upper surface of the pad facing upward.**
- ★ **Never disassemble the wheel pad.**

NOTICE:

When removing the wheel pad, take care not to pull the airbag wire harness.



2. REMOVE STEERING WHEEL

(a) Disconnect the connector.
(b) Remove the steering wheel set nut.
(c) Place matchmarks on the steering wheel and main shaft assembly.
(d) Using SST, remove the wheel.

SST 09950–50010 (09951–05010, 09952–05010, 09953–05020, 09954–05020)

3. REMOVE UPPER AND LOWER COLUMN COVERS

(a) Remove the lower No.2 cover from the lower cover.

(b) Remove the 3 screws.

4. REMOVE FRONT DOOR SCUFF INSIDE PLATE

5. REMOVE COWL SIDE TRIM

Remove the clip.

6. REMOVE No.1 LOWER PANEL

(a) Remove the 2 screws.

(b) Disconnect the hood lock control cable.

7. REMOVE LOWER LH PANEL

Remove the 4 bolts.

8. REMOVE LOWER FINISH PANEL

9. REMOVE COMBINATION SWITCH WITH SPIRAL CABLE

(a) Disconnect the 3 connectors.

(b) w/ ELECTRONIC MODULATED SUSPENSION
Disconnect the connector.

(c) Disconnect the airbag connector.

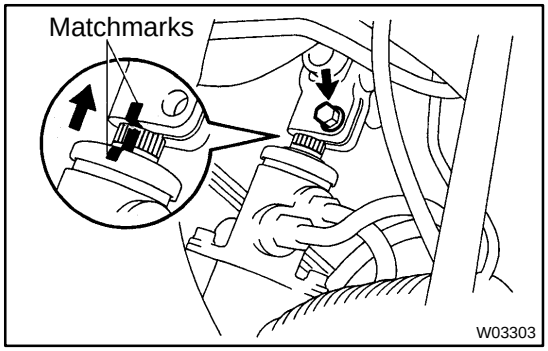
(d) Remove the 3 screws.

10. REMOVE SPIRAL CABLE

(See page BE–26)

NOTICE:

Do not disassemble the cable or apply oil to it.



11. DISCONNECT INTERMEDIATE SHAFT ASSEMBLY

(a) Place matchmarks on the intermediate shaft and control valve shaft.

(b) Remove the bolt.

12. REMOVE INTERMEDIATE SHAFT ASSEMBLY

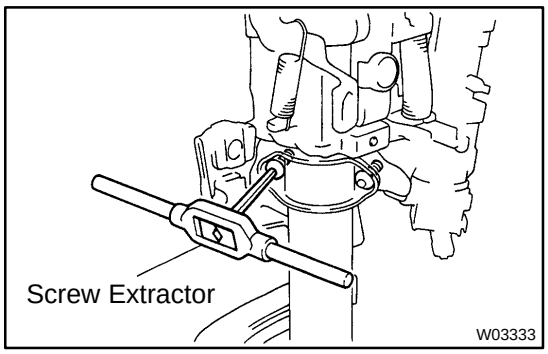
Remove the bolt.

13. REMOVE STEERING COLUMN ASSEMBLY

(a) Disconnect the connectors.

(b) Remove the 4 column assembly set nuts.

SR05U–05



DISASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. REMOVE KEY CYLINDER LAMP ASSEMBLY

Remove the screw and lamp assembly.

2. REMOVE COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

(a) Using a centering punch, mark the center of the 2 tapered–head bolts.

(b) Using a 3–4 mm (0.12–0.16 in.) drill, drill into the 2 bolts.

(c) Using a screw extractor, remove the 2 bolts.

3. REMOVE TURN SIGNAL BRACKET

Remove the 2 bolts.

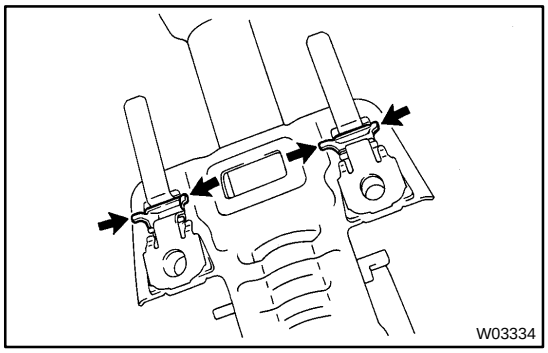
4. REMOVE TILT LEVER RETURN SPRING

5. REMOVE COLUMN TUBE SUPPORT

(a) Remove the bolt and washer.

(b) Remove the tube support with lower column tube attachment.

(c) Remove the tube attachment from the tube support.



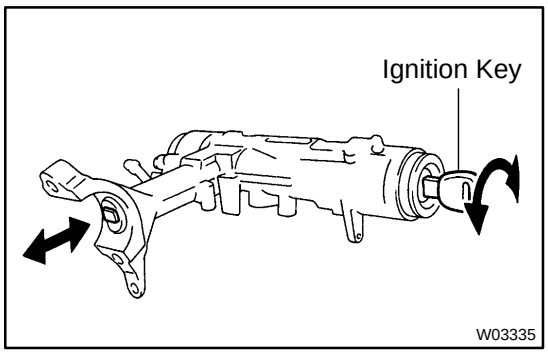
6. REMOVE 2 ENERGY ABSORBING PLATES

(a) Using pliers, remove the energy absorbing clip.

(b) Remove the energy absorbing plate, energy absorbing plate guide.

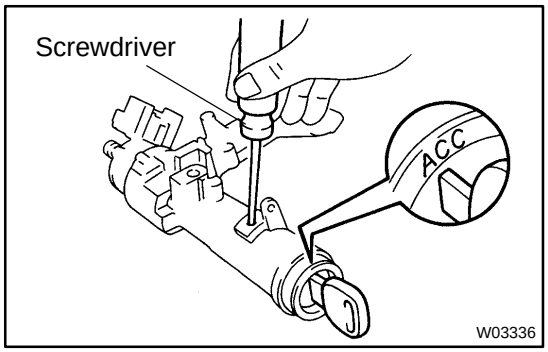
SR05V–05

INSPECTION



1. INSPECT STEERING LOCK OPERATION

Check that the steering lock mechanism operates properly.



2. IF NECESSARY, REPLACE KEY CYLINDER

(a) Place the ignition key at the ACC position.

(b) Push down the stop pin with a screwdriver, and pull out the cylinder.

(c) Install a new cylinder.

HINT:

Make sure the key is at the ACC position.

3. INSPECT IGNITION SWITCH
(See page BE–20)

4. IF NECESSARY, REPLACE IGNITION SWITCH

(a) Remove the 2 screws.

(b) Install a new switch with the 2 screws.

5. INSPECT KEY UNLOCK WARNING SWITCH
(See page BE–20)

6. IF NECESSARY, REPLACE KEY UNLOCK WARNING SWITCH

(a) Remove the 2 screws.

(b) Install a new switch with the 2 screws.

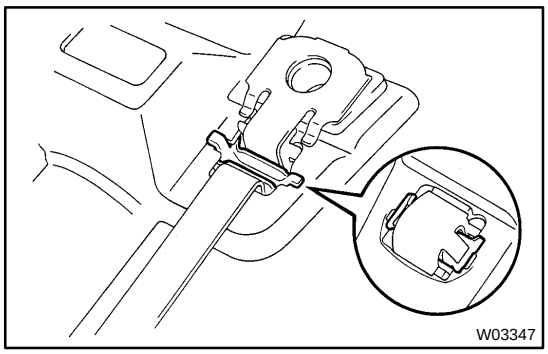
7. INSPECT KEY INTERLOCK SOLENOID
(See page AX–17)

8. IF NECESSARY, REPLACE KEY INTERLOCK SOLENOID

(a) Remove the 2 screws.

(b) Install a new solenoid with the 2 screws.

SR05W–05



REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. INSTALL 2 ENERGY ABSORBING PLATES

(a) Install the energy absorbing plate guide and absorbing plate.

(b) Install the new energy absorbing clip.

2. INSTALL COLUMN TUBE SUPPORT

(a) Install the tube attachment to the tube support.

(b) Torque the bolt and washer.

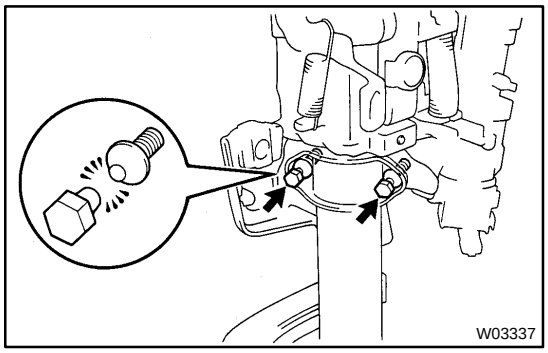
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

3. INSTALL TILT LEVER RETURN SPRING

4. INSTALL TURN SIGNAL BRACKET

Torque the 2 bolts.

Torque: 7 N·m (70 kgf·cm, 61 in.·lbf)



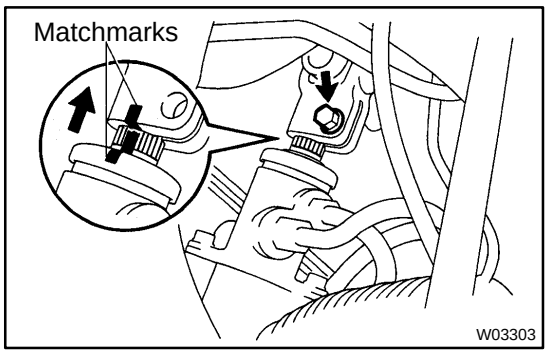
5. INSTALL COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

Tighten the 2 new tapered–head bolts until the bolt heads break off.

6. INSTALL KEY CYLINDER LAMP ASSEMBLY

Install the lamp assembly with the screw.

SR05X–01



INSTALLATION

1. INSTALL STEERING COLUMN ASSEMBLY

(a) Torque the 4 column assembly set nuts.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)

(b) Connect the connectors.

2. INSTALL INTERMEDIATE SHAFT ASSEMBLY

Torque the bolt.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

3. CONNECT INTERMEDIATE SHAFT ASSEMBLY

(a) Align the matchmarks on the intermediate shaft and control valve shaft.

(b) Torque the bolt.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

4. INSTALL SPIRAL CABLE
(See page BE–26)

5. INSTALL COMBINATION SWITCH WITH SPIRAL CABLE

(a) Tighten the 3 screws.

(b) Connect the airbag connector.

(c) w/ ELECTRONIC MODULATED SUSPENSION:
Connect the connector.

(d) Connect the 3 connectors.

6. INSTALL LOWER FINISH PANEL

7. INSTALL LOWER LH PANEL

Tighten the 4 bolts.

8. INSTALL No.1 LOWER PANEL

(a) Connect the hood lock control cable.

(b) Tighten the 2 screws.

9. INSTALL COWL SIDE TRIM

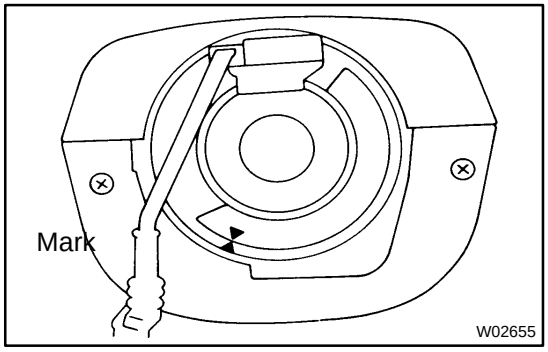
Install the clip.

10. INSTALL FRONT DOOR SCUFF INSIDE PLATE

11. INSTALL UPPER AND LOWER COLUMN COVERS

(a) Tighten the 3 screws.

(b) Install the lower No.2 cover to the lower cover.



12. CENTER SPIRAL CABLE

(a) Check that the front wheels are facing straight ahead.

(b) Turn the cable counterclockwise by hand until it becomes harder to turn the cable.

(c) Then rotate the cable clockwise about 3 turns to align the mark.

HINT:
The cable will rotate about 3 turns to either left or right of the center.

13. INSTALL STEERING WHEEL

(a) Align the matchmarks on the wheel and main shaft.

(b) Torque the wheel set nut.

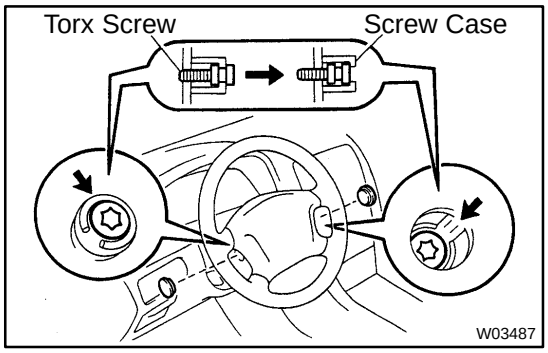
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

(c) Connect the connector.

14. INSTALL STEERING WHEEL PAD

NOTICE:

- ★ **Make sure the wheel pad is installed to the specified torque.**
- ★ **If the wheel pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.**
- ★ **When installing the wheel pad, take care that the wirings do not interfere with other parts and are not pinched between other parts.**



(a) Connect the airbag connector.

(b) Install the pad after confirming that the circumference groove of the torx screw is caught on the screw case.

(c) Using a torx socket wrench, torque the 2 screws.

Torque: 7.1 N·m (72 kgf·cm, 63 in.·lbf)

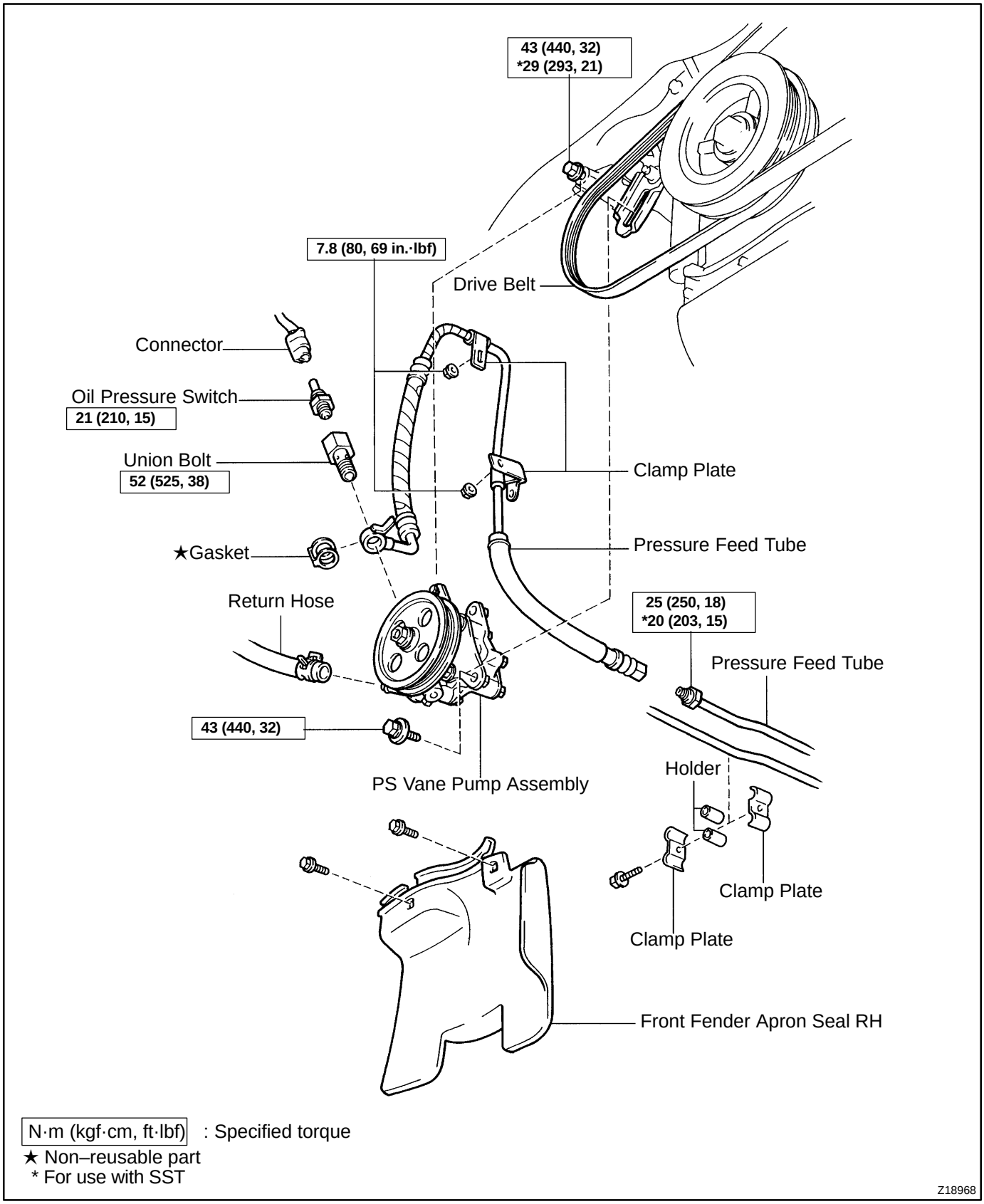
(d) Install the 2 steering wheel lower No.2 covers.

15. CHECK STEERING WHEEL CENTER POINT

POWER STEERING VANE PUMP

COMPONENTS

SR05Y–04

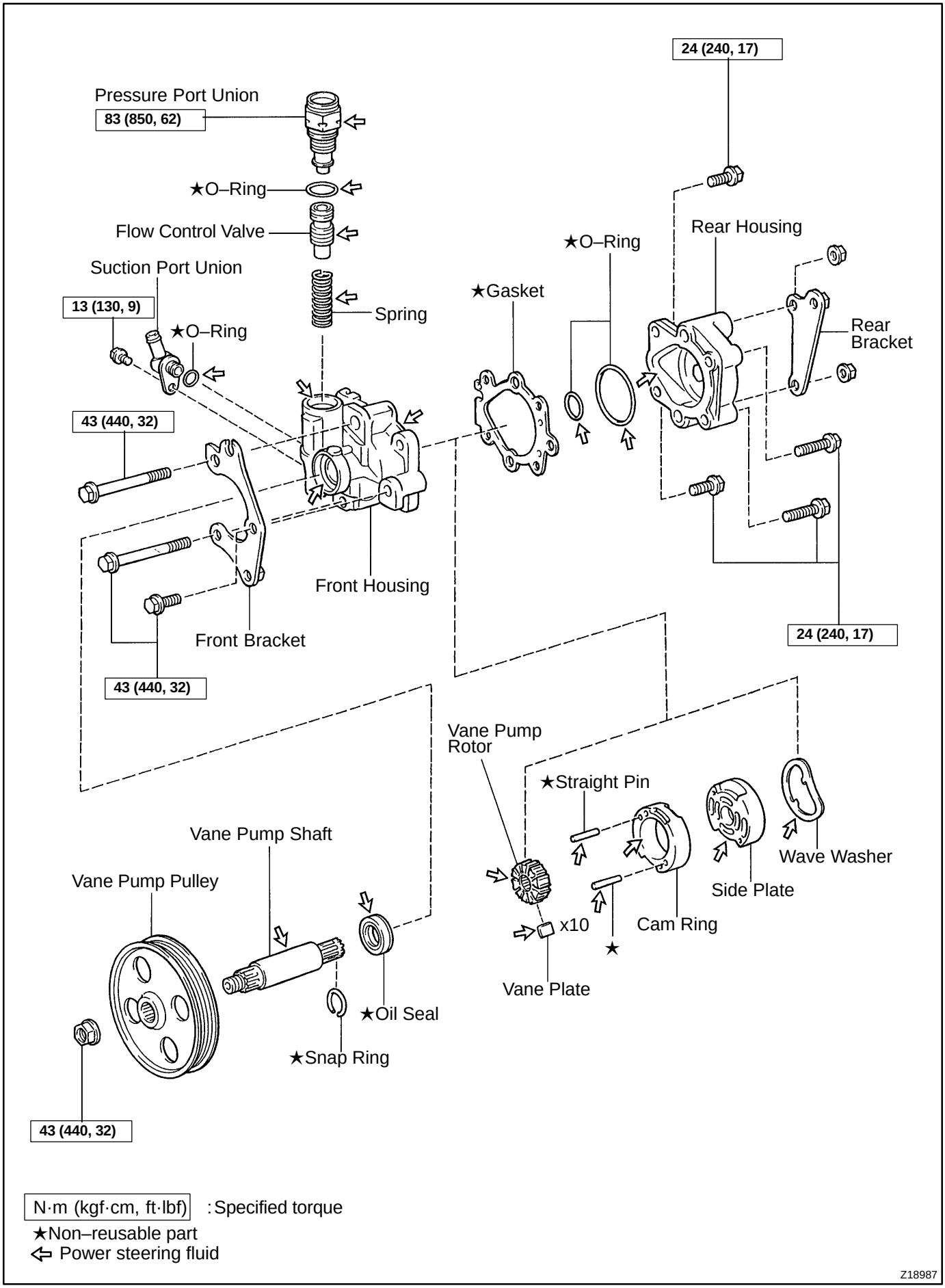


N·m (kgf·cm, ft·lbf) : Specified torque

★ Non–reusable part

* For use with SST

Z18968


24 (240, 17)
Pressure Port Union
83 (850, 62)
★O–Ring
Flow Control Valve
Suction Port Union
13 (130, 9)
★O–Ring
Spring
★Gasket
★O–Ring
Rear Housing
Rear Bracket
43 (440, 32)
Front Housing
Front Bracket
43 (440, 32)
24 (240, 17)
Vane Pump Rotor
★Straight Pin
Wave Washer
Side Plate
Cam Ring
x10
★
Vane Plate
Vane Pump Shaft
Vane Pump Pulley
★Oil Seal
★Snap Ring
43 (440, 32)
N·m (kgf·cm, ft·lbf) : Specified torque
★Non–reusable part
⇦ Power steering fluid
Z18987

SR05Z–01

REMOVAL

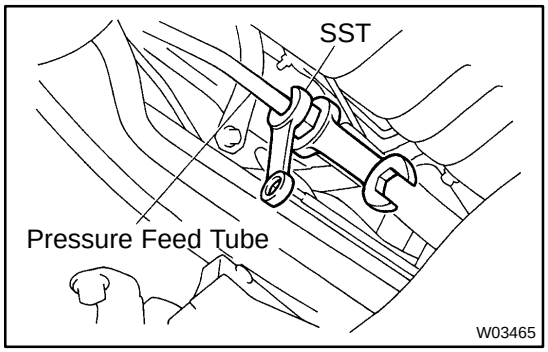
1. REMOVE FRONT FENDER APRON SEAL RH

Remove the 2 bolts.

2. DISCONNECT RETURN HOSE

NOTICE:

Take care not to spill fluid on the drive belt.



3. DISCONNECT PRESSURE FEED TUBE

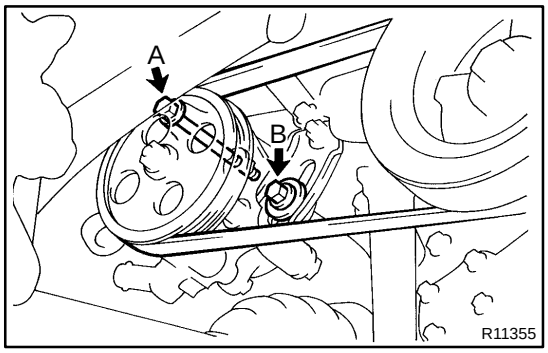
(a) Remove the 2 clamp plate set nuts.

(b) Remove the bolt.

(c) Remove the 2 clamp plates and 2 holders from the tube.

(d) Using SST, disconnect the tube.

SST 09631–22020



4. REMOVE DRIVE BELT

Loosen the 2 (A and B) bolts.

5. REMOVE PS VANE PUMP ASSEMBLY WITH PRESSURE FEED TUBE

(a) Disconnect the connector from the oil pressure switch.

(b) Loosen bolt A sufficiently so that pump assembly can be removed.

HINT:

Bolt A cannot be removed.

6. REMOVE PRESSURE FEED TUBE

(a) Remove the oil pressure switch from the union bolt.

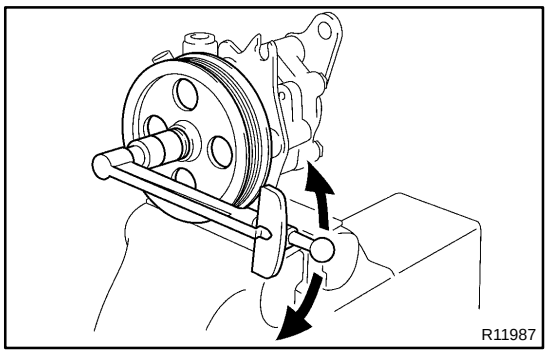
NOTICE:

Be careful not to drop the switch.

If the switch is dropped or strongly damaged, replace it with a new one.

(b) Remove the union bolt and gasket.

SR060–01



DISASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

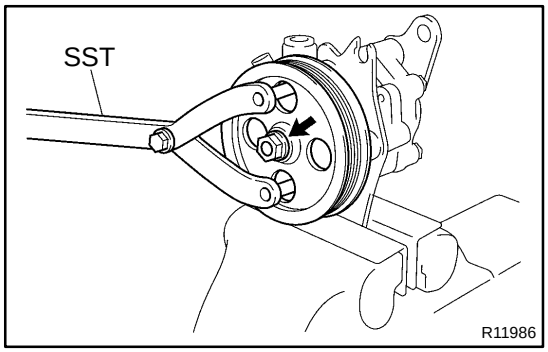
1. MEASURE PS VANE PUMP ROTATING TORQUE

(a) Check that the pump rotates smoothly without abnormal noise.

(b) Using a torque wrench, check the pump rotating torque.

Rotating torque:

0.3 N·m (2.8 kgf·cm, 2.4 in.·lbf) or less



2. REMOVE VANE PUMP PULLEY

Using SST, to stop the pulley rotating, remove the nut.

SST 09960–10010 (09962–01000, 09963–01000)

3. REMOVE FRONT AND REAR BRACKETS

Remove the 3 bolts and 2 nuts.

4. REMOVE SUCTION PORT UNION

(a) Remove the bolt.

(b) Remove the O–ring from the union.

5. REMOVE PRESSURE PORT UNION, FLOW CONTROL VALVE AND SPRING

Remove the O–ring from the union.

6. REMOVE REAR HOUSING

(a) Remove the 4 bolts.

(b) Remove the 2 O–rings from the housing.

7. REMOVE WAVE WASHER

8. REMOVE SIDE PLATE

9. REMOVE GASKET

10. REMOVE CAM RING, 10 VANE PLATES AND VANE PUMP ROTOR

Using a screwdriver, remove the snap ring from the vane pump shaft.

NOTICE:

Take care not to drop the plate.

11. REMOVE VANE PUMP SHAFT

12. REMOVE STRAIGHT PINS

Remove the 2 pins from the front housing.

SR061–04

INSPECTION

NOTICE:

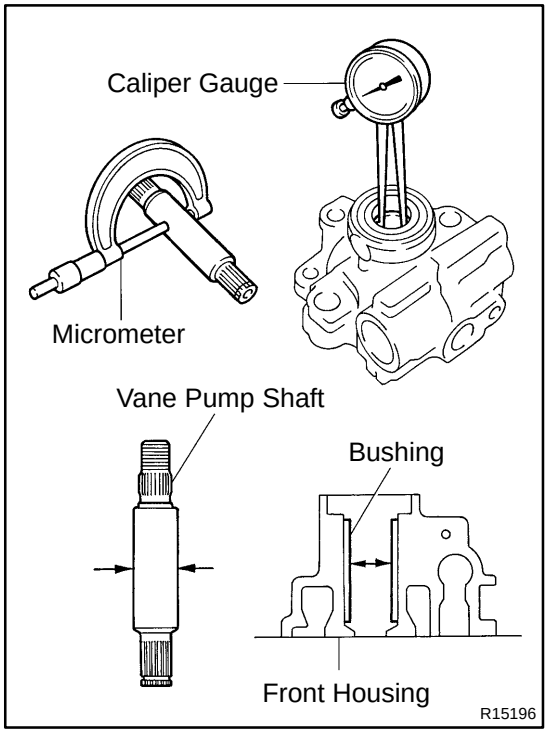
When using a vise, do not overtighten it.

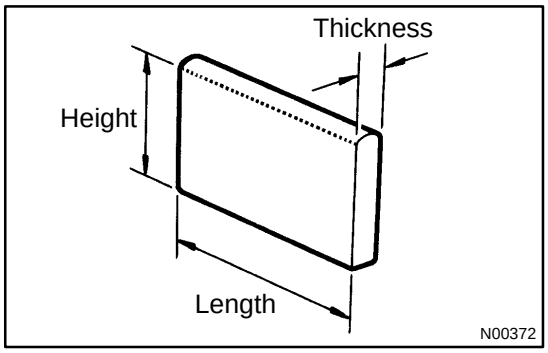
1. CHECK OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING

Using a micrometer and caliper gauge, measure the oil clearance.

Standard clearance:
0.03 – 0.05 mm (0.0012 – 0.0020 in.)
Maximum clearance: 0.07 mm (0.0028 in.)

If it is more than the maximum, replace the front housing and vane pump shaft.

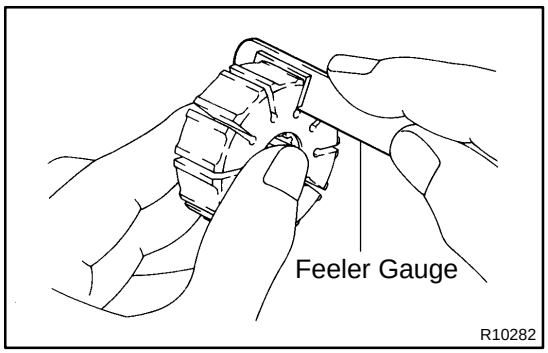




2. INSPECT VANE PUMP ROTOR AND VANE PLATES

(a) Using a micrometer, measure the height, thickness and length of the plates.

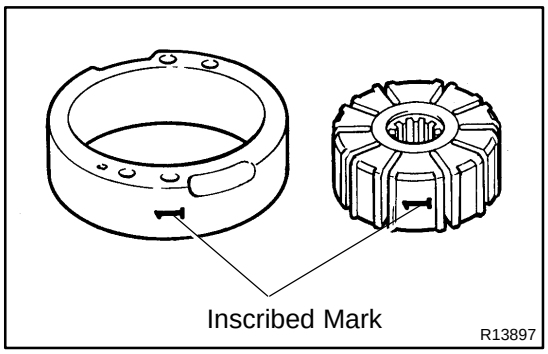
Minimum height: 8.6 mm (0.339 in.)
Minimum thickness: 1.397 mm (0.0550 in.)
Minimum length: 14.991 mm (0.5902 in.)



(b) Using a feeler gauge, measure the clearance between the rotor groove and plate.

Maximum clearance: 0.035 mm (0.0014 in.)

If it is more than the maximum, replace the plate and/or rotor with one having the same mark stamped on the cam ring.

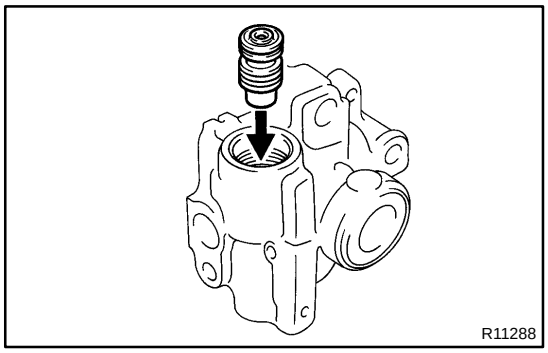


Inscribed mark: 1, 2, 3, 4 or None

HINT:

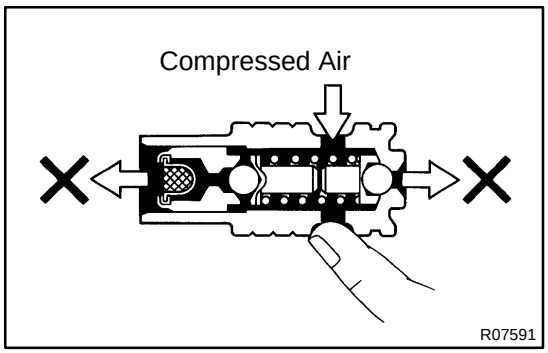
There are 5 vane lengths with the following rotor and cam ring marks:

Rotor and cam ring mark	Vane plate part number	Vane plate length mm (in.)
None	44345–26010	14.999–15.001 (0.59051–0.59059)
1	44345–26020	14.997–14.999 (0.59043–0.59051)
2	44345–26030	14.995–14.997 (0.59035–0.59043)
3	44345–26040	14.993–14.995 (0.59027–0.59035)
4	44345–26050	14.991–14.993 (0.59020–0.59027)

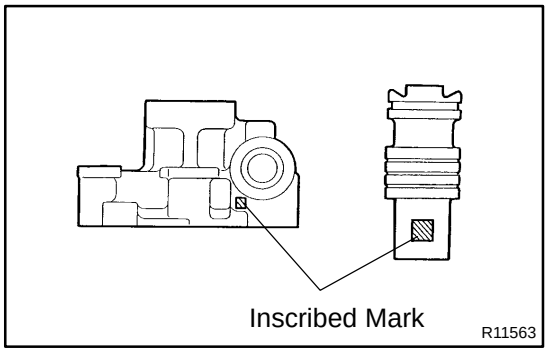


3. INSPECT FLOW CONTROL VALVE

(a) Coat the valve with power steering fluid and check that it falls smoothly into the valve hole by its own weight.

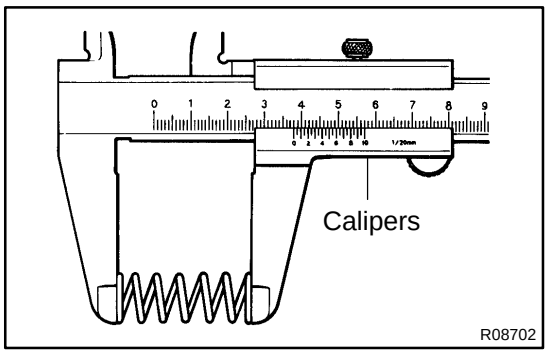


(b) Check the valve for leakage. Close one of the holes and apply 392–490 kPa (4–5 kgf/cm^2, 57–71 psi) of compressed air into the opposite side, and confirm that air does not come out from the end holes.



If necessary, replace the valve with one having the same letter as inscribed on the front housing.

Inscribed mark: A, B, C, D, E or F

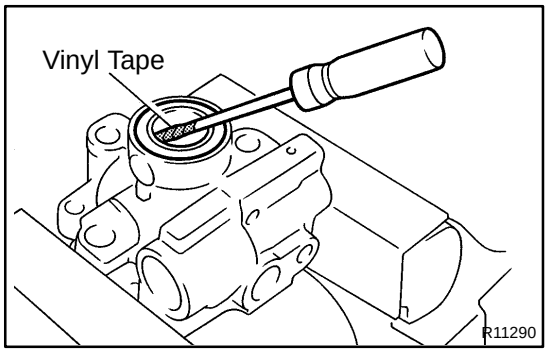


4. INSPECT SPRING

Using a calipers, measure the free length of the spring.

Minimum free length: 32.3 mm (1.272 in.)

If it is not within the specification, replace the spring.

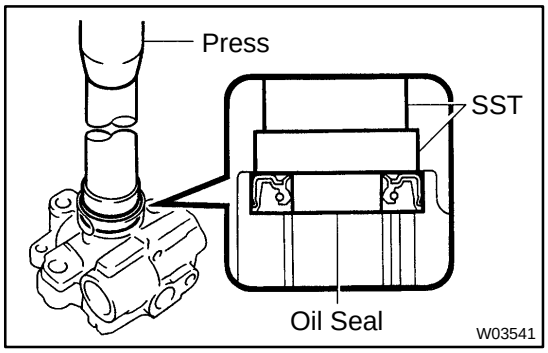


5. IF NECESSARY, REPLACE OIL SEAL

(a) Using a screwdriver with vinyl tape wound around its tip, remove the oil seal.

NOTICE:

Be careful not to damage the front housing.



(b) Coat a new oil seal lip with power steering fluid.

(c) Using SST, press in the oil seal.

SST 09950–60010 (09951–00330),
09950–70010 (09951–07100)

NOTICE:

Make sure to install the oil seal facing the correct direction.

SR062–01

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT WITH POWER STEERING FLUID
(See page SR–18)

2. INSTALL VANE PUMP SHAFT

3. INSTALL STRAIGHT PINS

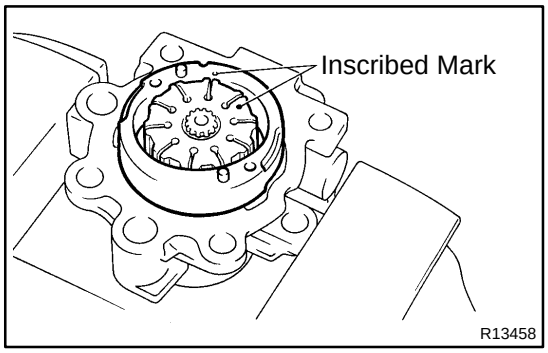
Using a plastic hammer, tap in 2 new pins.

NOTICE:

Be careful not to damage the pins.

4. INSTALL CAM RING

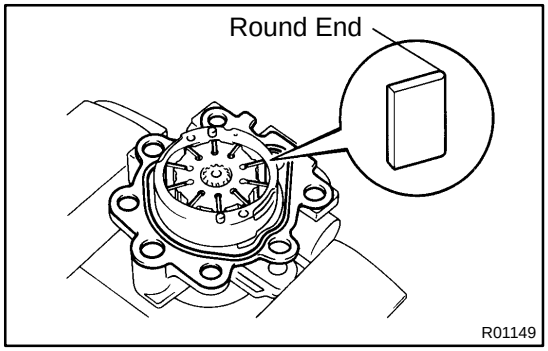
Align the holes of the ring and 2 straight pins, and install the ring with the inscribed mark facing outward.



5. INSTALL VANE PUMP ROTOR

(a) Install the rotor with the inscribed mark facing outward.

(b) Install a new snap ring to the vane pump shaft.



6. INSTALL VANE PLATES

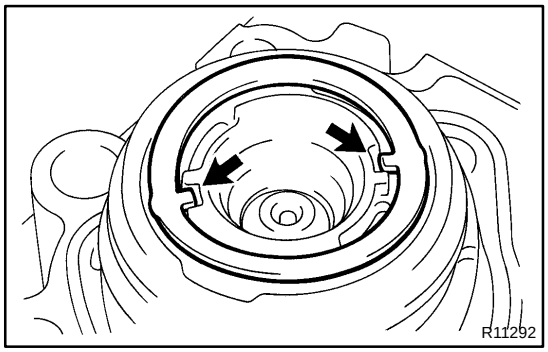
Install the 10 plates with the round end facing outward.

7. INSTALL GASKET

Install a new gasket.

8. INSTALL SIDE PLATE

Align the holes of the plate and 2 straight pins.



9. INSTALL WAVE WASHER

Install the washer so that its protrusions fit into the slots in the side plate.

10. INSTALL REAR HOUSING

(a) Coat 2 new O–rings with power steering fluid and install them to the housing.

(b) Torque the 4 bolts.

Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)

11. INSTALL SPRING, FLOW CONTROL VALVE AND PRESSURE PORT UNION

(a) Install the valve facing the correct direction.
(See page SR–18)

(b) Coat a new O–ring with power steering fluid and install it to the union.

(c) Torque the union.
Torque: 83 N·m (850 kgf·cm, 62 ft·lbf)

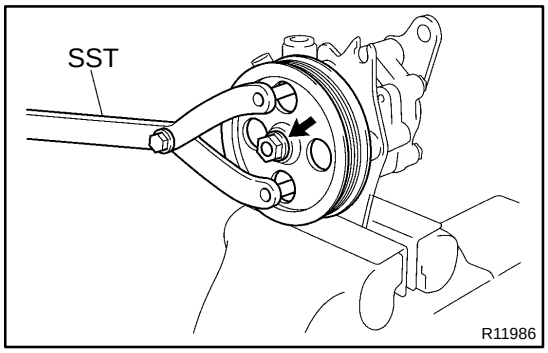
12. INSTALL SUCTION PORT UNION

(a) Coat a new O–ring with power steering fluid and install it to the union.

(b) Torque the bolt.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

13. INSTALL FRONT AND REAR BRACKETS

Torque the 3 bolts and 2 nuts.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)



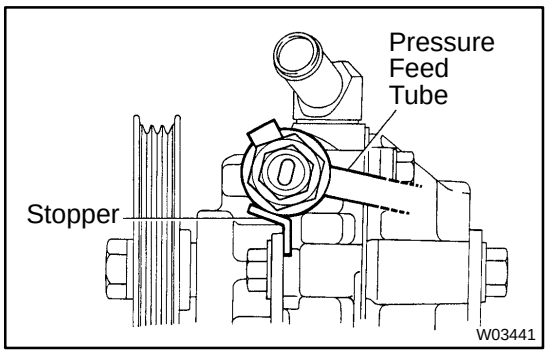
14. INSTALL VANE PUMP PULLEY

Using SST to stop the pulley rotating, torque the nut.
SST 09960–10010 (09962–01000, 09963–01000)
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

15. MEASURE PS VANE PUMP ROTATING TORQUE
(See page SR–21)

SR063–01

INSTALLATION



1. INSTALL PRESSURE FEED TUBE

(a) Torque the union bolt with a new gasket.

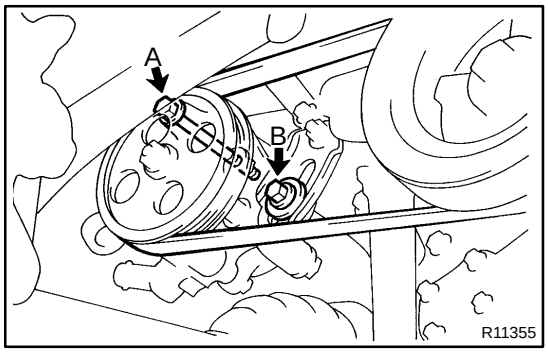
HINT:

Make sure the stopper of the tube is touching the front bracket, as shown, then torque the union bolt.

Torque: 52 N·m (525 kgf·cm, 38 ft·lbf)

(b) Install the oil pressure switch to the union bolt.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

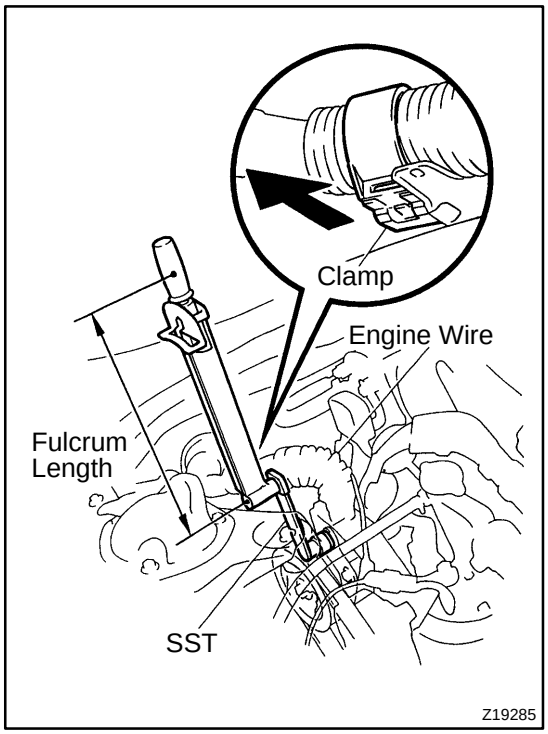


2. INSTALL PS VANE PUMP ASSEMBLY WITH PRESSER FEED TUBE

Temporarily tighten the 2 (A and B) bolts.

3. INSTALL DRIVE BELT

(a) Adjust drive belt tension.
(See page SR–3)



(b) Using SST, torque the A bolt.

SST 09249–63010

Torque: 29 N·m (293 kgf·cm, 21 ft·lbf)

HINT:

★ Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

★ Disconnect the clamp with engine wire.

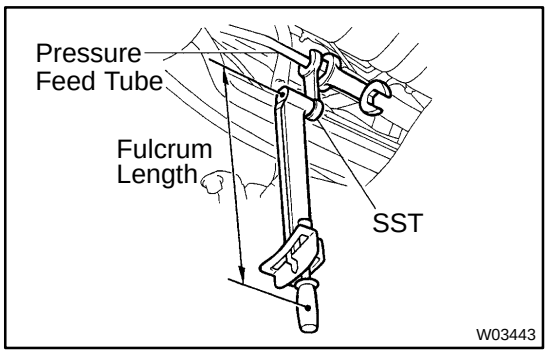
(c) Torque the B bolt.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(d) Connect the connector to the oil pressure switch.

NOTICE:

Be careful for oil on the connector.



4. CONNECT PRESSURE FEED TUBE

(a) Using SST, connect the tube.
SST 09631–22020
Torque: 20 N·m (203 kgf·cm, 15 ft·lbf)

HINT:

★ Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

★ This torque value is effective in case that SST is parallel to a torque wrench.

(b) Install the 2 clamp plates and 2 holders to the tube.

(c) Tighten the bolt.

(d) Install the 2 clamp plate set nuts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

5. CONNECT RETURN HOSE

6. INSTALL FRONT FENDER APRON SEAL RH

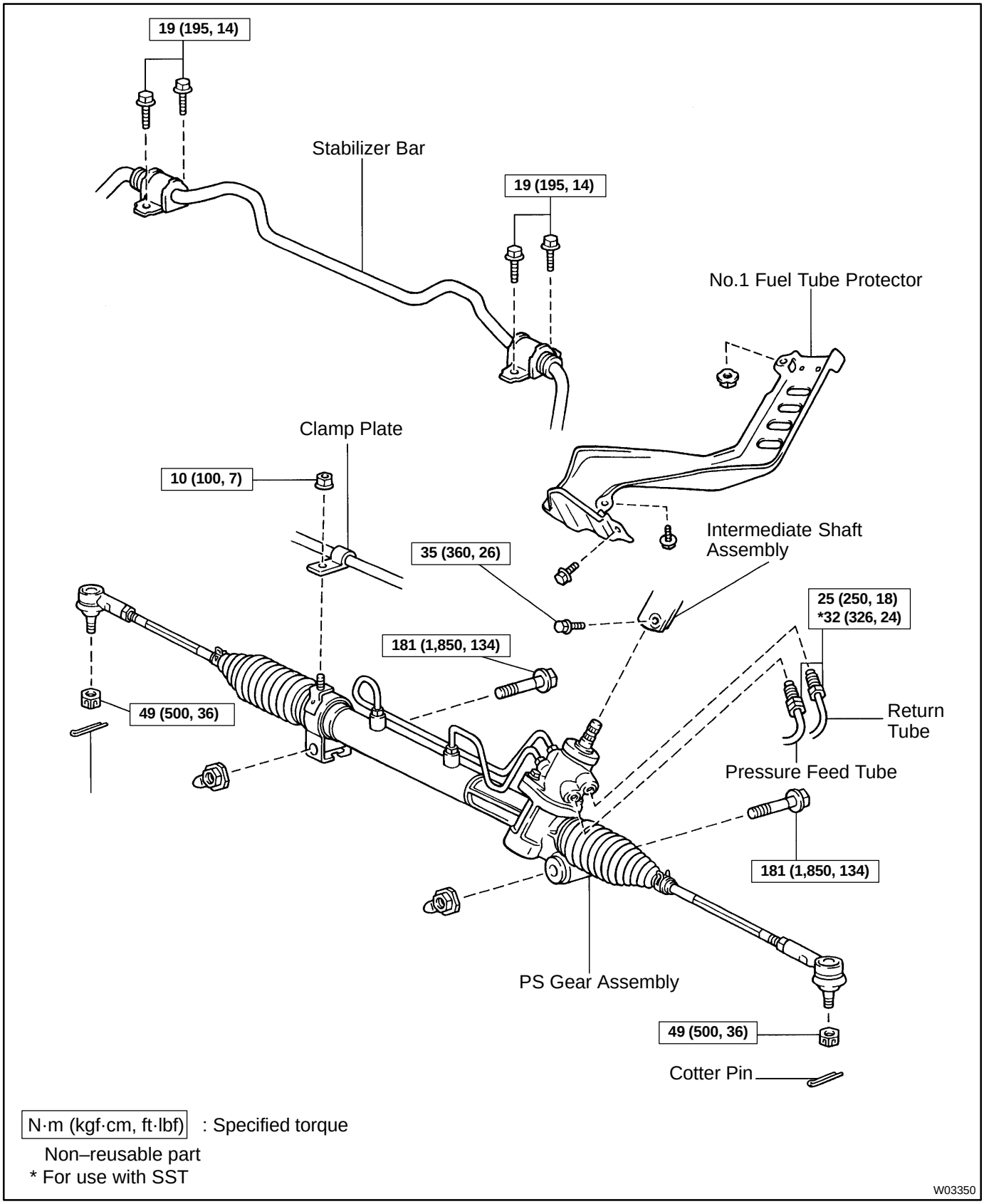
Tighten the 2 bolts.

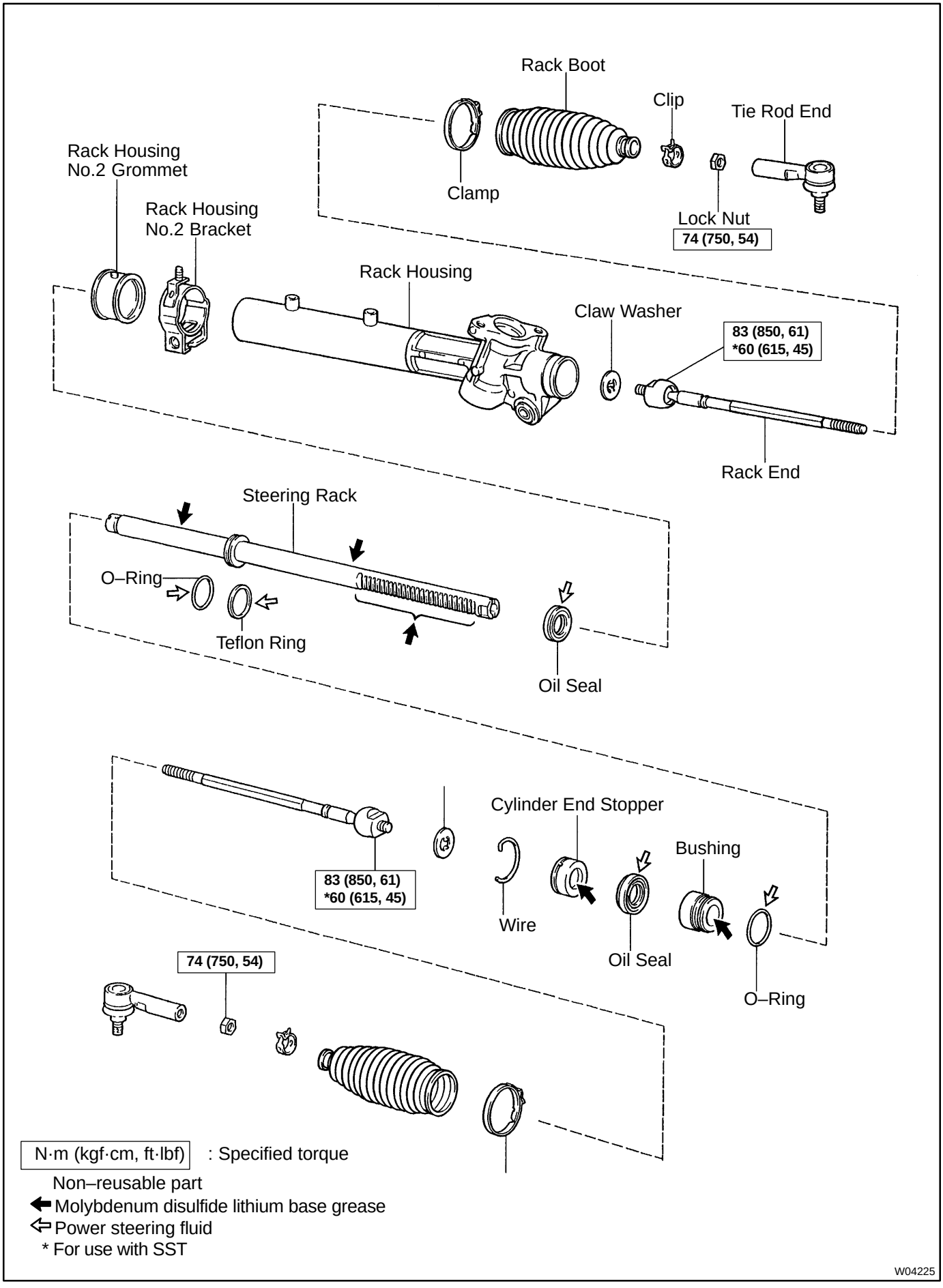
7. BLEED POWER STEERING SYSTEM
(See page SR–4)

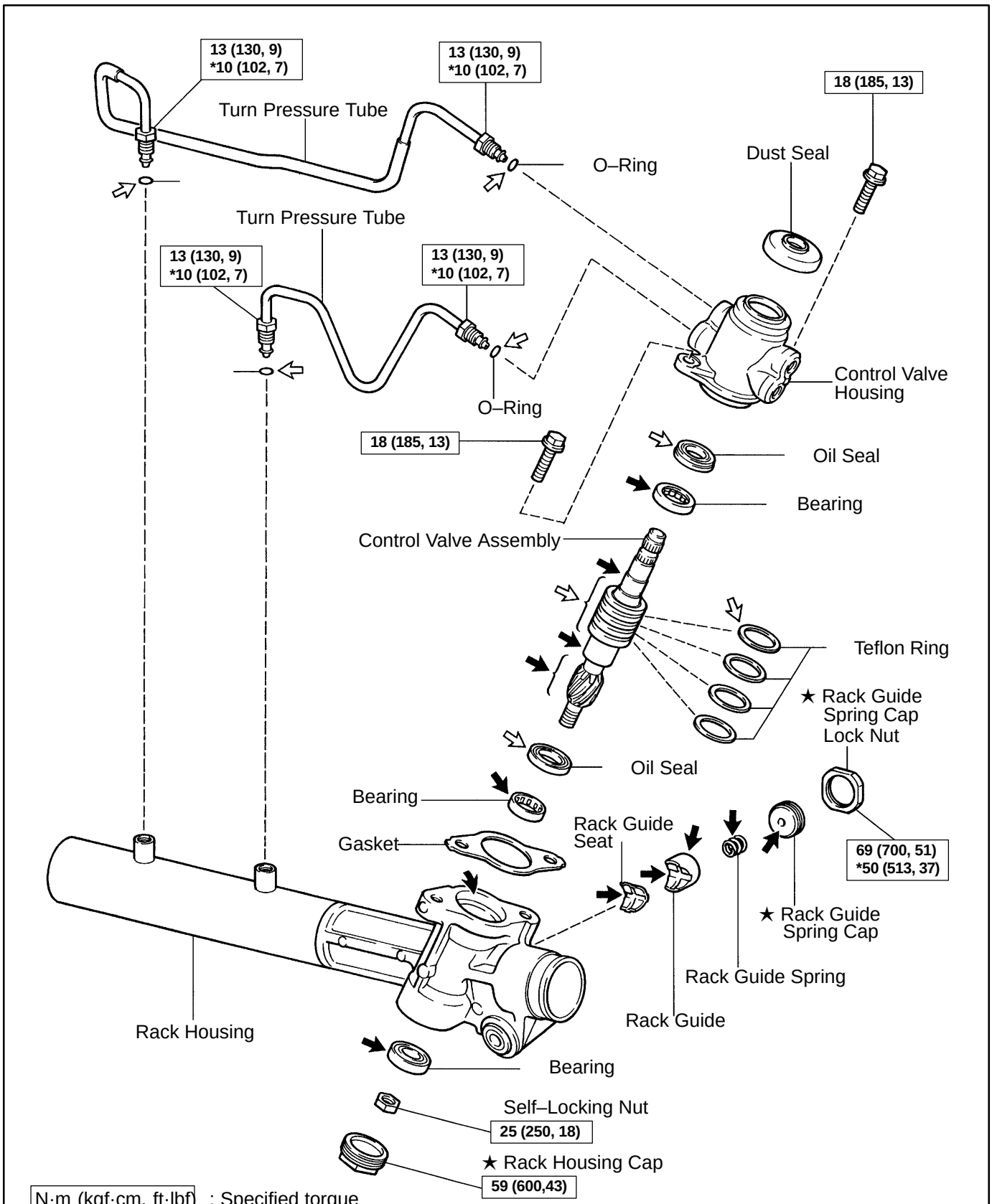
POWER STEERING GEAR

COMPONENTS

SR064–06




Rack Boot
Clip
Tie Rod End
Rack Housing
No.2 Grommet
Clamp
Rack Housing
No.2 Bracket
Lock Nut
74 (750, 54)
Rack Housing
Claw Washer
83 (850, 61)
*60 (615, 45)
Rack End
Steering Rack
O–Ring
Teflon Ring
Oil Seal
Cylinder End Stopper
Bushing
83 (850, 61)
*60 (615, 45)
Wire
Oil Seal
O–Ring
74 (750, 54)
N·m (kgf·cm, ft·lbf) : Specified torque
Non–reusable part
Molybdenum disulfide lithium base grease
Power steering fluid
* For use with SST
W04225



N·m (kgf·cm, ft·lbf) : Specified torque
Non–reusable part
★ Precoated part
⬅ Molybdenum disulfide lithium base grease
⇦ Power steering fluid
* For use with SST

Z18921

SR065–01

REMOVAL

1. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

2. REMOVE STEERING WHEEL PAD
(See page SR–11)

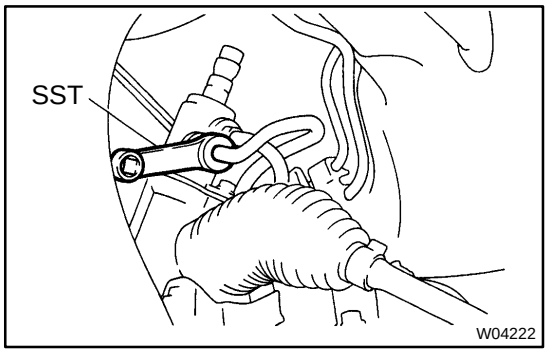
3. REMOVE STEERING WHEEL
(See page SR–11)

4. DISCONNECT RH AND LH TIE ROD ENDS
(See page SA–9)

5. DISCONNECT INTERMEDIATE SHAFT ASSEMBLY
(See page SR–11)

6. DISCONNECT CLAMP PLATE

Remove the nut.



7. DISCONNECT PRESSURE FEED AND RETURN TUBES

Using SST, disconnect the tube.

SST 09631–22020

8. DISCONNECT STABILIZER BAR

Remove the 4 bolts.

HINT:

Do not remove the bar.

9. REMOVE NO.1 FUEL TUBE PROTECTOR

Remove the 2 bolts and nut.

10. REMOVE PS GEAR ASSEMBLY

(a) Remove the 2 gear assembly set bolts and nuts.

HINT:

Lift up the stabilizer bar and remove the bolts.

(b) Remove the gear assembly from the LH of the vehicle.

NOTICE:

Do not damage the turn pressure tubes.

SR066–06

DISASSEMBLY

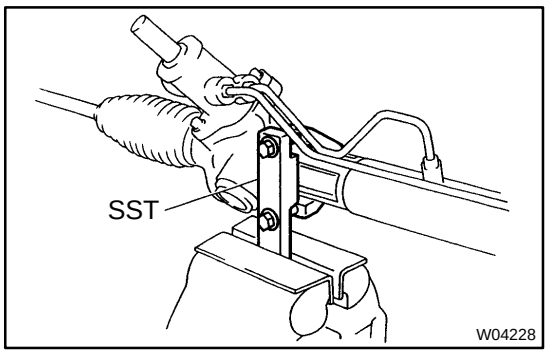
NOTICE:

When using a vise, do not overtighten it.

1. SECURE PS GEAR ASSEMBLY IN VISE

Using SST, secure the gear assembly in a vise.

SST 09612–00012

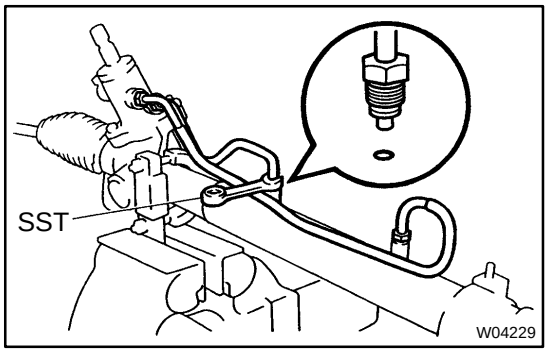


2. REMOVE 2 TURN PRESSURE TUBES

(a) Using SST, remove the tube.

SST 09633–00020

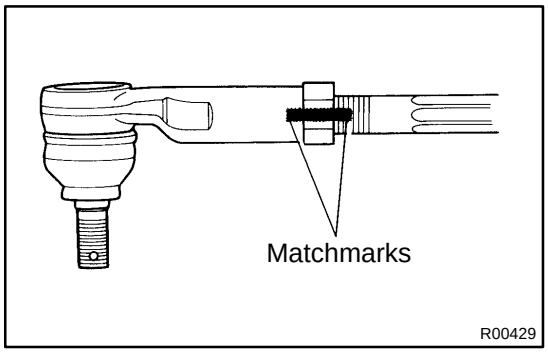
(b) Remove the 2 O–rings from the tube.



3. REMOVE RH AND LH TIE ROD ENDS AND LOCK NUTS

(a) Place matchmarks on the tie rod end and rack end.

(b) Loosen the lock nut.



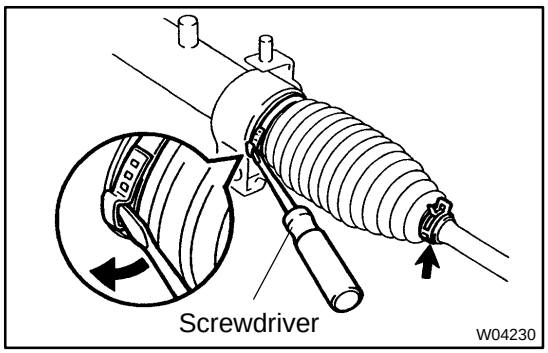
4. REMOVE RH AND LH CLIPS, RACK BOOTS AND CLAMPS

Using a screwdriver, loosen the clamp.

NOTICE:

★ **Be careful not to damage the boot.**

★ **Mark the RH and LH boots.**

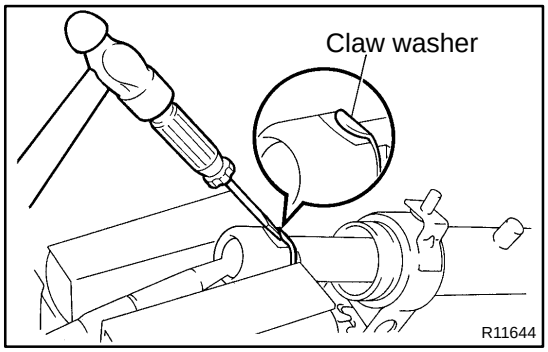


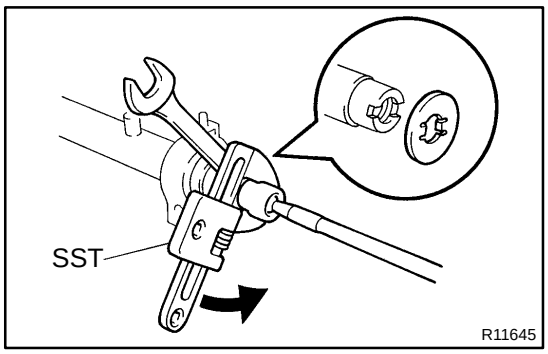
5. REMOVE RH AND LH RACK ENDS AND CLAW WASHERS

(a) Using a screwdriver and hammer, stake back the washer.

NOTICE:

Avoid any impact to the steering rack.





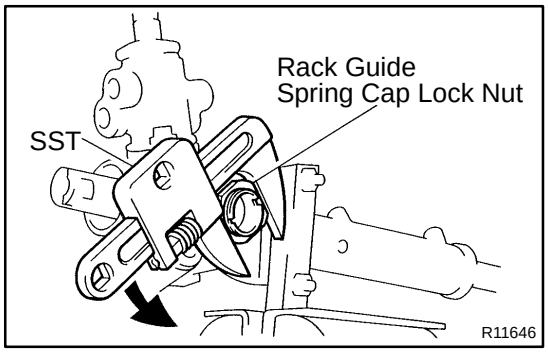
(b) Using a spanner (24 mm) to hold the steering rack steady, and using SST, remove the rack end.
SST 09922–10010

NOTICE:

★ **Use SST 09922–10010 in the direction shown in the illustration.**

★ **Mark the RH and LH rack ends.**

(c) Remove the washer from the rack end.

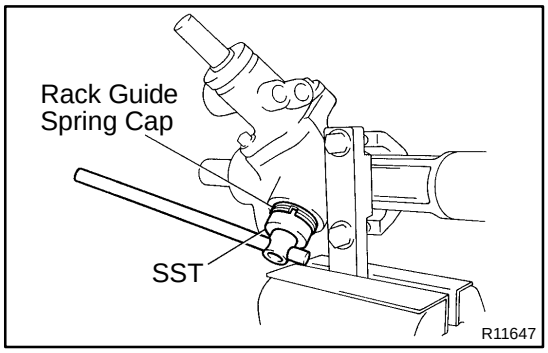


6. REMOVE RACK GUIDE SPRING CAP LOCK NUT

Using SST, remove the nut.
SST 09922–10010

NOTICE:

Use SST 09922–10010 in the direction shown in the illustration.

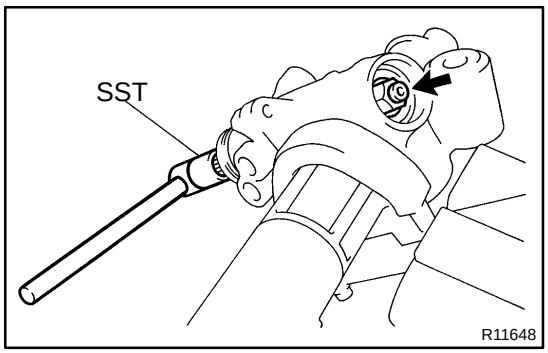


7. REMOVE RACK GUIDE SPRING CAP, RACK GUIDE SPRING, RACK GUIDE AND RACK GUIDE SEAT

(a) Using SST, remove the cap.
SST 09631–10021

(b) Remove the seat from the guide.

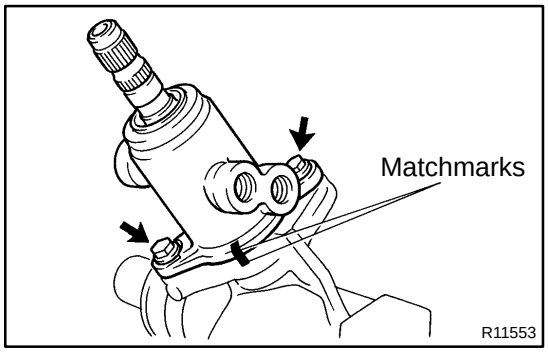
8. REMOVE RACK HOUSING CAP



9. REMOVE SELF–LOCKING NUT

Using SST to stop the control valve shaft rotating, remove the nut.
SST 09616–00010

10. REMOVE DUST COVER

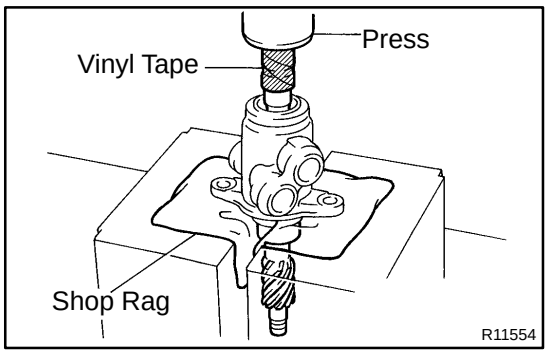


11. REMOVE CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

(a) Place matchmarks on the valve housing and rack housing.

(b) Remove the 2 bolts.

(c) Remove the gasket from the rack housing.



12. REMOVE CONTROL VALVE ASSEMBLY

(a) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the valve shaft.

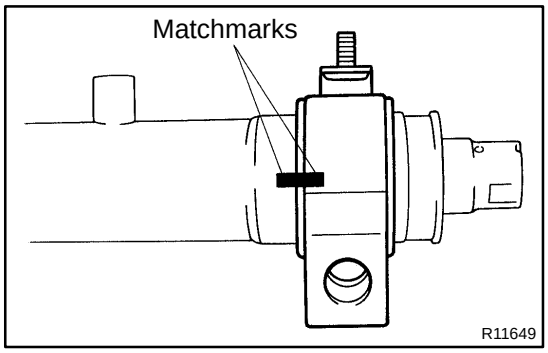
(b) Press out the valve assembly with the oil seal.

NOTICE:

- ★ **Place a shop rag between the valve housing and the blocks.**
- ★ **Be careful not to drop the valve assembly.**
- ★ **Be careful not to damage the oil seal lip.**

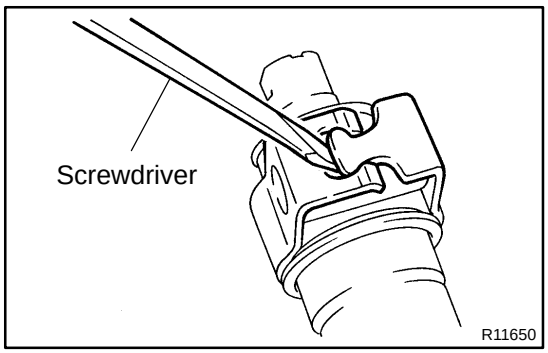
13. REMOVE OIL SEAL

Remove the oil seal from the control valve assembly.



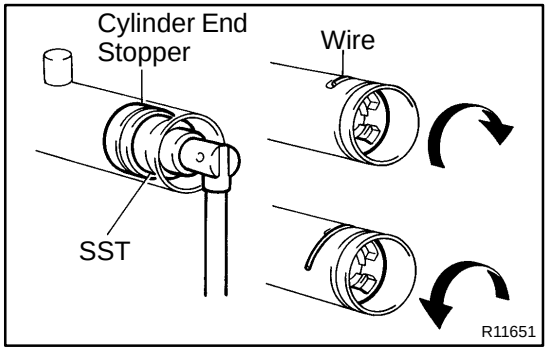
14. REMOVE RACK HOUSING NO.2 BRACKET AND GROMMET

(a) Place matchmarks on the bracket and rack housing.



(b) Using a screwdriver, pry the clamp of the bracket.

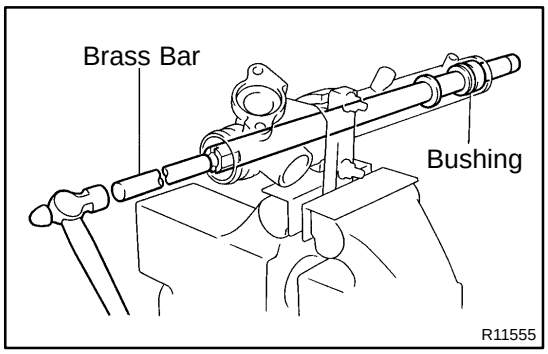
(c) Remove the grommet from the bracket.



15. REMOVE CYLINDER END STOPPER

(a) Using SST, turn the stopper clockwise until the wire end is visible through the service hole.
SST 09631–10021

(b) Using SST, turn the stopper counterclockwise, and remove the wire.
SST 09631–10021

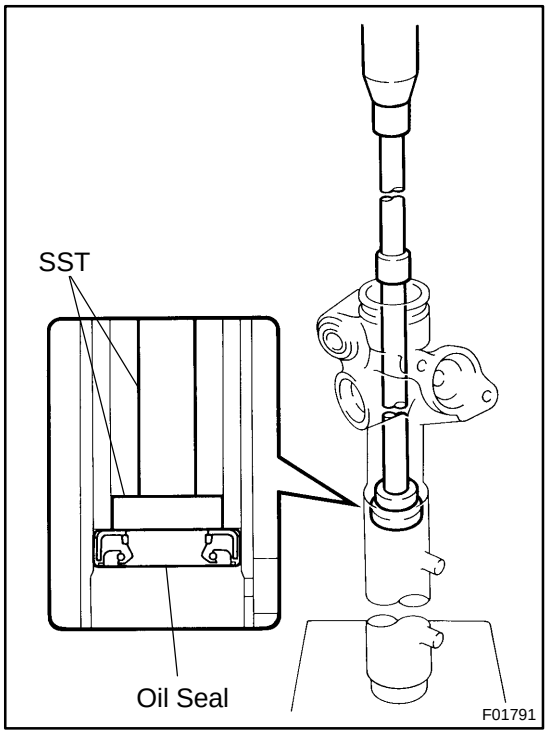


16. REMOVE STEERING RACK AND BUSHING

(a) Using a brass bar and hammer, tap out the rack with the bushing.

(b) Remove the bushing from the rack.

(c) Remove the O–ring from the bushing.



17. REMOVE OIL SEAL

Using SST, press out the oil seal.

SST 09950–60010 (09951–00290),
09950–70010 (09951–07360)

SR067–06

INSPECTION

NOTICE:

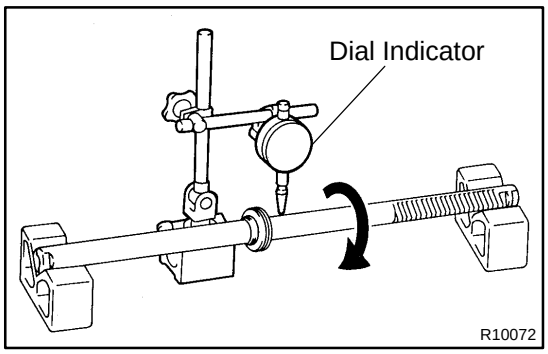
When using a vise, do not overtighten it.

1. INSPECT STEERING RACK

(a) Using a dial indicator, check the rack for runout and for teeth wear and damage.

Maximum runout: 0.30 mm (0.0118 in.)

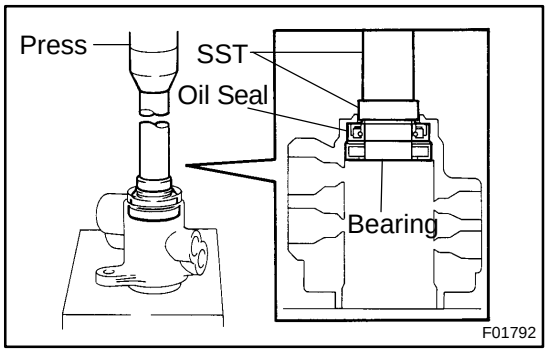
(b) Check the back surface for wear and damage.



2. IF NECESSARY, REPLACE OIL SEAL AND BEARING

(a) Using SST, press out the oil seal and bearing from the control valve housing.

SST 09950–60010 (09951–00250), 09950–70010 (09951–07200)



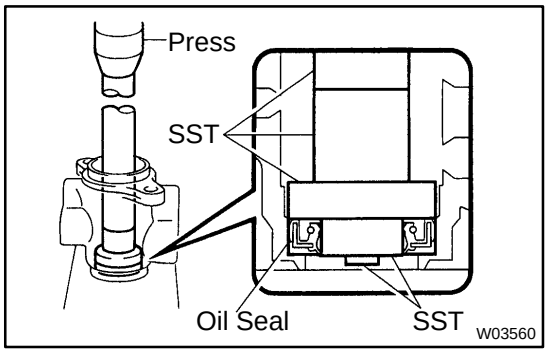
(b) Coat a new oil seal lip with power steering fluid.

(c) Using SST, press in the oil seal.

SST 09950–60010 (09951–00180, 09951–00320, 09952–06010), 09950–70010 (09951–07200)

NOTICE:

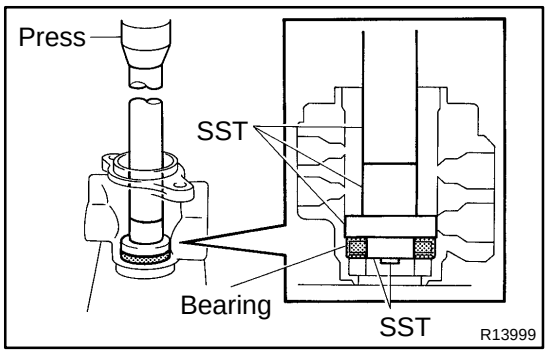
Make sure to install the oil seal facing the correct direction.



(d) Coat a new bearing with molybdenum disulfide lithium base grease.

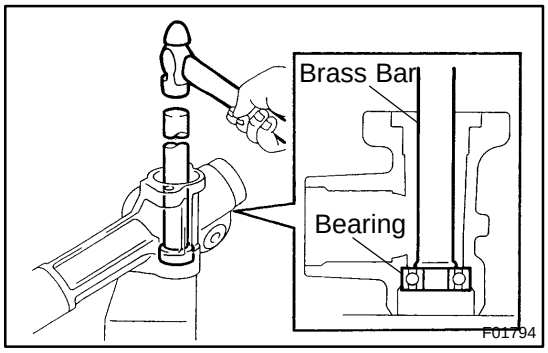
(e) Using SST, press in the bearing.

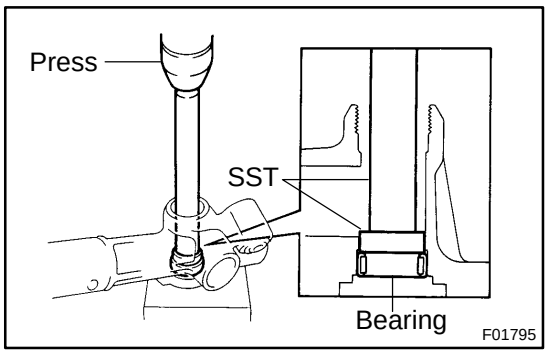
SST 09950–60010 (09951–00180, 09951–00340, 09952–06010), 09950–70010 (09951–07200)



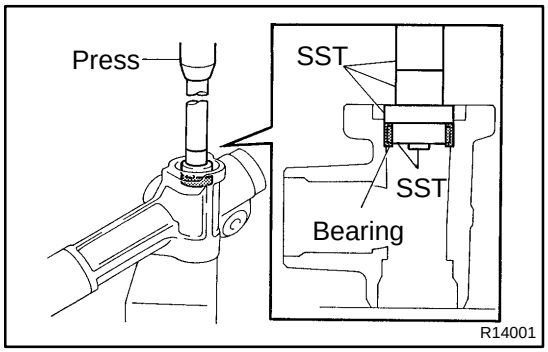
3. IF NECESSARY, REPLACE 2 BEARINGS

(a) Using a brass bar and hammer, tap out the bearing from the rack housing.

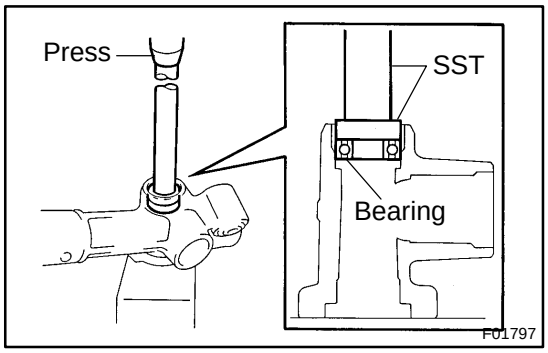




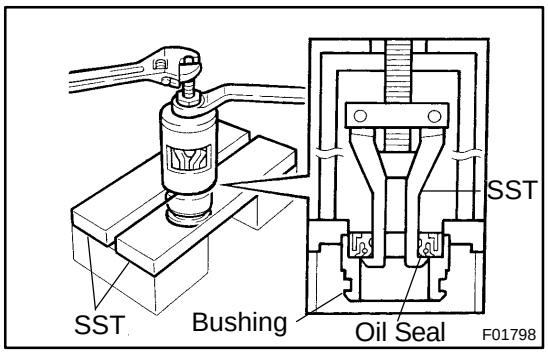
(b) Using SST, press out the bearing from the rack housing.
SST 09950–60010 (09951–00260), 09950–70010 (09951–07200)



(c) Coat a new bearing with molybdenum disulfide lithium base grease.
(d) Using SST, press in the bearing.
SST 09950–60010 (09951–00250, 09951–00310, 09952–06010), 09950–70010 (09951–07200)



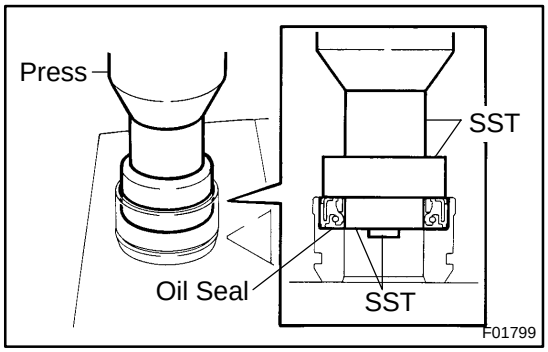
(e) Coat a new bearing with molybdenum disulfide lithium base grease.
(f) Using SST, press in the bearing.
SST 09950–60010 (09951–00320), 09950–70010 (09951–07200)



4. IF NECESSARY, REPLACE OIL SEAL

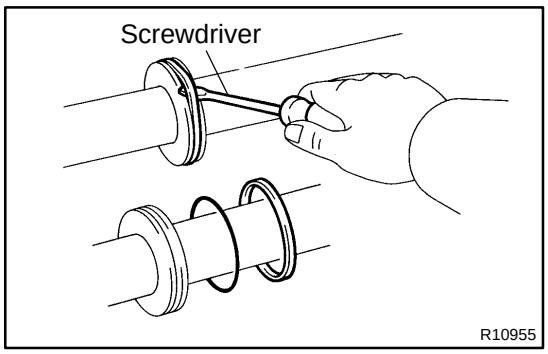
(a) Using SST, remove the oil seal from the bushing.
SST 09527–20011, 09612–24014 (09613–22011)

NOTICE:
Be careful not to damage the bushing.



(b) Coat a new oil seal lip with power steering fluid.
(c) Using SST, press in the oil seal.
SST 09950–60010 (09951–00240, 09951–00400, 09952–06010)

NOTICE:
Make sure to install the oil seal facing the correct direction.



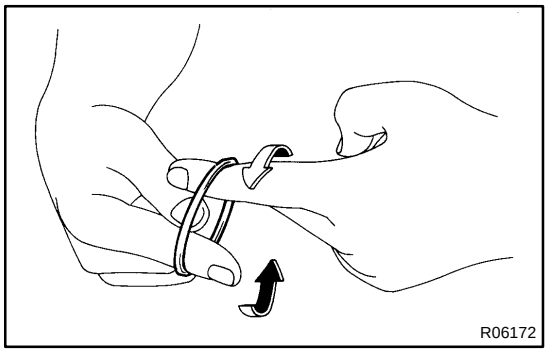
5. IF NECESSARY, REPLACE TEFLON RING AND O–RING

(a) Using a screwdriver, remove the teflon ring and O–ring from the steering rack.

NOTICE:

Be careful not to damage the groove for the teflon ring.

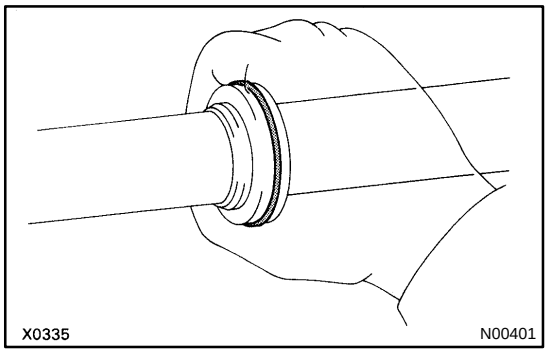
(b) Coat a new O–ring with power steering fluid and install it.



(c) Expand a new teflon ring with your fingers.

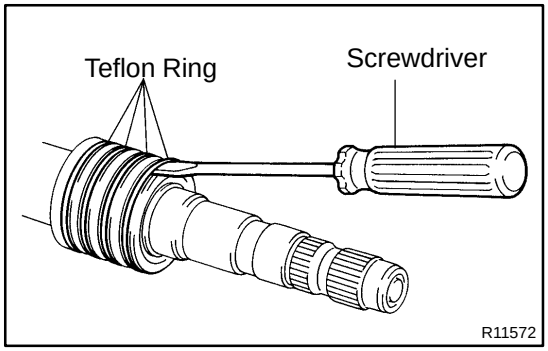
NOTICE:

Be careful not to over–expand the ring.



(d) Coat the ring with power steering fluid.

(e) Install the ring to the steering rack, and settle it down with your fingers.



6. IF NECESSARY, REPLACE TEFLON RINGS

(a) Using a screwdriver, remove the 4 rings from the control valve assembly.

NOTICE:

Be careful not to damage the grooves for the teflon ring.

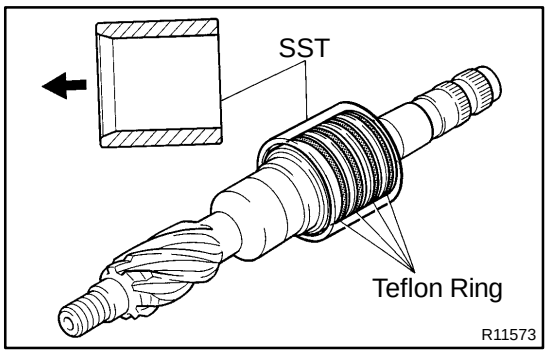
(b) Expand 4 new teflon rings with your fingers.

NOTICE:

Be careful not to over–expand the teflon ring.

(c) Coat the rings with power steering fluid.

(d) Install the rings to the control valve assembly, and settle them down with your fingers.



(e) Carefully slide the tapered end of SST over the rings until the rings fit to the steering rack.
SST 09631–20081

NOTICE:

Be careful not to damage the rings.

SR068–05

REASSEMBLY

NOTICE:

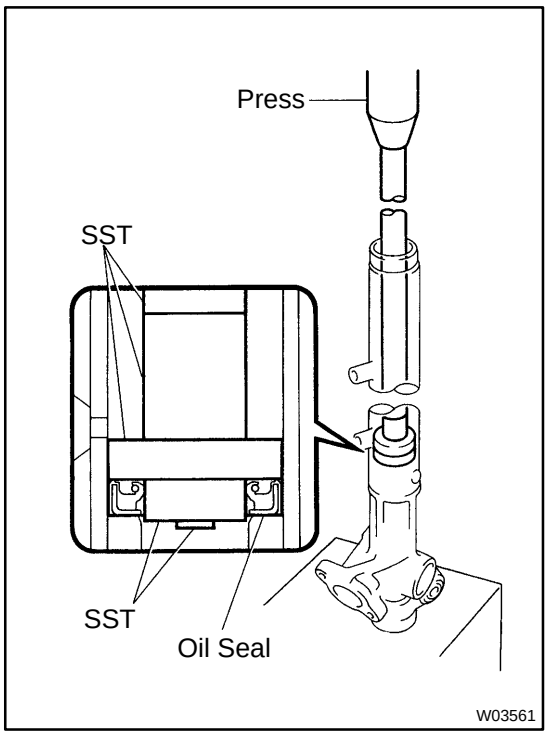
When using a vise, do not overtighten it.

1. COAT WITH POWER STEERING FLUID OR MOLYBDENUM DISULFIDE LITHIUM BASE GREASE
(See pages SR–29)

2. INSTALL OIL SEAL

(a) Coat a new oil seal lip with power steering fluid.

(b) Using SST, press in the oil seal.
SST 09950–60010 (09951–00240, 09951–00430, 09952–06010), 09950–70010 (09951–07360)



NOTICE:

★ **Make sure to install the oil seal facing the correct direction.**

★ **Take care that the oil seal does not get reversed as you install it.**

3. INSTALL STEERING RACK

(a) Install SST to the rack.
SST 09631–33010

HINT:

If necessary, scrape the burrs off the rack teeth end and burnish.

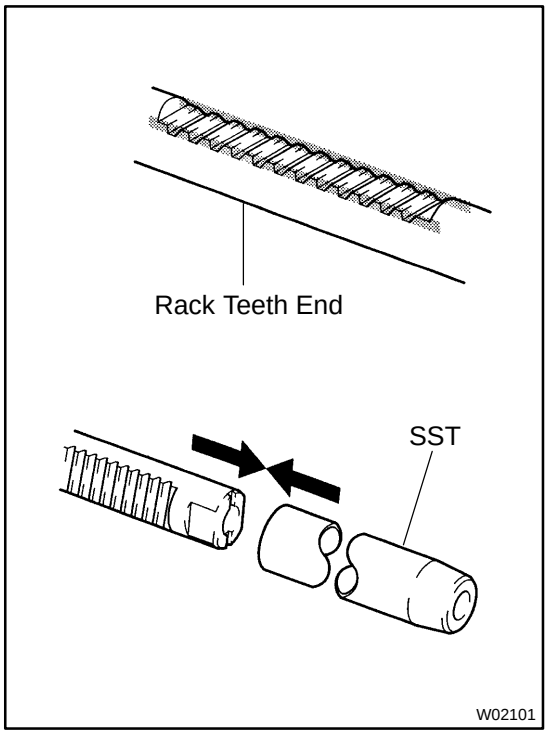
(b) Coat the SST with power steering fluid.

(c) Install the rack into the rack housing.

NOTICE:

Be careful not to damage the oil seal lip.

(d) Remove SST.



4. INSTALL BUSHING

(a) Coat a new O–ring with power steering fluid and install it to the bushing.

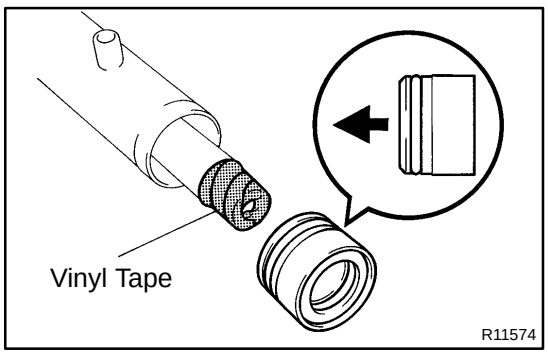
(b) To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.

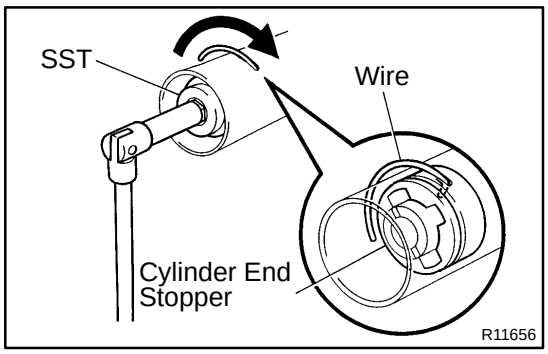
(c) Install the bushing.

NOTICE:

★ **Make sure to install the bushing facing the correct direction.**

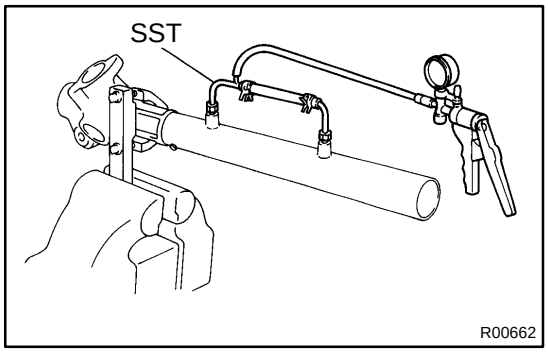
★ **Be careful not to damage the oil seal lip.**





5. INSTALL CYLINDER END STOPPER

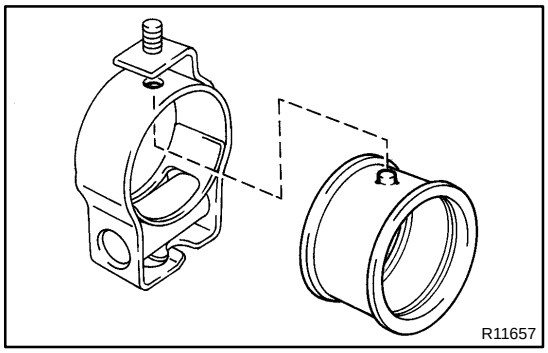
(a) Align the installation hole for the wire of the stopper with the slot of the rack housing.
(b) Install a new wire into the stopper.
(c) Using SST, turn the stopper clockwise 450 ± 50°.
SST 09631–10021



6. AIR TIGHTNESS TEST

(a) Install SST to the rack housing.
SST 09631–12071
(b) Apply 53 kPa (400 mmHg, 15.75 in.Hg) of vacuum for about 30 seconds.
(c) Check that there is no change in the vacuum.

If there is change in the vacuum, check the installation of the oil seals.

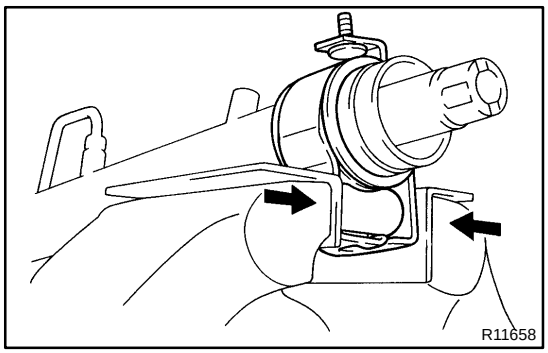


7. INSTALL RACK HOUSING NO.2 BRACKET AND GROMMET

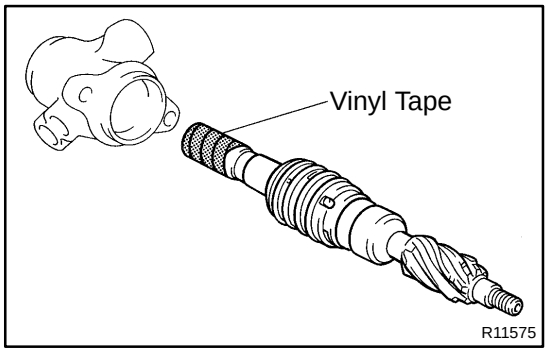
(a) Install the grommet to the bracket.

HINT:
Align the projection of the grommet with the hole of the bracket.

(b) Align the matchmarks on the bracket and rack housing.



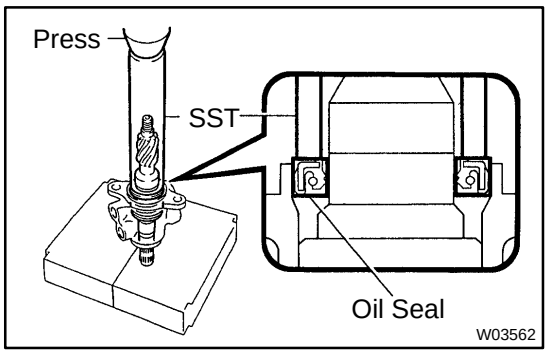
(c) Place the bracket in a vise and tighten the vise to fasten the clamp.



8. INSTALL CONTROL VALVE ASSEMBLY

(a) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the valve shaft.
(b) Coat the teflon rings with power steering fluid.
(c) Install the valve assembly into the valve housing.

NOTICE:
Be careful not to damage the teflon rings and oil seal.



9. INSTALL OIL SEAL

(a) Coat a new oil seal lip with power steering fluid.

(b) Using SST, press in the oil seal.

SST 09612–22011

NOTICE:

Make sure to install the oil seal facing the correct direction.

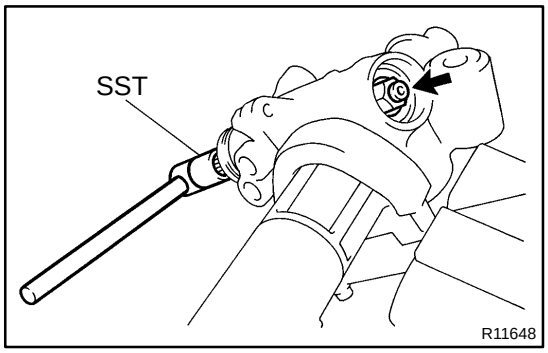
10. INSTALL CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

(a) Place a new gasket on the rack housing.

(b) Align the matchmarks on the valve housing and rack housing.

(c) Torque the 2 bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



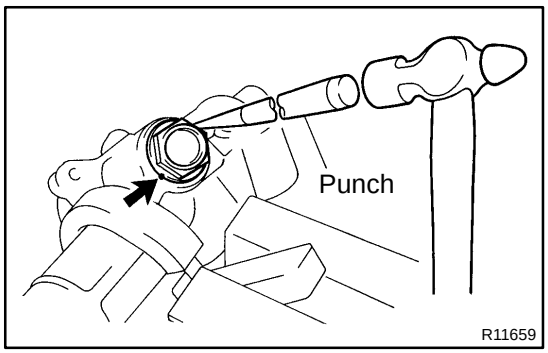
11. INSTALL SELF–LOCKING NUT

Using SST to stop the control valve shaft rotating, torque a new nut.

SST 09616–00010

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

12. INSTALL DUST COVER



13. INSTALL RACK HOUSING CAP

(a) Apply sealant to 2 or 3 threads of the cap.

Sealant:
Part No.08833–00080, THREE BOND 1344,
LOCTITE 242 or equivalent

(b) Torque the cap.

Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)

(c) Using a punch and hammer, stake the 2 parts of the cap.

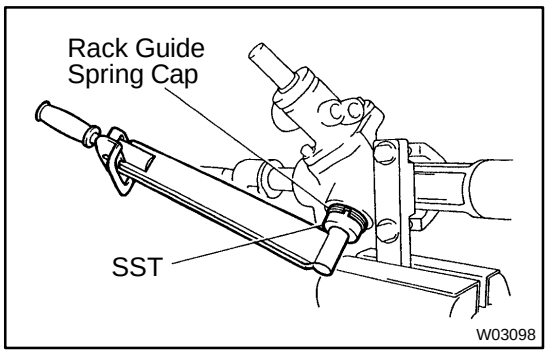
14. INSTALL RACK GUIDE SEAT, RACK GUIDE, RACK GUIDE SPRING AND RACK GUIDE SPRING CAP

(a) Install the seat to the guide.

(b) Apply sealant to 2 or 3 threads of the cap.

Sealant:
Part No.08833–00080, THREE BOND 1344,
LOCTITE 242 or equivalent

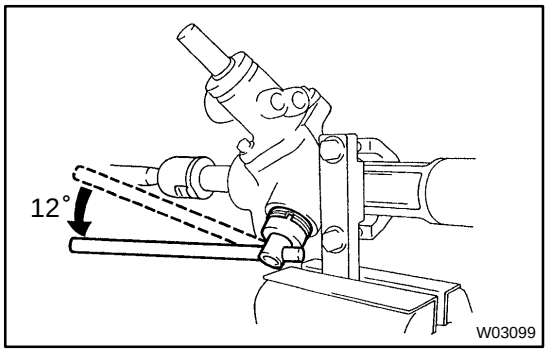
(c) Temporarily install the cap.



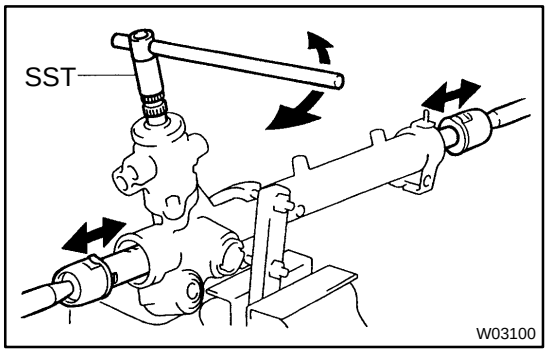
15. ADJUST TOTAL PRELOAD

(a) To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH rack ends.

(b) Using SST, torque the rack guide spring cap.
SST 09631–10021
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

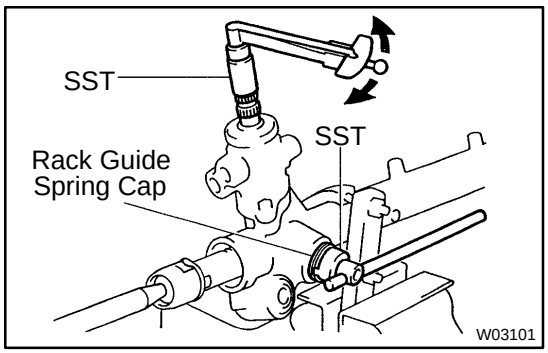


(c) Using SST, return the cap 12°.
SST 09631–10021

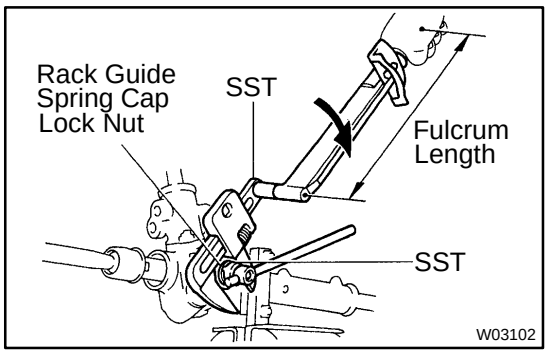


(d) Using SST, turn the control valve shaft right and left 1 or 2 times.
SST 09616–00010

(e) Using SST, loosen the cap until the rack guide spring is not functioning.
SST 09631–10021



(f) Using SST and a torque wrench, tighten the cap until the preload is within specification.
SST 09616–00010, 09631–10021
Preload (turning):
0.8 – 1.4 N·m (8 – 14 kgf·cm, 6.9 – 12.2 in.·lbf)



16. INSTALL RACK GUIDE SPRING CAP LOCK NUT

(a) Apply sealant to 2 or 3 threads of the nut.
Sealant:
Part No.08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

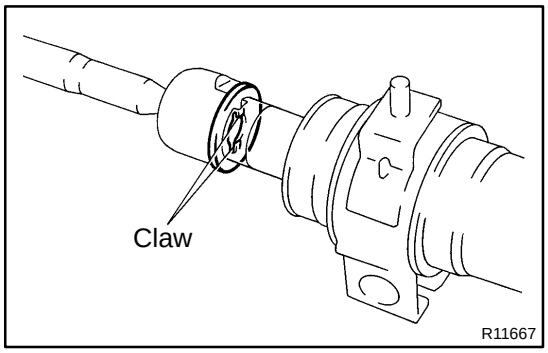
(b) Using SST to hold the rack guide spring cap, and using SST, torque the nut.
SST 09631–10021, 09922–10010
Torque: 50 N·m (513 kgf·cm, 37 ft·lbf)

NOTICE:
Use SST 09922–10010 in the direction shown in the illustration.

HINT:
Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

(c) Recheck the total preload.
Preload (turning):
0.8 – 1.4 N·m (8 – 14 kgf·cm, 6.9 – 12.2 in.·lbf)

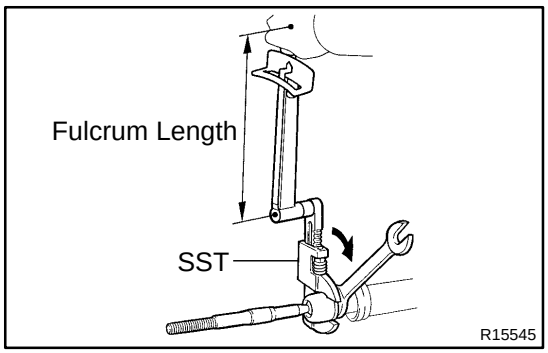
(d) Remove the RH and LH rack ends.



17. INSTALL RH AND LH CLAW WASHERS AND RACK ENDS

(a) Install a new claw washer, and temporarily install the rack end.

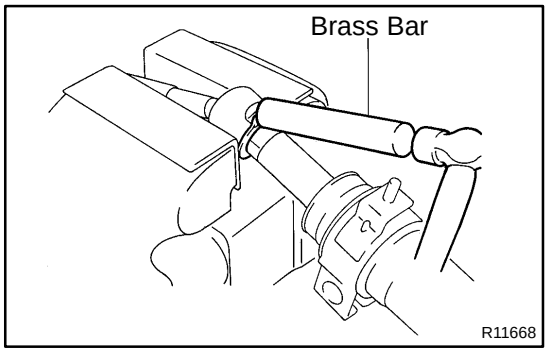
HINT:
Align the claws of the washer with the steering rack grooves.



(b) Using a spanner (24 mm) to hold the steering rack steady, and using SST, torque the rack end.
SST 09922–10010
Torque: 60 N·m (615 kgf·cm, 45 ft·lbf)

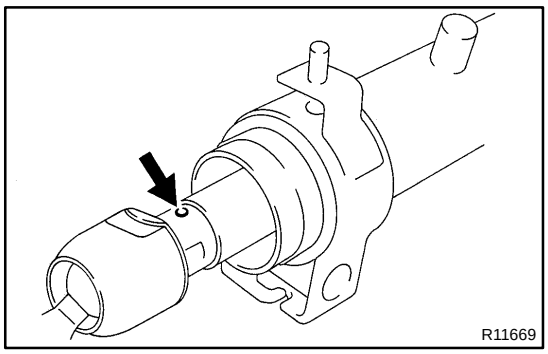
NOTICE:
Use SST 09922–10010 in the direction shown in the illustration.

HINT:
Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).



(c) Using a brass bar and hammer, stake the washer.

NOTICE:
Avoid any impact to the rack.

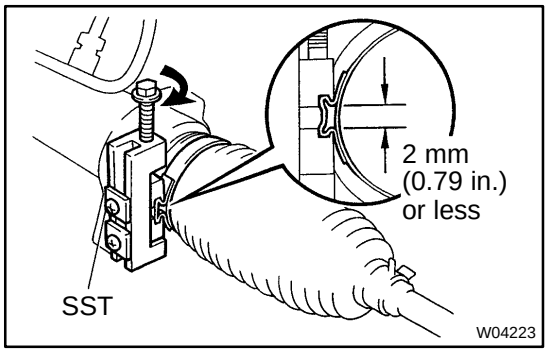


18. INSTALL RH AND LH RACK BOOTS, CLAMPS AND CLIPS

(a) Ensure that the steering rack hole is not clogged with grease.

HINT:

If the hole is clogged, the pressure inside the boot will change after it is assembled and the steering wheel is turned.



(b) Install the boot.

NOTICE:

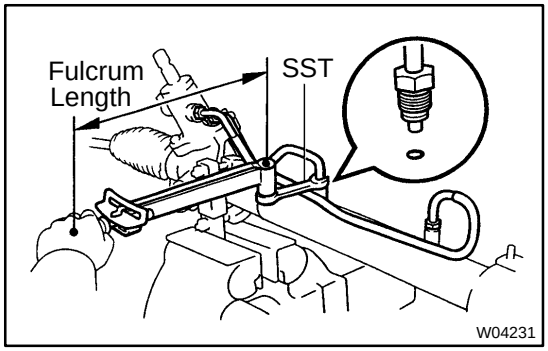
Be careful not to damage or twist the boot.

(c) Using SST, tighten the clamp as shown in the illustration.
SST 09521–24010

19. INSTALL RH AND LH TIE ROD ENDS AND LOCK NUTS

(a) Screw the lock nut and tie rod end onto the rack end until the matchmarks are aligned.

(b) After adjusting toe–in, torque the nut.
(See page SA–4)
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)



20. INSTALL 2 TURN PRESSURE TUBES

(a) Coat 2 new O–rings with power steering fluid and install them to the tube.

(b) Using SST, install the tube.
SST 09633–00020
Torque: 10 N·m (102 kgf·cm, 7 ft·lbf)

HINT:

★ Use a torque wrench with a fulcrum length of 250 mm (9.84 in.).

★ This torque value is effective in case that SST is parallel to a torque wrench.

SR069–01

INSTALLATION

1. INSTALL PS GEAR ASSEMBLY

(a) Install the gear assembly from the LH of the vehicle.

NOTICE:

Do not damage the turn pressure tubes.

(b) Torque the 2 gear assembly set bolts and nuts.

Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)

HINT:

Lift up the stabilizer bar and install the bolts.

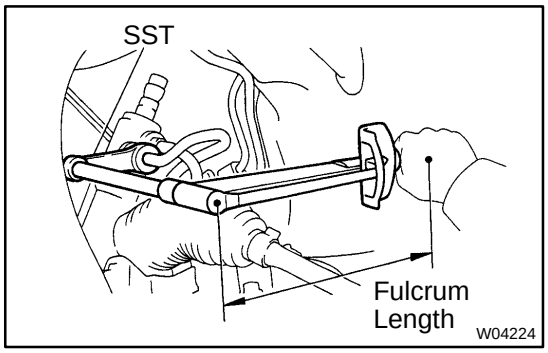
2. INSTALL NO.1 FUEL TUBE PROTECTOR

Install the 2 bolts and nut.

3. CONNECT STABILIZER BAR

Torque the 4 bolts.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)



4. CONNECT PRESSURE FEED AND RETURN TUBES

Using SST, connect the tube.

SST 09631–22020

Torque: 32 N·m (326 kgf·cm, 24 ft·lbf)

HINT:

★ Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).

★ This torque value is effective in case that SST is parallel to a torque wrench.

5. CONNECT CLAMP PLATE

Torque the nut.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

6. CONNECT INTERMEDIATE SHAFT ASSEMBLY

(See page SR–16)

7. CONNECT RH AND LH TIE ROD ENDS

(See page SA–9)

8. POSITION FRONT WHEELS FACING STRAIGHT AHEAD

HINT:

Do it with the front of the vehicle jacked up.

9. CENTER SPIRAL CABLE

(See page SR–16)

10. INSTALL STEERING WHEEL

(a) Install the wheel at straight–ahead position.

(b) Temporarily tighten the wheel set nut.

(c) Connect the connector.

11. BLEED POWER STEERING SYSTEM

(See page SR–4)

12. CHECK STEERING WHEEL CENTER POINT

13. **TORQUE STEERING WHEEL SET NUT**
    Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)
14. **INSTALL STEERING WHEEL PAD**
    (See page SR–16)
15. **CHECK FRONT WHEEL ALIGNMENT**
    (See page SA–4)

SRS AIRBAG

RS01Y–41

PRECAUTION

NOTICE:

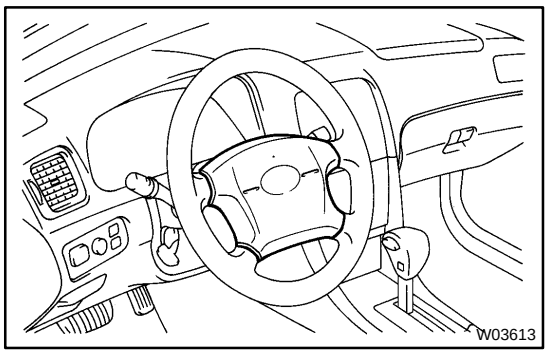
- **The LEXUS ES300 is equipped with SRS, which comprises a driver airbag and a front passenger airbag. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the SRS, it is possible that the SRS may fail to operate when required. Before performing servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedures described in the repair manual.**
- **Malfunction symptoms of the SRS are difficult to confirm, so the DTCs become the most important source of information when troubleshooting. When troubleshooting the SRS, always inspect the DTCs before disconnecting the battery.**
- **Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly and airbag sensor assembly should be inspected (See page RS–9 , RS–23 and RS–36).**
- **Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.**
- **Never disassemble and repair the steering wheel pad, front passenger airbag assembly or airbag sensor assembly in order to reuse it.**
- **If the steering wheel pad, front passenger airbag assembly or airbag sensor assembly have been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.**
- **Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting the system's electrical circuits.**
- **Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.**
- **After work on the SRS is completed, perform the SRS warning light check (See page DI–324).**
- **If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.**

CAUTION:

- **Work must be started after 90 seconds from when the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.**
  (The SRS is equipped with a back–up power source so that if work is started within 90 seconds from disconnecting the negative (–) terminal cable of the battery, the SRS may be deployed.)
- **When the negative (–) terminal cable is disconnected from the battery, the memory of the clock and audio system will be canceled. So before starting work, make a record of the contents memorized in the audio memory system. When work is finished, reset the audio systems as they were before and adjust the clock. To avoid erasing the memory in each memory system, never use a back– up power supply from outside the vehicle.**
- **Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.**
- **Do not expose the steering wheel pad, front passenger airbag assembly or airbag sensor assembly directly to hot air or flames.**

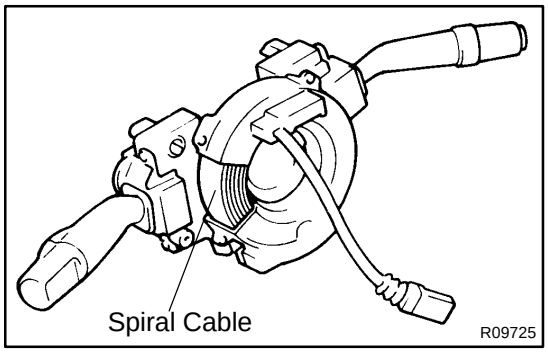
RS0NZ–01

OPERATION



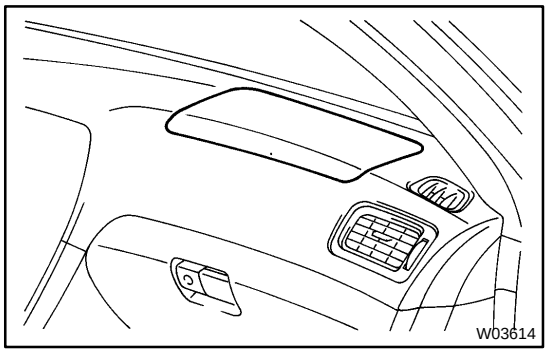
1. STEERING WHEEL PAD (with AIRBAG)

The inflater and bag of the SRS are stored in the steering wheel pad and cannot be disassembled. The inflater contains a squib, igniter charge, gas generant, etc., and inflates the bag when instructed by the airbag sensor assembly.



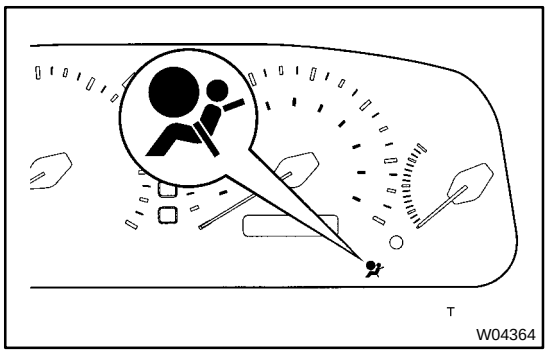
2. SPIRAL CABLE (in COMBINATION SWITCH)

A spiral cable is used as an electrical joint from the vehicle body side to the steering wheel.



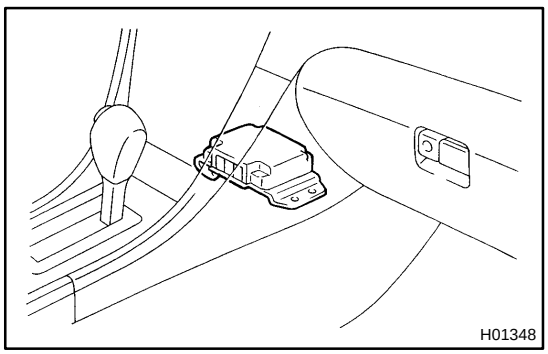
3. FRONT PASSENGER AIRBAG ASSEMBLY

The inflater and bag of the SRS are stored in the front passenger airbag assembly and cannot be disassembled. The inflater contains a squib, igniter charge and gas generant, etc., and inflates the bag when instructed by the airbag sensor assembly.



4. SRS WARNING LIGHT

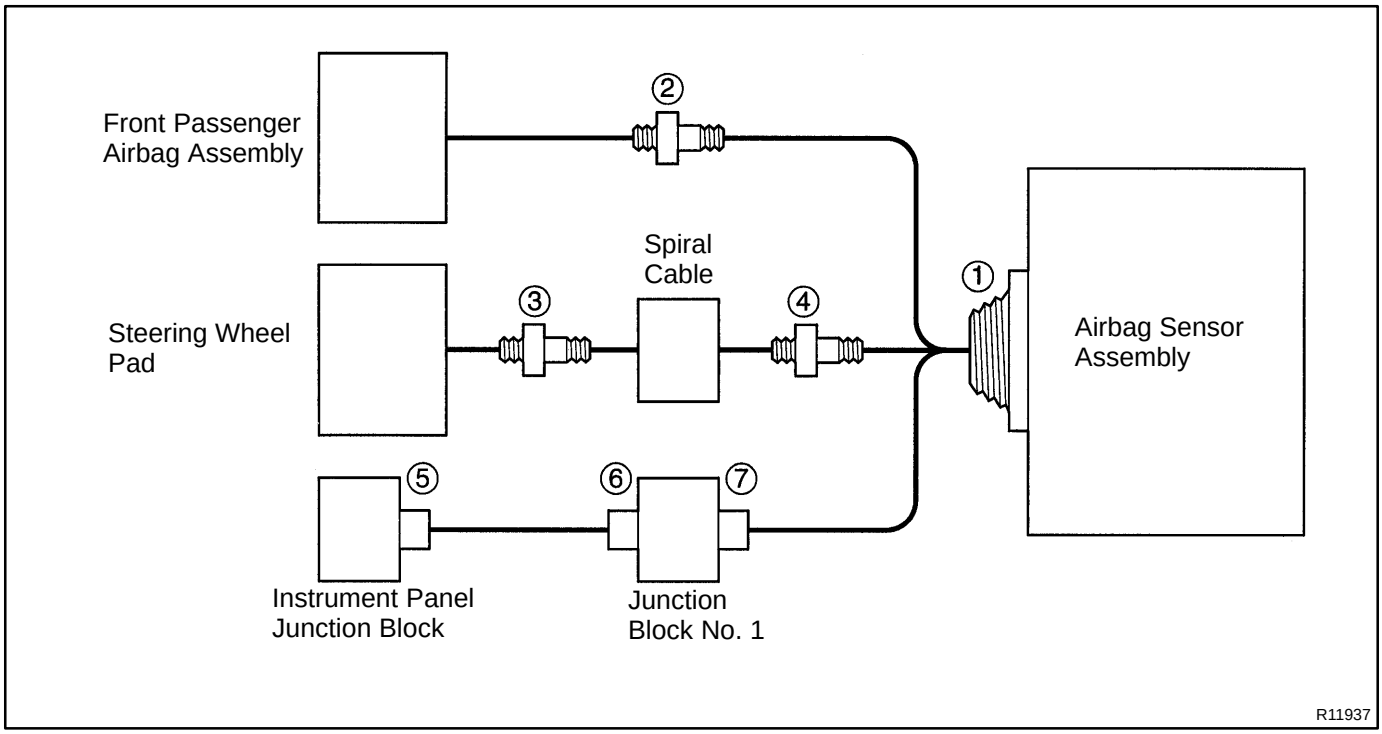
The SRS warning light is located on the combination meter. It goes on to alert the driver of trouble in the system when a malfunction is detected in the airbag sensor assembly. In normal operation condition when the ignition switch is turned to the ACC or ON position, the light goes on for about 6 seconds and then goes off.



5. AIRBAG SENSOR ASSEMBLY

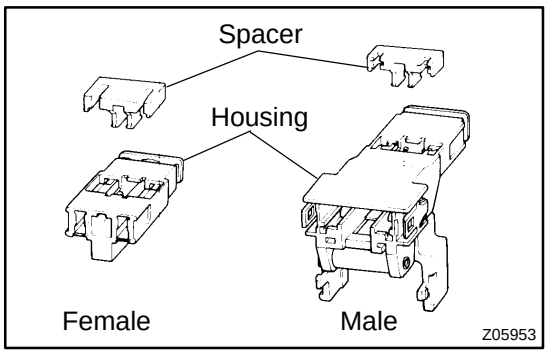
The airbag sensor assembly is mounted on the floor inside the console box. The airbag sensor assembly consists of an airbag sensor, safing sensor, diagnosis circuit and ignition control, drive circuit, etc. It receives signals from the airbag sensor and judges whether the SRS must be activated or not.

6. SRS CONNECTORS



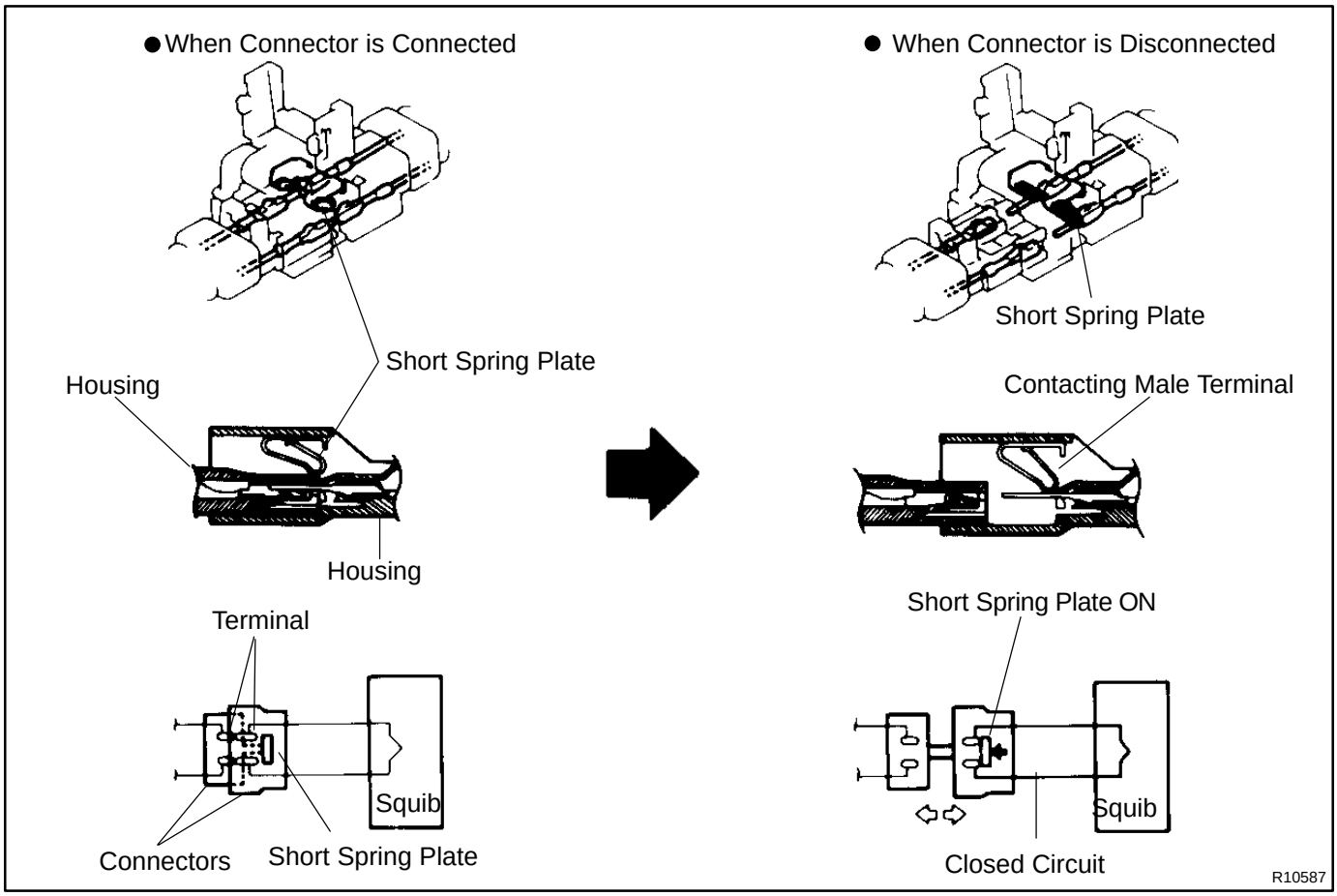
No.	Item	Application
(1)	Terminal Twin–Lock Mechanism	Connectors 1, 2, 3, 4, 5, 6, 7
(2)	Airbag Activation Prevention Mechanism	Connectors 1, 2, 3, 4
(3)	Electrical Connection Check Mechanism	Connectors 1
(4)	Connector Twin–Lock Mechanism	Connectors 2, 3, 4

(a) All connectors in the SRS are colored in yellow to distinguish them from other connectors. Connectors having special functions and specifically designed for the SRS are used in the locations shown above to ensure high reliability. These connectors use durable gold–plated terminals.



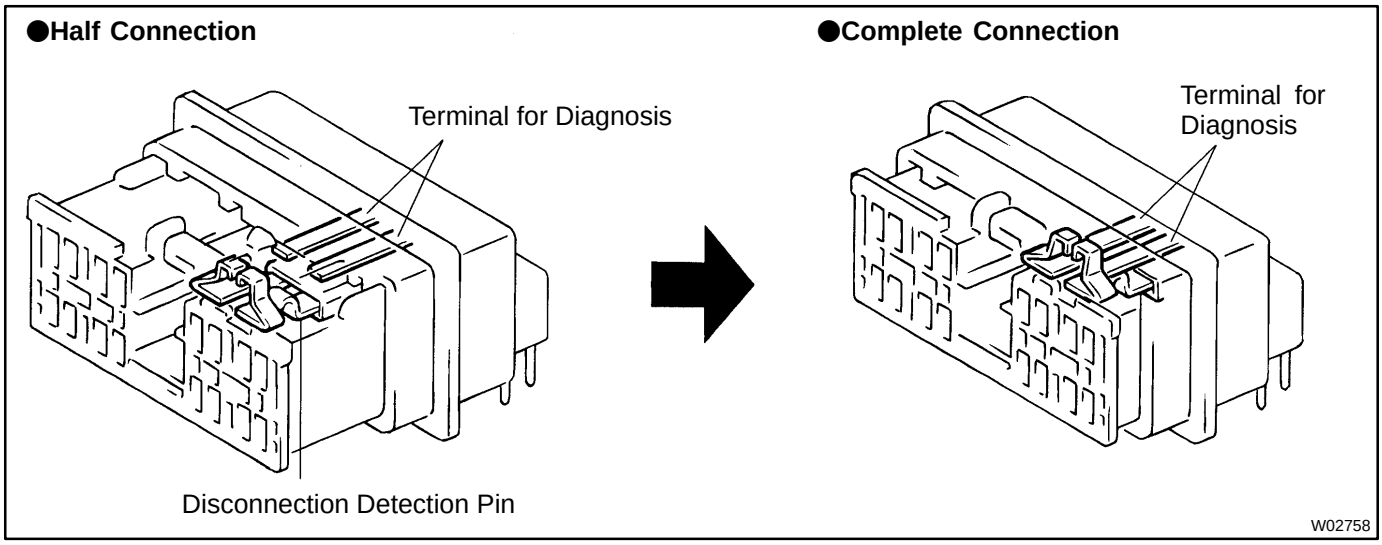
(1) Terminal Twin–Lock Mechanism
Each connector has a two–piece component consisting of a housing and a spacer. This design enables the terminal to be locked securely by two locking devices (the retainer and the lance) to prevent terminals from coming out.

(2) Airbag Activation Prevention Mechanism
Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects positive (+) terminal and negative (–) terminal of the squib.

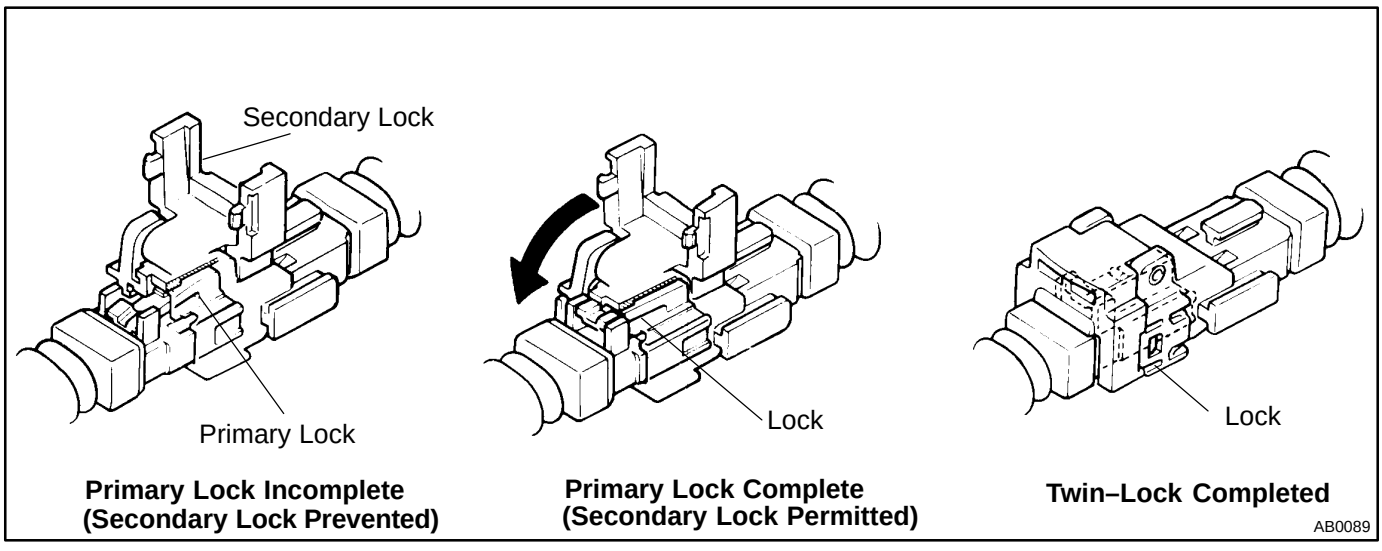


HINT:
The type of connector shown above is used for connectors ”2”, ”3” and ”4” in the diagram on the preceding page.

(3) Electrical Connection Check Mechanism
This mechanism electrically checks that connectors are connected correctly and completely. The electrical connection check mechanism is designed so that the disconnection detection pin connects with the diagnosis terminals when the connector housing lock is locked.



(4) Connector Twin–Lock Mechanism
With this mechanism connectors (male and female connectors) are locked by 2 locking devices to increase the connection reliability. If the primary lock is incomplete, ribs interfere and prevent the secondary lock.



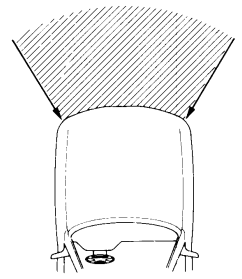


Fig.1

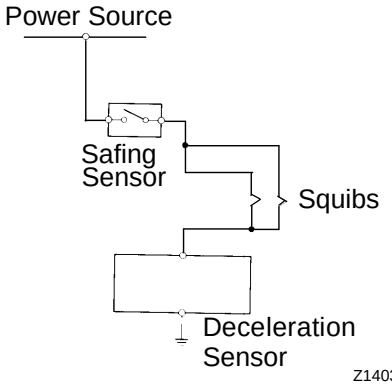


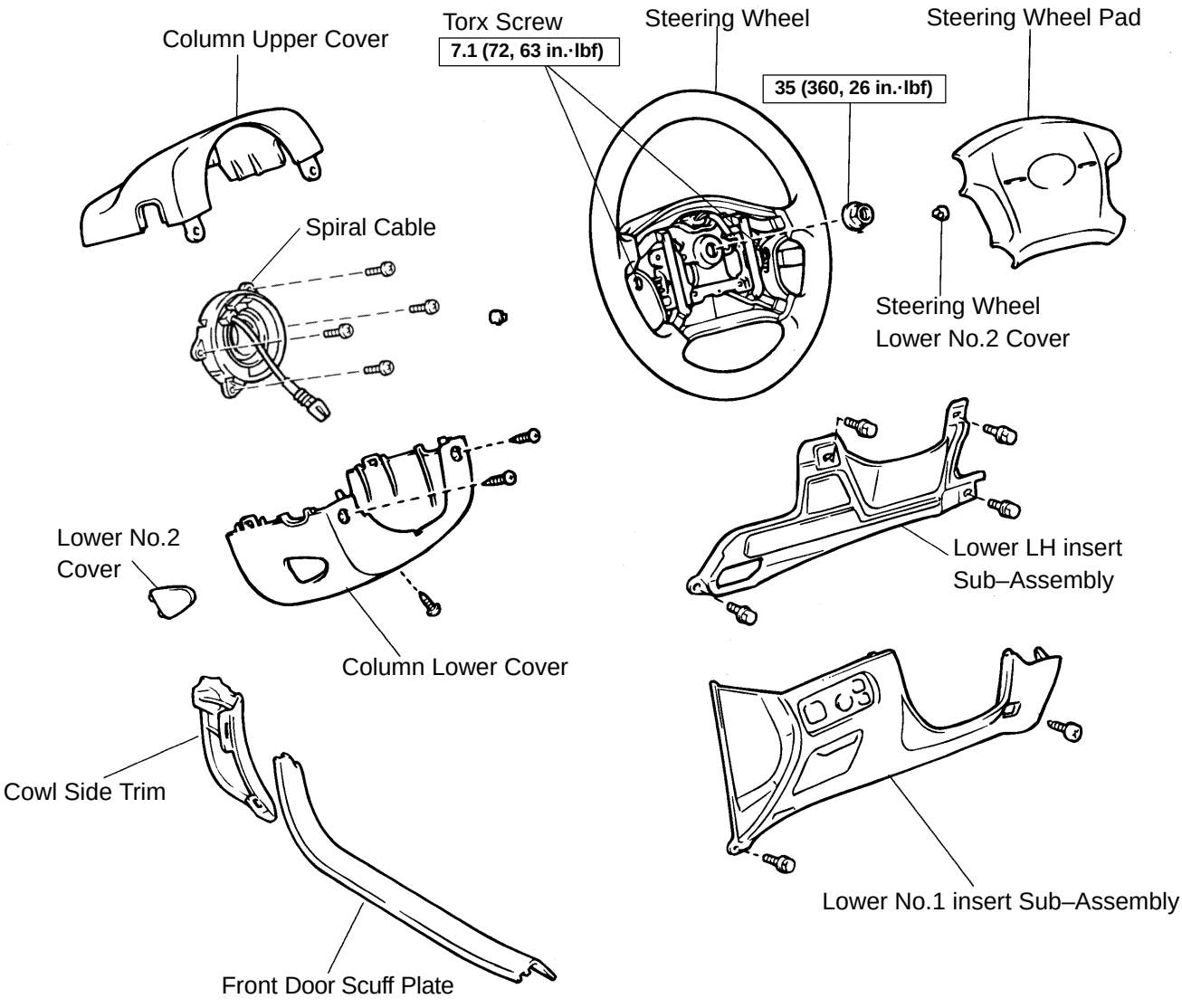
Fig.2

(b) When the vehicle is involved in a frontal collision in the hatched area (Fig. 1) and the shock is larger than the predetermined level, the SRS is activated automatically. A safing sensor is designed to go on at a smaller deceleration rate than the airbag sensor. As illustrated in Fig. 2, ignition is caused when current flows to the squib, which happens when a safing sensor and the airbag sensor go on simultaneously. When a deceleration force acts on the sensors, 2 squibs in the driver airbag and front passenger airbag ignite and generate gas. The gas discharging into the driver airbag and front passenger airbag rapidly increases the pressure inside the bags, breaking open the steering wheel pad and instrument panel door.
Bag inflation then ends, and the bags deflate as the gas is discharged through discharge holes at the bag's rear or side.

STEERING WHEEL PAD AND SPIRAL CABLE

COMPONENTS

RS00Y–02



N·m (kgf·cm, ft·lbf) : Specified torque

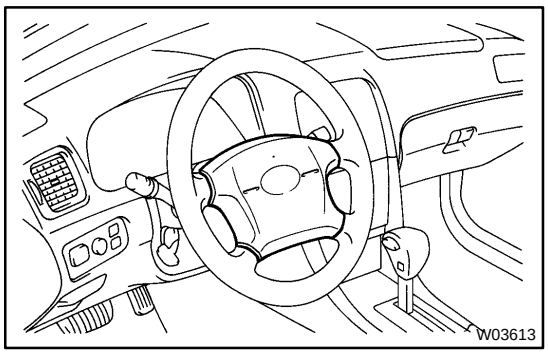
W03844

RS00Z–02

REMOVAL

(See page SR–11)

RS010–02

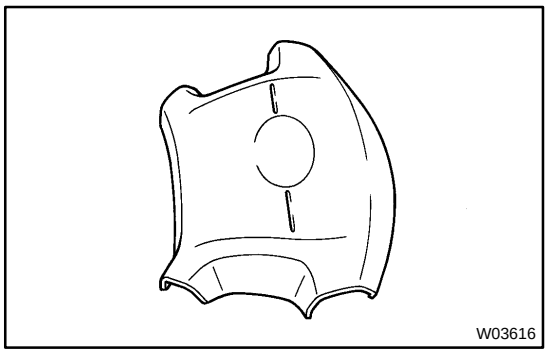


INSPECTION

1. VEHICLES NOT INVOLVED IN A COLLISION

(a) Do a diagnostic system check.
(See page DI–324)

(b) Do a visual check which includes the following items with the steering wheel pad (with airbag) installed in the vehicle.
Check cuts, minute cracks or marked discoloration on the steering wheel pad top surface and in the grooved portion.

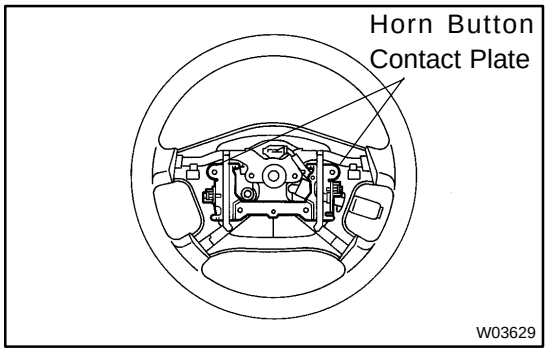


2. VEHICLE INVOLVED IN A COLLISION AND AIRBAG IS NOT DEPLOYED

(a) Do a diagnostic system check.
(See page DI–324)

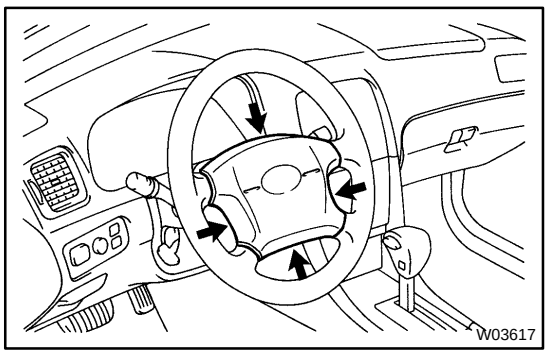
(b) Do a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.

- Check cuts minute cracks or marked discoloration on the steering wheel pad top surface and in the grooved portion.
- Check cuts and cracks in wire harnesses, and chipping in connectors.
- Check the deformation of the horn button contact plate of the steering wheel.



HINT:

- If the horn button contact plate of the steering wheel is deformed, never repair it. Always replace the steering wheel assembly with a new one.



- There should be no interference between the steering wheel pad and steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.

CAUTION:

For removal and installation of the steering wheel pad, see page SR–11 and be sure to follow the correct procedure.

3. VEHICLE INVOLVED IN A COLLISION AND AIRBAG IS DEPLOYED

(a) Do a diagnostic system check.
(See page DI–324)

(b) Do a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.
- Check the deformation on the horn button contact plate of the steering wheel.
- Check the damage on the spiral cable connector and wire harness.

HINT:
- If the horn button contact plate of the steering wheel is deformed, never repair it. Always replace the steering wheel assembly with a new one.
- There should be no interference between the steering wheel pad and steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.

RS011–31

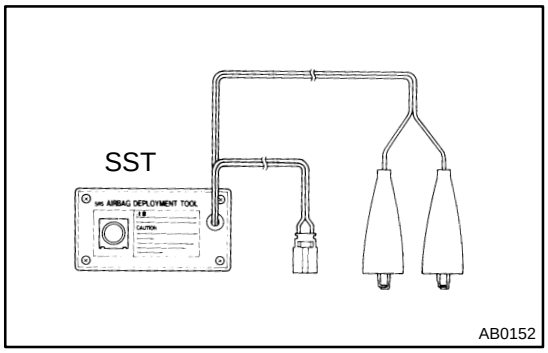
DISPOSAL

HINT:

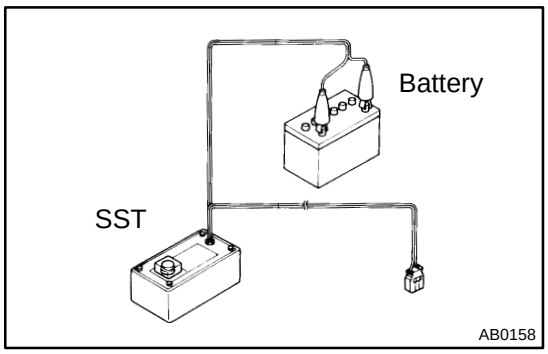
When a scrapping vehicle equipped with an SRS or disposing of a steering wheel pad (with airbag), always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC. When disposing of a steering wheel pad with an airbag deployed in a collision, follow the same procedure given in step 1–(g) in ”DISPOSAL”.

CAUTION:

- **Never dispose of a steering wheel pad which has an undeployed airbag.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out–of–doors and where it will not create a nuisance to nearby residents.**

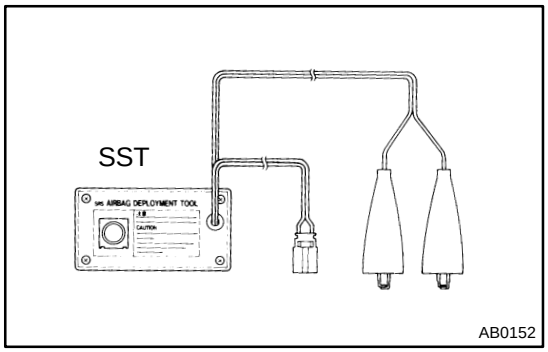


- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.**
  SST 09082–00700
- **When deploying an airbag, perform the operation at least 10 m (33 ft) away from the steering wheel pad.**
- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering wheel pad with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a steering wheel pad with the deployed airbag.**



1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

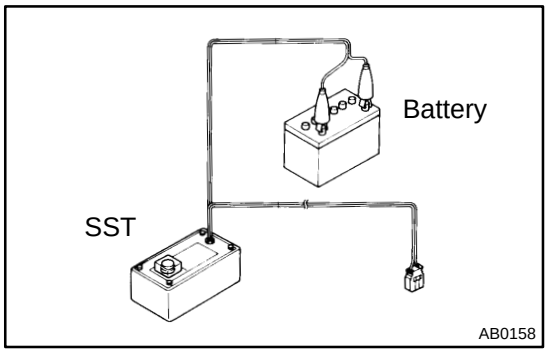
HINT:
Have a battery ready as the power source to deploy the airbag.



(a) Confirm functioning of the SST.

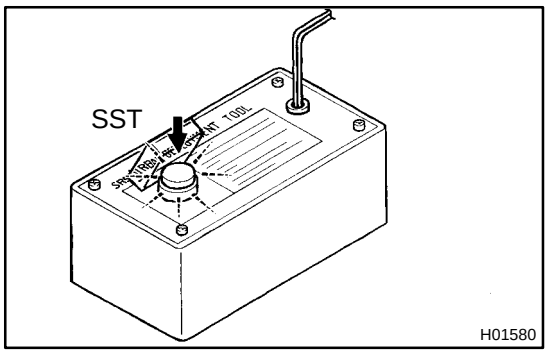
CAUTION:
When deploying the airbag, always use the specified SST: SRS Airbag Deployment Tool.

SST 09082–00700



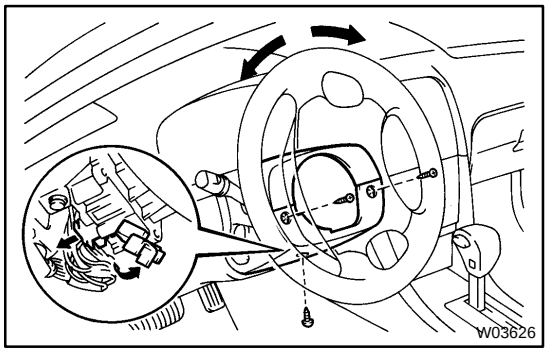
(1) Connect the SST to the battery.
Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.

HINT:
Do not connect the yellow connector which will be connected with the supplemental restraint system.



(2) Confirm functioning of the SST.
Press the SST activation switch, and check that the LED of the SST activation switch lights up.

CAUTION:
If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.

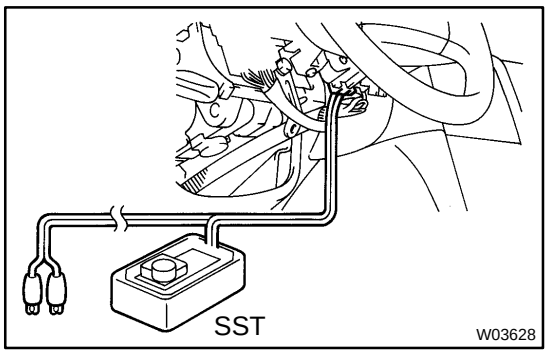


(b) Install the SST.

CAUTION:
Check that there is no looseness in the steering wheel and steering wheel pad.

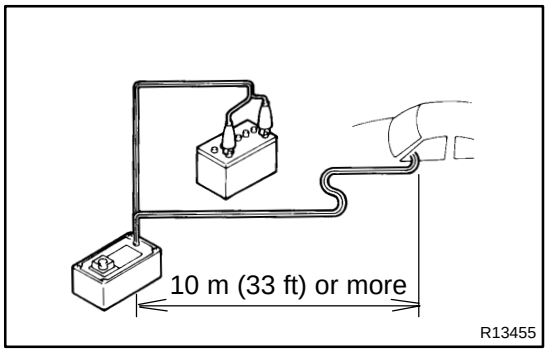
(1) Remove the steering column lower cover.
Remove the 3 screws and steering column lower cover as shown in the illustration.

(2) Disconnect the airbag connector of the spiral cable.



(3) Connect the SST connector to the airbag connector of the spiral cable.

SST 09082–00700



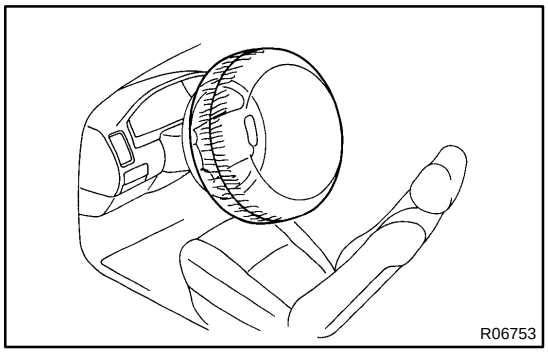
(4) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

(5) Close all the doors and window of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(6) Connect the SST red clip to the battery positive (+) terminal and the black clip to the negative (–) terminal.



(c) Deploy the airbag.

(1) Confirm that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

(2) Press the SST activation switch and deploy the airbag.

HINT:

The airbag deploys simultaneously as the LED of the SST activation switch lights up.

(d) Dispose of steering wheel pad (with airbag).

CAUTION:

- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering wheel pad with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a steering wheel pad with the deployed airbag.**

(1) When scrapping a vehicle, deploy the airbag and scrap the vehicle with the steering wheel pad still installed.

(2) When moving a vehicle for scrapping which has a steering wheel pad with deployed airbag, use gloves and safety glasses.

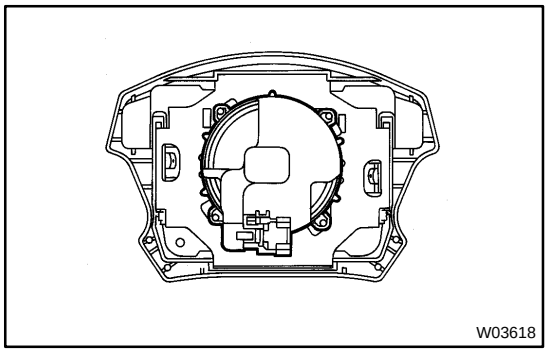
2. DEPLOYMENT WHEN DISPOSING OF STEERING WHEEL PAD ONLY

NOTICE:

- **When disposing of the steering wheel pad (with airbag) only, never use the customers vehicle to deploy the airbag.**
- **Be sure to follow the procedure given below when deploying the airbag.**

HINT:

Have a battery ready as the power source to deploy the airbag.

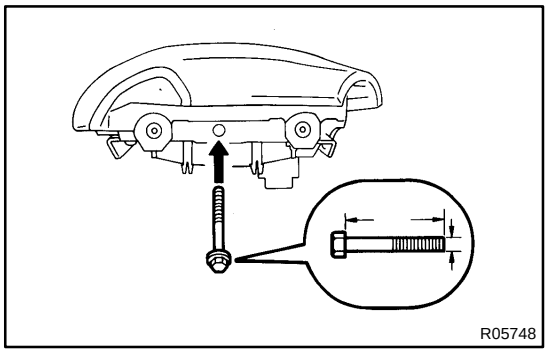


(a) Remove the steering wheel pad.
(See page SR–11)

CAUTION:

When storing the steering wheel pad, keep the upper surface of the pad facing upward.

(b) Remove the steering wheel pad connector.
Remove the connector on the rear surface of the steering wheel pad from the bracket.

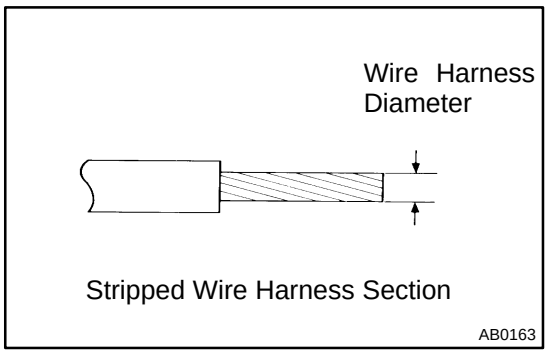


(c) Fix the steering wheel pad to the disc wheel with tire.
(1) Install the 2 bolts with washer in the 2 bolt holes on the steering wheel pad.

Bolt:
L: 35. mm (1.387 in.)
M: 6.0 mm (0.236 in.)
Pitch: 1.0 mm (0.039 in.)

NOTICE:

- **Tighten the bolts by hand until the bolts become difficult to turn.**
- **Do not tighten the bolts too much.**



(2) Using a service–purpose wire harness tie down the steering wheel pad to the disc wheel.

Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 in^2. or more).

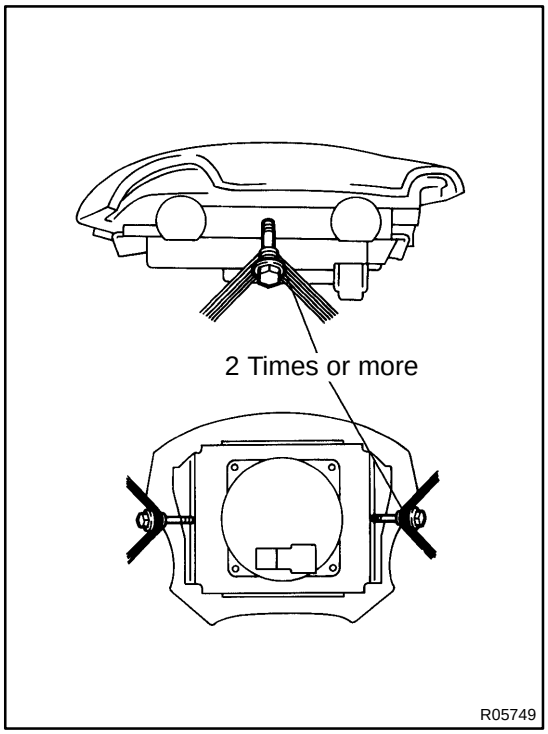
HINT:

To calculate the square of the stripped wire harness section:

Square – 3.14 x (Diameter)^2 divided by 4

CAUTION:

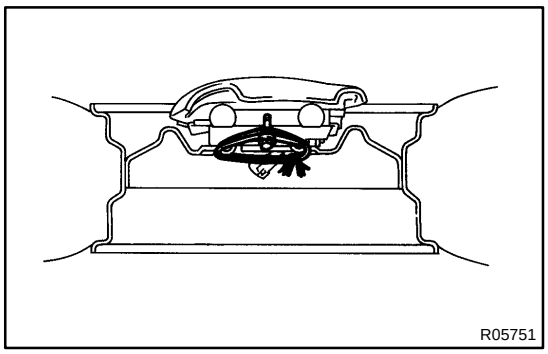
If a wire harness which is too thin or some other thing is used to tie down the steering wheel pad, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm^2 (0.0019 in^2).



(3) Using 3 wire harnesses, wrap the wire harness at least 2 times each around the bolts installed on the left and right sides of the steering wheel pad.

CAUTION:

- **Tightly wind the wire harness around the bolts so that there is no slack.**
- **If there is slackness in the wire harness, the steering wheel pad may come loose due to the shock when the airbag is deployed. This is highly dangerous.**


R05751

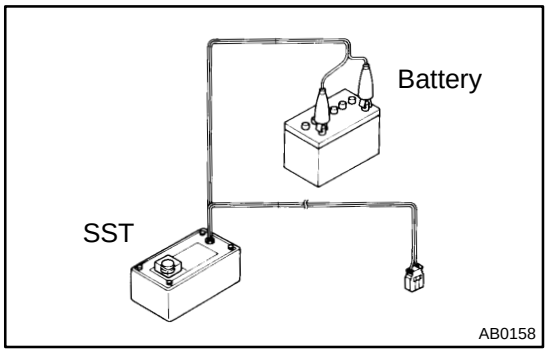
(4) Face the upper surface of the steering wheel pad upward. Separately tie the left and right sides of the steering wheel pad to the disc wheel through the hub nut holes. Position the steering wheel pad connector so that it hangs downward though a hub hole in the disc wheel.

CAUTION:

- **Make sure that the wire harness is tight. It is very dangerous when looseness in the wire harness results in the steering wheel pad coming free through the shock from the airbag deploying.**
- **Always tie down the steering wheel pad with the pad side facing upward. It is very dangerous if the steering wheel pad is tied down with the metal surface facing upward as the wire harness will be cut by the shock of the airbag deploying and the steering wheel pad will be thrown into the air.**

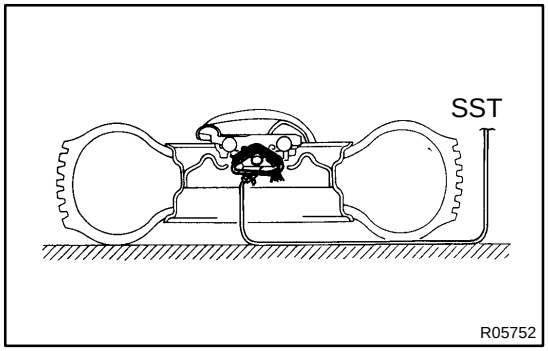
NOTICE:

The disc wheel will be marked by airbag deployment, so use the spare disc wheel.



AB0158

(d) Confirm functioning of the SST.
SST 09082–00700



R05752

(e) Install the SST.

CAUTION:

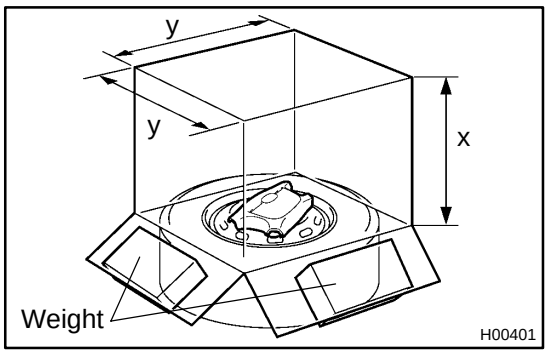
Place the disc wheel on the level ground.

(1) Connect the 2 SST connector to the steering wheel pad connector.
SST 09082–00700

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. Also, secure some slack for the SST wire harness inside the disc wheel.

(2) Move the SST to at least 10 m (33 ft) away from the steering wheel pad tied down on the disc wheel.

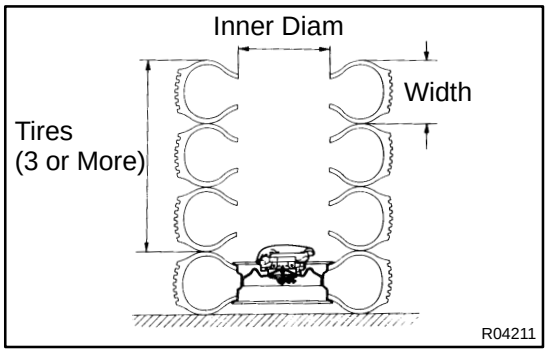


(f) Cover the steering wheel pad with cardboard box or tires.

- Covering method using cardboard box:
  Cover the steering wheel pad with the cardboard box and weight the cardboard box down in 4 places with at least 196 N (20 kg, 44 lb).

Size of cardboard box:
Must exceed the following dimensions:
x=460 mm (18.11 in.)
When dimension of the cardboard box exceeds the diameter of the disc wheel with tire to which the steering wheel pad is tied –
x=460 mm (18.11 in.) + width of tire
y= 650 mm (25.59 in.)

NOTICE:
If a cardboard box smaller than the specified size is used, the cardboard box will be broken by the shock from the airbag deployment.



- Covering method using tires:
  Place at least 3 tires without disc wheel on top of the disc wheel with tire to which the steering wheel pad is tied.

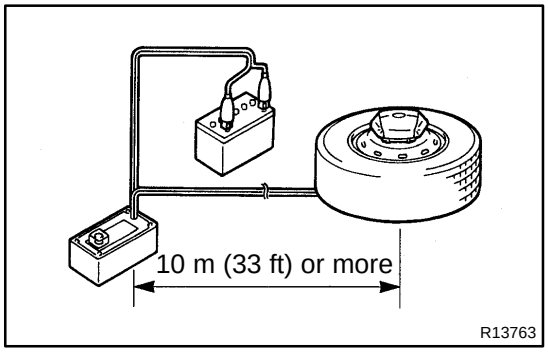
Tire size: Must exceed the following dimensions–
Width: 185 mm (7.87 in.)
Inner diameter: 360 mm (14.17 in.)

CAUTION:
Do not use tires with disc wheels.

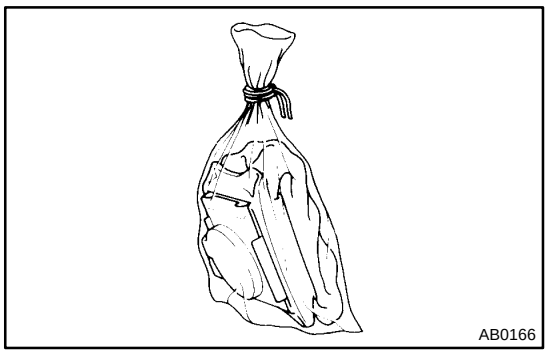
NOTICE:
The tires may be marked by the airbag deployment, so use the spare tires.

(g) Deploy the airbag.

(1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.
(2) Check that no one is within 10 m (33 ft) area around the disc wheel which the steering wheel pad is tied to.
(3) Press the SST activation switch and deploy the airbag.



HINT:
The airbag deploys simultaneously as the LED of the SST activation switch lights up.



(h) Dispose of the steering wheel pad (with airbag).

CAUTION:

- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering wheel pad with deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a steering wheel pad with deployed airbag.**

(1) Remove the steering wheel pad from the disc wheel.

(2) Place the steering wheel pad in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.

RS012–02

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the steering wheel pad, steering wheel or spiral cable.

- If the airbag has been deployed.
- If the steering wheel pad or spiral cable has been found to be faulty in troubleshooting.
- If the steering wheel pad, steering or spiral cable has been found to be faulty during the check in items (See page RS–9)
- If the steering wheel pad has been dropped.

CAUTION:

For removal and installation of the steering wheel pad, see page SR–11, SR–16 and be sure to follow the correct procedure.

RS013–02

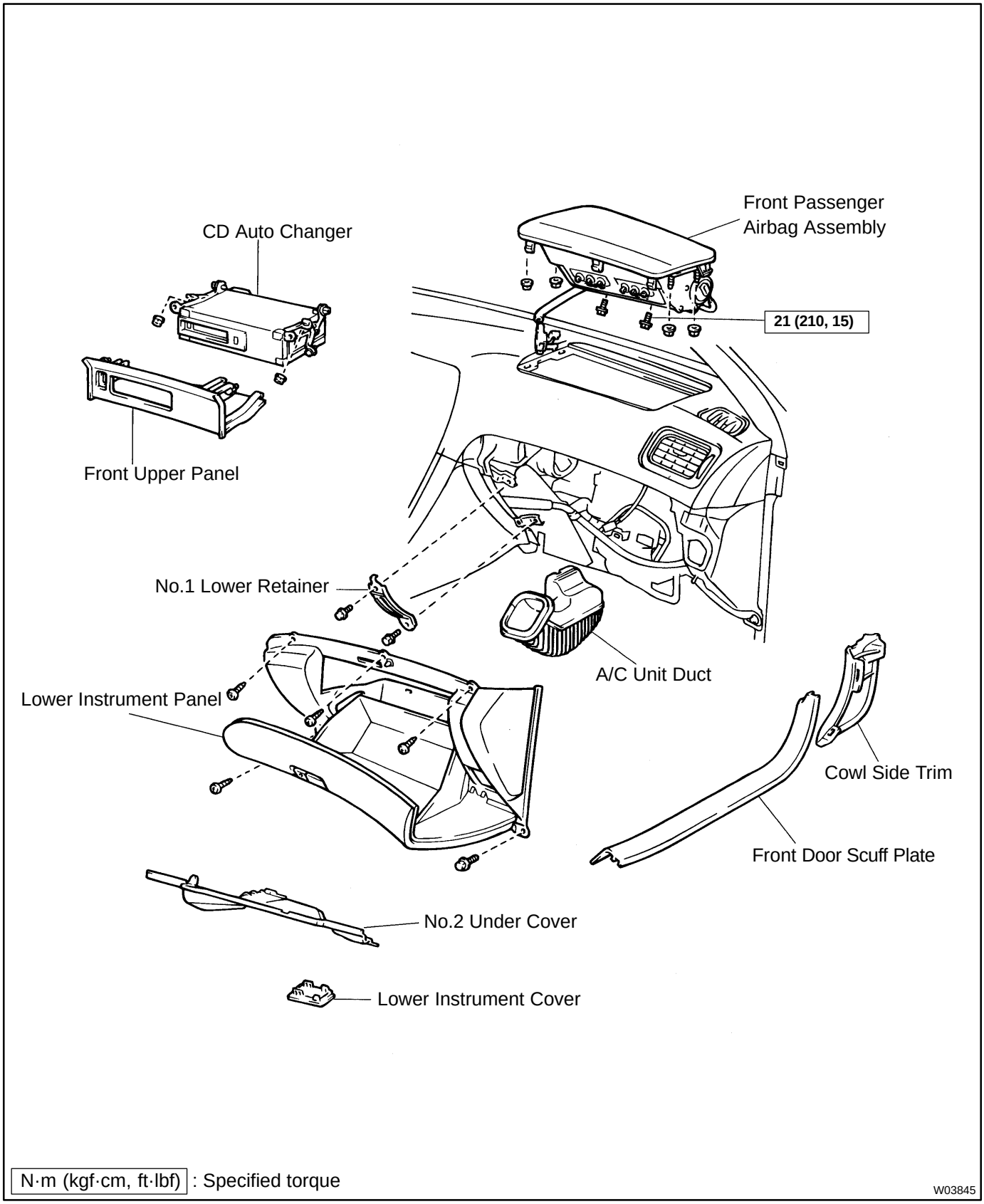
INSTALLATION

(See page SR–16)

FRONT PASSENGER AIRBAG ASSEMBLY

RS014–02

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

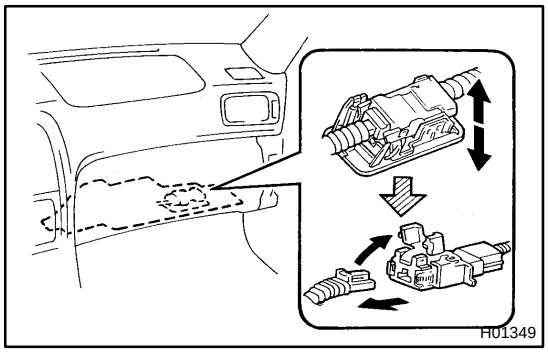
W03845

RS02P–01

REMOVAL

NOTICE:

- **If the wiring connector of the SRS is disconnected and the ignition switch is at ON or ACC position, DTCs will be recorded.**
- **Never use the airbag parts from another vehicle. When replacing parts, replace with new parts.**



1. DISCONNECT AIRBAG CONNECTOR

(a) Remove the lower instrument cover inside the No.2 under cover.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

(b) Pull up the connector.

(c) Disconnect the front passenger airbag connector.

2. REMOVE THESE PARTS: (See page BO–79)

(a) Front door scuff plate

(b) Cowl side trim

(c) No.2 under cover

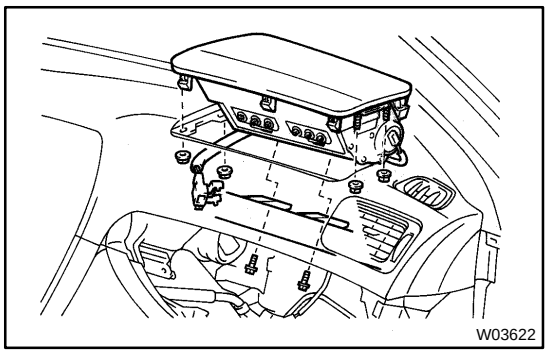
(d) Lower instrument panel

(e) No.1 lower retainer

(f) Finish upper panel

(g) CD auto changer

(h) A/C unit duct



3. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY

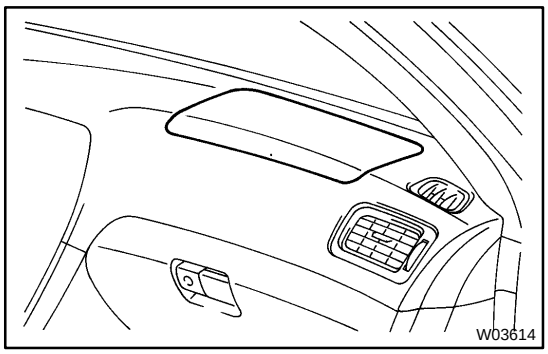
Remove the 2 bolts, 4 nuts and front passenger airbag assembly.

CAUTION:

- **Do not store the front passenger airbag assembly with the airbag deployment direction facing downward.**
- **Never disassemble the front passenger airbag assembly.**

RS02Q–01

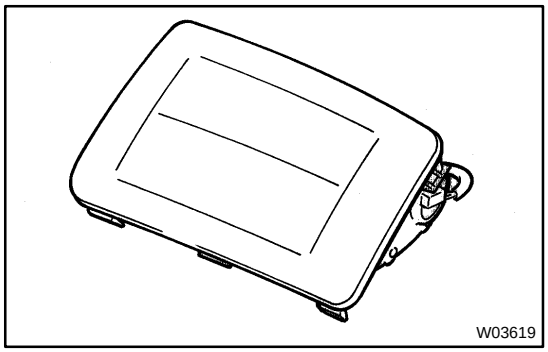
INSPECTION



1. VEHICLES NOT INVOLVED IN A COLLISION

(a) Do a diagnostic system check.
(See page DI–324)

(b) Do a visual check which includes the following items with the front passenger airbag assembly installed in the vehicle.
Check cuts, minute cracks or marked discoloration on the front passenger airbag assembly and instrument panel.

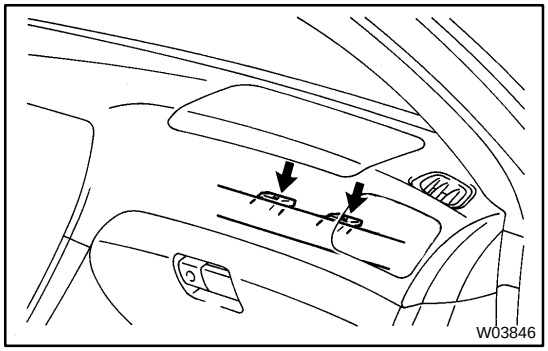


2. VEHICLE INVOLVED IN A COLLISION AND AIRBAG IS NOT DEPLOYED

(a) Do a diagnostic system check.
(See page DI–324)

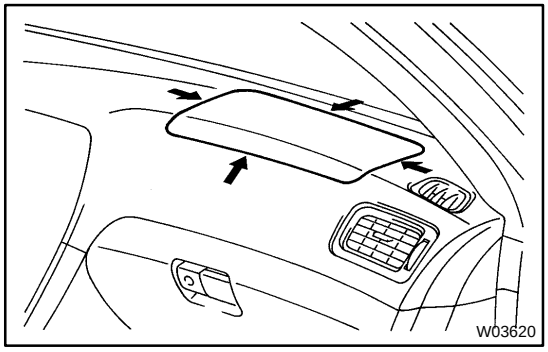
(b) Do a visual check which includes the following items with the front passenger airbag assembly removed from the vehicle.

- Check cuts minute cracks or marked discoloration on the front passenger airbag assembly.
- Check cuts and cracks in wire harnesses, and for chipping in connectors.
- Check the deformation or cracks on the instrument panel and instrument panel reinforcement.



HINT:

- If the instrument panel or instrument panel reinforcement is deformed or cracked, never repair it. Always replace it with a new one.



- There should be no interference between the instrument panel and the front passenger airbag assembly.

CAUTION:
For removal and installation of the front passenger airbag assembly, see page RS–22, RS–32 and be sure to follow the correct procedure.

3. VEHICLE INVOLVED IN A COLLISION AND AIRBAG IS DEPLOYED

(a) Do a diagnostic system check.
(See page DI–324)

(b) Do a visual check which includes the following items with the front passenger airbag assembly removed from the vehicle.

- Check the deformation or cracks on the instrument panel and instrument panel reinforcement.
- Check the damage on the connector and wire harness.

HINT:
If the instrument panel or instrument panel reinforcement is deformed or cracked, never repair it. Always replace it with a new one.

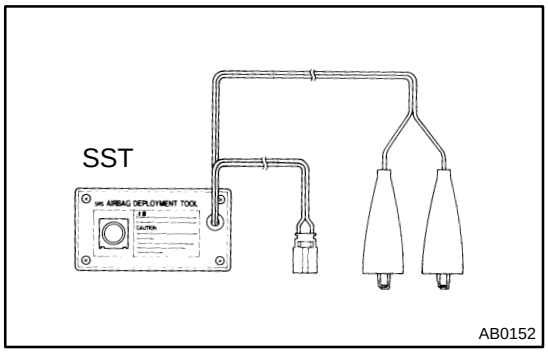
RS02R–01

DISPOSAL

HINT:

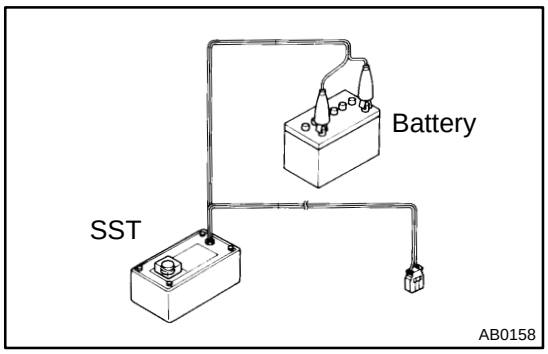
When a scrapping vehicle equipped with an SRS or disposing of a front passenger airbag assembly, always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

When disposing of a front passenger airbag assembly with an airbag deployed in a collision, follow the same procedure given in step 1–(e) in "DISPOSAL".



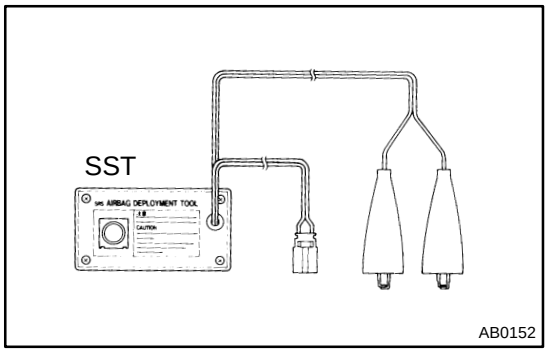
CAUTION:

- **Never dispose of a front passenger airbag assembly which has an undeployed airbag.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out–of–doors and where it will not create a nuisance to nearby residents.**
- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.**
  SST 09082–00700
- **When deploying an airbag, perform the operation from at least 10 m (33 ft) away from the front passenger airbag assembly.**
- **The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front passenger airbag assembly with deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front passenger airbag assembly with deployed airbag.**



1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

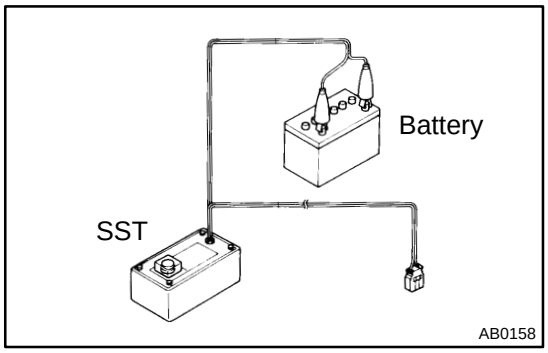
HINT:
Have a battery ready as the power source to deploy the airbag.



(a) Confirm functioning of the SST.

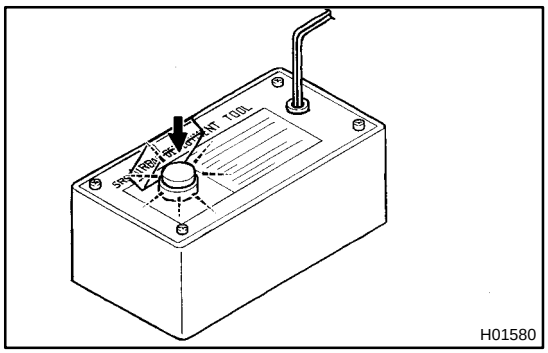
CAUTION:
When deploying the airbag, always use the specified SST: SRS Airbag Deployment Tool.

SST 09082–00700



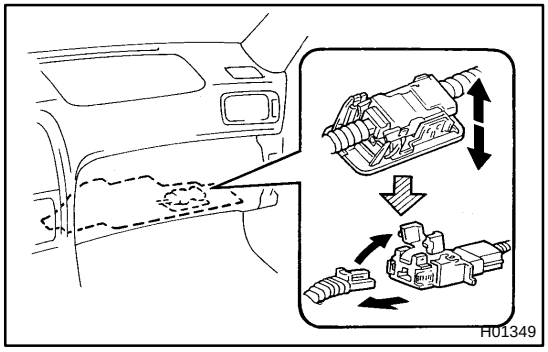
(1) Connect the SST to battery.
Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.

HINT:
Do not connect the yellow connector which will be connected with the supplemental restraint system.



(2) Confirm functioning of the SST.
Press the SST activation switch, and confirm the LED of the SST activation switch lights up.

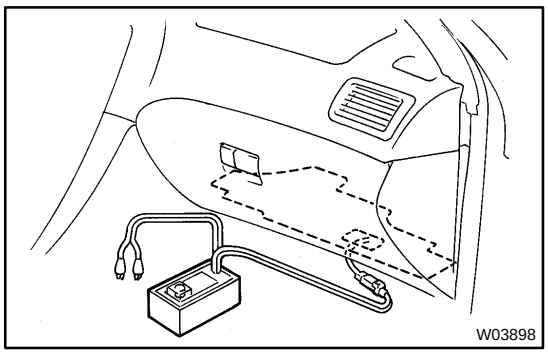
CAUTION:
If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.



(b) Disconnect the airbag connector.
(1) Remove the lower instrument cover inside the No.2 under cover.

NOTICE:
When handling the airbag connector, take care not to damage the airbag wire harness.

(2) Pull up the connector.
(3) Disconnect the airbag connector.



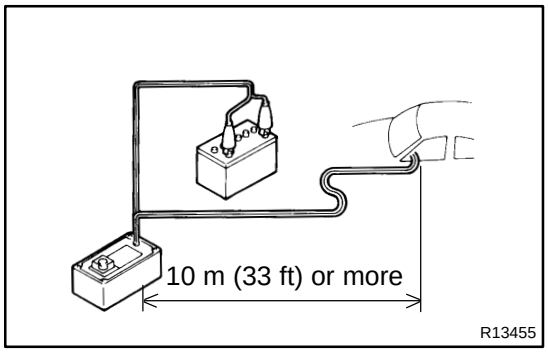
(c) Install the SST.

(1) Connect the SST connector to the front passenger airbag assembly connector.

SST 09082–00700

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



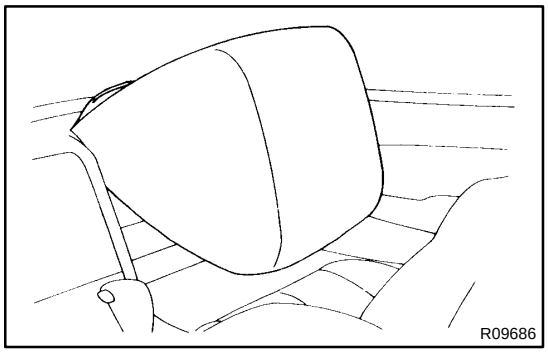
(2) Move the SST to at least 10 m (33 ft) from the front of the vehicle.

(3) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(4) Connect the SST red clip to the battery positive (+) terminal and the black clip to the negative (+) terminal.



(d) Deploy the airbag.

(1) Confirm that no–one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

(2) Press the SST activation switch and deploy the airbag.

HINT:

The airbag deploys simultaneously as the LED of the SST activation switch lights up.

(e) Dispose of the front passenger airbag assembly.

CAUTION:

- **The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front passenger airbag assembly with deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front passenger airbag assembly with deployed airbag.**

(1) When scrapping a vehicle, deploy the airbag and scrap the vehicle with the front passenger airbag assembly still installed.

(2) When moving a vehicle for scrapping which has a front passenger airbag assembly with deployed airbag, use gloves and safety glasses.

2. DEPLOYMENT WHEN DISPOSING OF FRONT PASSENGER AIRBAG ASSEMBLY ONLY

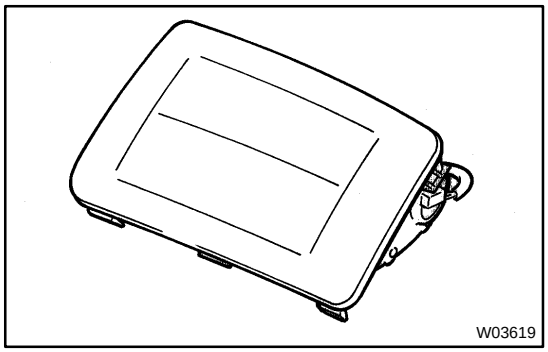
NOTICE:

- **When disposing of the front passenger airbag assembly only, never use the customers vehicle to deploy the airbag.**
- **Be sure to follow the procedure given below when deploying the airbag.**

HINT:

Have a battery ready as the power source to deploy the airbag.

(a) Remove the front passenger airbag assembly.
(See page RS–22)



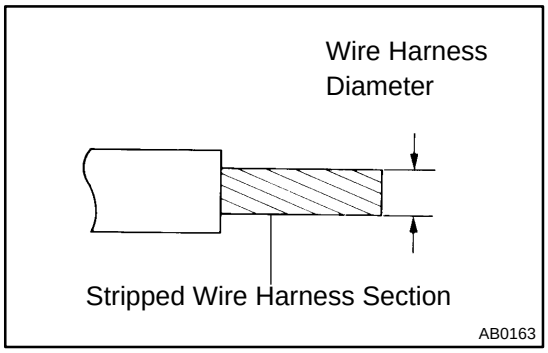
CAUTION:

- **When removing the front passenger airbag assembly, work must be started after 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.**
- **Store the front passenger airbag assembly with the airbag deployment direction facing upward.**

(b) Fix the front passenger airbag assembly to tire.

(1) Using a service–purpose wire harness for the vehicle, tie down the front passenger airbag assembly to the tire.

Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 $in.^2$ or more)



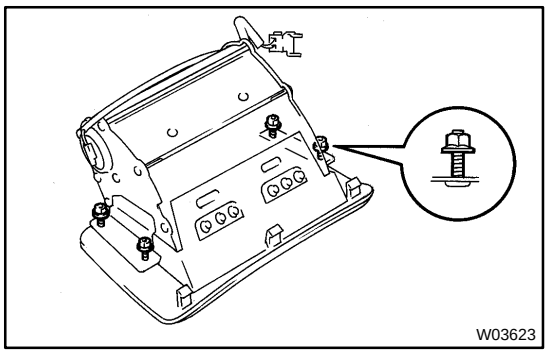
HINT:

To calculate the square of the stripped wire harness section:

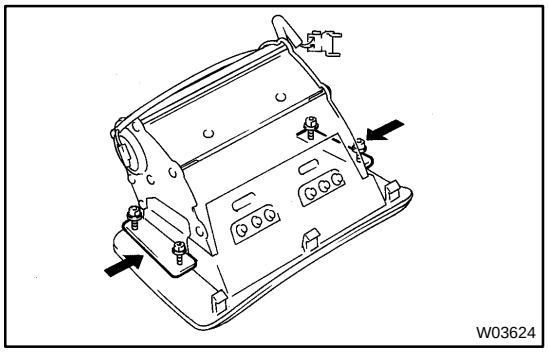
Square = 3.14 X $(Diameter)^2$ divided by 4

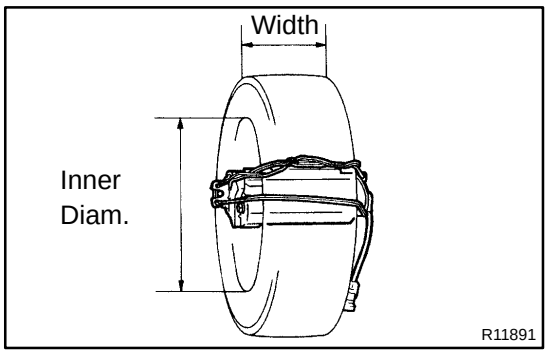
(2) Install the 4 nuts in the front passenger airbag assembly.

(3) Remove the 2 nuts and front passenger airbag assembly bracket.



(4) Wrap the wire harness around the tire, passing the wire harness through the installation holes indicated by arrows in the installation.





(5) Position the front passenger airbag assembly inside the tire with the airbag deployment direction facing inside.

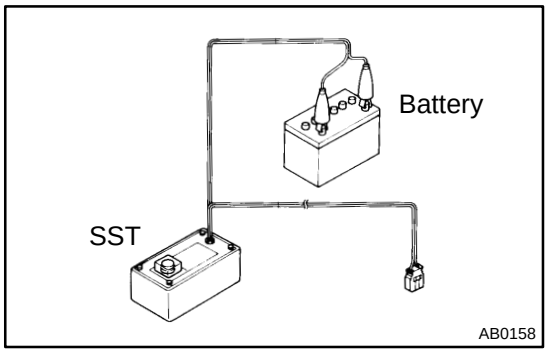
Tire size: Must exceed the following dimensions–
Width: 185 mm (7.28 in.)
Inner diameter: 360 mm (14.17 in.)

CAUTION:

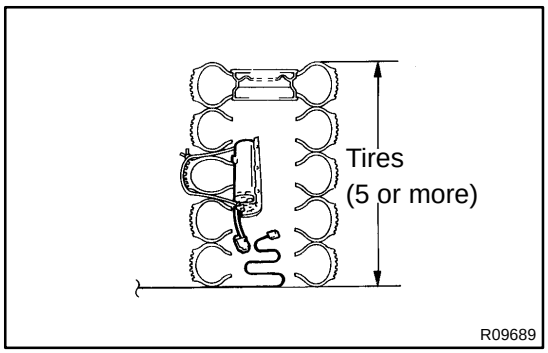
- **Make sure that the wire harness is tight. It is very dangerous if looseness in the wire harness results in the front passenger airbag assembly coming free due to the shock of the airbag deploying.**
- **Always tie down the front passenger airbag assembly with the airbag door facing inside.**

NOTICE:

The tire will be marked by the airbag deployment, so use a redundant tire.



(c) Confirm functioning of the SST.
SST 09082–00700



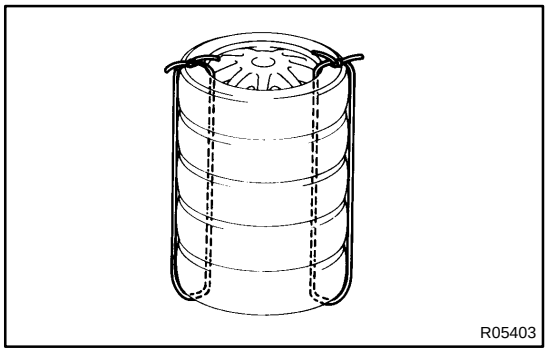
(d) Place tires.
(1) Place at least 2 tires under the tire to which the front passenger airbag assembly is tied.
(2) Place at least 2 tires over the tire to which the front passenger airbag assembly is tied. The top tire should have the wheel installed.
(3) Tie the tires together with 2 wire harnesses.

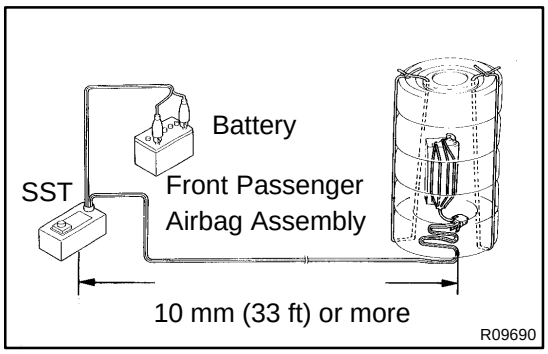
CAUTION:

Make sure that the wire harnesses are tight. It is very dangerous if loose wire harnesses result in the tires coming free due to the shock of the airbag deploying.

HINT:

Place the SST connector and wire harness inside tires. Provide at least 1 m (3 ft) of slack for the wire harness.



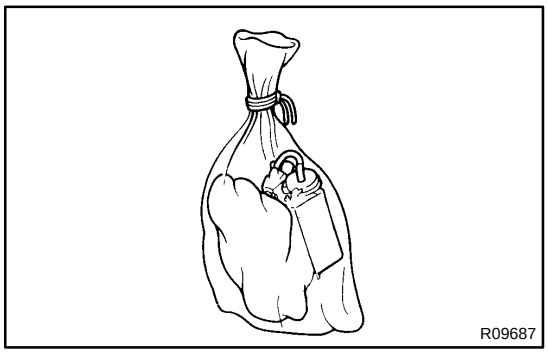


(e) Install the SST.
Connect the SST connector to the front passenger airbag assembly connector.
SST 09082–00700

NOTICE:
To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.

(f) Deploy the airbag.
(1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.
(2) Confirm that no–one is within 10 m (33 ft) area around the tire which the front passenger airbag assembly is tied to.
(3) Press the SST activation switch and deploy the airbag.

HINT:
The airbag deploys simultaneously as the LED of the SST activation switch lights up.



(g) Dispose of the front passenger airbag assembly.

CAUTION:
- **The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front passenger airbag assembly with deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front passenger airbag assembly with deployed airbag.**

(1) Remove the front passenger airbag assembly from the tire.
(2) Place the front passenger airbag assembly in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts.

RS018–02

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the front passenger airbag assembly, instrument panel or instrument panel reinforcement.

- If the airbag has been deployed.
- If the front passenger airbag assembly has been found to be faulty in troubleshooting.
- If the front passenger airbag assembly, instrument panel or instrument panel reinforcement has been found to be faulty during the check in items.(See page RS–23)
- If the front passenger airbag assembly has been dropped.

CAUTION:

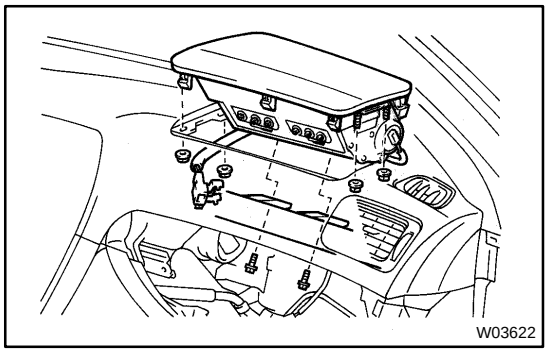
For replacement of the front passenger airbag assembly, see page RS–22, RS–32 and be sure to follow the correct procedure.

RS019–02

INSTALLATION

NOTICE:

Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.



1. INSTALL FRONT PASSENGER AIRBAG ASSEMBLY

Install the front passenger airbag assembly to the instrument panel.

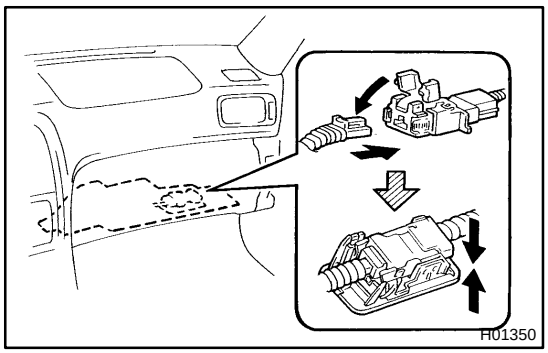
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

CAUTION:

- **Make sure that no foreign objects are trapped between the airbag bag, and within the module.**
- **Do not damage the strap when installing the module.**

NOTICE:

If the front passenger airbag assembly has been dropped, or there are cracks, dents or other defects in the case or connector, replace the front passenger airbag assembly with a new one.



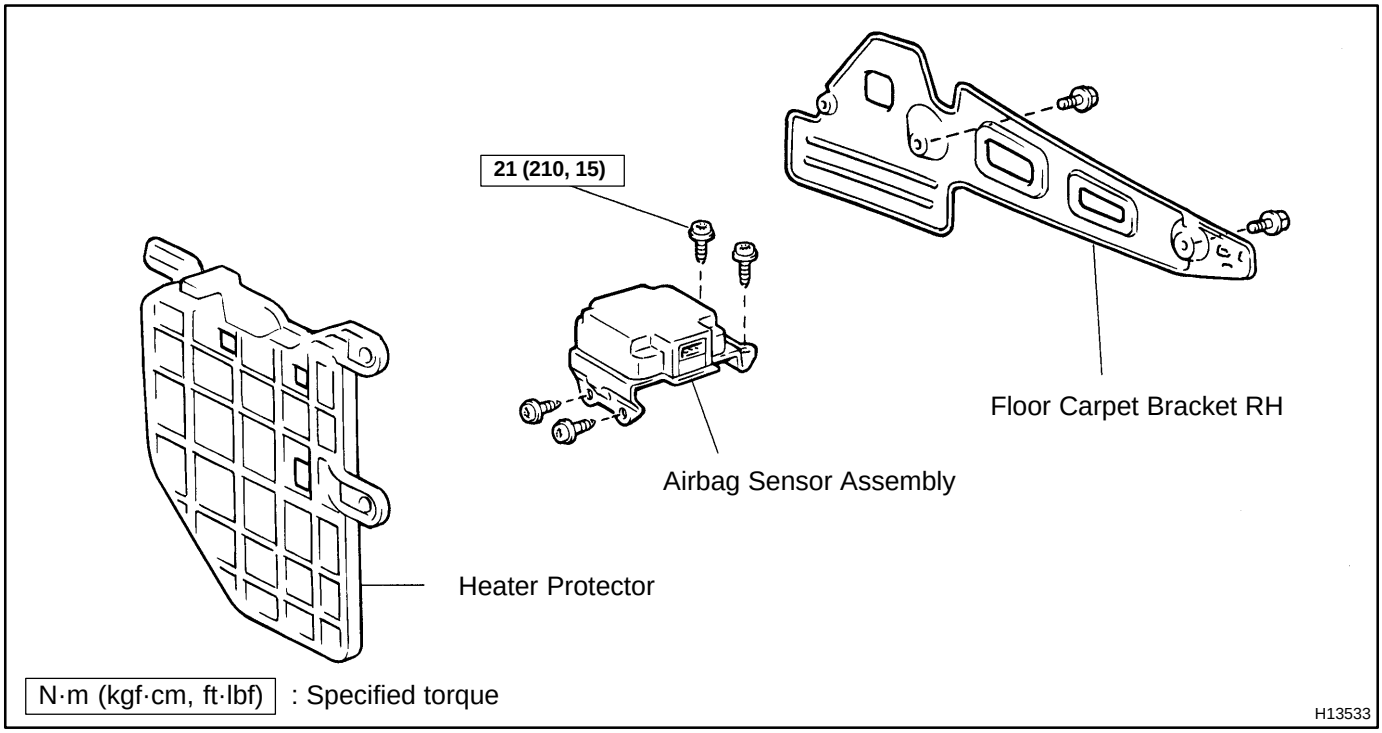
2. CONNECT AIRBAG CONNECTOR

(a) Connect the airbag connector.
(b) Install the airbag connector to the No.2 under cover.
(c) Install the No.2 under cover.

AIRBAG SENSOR ASSEMBLY

COMPONENTS

RS01G–23



RS01H–10

REMOVAL

NOTICE:

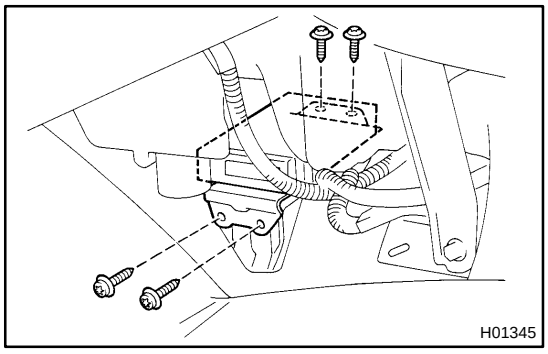
Do not open the cover or the case of the ECU and various electrical devices unless absolutely necessary.

(If the IC terminals are touched, the IC may be destroyed by static electricity.)

1. REMOVE THESE PARTS

(a) Floor carpet bracket RH

(b) Heater protector



2. REMOVE AIRBAG SENSOR ASSEMBLY

(a) Disconnect the airbag sensor connector.

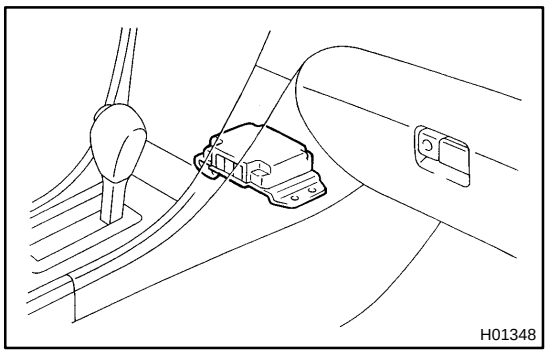
NOTICE:

Remove the connectors with the sensor assembly installed.

(b) Using a torx wrench, remove the 4 screws and airbag sensor assembly.

Torx wrench: T40 (Part No.09042–00020 or locally manufactured tool)

RS01I–02



INSPECTION

1. VEHICLE NOT INVOLVED IN COLLISION

Do a diagnostic system check.

(See page DI–324)

2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

Do a diagnostic system check.

(See page DI–324)

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

Replace the airbag sensor assembly.

RS01J–03

REPLACEMENT

REPLACEMENT REQUIREMENT

In the following cases, replace the airbag sensor assembly.

- If the SRS has been deployed in a collision.
- If the airbag sensor assembly has been found to be faulty in troubleshooting.
- If the airbag sensor assembly has been dropped.

CAUTION:

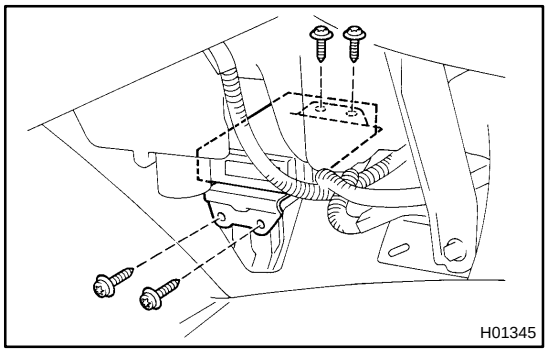
For removal and installation of the airbag sensor assembly, see page RS–34 and RS–37. Be sure to follow the correct procedure.

RS01K–10

INSTALLATION

NOTICE:

- **Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.**
- **Never reuse the airbag sensor assembly involved in a collision when the airbag has deployed.**
- **Never repair a sensor in order to reuse it.**



1. INSTALL AIRBAG SENSOR ASSEMBLY

(a) Using a torx wrench, install the airbag sensor assembly with 4 screws.

Torx wrench: T40 (Part No.09042–00020 or locally manufactured tool)

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

(b) Connect the airbag sensor connectors.

NOTICE:

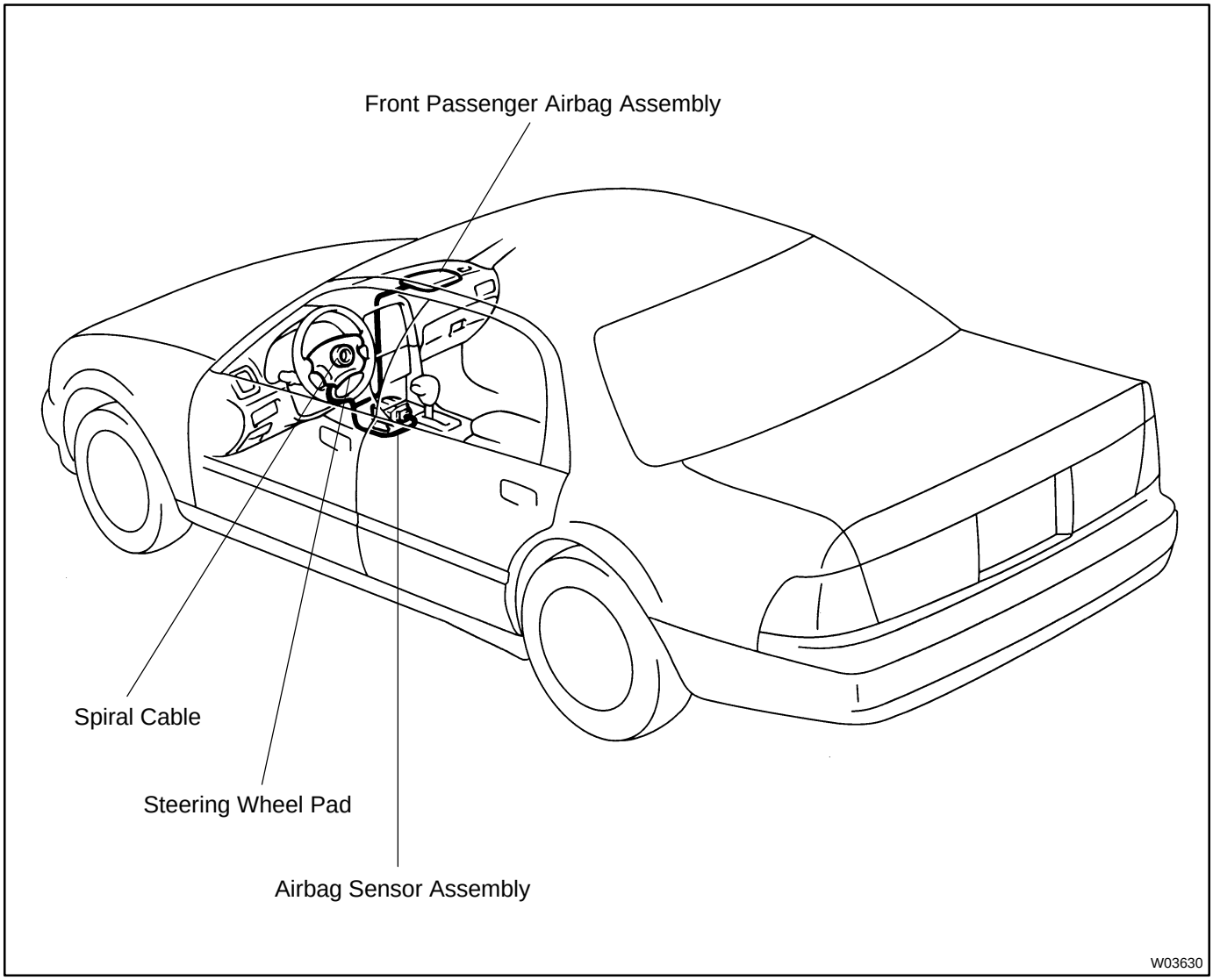
- **Installation of the connector is done after the sensor assembly has been installed.**
- **Make sure the sensor assembly is installed with the specified torque.**
- **If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.**
- **When installing the senor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.**
- **After installing , shake the sensor assembly to check that there is no looseness.**

2. INSTALL REMOVED PARTS

WIRE HARNESS AND CONNECTOR

LOCATION

RS01V–24



RS01W–02

INSPECTION

HINT:

The SRS wire harness is integrated with the instrument panel wire harness assembly. The wires for the SRS wire harness are encased in a yellow corrugated tube and all the connectors in the system are a standard yellow color.

1. VEHICLES NOT INVOLVED IN COLLISION

Do a diagnostic system check.

(See page DI–324)

2. VEHICLES INVOLVED IN COLLISION

(a) Do a diagnostic system check.
(See page DI–324)

(b) Check breaks in all wires of the SRS wire harness, and exposed conductors.

(c) Check to see if the SRS wire harness connectors are cracked or chipped.

RS01X–02

REPLACEMENT

In the following cases,replace the wire harness or connector.

- If any part of the SRS wire harness or any connector has been found to be faulty in troubleshooting.
- If any part of the SRS wire harness or any connector has been found to be faulty during the checking items. (See page RS–39)

CAUTION:

If the wire harness used in the SRS is damaged, replace the whole wire harness assembly.

TROUBLESHOOTING

SA0DT–03

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Wander/pulls	1. Tire (Worn or improperly inflated)	SA–2
	2. Wheel alignment (Incorrect)	SA–4
		SA–7
	3. Steering linkage (Loosen or worn)	–
	4. Hub bearings (Worn)	SA–8
		SA–45
	5. Steering gear (Out of adjustment or broken)	–
	6. Suspension parts (Worn)	–
Bottoming	1. Vehicle (Overloaded)	–
	2. Spring (Weak)	SA–24
		SA–50
	3. Shock absorber (Worn out)	SA–28
		SA–54
Sways/pitches	1. Tire (Worn or improperly inflated)	SA–2
	2. Stabilizer bar (Bent or broken)	SA–41
		SA–64
	3. Shock absorber (Worn out)	SA–28
		SA–54
Front wheel shimmy	1. Tire (Worn or improperly inflated)	SA–2
	2. Wheels (Out of balance)	SA–2
	3. Shock absorber (Worn out)	SA–28
	4. Wheel alignment (Incorrect)	SA–4
	5. Ball joints (Worn)	SA–39
	6. Hub bearings (Worn)	SA–8
	7. Steering linkage (Loosen or worn)	–
	8. Steering gear (Out of adjustment or broken)	–
Abnormal tire wear	1. Tire (Worn or improperly inflated)	SA–2
	2. Wheels (Out of balance)	SA–2
	3. Suspension parts (Worn)	–
	4. Shock absorber (Worn out)	SA–28
		SA–54

TIRE AND WHEEL

SA0DU–01

INSPECTION

1. INSPECT TIRE

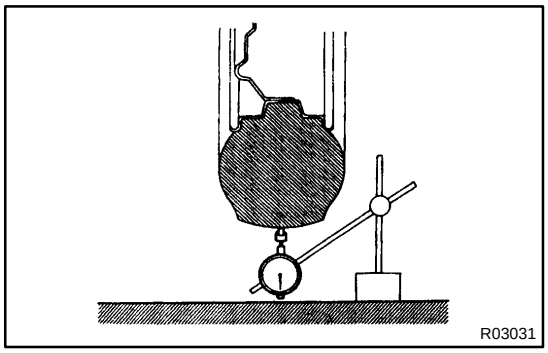
(a) Check the tires for wear and for the proper inflation pressure.

Cold inflation pressure:

Tire size	Front, Rear kPa (kgf/cm^2 or bar, psi)
P205/65R15 92H	*1 180 (1.8, 26) *2 220 (2.2, 32)

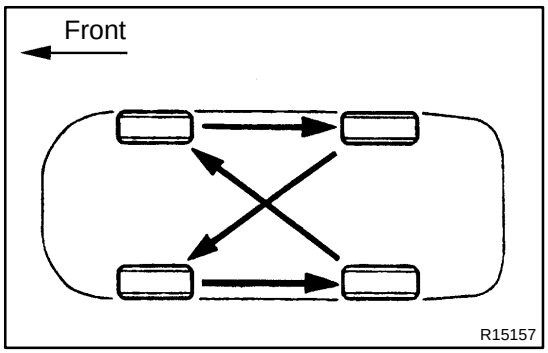
*1: For all loads including full rated loads

*2: For reduced loads (1 to 4 passengers)



(b) Check the tire runout.

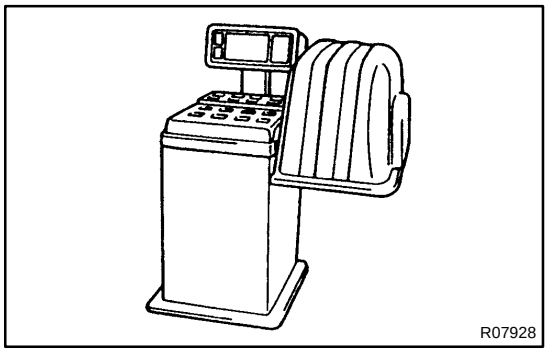
Tire runout: 1.0 mm (0.039 in.) or less



2. ROTATING TIRES

HINT:

See the illustration for where to rotate each tire.

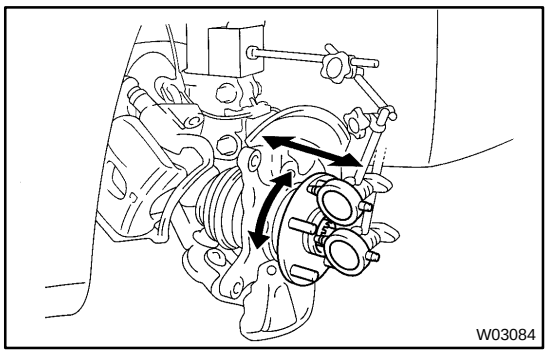


3. INSPECT WHEEL BALANCE

(a) Check and adjust the Off–the–car balance.

(b) If necessary, check and adjust the On–the–car balance.

Unbalance after adjustment: 8.0 g (0.018 lb) or less



4. CHECK WHEEL BEARING LOOSENESS

(a) Check the backlash in the bearing shaft direction.
Maximum: 0.05 mm (0.0020 in.)

(b) Check the axle hub deviation.
Maximum: 0.05 mm (0.0020 in.)

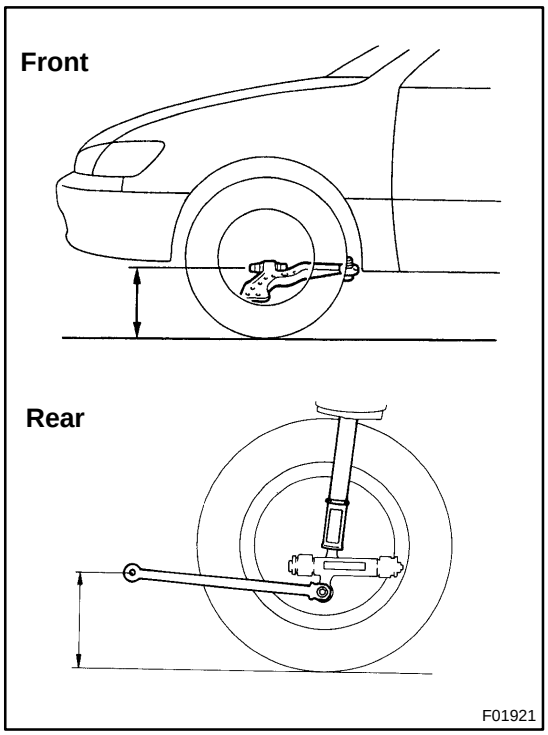
5. CHECK FRONT SUSPENSION FOR LOOSENESS

6. CHECK STEERING LINKAGE FOR LOOSENESS

7. CHECK BALL JOINT FOR LOOSENESS

8. CHECK SHOCK ABSORBER WORKS PROPERLY

- Check for oil leaks
- Check mounting bushings for wear
- Bounce front and rear of the vehicle



FRONT WHEEL ALIGNMENT

SA0DV–04

INSPECTION

1. MEASURE VEHICLE HEIGHT

Tire size	Front*1 mm (in.)	Rear*2 mm (in.)
205/65R15	213 (8.39)	259 (10.20)

***1: Front measuring point**

Measure from the ground to the center of the front side lower suspension arm mounting bolt.

***2: Rear measuring point**

Measure from the ground to the center of the front side strut rod mounting bolt.

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specification.

If the vehicle height is not to the specification, try to adjust it by pushing down on or lifting the body.

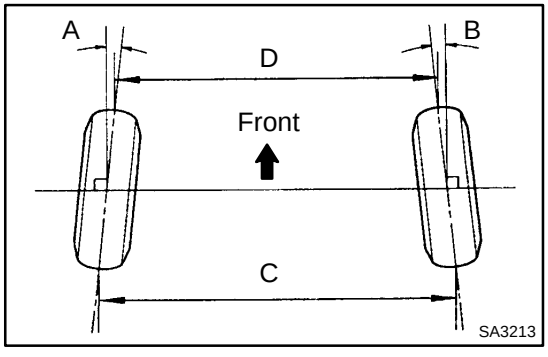
2. INSTALL CAMBER–CASTER–KINGPIN GAUGE ONTO VEHICLE OR POSITION VEHICLE ON WHEEL ALIGNMENT TESTER

Follow the specific instructions of the equipment manufacturer.

3. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

Camber	–0°37' ± 45' (–0.62° ± 0.75°)
Left–right error	45' (0.75°) or less
Caster	2°18' ± 45' (2.30° ± 0.75°)
Left–right error	45' (0.75°) or less
Steering axis inclination	13°04' ± 45' (13.07° ± 0.75°)
Left–right error	45' (0.75°) or less

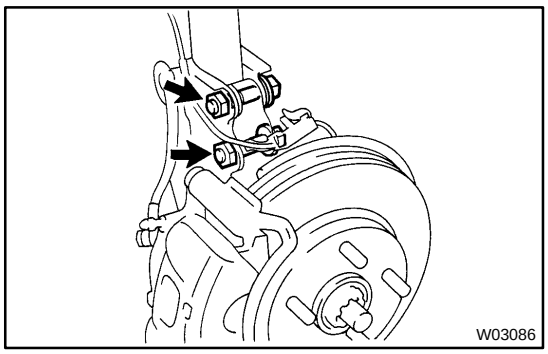
If the caster and steering axis inclination are not within the specification, after the camber has correctly adjusted, recheck the suspension parts for damaged and/or worn out parts.



4. INSPECT TOE–IN

Toe–in (total)	A + B: 0° ± 12' (0° ± 0.2°) C – D: 0 ± 2 mm (0 ± 0.08 in.)

If the toe–in is not within the specification, adjust it at the rack ends.


W03086

5. ADJUST CAMBER

NOTICE:

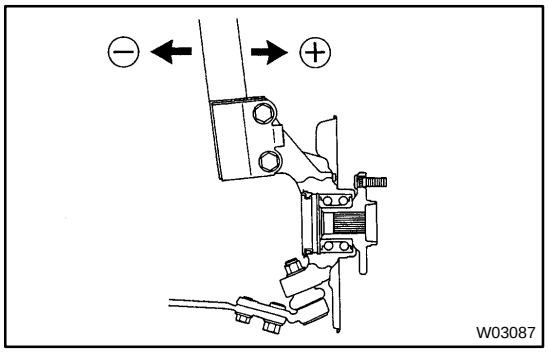
After the camber has been adjusted, inspect the toe–in.

(a) Remove the front wheels and speed sensor clamp.

(b) Remove the 2 nuts on the lower side of the shock absorber.

(c) Coat the threads of the nuts with engine oil.

(d) Temporarily install the 2 nuts.


W03087

(e) Adjust the camber by pushing or pulling the lower side of the shock absorber in the direction in which the camber adjustment is required.

(f) Tighten the nuts.

Torque: 211 N·m (2,150 kgf·cm, 156 ft·lbf)

(g) Install the front wheels.

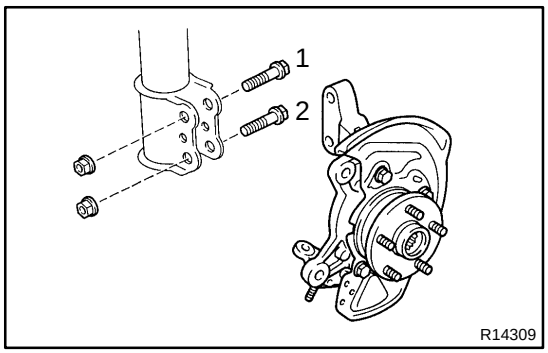
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

(h) Check the camber.

HINT:

- Try to adjust the camber to the center value.
- Adjusting value for the set bolts is 6’ – 30’ (0.1˚ – 0.5˚).

If the camber is not within the specification, using the table below, estimate of how much additional camber adjustment will be required, and select the camber adjusting bolt.



R14309

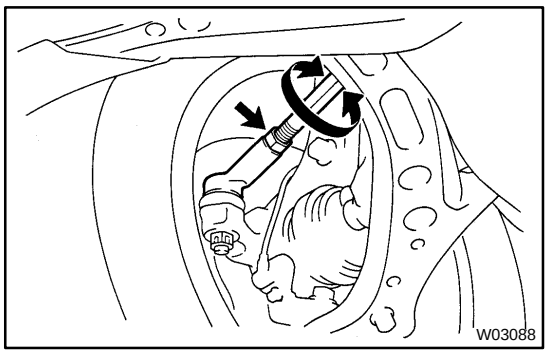
Bolt / Adjusting Value	Set Bolt		Adjusting Bolt					
	90105–17001		90105–17003		90105–17004		90105–17005	
			1 Dot		2 Dots		3 Dots	
	11		•11		•11		•11	
	1	2	1	2	1	2	1	2
15’	●			●				
30’	●					●		
45’	●							●
1˚00’			●					●
1˚15’					●			●
1˚30’							●	●

F01195

(i) Do the above mentioned steps again. Between step (b) and (c), exchange 1 or 2 selected bolts.

HINT:

When exchange 2 bolts, exchange 1 bolt for each time.



6. ADJUST TOE–IN

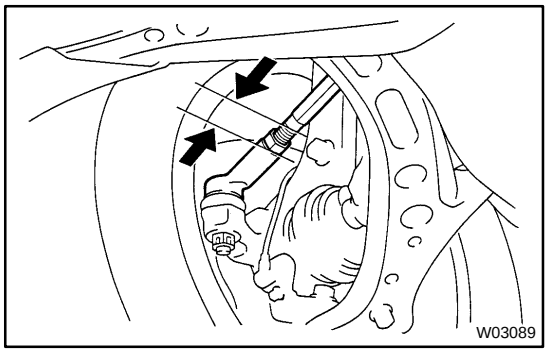
(a) Remove the boot clamps.

(b) Loosen the tie rod end lock nuts.

(c) Turn the left and right tie rod ends an equal amount to adjust the toe–in.

HINT:

◆ Try to adjust the toe–in to the center value.



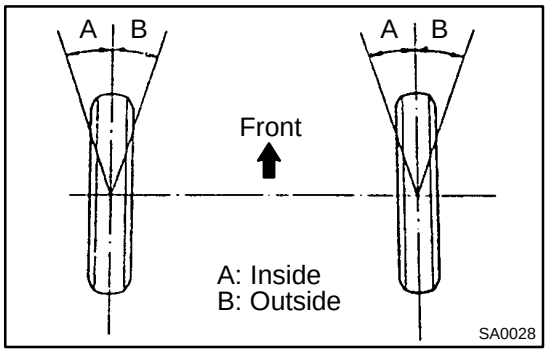
◆ Make sure that the length of the left and right tie rod ends length are the same.
Tie rod end length difference:
1.5 mm (0.059 in.) or less

(d) Torque the tie rod end lock nuts.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

(e) Place the boot on the seat and install the clip it.

HINT:

Make sure that the boots are not twisted.



7. INSPECT WHEEL ANGLE

Turn the steering wheel fully, and measure the turning angle.

Inside wheel	Outside wheel (Reference)
35˚47' ± 2˚	31˚25'

If the wheel angles differ from the specification, check the left and right tie rod end length.

REAR WHEEL ALIGNMENT

SA0DW–03

INSPECTION

1. MEASURE VEHICLE HEIGHT (See page SA–4)

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specification.

2. INSTALL CAMBER – CASTER – KINGPIN GAUGE ONTO VEHICLE OR POSITION VEHICLE ON WHEEL ALIGNMENT TESTER

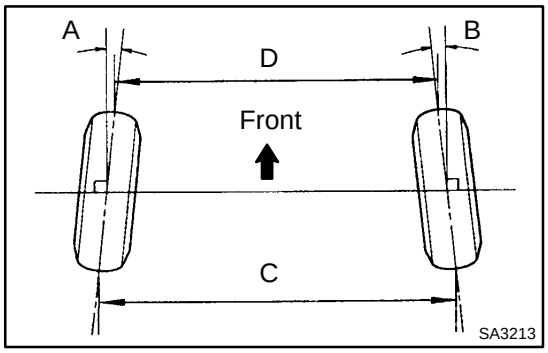
Follow the specific instructions on the equipment manufacturer.

3. INSPECT CAMBER

Camber	–0°48' ± 45' (–0.80° ± 0.75°)
Left–right error	45' (0.75°) or less

HINT:

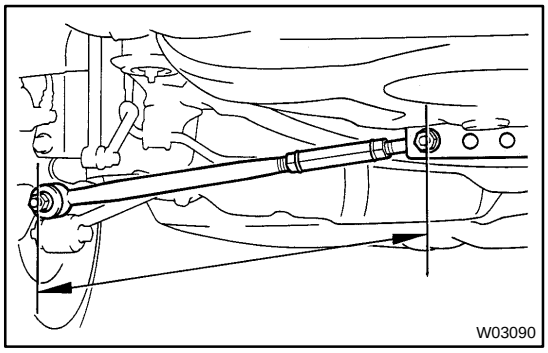
Camber is not adjustable, it measurement is not within the specification, inspect the suspension parts for damaged and/or worn–out parts and replace them if necessary.



4. INSPECT TOE–IN

Toe–in (total)	A + B: 0°24' ± 12' (0.4° ± 0.2°) C – D: 4 ± 2 mm (0.16 ± 0.08 in.)

If the toe–in is not within the specification, adjust it at the No.2 lower suspension arm.

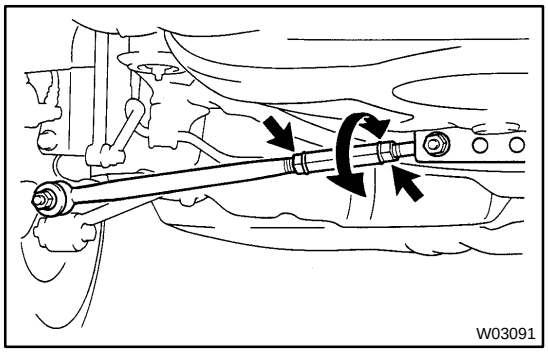


5. ADJUST TOE–IN

(a) Measure the length of the left and right No.2 lower suspension arms.

No.2 lower suspension arm length difference:
1 mm (0.04 in.) or less

If the left–right difference is greater than the specification, adjust the length.



(b) Loosen the lock nuts.

(c) Turn the left and right lower suspension arms an equal amount to adjust toe–in.

HINT:

- Try to adjust the toe–in to the center value.
- One turn of the each adjusting tube will adjust the toe–in about 36' (0.6°, 6.7 mm, 0.264 in.).

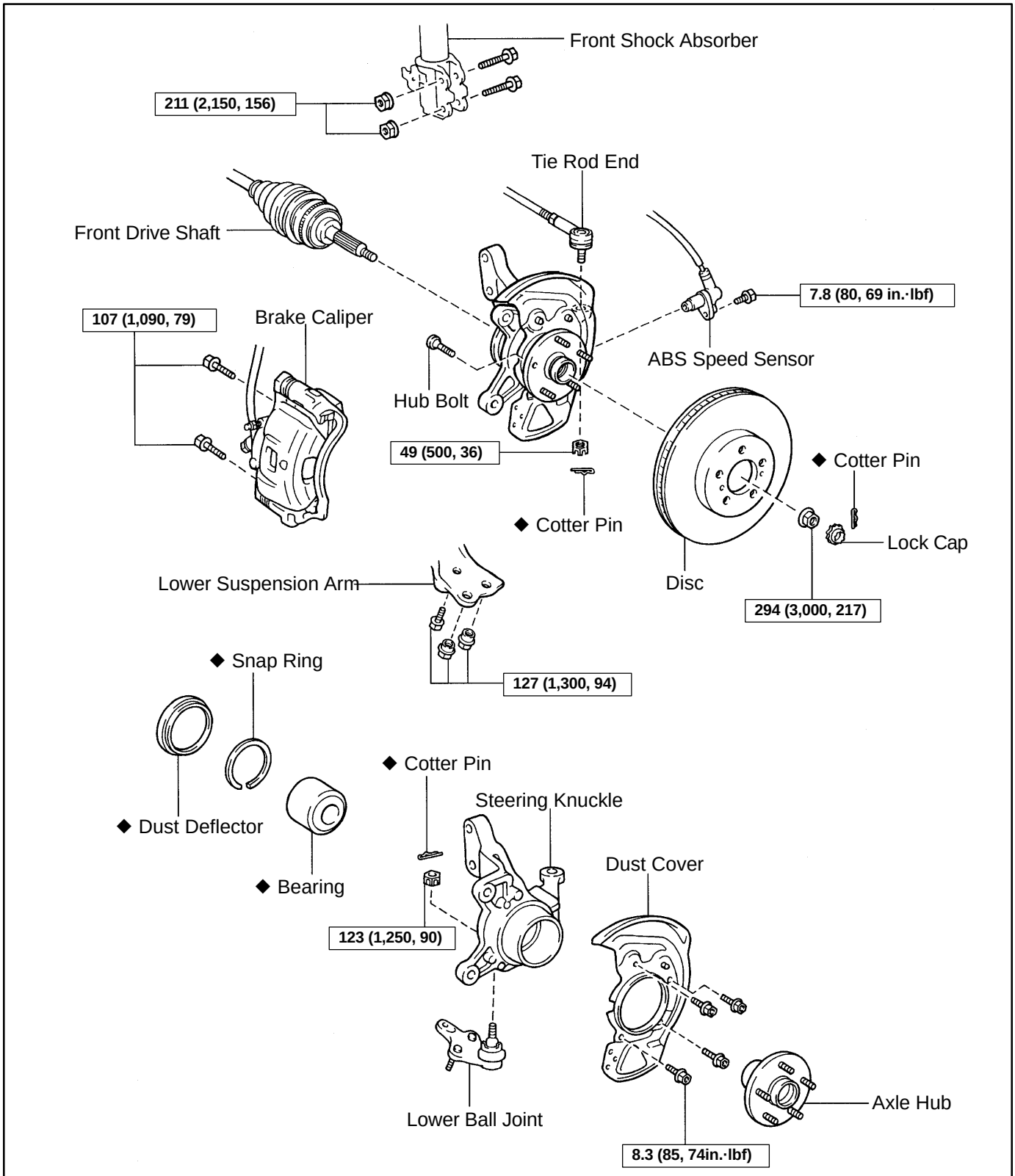
(d) Torque the lock nuts.

Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

FRONT AXLE HUB

COMPONENTS

SA0DX–02



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non– reusable part

W03092

SA0DY–01

REMOVAL

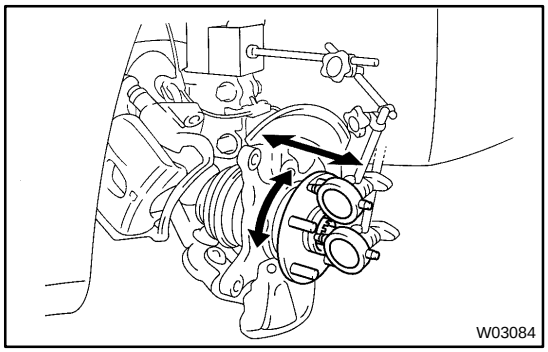
1. REMOVE FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. CHECK BEARING BACKLASH AND AXLE HUB DEVIATION

(a) Remove the 2 bolts, brake caliper and disc.

(b) Support the brake caliper securely.



(c) Using a dial indicator near the center of the axle hub and check the backlash in the bearing shaft direction.

Maximum: 0.05 mm (0.0020 in.)

If the backlash exceeds the maximum, replace the bearing.

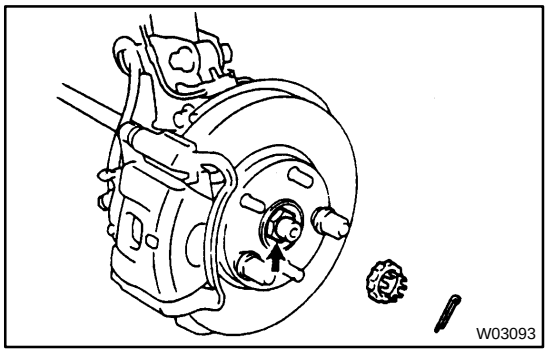
(d) Using a dial indicator, check the deviation at the surface of the axle hub outside the hub bolt.

Maximum: 0.05 mm (0.0020 in.)

If the deviation exceeds the maximum, replace the bearing.

(e) Install the disc, 2 bolts and brake caliper.

Torque: 107 N·m (1,090 kgf·cm, 79 ft·lbf)



3. REMOVE DRIVE SHAFT LOCK NUT

(a) Remove the cotter pin and lock cap.

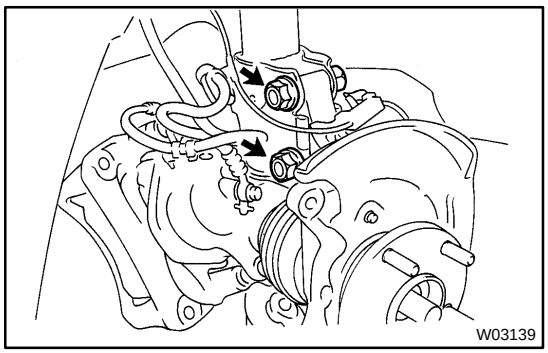
(b) With applying the brakes, remove the nut.

Torque: 294 N·m (3,000 kgf·cm, 217 ft·lbf)

(c) Remove the brake caliper and disc.

4. REMOVE ABS SPEED SENSOR AND WIRE HARNESS CLAMP

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)



5. LOOSEN 2 NUTS ON LOWER SIDE OF SHOCK ABSORBER

HINT:

Do not remove the bolts.

Torque: 211 N·m (2,150 kgf·cm, 156 ft·lbf)

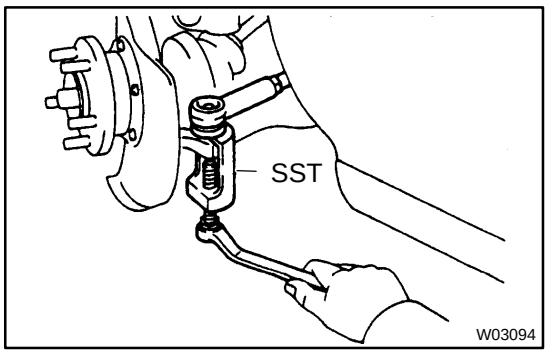
HINT:

At the time of installation, coat the nut's thread with engine oil.

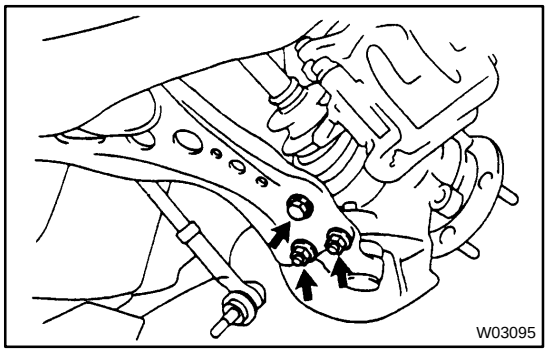
6. DISCONNECT TIE ROD END FROM STEERING KNUCKLE

(a) Remove the cotter pin and nut.

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)



(b) Using SST, disconnect the tie rod end from the steering knuckle.
SST 09610–20012



7. DISCONNECT LOWER BALL JOINT FROM LOWER ARM

Remove the 2 nuts and bolt.

Torque: 127 N·m (1,300 kgf·cm, 94 ft·lbf)

8. REMOVE STEERING KNUCKLE WITH AXLE HUB

(a) Remove the 2 bolts on the lower side of the shock absorber.

(b) Remove the steering knuckle with the axle hub.

NOTICE:

Be careful not to damage the oil seal with drive shaft.

SA0DZ–01

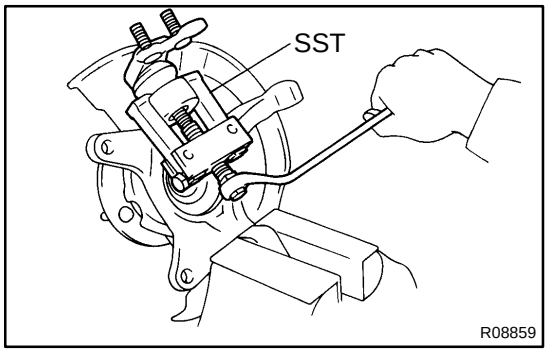
DISASSEMBLY

1. REMOVE DUST DEFLECTOR

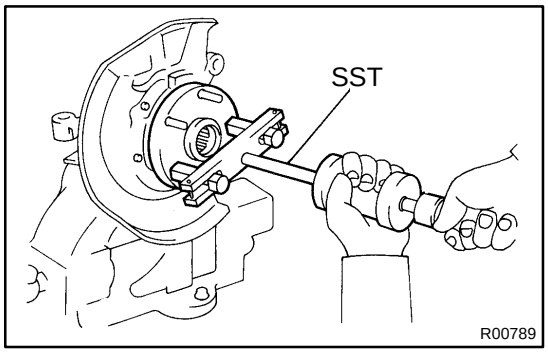
Using a screwdriver, remove the dust deflector.

2. REMOVE LOWER BALL JOINT

(a) Remove the cotter pin and nut.

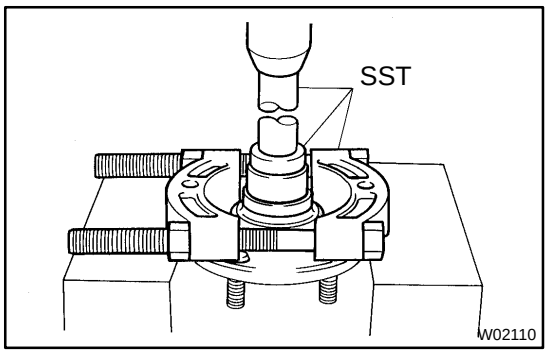


(b) Using SST, remove the lower ball joint.
SST 09628–62011



3. REMOVE AXLE HUB

(a) Using SST, remove the axle hub.
SST 09520–00031



(b) Using SST and a press, remove the inner race (outside) from the axle hub.
SST 09950–00020, 09950–60010 (09951–00400), 09950–70010 (09951–07100)

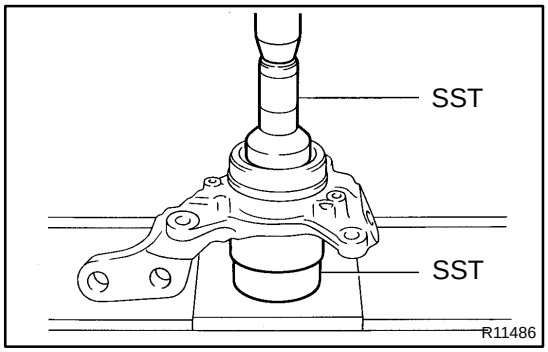
4. REMOVE DUST COVER

Using a torx wrench (T30), remove the 4 bolts and dust cover.

5. REMOVE BEARING FROM STEERING KNUCKLE

(a) Using snap ring pliers, remove the snap ring.

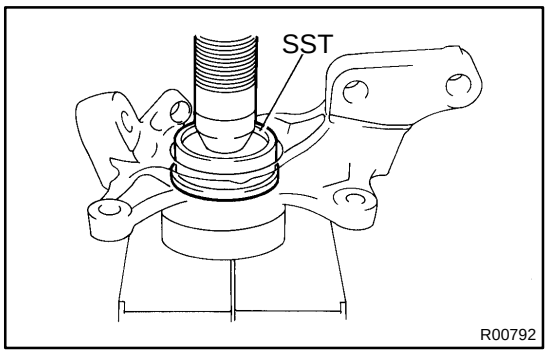
(b) Place the inner race on the outside of the bearing.



(c) Using SST and a press, remove the bearing.
SST 09310–35010, 09527–17011

SA0E0–01

REASSEMBLY



1. INSTALL BEARING

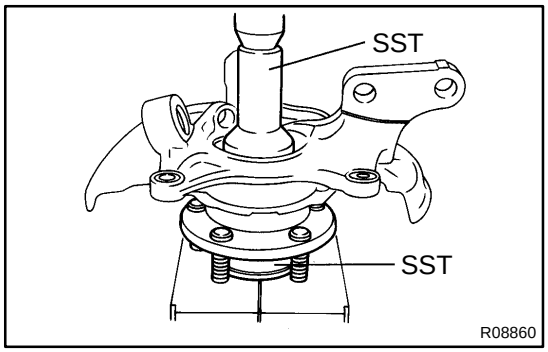
(a) Using SST and a press, install a new bearing to the steering knuckle.
SST 09608–32010

(b) Using snap ring pliers, install a new snap ring.

2. INSTALL DUST COVER

Place the dust cover and using a torx wrench (T30), torque the 4 bolts.

Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)



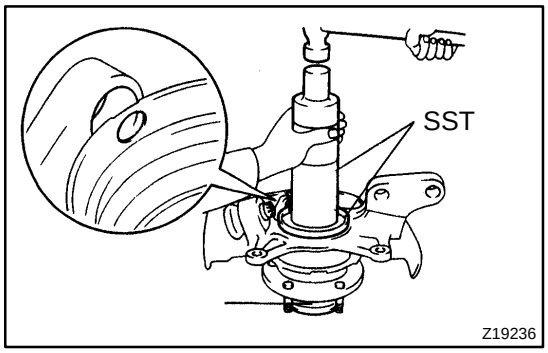
3. INSTALL FRONT AXLE HUB

Using SST and a press, install the axle hub.
SST 09310–35010, 09608–32010

4. INSTALL LOWER BALL JOINT

(a) Install the lower ball joint and torque the nut.
Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)

(b) Install a new cotter pin.



5. INSTALL DUST DEFLECTOR

Using SST and a hammer, install a new dust deflector.
SST 09316–60011 (09316–00011, 09316–00041), 09608–32010

HINT:
Align the holes for the ABS speed sensor in the dust deflector and steering knuckle.

SA0E1–01

INSTALLATION

Installation is in the reverse order of removal (See page SA–9).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page DI–232 or DI–273) AND FRONT WHEEL ALIGNMENT (See page SA–4)

FRONT WHEEL HUB BOLT

SA0E2–01

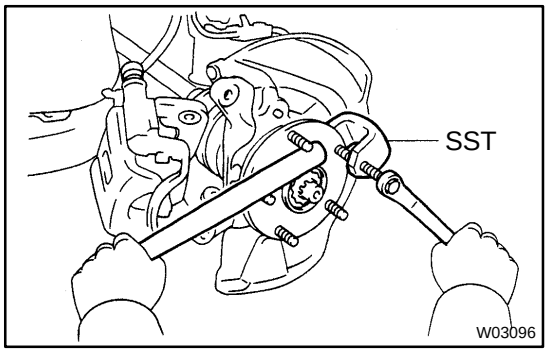
REPLACEMENT

1. REMOVE FRONT WHEEL

2. REMOVE BRAKE CALIPER AND DISC

(a) Remove the 2 bolts, brake caliper and disc.

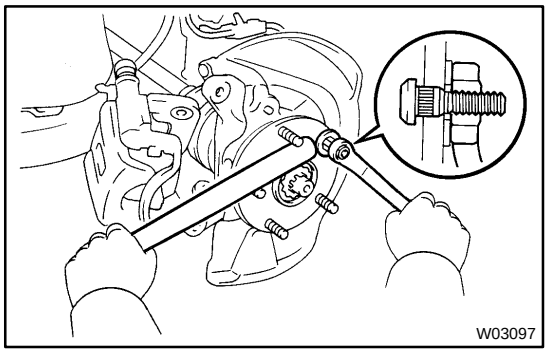
(b) Support the brake caliper securely.



3. REMOVE HUB BOLT

Using SST, remove the hub bolt.

SST 09628–10011



4. INSTALL HUB BOLT

Install a washer and nut to the hub bolt, as shown in the illustration, and install the hub bolt by torquing the nut.

5. INSTALL BRAKE DISC AND CALIPER

Install the disc and brake caliper with 2 bolts.

Torque: 107 N·m (1,090 kgf·cm, 79 ft·lbf)

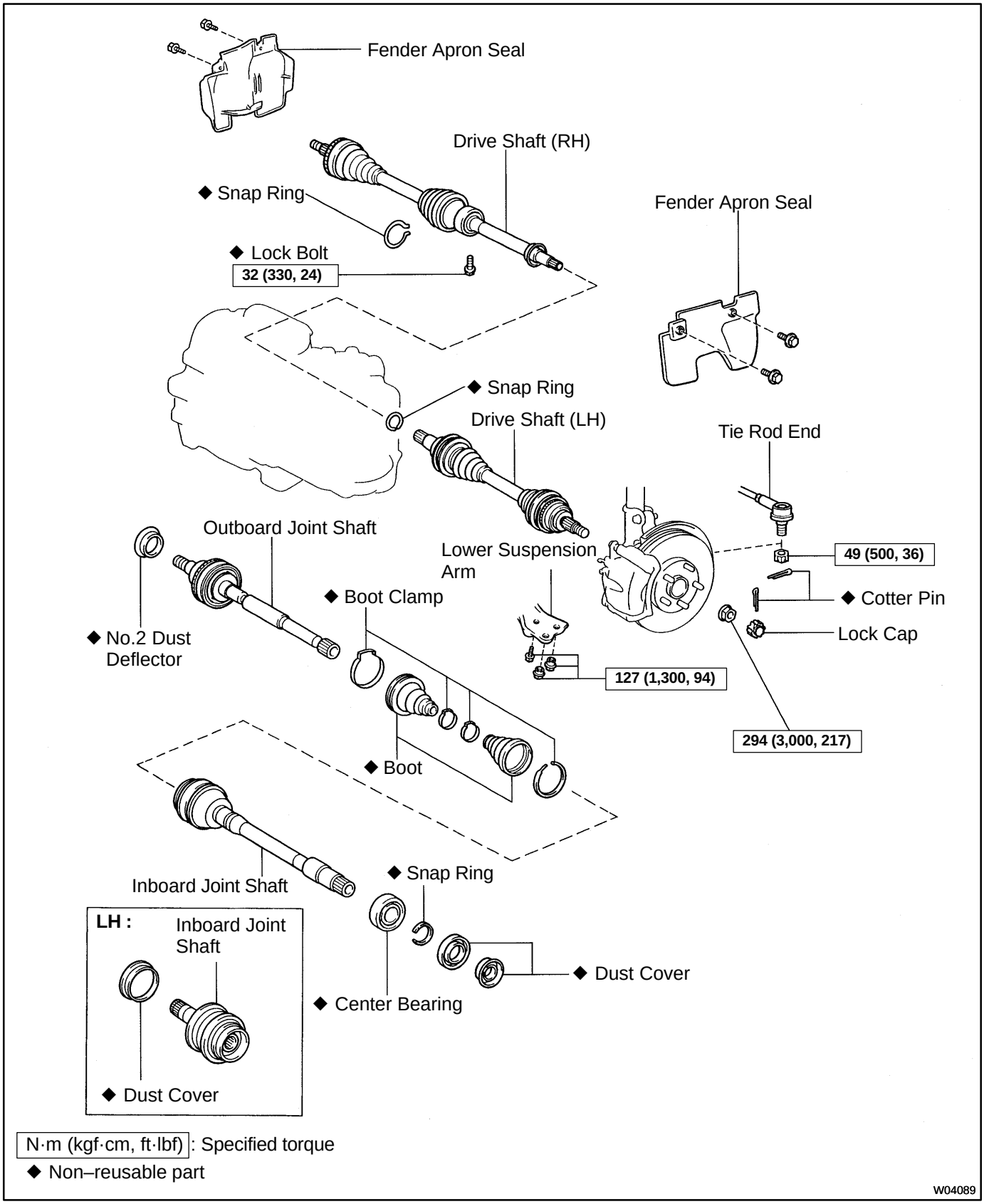
6. INSTALL FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

FRONT DRIVE SHAFT

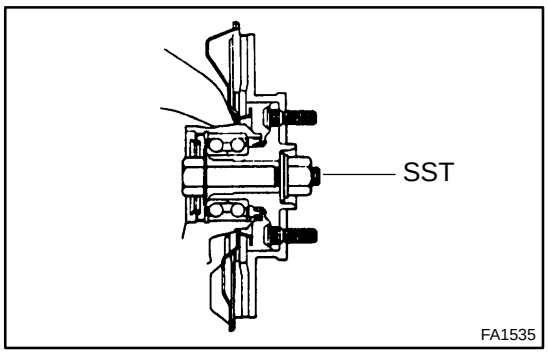
SA0E3–02

COMPONENTS



SA0E4–01

REMOVAL



NOTICE:

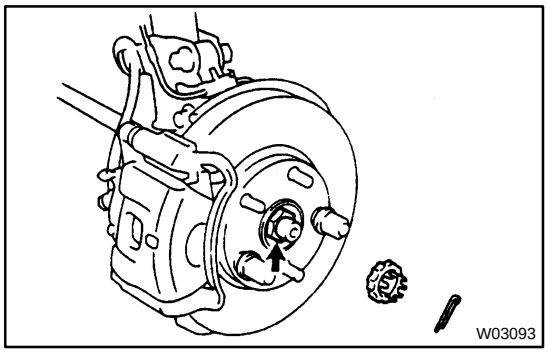
The hub bearing could be damaged if it is subjected to the vehicle weight, such as when moving the vehicle with the drive shaft removed.

Therefore, if it is absolutely necessary to place the vehicle weight on the hub bearing, first support it with SST.

SST 09608–16042 (09608–02021, 09608–02041)

1. REMOVE FRONT WHEEL AND FRONT FENDER APRON SEAL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



2. REMOVE DRIVE SHAFT LOCK NUT

(a) Remove the cotter pin and lock cap.

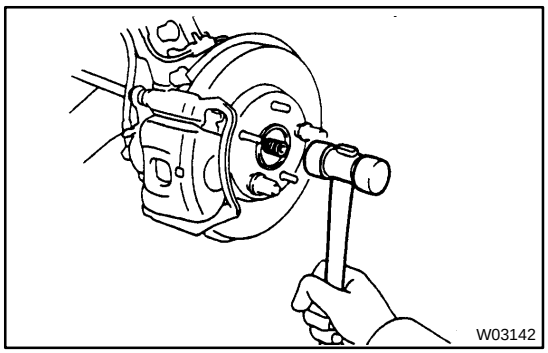
(b) With applying brakes, remove the nut.

Torque: 294 N·m (3,000 kgf·cm, 217 ft·lbf)

3. DRAIN ATF

4. DISCONNECT TIE ROD END FROM STEERING KNUCKLE (See page SA–9)

5. DISCONNECT LOWER BALL JOINT FROM LOWER SUSPENSION ARM (See page SA–9)



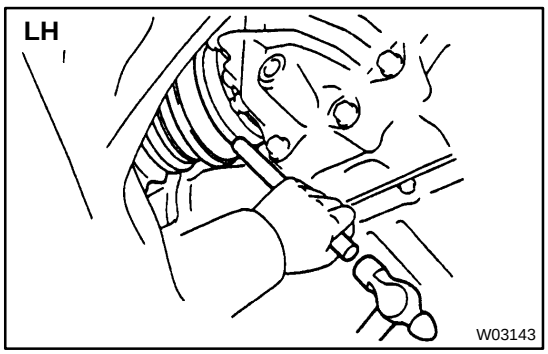
6. DISCONNECT DRIVE SHAFT FROM AXLE HUB

(a) Using a plastic hammer, disconnect the drive shaft from the axle hub.

NOTICE:

Cover the drive shaft boot with cloth to protect it from damage.

(b) Push the front axle hub toward the outside of the vehicle, and separate the drive shaft from the axle hub.



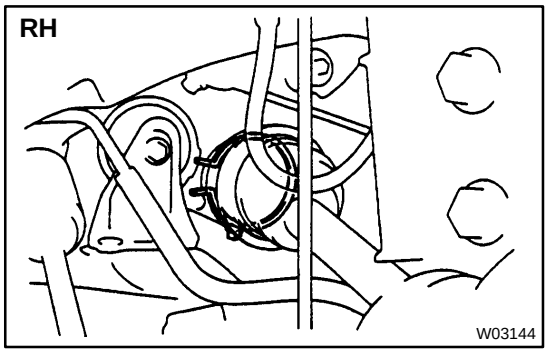
7. REMOVE LH DRIVE SHAFT

(a) Using a brass bar and hammer, remove the snap ring, and remove the drive shaft.

HINT:
At the time of installation, please refer to the following items.

- Coat gear oil to the inboard joint shaft and differential case sliding surface.
- Before installing the drive shaft, set the snap ring opening side facing downward.
- Whether or not the inboard joint shaft is making contact with the pinion shaft can be known by the sound or feeling when driving it in.
- After installation, check that there is 2 – 3 mm (0.08 – 0.12 in.) of play in the axial direction.
- After installation, check that the drive shaft cannot be removed by hand.

(b) Using a screwdriver, remove the snap ring from the inboard joint shaft.



8. REMOVE RH DRIVE SHAFT

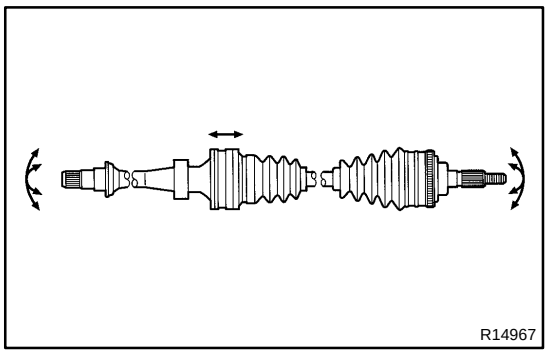
(a) Remove the bearing lock bolt.
Torque: 32 N·m (330 kgf·cm, 24 ft·lbf)

(b) Using pliers, remove the snap ring and drive shaft.

HINT:
At the time of installation, coat gear oil to the inboard joint shaft and differential case sliding surface.

SA0E5–01

DISASSEMBLY


R14967

1. CHECK DRIVE SHAFT

(a) Check to see that there is no play in the outboard joint shaft.

(b) Check to see that the inboard joint shaft slides smoothly in the thrust direction.

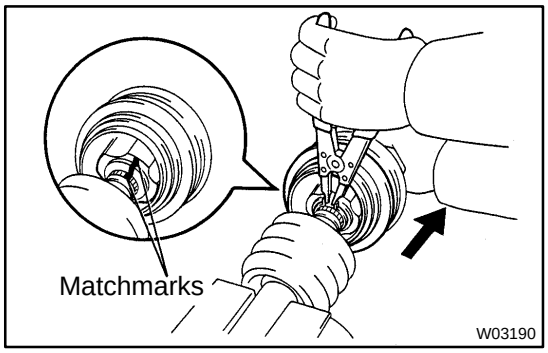
(c) Check to see that there is no remarkable play in the radial direction of the inboard joint shaft.

(d) Check for damage to boots.

2. REMOVE INBOARD AND OUTBOARD JOINT BOOT CLAMPS

(a) Using pliers, draw the hook together and remove the large inboard joint boot clamp and remove them.

(b) Using a side cutter, cut the small inboard and 2 outboard joint boot clamps and remove them.



W03190

3. REMOVE INBOARD JOINT SHAFT FROM OUTBOARD JOINT SHAFT

(a) Place matchmarks on the inboard and outboard joint shafts.

NOTICE:

Do not punch the marks.

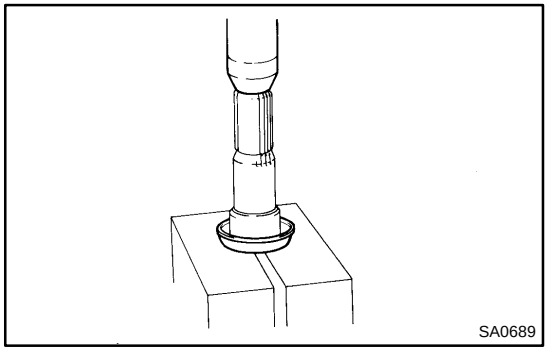
(b) Using a snap ring expander, pull out the outboard joint shaft expanding the snap ring.

4. REMOVE INBOARD AND OUTBOARD JOINT BOOTS

Slide out the 2 boots.

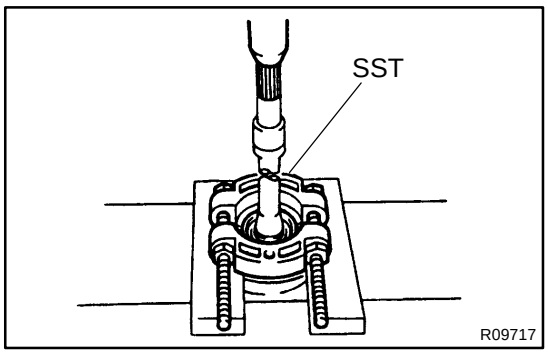
5. LH DRIVE SHAFT:
REMOVE DUST COVER

Using a screwdriver and hammer, remove the dust cover from the inboard joint shaft.


SA0689

6. RH DRIVE SHAFT:
REMOVE DUST COVER

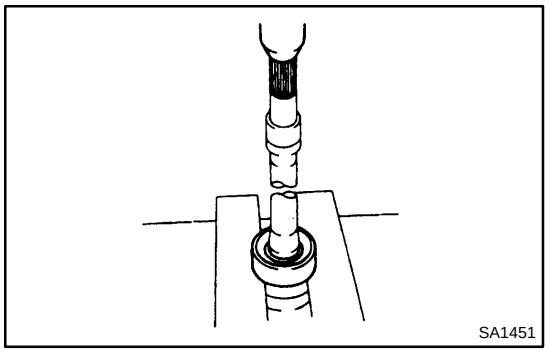
Using a press, remove the dust cover from the inboard joint shaft.



7. RH DRIVE SHAFT:
DISASSEMBLE INBOARD JOINT SHAFT

(a) Using SST and a press, remove the dust cover.
SST 09950–00020

(b) Using a snap ring expander, remove the snap ring.



(c) Using a press, remove the bearing.

(d) Remove the snap ring.

8. REMOVE NO.2 DUST DEFLECTOR

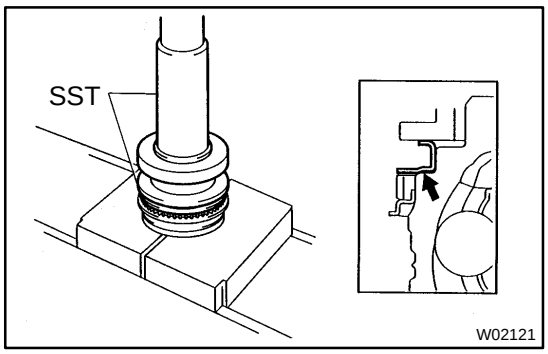
(a) Mount outboard joint shaft in a soft jaw vise.

(b) Using a screwdriver and hammer, remove the No.2 dust deflector.

NOTICE:
Be careful not to damage the ABS speed sensor rotor.

SA0E6–02

REASSEMBLY



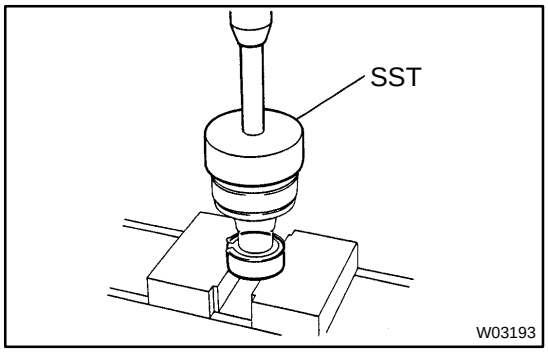
1. INSTALL NO.2 DUST DEFLECTOR

Using SST and a press, install a new No.2 dust deflector.

SST 09309–36010, 09316–20011

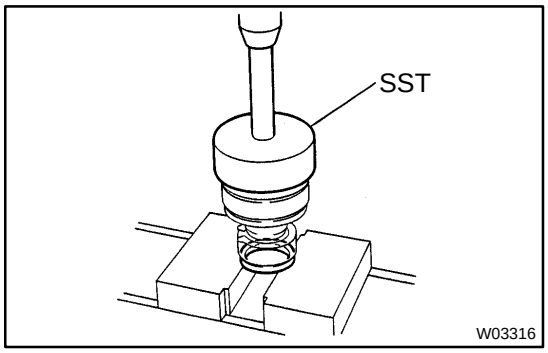
2. RH DRIVE SHAFT:
ASSEMBLE INBOARD JOINT SHAFT

(a) Install a new snap ring to the inboard joint shaft.

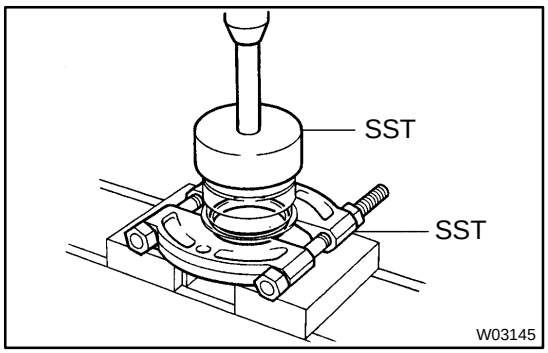


(b) Using SST and a press, install a new bearing.
SST 09223–56010

(c) Using a snap ring expander, install a new snap ring.



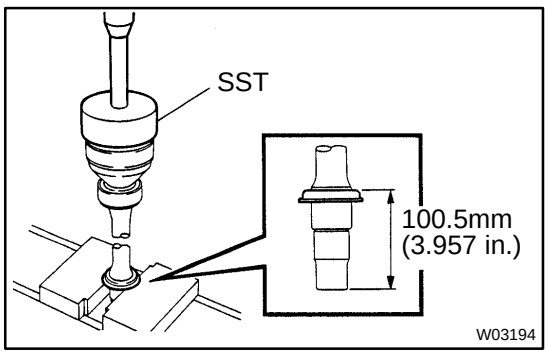
(d) Using SST and a press, install a new dust cover.
SST 09223–56010



3. LH DRIVE SHAFT:
INSTALL DUST COVER

Using SST and a press, install a dust cover.

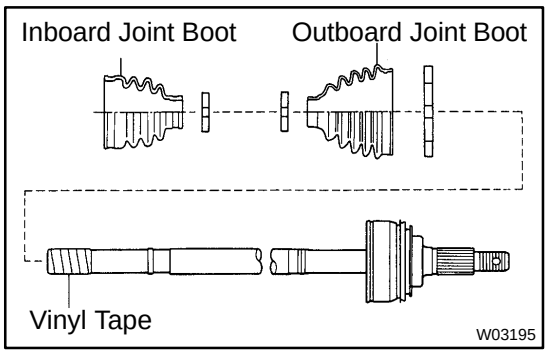
SST 09223–56010, 09555–55010



4. RH DRIVE SHAFT:
INSTALL DUST COVER

Using SST and a press, install a new dust cover until the distance from the tip of the inboard joint shaft to the dust cover falls within the specification, as shown in the illustration.

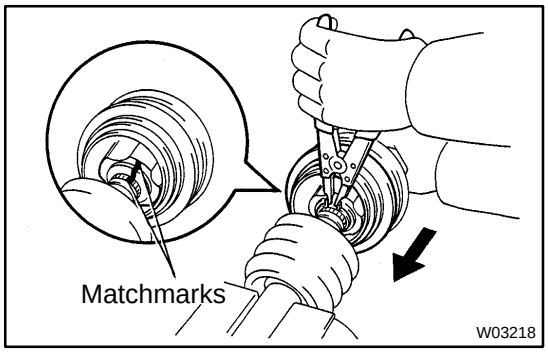
SST 09223–56010



5. TEMPORARILY INSTALL OUTBOARD AND INBOARD JOINT BOOTS AND NEW BOOT CLAMPS

HINT:

- Before installing the boot, wrap vinyl tape around the spline of the drive shaft to prevent damaging the boot.
- Before installing the boot, place 3 new clamps to the small boot ends and large end (wheel side) and install its to drive shaft.



6. INSTALL INBOARD JOINT SHAFT TO OUTBOARD JOINT SHAFT

Align the matchmarks placed at removal, and using a snap ring expander, put in the inboard joint shaft expanding the snap ring.

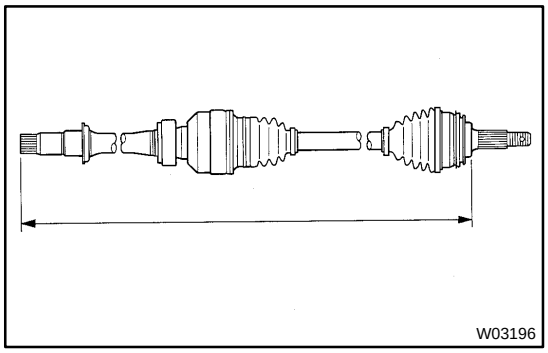
7. INSTALL BOOT TO OUTBOARD JOINT

Before assembling the boot, pack the outboard joint and boot with grease in the boot kit.

8. INSTALL BOOT TO INBOARD JOINT SHAFT

(a) Pack the inboard joint and boot with grease in the boot kit.

(b) Install the boot to the inboard joint shaft.



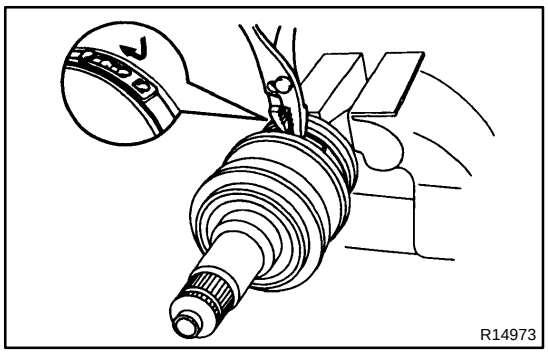
9. ASSEMBLE BOOT CLAMPS TO BOTH BOOTS

(a) Make sure that the 2 boots are on the shaft groove.

(b) Make sure that the 2 boots are not stretched or contracted when the drive shaft is at standard length.

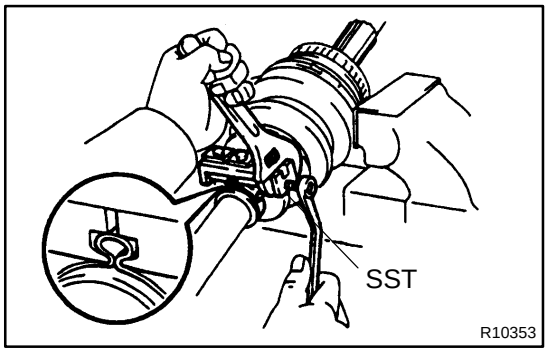
Drive shaft standard length:

LH	586.0 ± 2.0 mm (23.071 ± 0.079 in.)
RH	881.6 ± 2.0 mm (34.709 ± 0.079 in.)



(c) Holding the clamp near the closing hooks, using pliers, position the holes in the clamp's free end over the closing hooks.

(d) Secure clamp by drawing the closing hooks together.



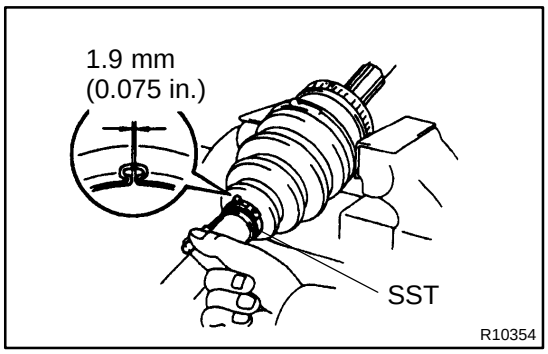
(e) Secure the clamp onto the boot.

(f) Place SST onto the clamp.
SST 09521–24010

(g) Tighten the SST so that the clamp is pinched.

NOTICE:

Do not overtighten the SST.



(h) Using SST, adjust the clearance of the clamp.
SST 09240–00020
Clearance: 1.9 mm (0.075 in.) or less

10. CHECK DRIVE SHAFT (See page SA–18)

SA0E7–01

INSTALLATION

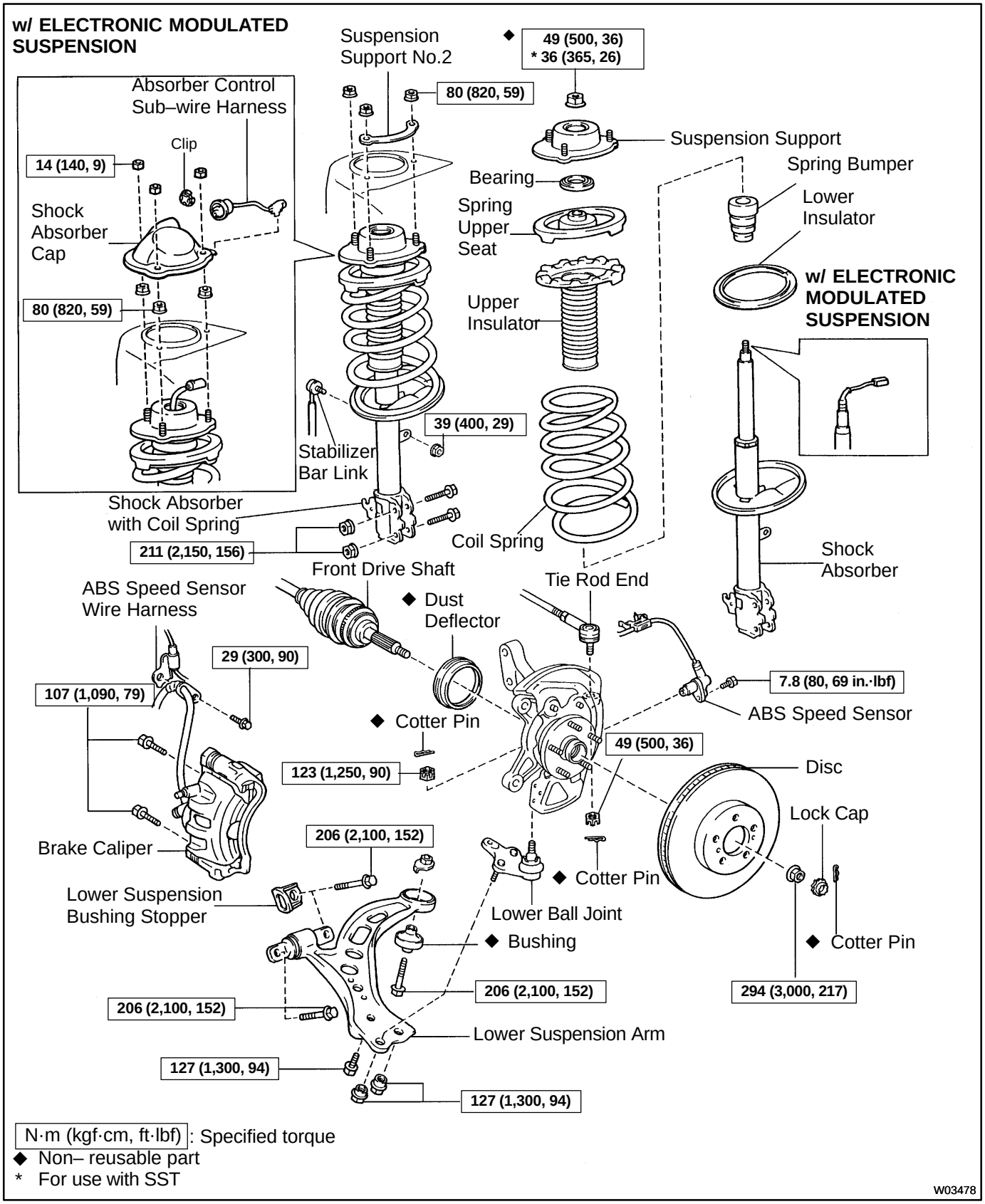
Installation is in the reverse order of removal (See page SA–16).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page DI–232 or DI–273) AND FRONT WHEEL ALIGNMENT (See page SA–4)

FRONT SHOCK ABSORBER

SA0E8–03

COMPONENTS



SA0E9–01

REMOVAL

1. REMOVE FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REMOVE FLEXIBLE HOSE AND ABS SPEED SENSOR WIRE HARNESS AND CLAMP FROM SHOCK ABSORBER

Remove the bolt, flexible hose and ABS wire harness clamp.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

3. DISCONNECT STABILIZER BAR LINK FROM SHOCK ABSORBER (See page SA–42)

4. DISCONNECT SHOCK ABSORBER FROM STEERING KNUCKLE

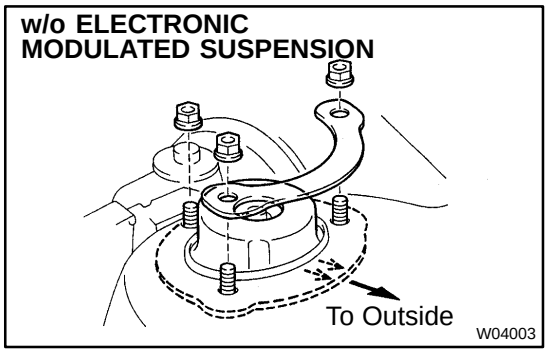
(a) Remove the 2 nuts and bolts on the lower side of the shock absorber.

Torque: 211 N·m (2,150 kgf·cm, 156 ft·lbf)

(b) Remove the shock absorber from the steering knuckle.

HINT:

At the time of installation, coat the nut's threads with engine oil.



5. w/o ELECTRONIC MODULATED SUSPENSION: REMOVE SHOCK ABSORBER WITH COIL SPRING

Remove the 3 nuts, suspension support No.2 and shock absorber with the coil spring.

Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)

HINT:

At the time of installation, rotate the suspension support and set it in the direction, as shown in the illustration.

6. w/ ELECTRONIC MODULATED SUSPENSION: REMOVE SHOCK ABSORBER WITH COIL SPRING

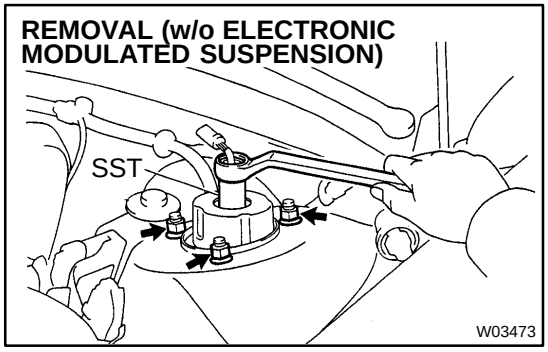
(a) Disconnect the absorber control actuator sub–wire harness connector.

(b) Remove the 3 nuts and shock absorber cap.

Torque: 14 N·m (140 kgf·cm, 9 ft·lbf)

(c) Slide the grommet and remove the clip.

(d) Disconnect the absorber control actuator connector.



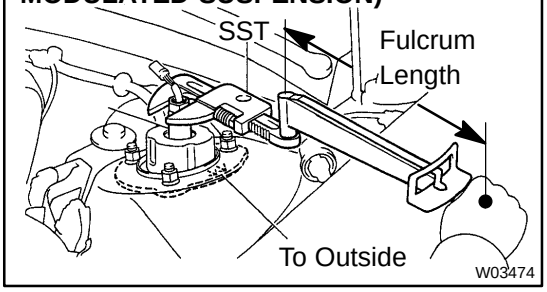
(e) Using SST, loosen the nut in middle of the suspension support.

SST 09817–33190

NOTICE:

Do not remove it.

INSTALLATION (w/o ELECTRONIC MODULATED SUSPENSION)



HINT:

At the time of installation, refer to the following item.

- Using SST, torque the nut.
- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

  SST 09817–33190, 09922–10010

  Torque: 36 N·m (365 kgf·cm, 26 ft·lbf)

NOTICE:

At the time of installation, use SST (09922–10010) in direction shown in the illustration,

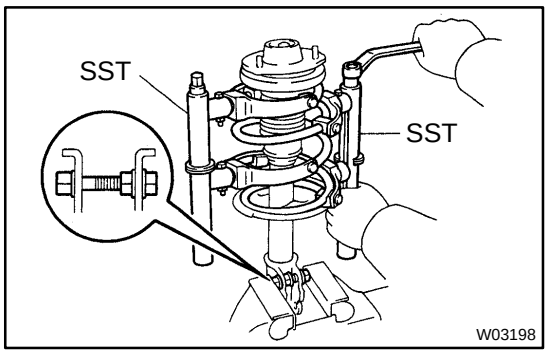
(f) Remove the 3 nuts and shock absorber with the coil spring.

Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)

HINT:

At the time of installation, rotate the suspension support and set it in the direction, as shown in the illustration.

SA0EA–02



DISASSEMBLY

REMOVE COIL SPRING

(a) Install 2 nuts and a bolt to the bracket at the lower portion of the shock absorber and secure it in a vise.

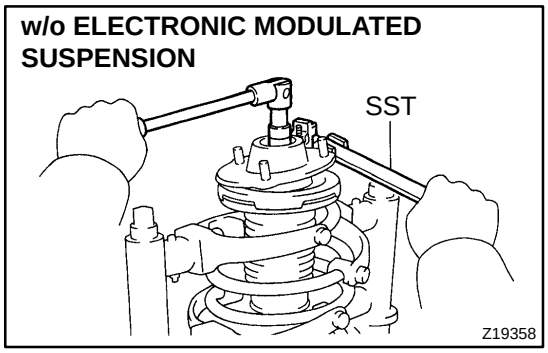
(b) Using SST, compress the coil spring.
SST 09727–30021

NOTICE:

- **When holding the shock absorber with the coil spring removed, do not hold it by the spring lower seat. Also, do not knock the spring lower seat.**
- **Do not use an impact wrench. It will damage the SST.**

HINT:
Use 2 of the same type of SST.

w/o ELECTRONIC MODULATED SUSPENSION

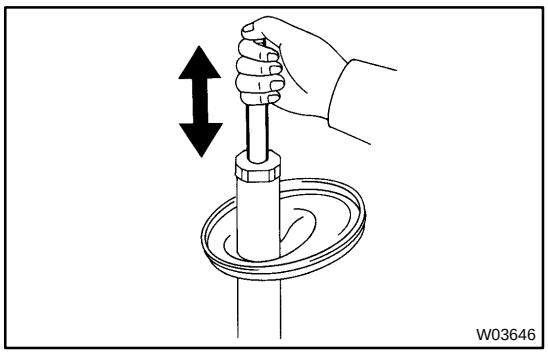


(c) w/o ELECTRONIC MODULATED SUSPENSION:
Using SST to hold the suspension support, remove the nut.
SST 09729–22031

(d) w/ ELECTRONIC MODULATED SUSPENSION:
Remove the suspension support nut.

(e) Remove these parts from the shock absorber:
- Suspension support
- Bearing
- Spring upper seat
- Upper insulator
- Coil spring
- Lower insulator
- Spring bumper

SA0EB–01



INSPECTION

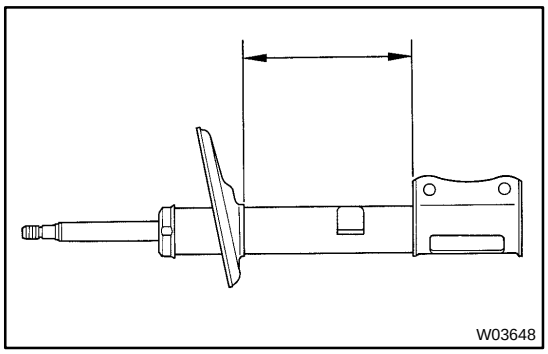
INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual operation sounds.

NOTICE:

When discarding the shock absorber, see page DISPOSAL on page SA–29.

SA0EE–01



DISPOSAL

1. FULLY EXTEND SHOCK ABSORBER ROD

2. DRILL HOLE TO REMOVE GAS FROM CYLINDER

Drill a hole between the lines, as shown.

CAUTION:

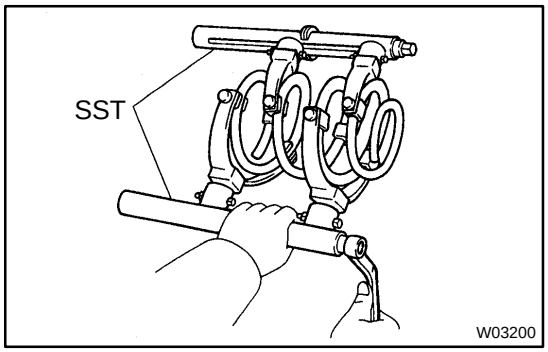
The gas coming out is harmless, but be careful of chips which may fly up when drilling.

SA0EC–02

REASSEMBLY

1. INSTALL LOWER INSULATOR ONTO SHOCK ABSORBER

2. INSTALL SPRING BUMPER TO PISTON ROD



3. INSTALL COIL SPRING

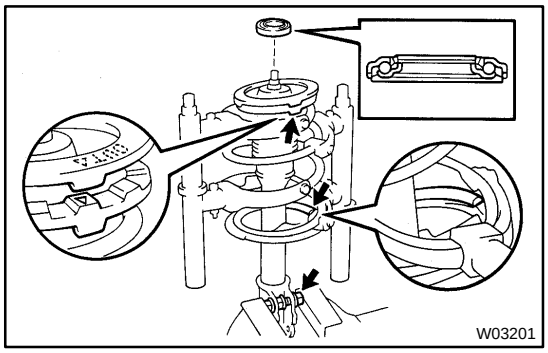
(a) Using SST, compress the coil spring.
SST 09727–30021

NOTICE:

Do not use an impact wrench. It will damage the SST.

HINT:

Use 2 of the same type of SST.



(b) Install the coil spring to the shock absorber.

HINT:

Fit the lower end of the coil spring into the gap of the spring lower seat.

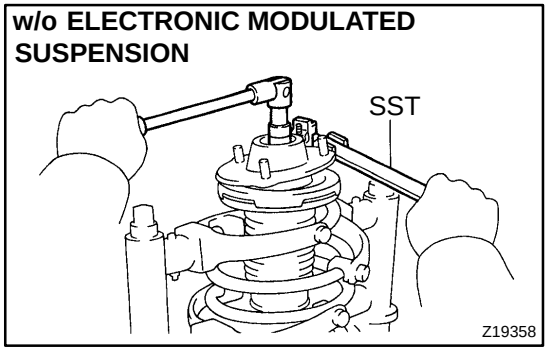
4. INSTALL SPRING UPPER SEAT AND INSULATOR

(a) Align the 'OUT' mark of spring upper seat with the mark of the upper insulator.

(b) Install the spring upper seat with upper insulator to the shock absorber with the mark facing the outside of the vehicle.

(c) Install the bearing and suspension support.

w/o ELECTRONIC MODULATED SUSPENSION



(d) w/o ELECTRONIC MODULATED SUSPENSION:
Using SST to hold the suspension support, install a new nut.
SST 09729–22031
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

(e) w/ ELECTRONIC MODULATED SUSPENSION:
Temporarily tighten the nut.

(f) Remove the SST from the coil spring.
SST 09727–30021

NOTICE:
Check that the bearing fits into the recess in the suspension support.

SA0ED–01

INSTALLATION

Installation is in the reverse order of removal (See page SA–25).
AFTER INSTALLATION, CHECK FRONT WHEEL ALIGNMENT (See page SA–4)

SA0ED–01

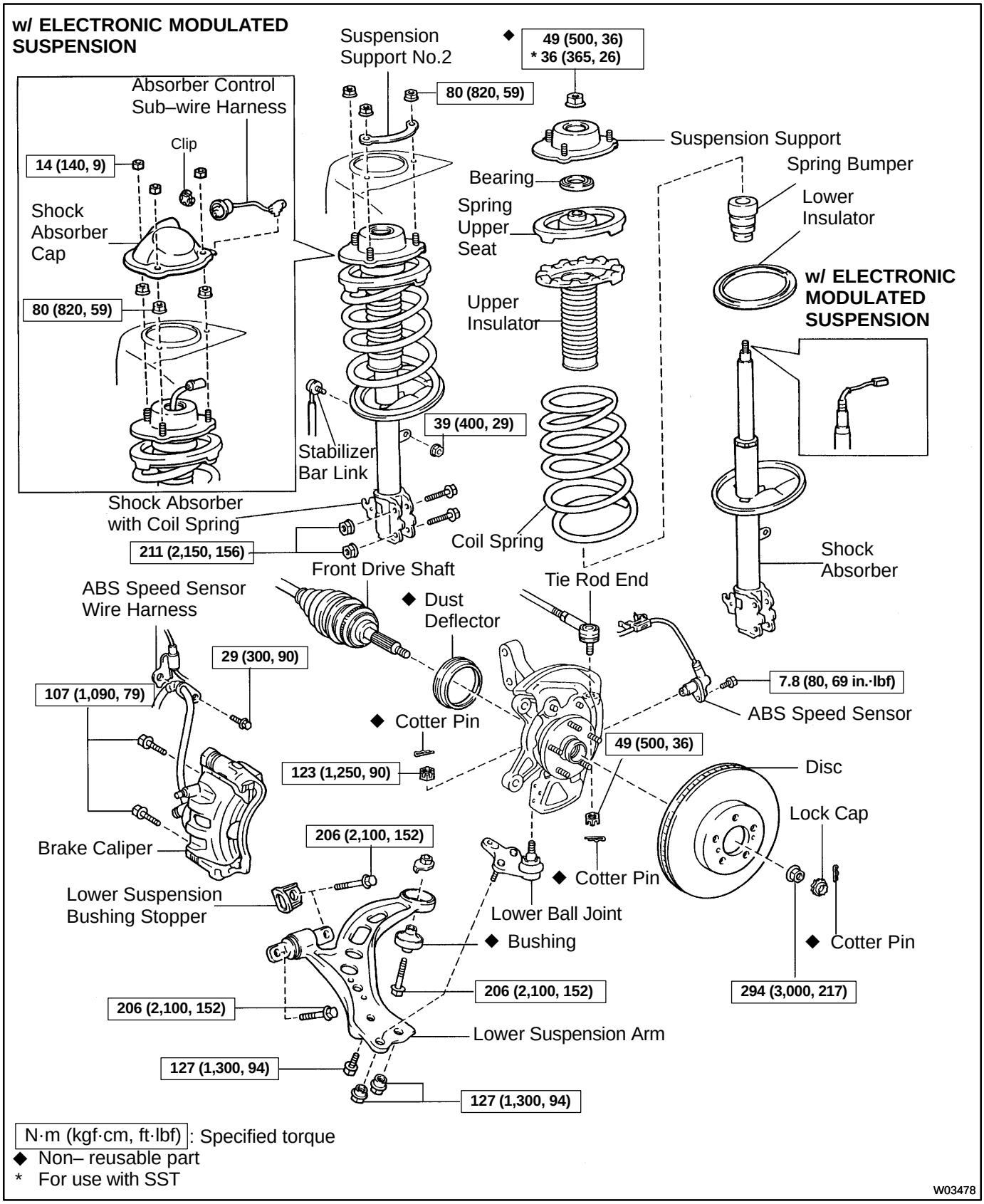
INSTALLATION

Installation is in the reverse order of removal (See page SA–25).
AFTER INSTALLATION, CHECK FRONT WHEEL ALIGNMENT (See page SA–4)

FRONT LOWER SUSPENSION ARM

SA0EF–03

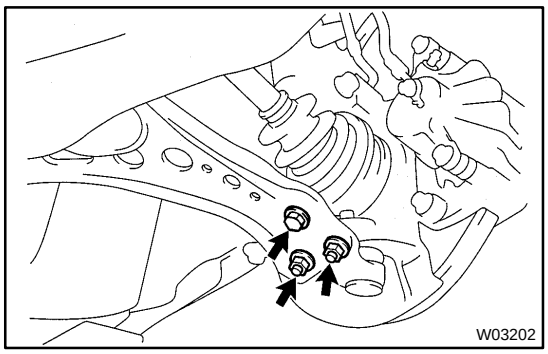
COMPONENTS



N·m (kgf·cm, ft·lbf): Specified torque
◆ Non– reusable part
* For use with SST

W03478

SA0EG–02



REMOVAL

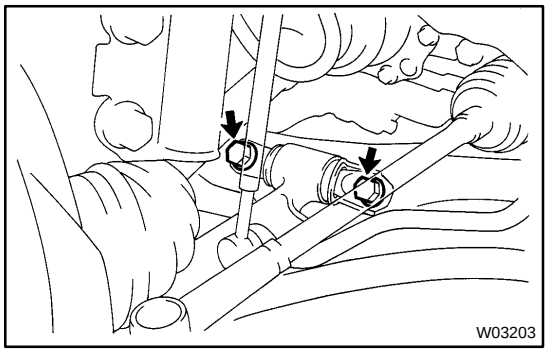
1. REMOVE FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. DISCONNECT LOWER SUSPENSION ARM FROM LOWER BALL JOINT

Remove the 2 nuts and bolt.

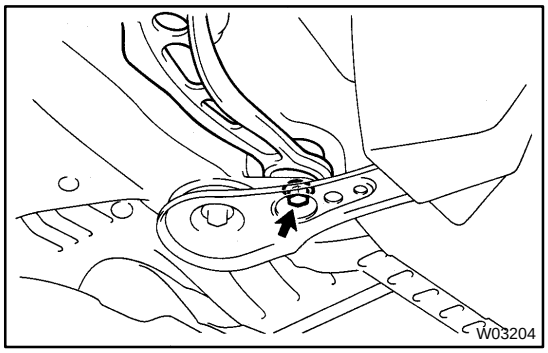
Torque: 127 N·m (1,300 kgf·cm, 94 ft·lbf)



3. REMOVE LOWER SUSPENSION ARM

(a) Remove the 2 bolts on the front side of the lower suspension arm.

Torque: 206 N·m (2,100 kgf·cm, 152 ft·lbf)



(b) Remove the bolt and nut on the rear side of the lower suspension arm.

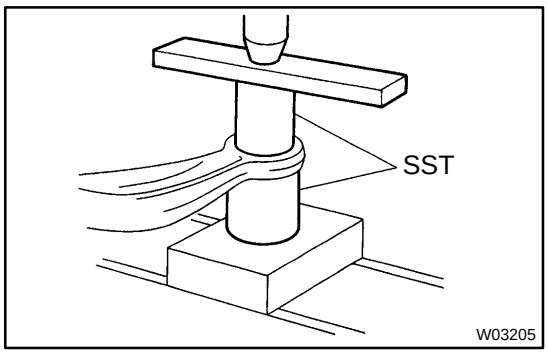
Torque: 206 N·m (2,100 kgf·cm, 152 ft·lbf)

(c) Remove the lower suspension arm.

(d) Remove the lower suspension arm bushing stopper from the lower suspension arm shaft.

SA0EH–01

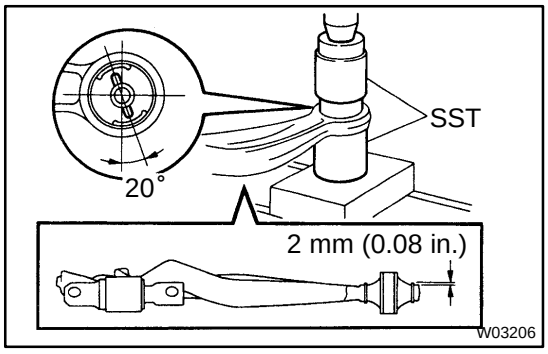
REPLACEMENT



1. REMOVE LOWER SUSPENSION ARM BUSHING

Using SST and a press, remove the bushing.

SST 09649–17010, 09710–04081



2. INSTALL LOWER SUSPENSION ARM BUSHING

Using SST and a press, install a new bushing.

SST 09238–47012, 09649–17010

HINT:

Install the bushing before, and set it in the direction, as shown in the illustration,

SA0EI–01

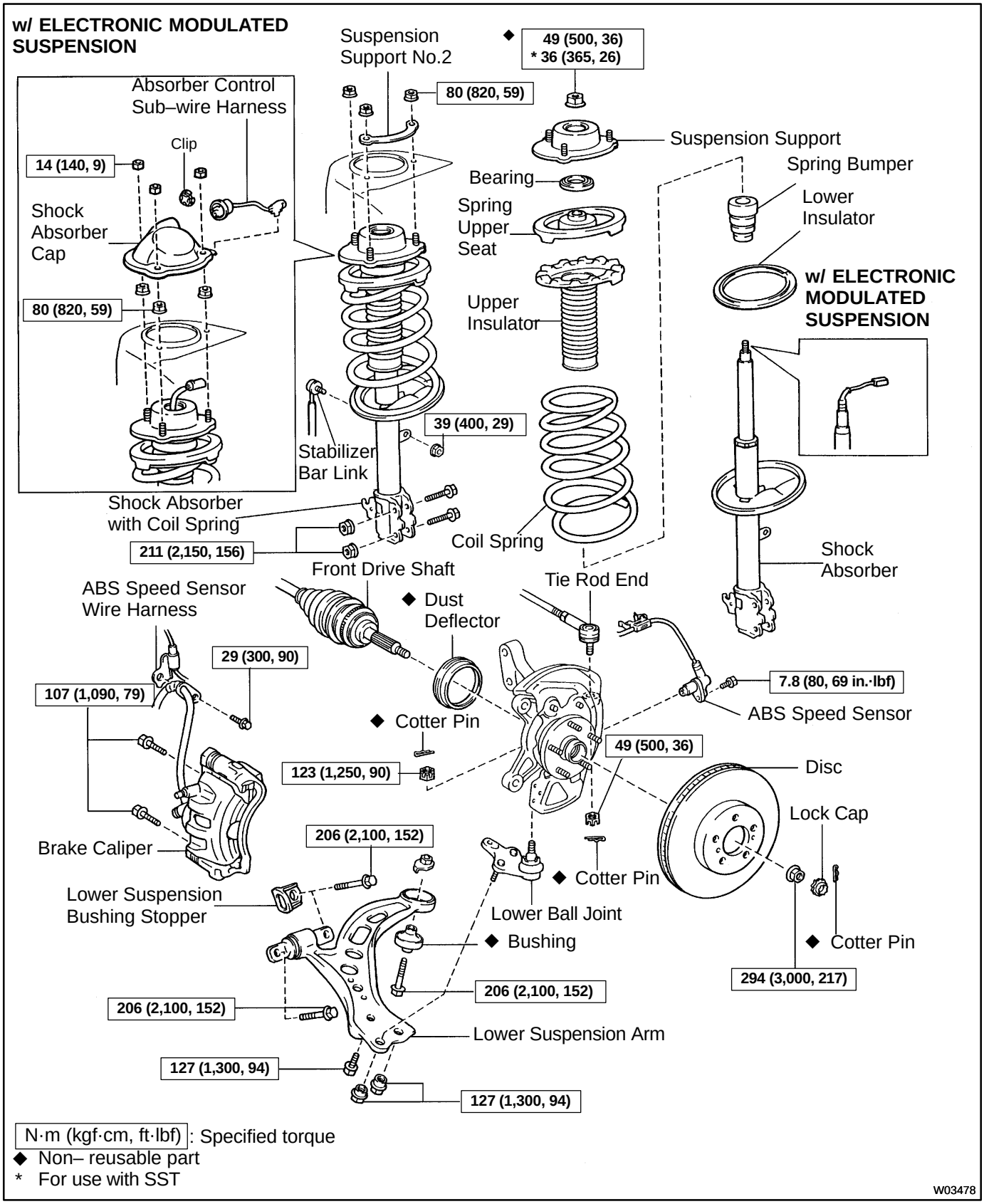
INSTALLATION

Installation is in the reverse order of removal (See page SA–34).
AFTER INSTALLATION, CHECK FRONT WHEEL ALIGNMENT (See page SA–4)

FRONT LOWER BALL JOINT

SA0EJ–03

COMPONENTS



SA0EK–01

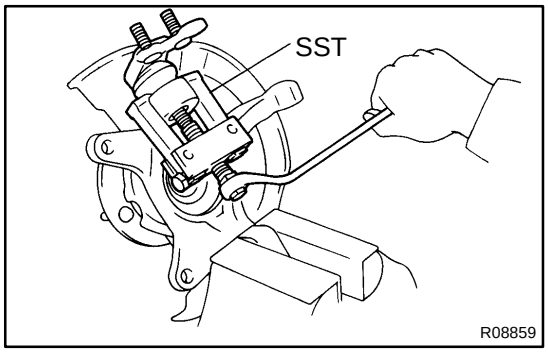
REMOVAL

1. REMOVE STEERING KNUCKLE WITH AXLE HUB
(See page SA–9)

2. REMOVE LOWER BALL JOINT

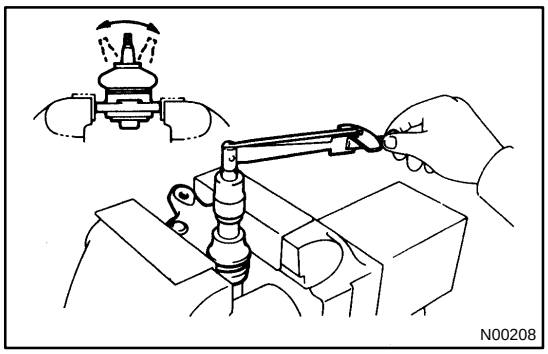
(a) Using a screwdriver, remove the dust deflector.

(b) Remove the cotter pin and nut.



(c) Using SST, remove the lower ball joint.
SST 09628–62011

SA0EL–01



INSPECTION

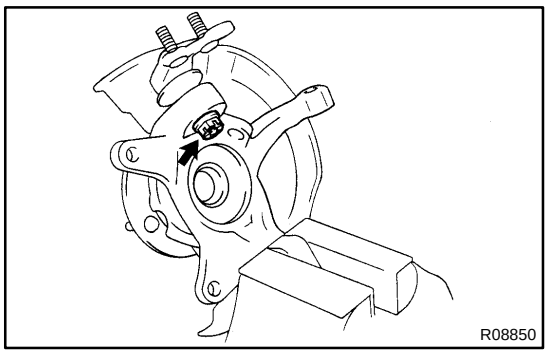
INSPECT BALL JOINT FOR ROTATION CONDITION

(a) As shown, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the nut continuously one turn each 2 – 4 seconds and take the torque reading on the 5th turn.

Turning torque:
1.0 – 3.4 N·m (10 – 35 kgf·cm, 8.7 – 30 in.·lbf)

SA0EM–03

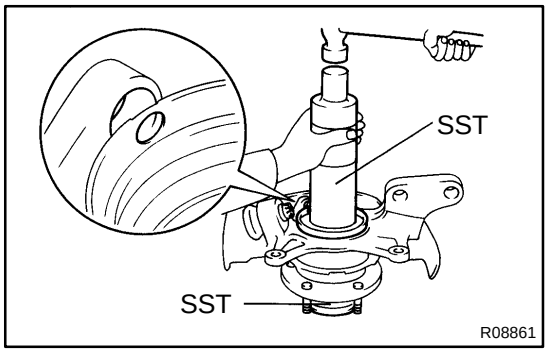


INSTALLATION

1. INSTALL LOWER BALL JOINT

(a) Install the lower ball joint and tighten the nut.
Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)

(b) Install a new cotter pin.



2. INSTALL NEW DUST DEFLECTOR

Using SST and a hammer, install a new dust deflector.

SST 09316–60011 (09316–00011, 09316–00041), 09608–32010

HINT:

Align the holes for the ABS speed sensor in the dust deflector and steering knuckle.

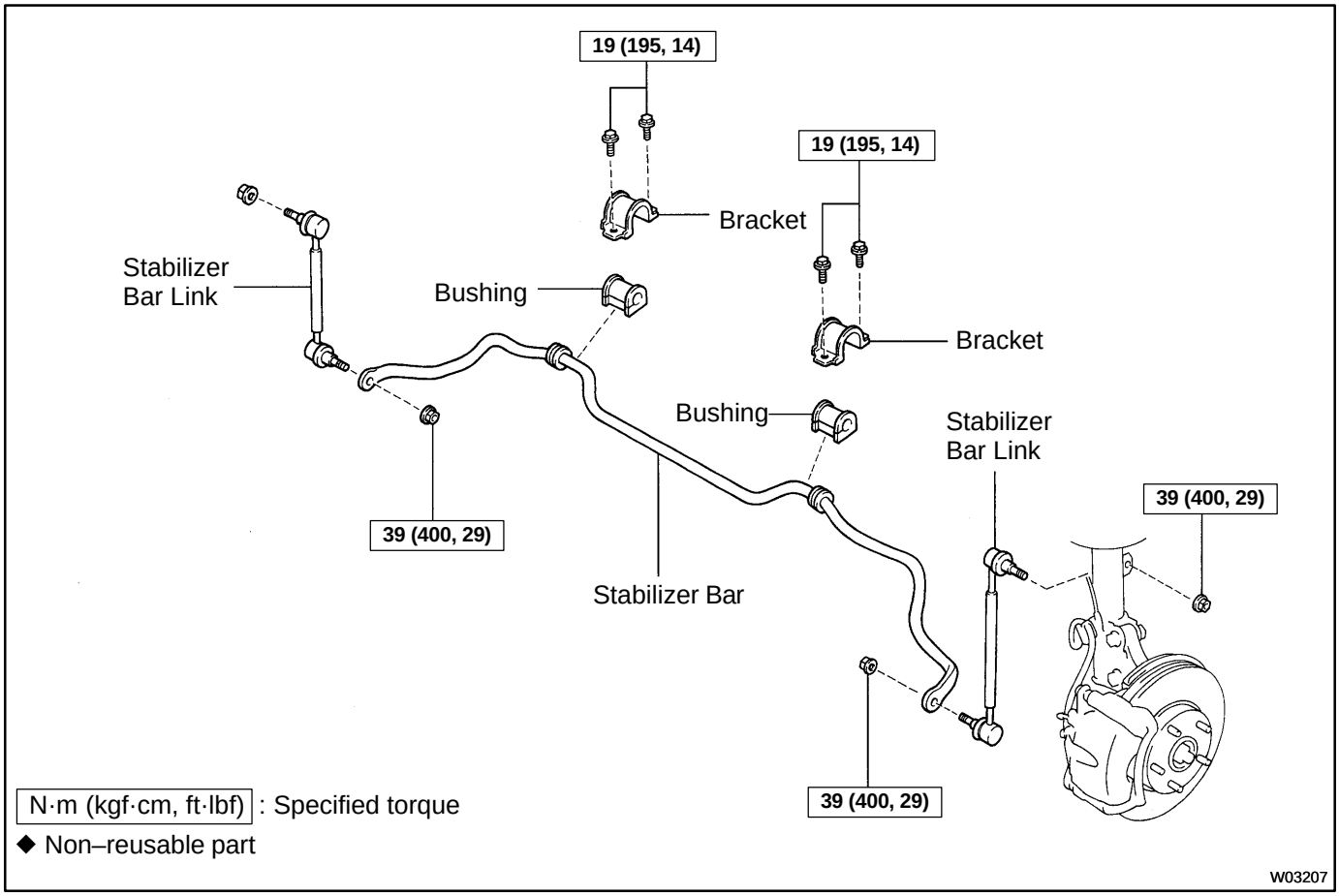
3. INSTALL STEERING KNUCKLE WITH AXLE HUB (See page SA–13)

4. CHECK ABS SPEED SENSOR SIGNAL (See page DI–232 or DI–273) AND FRONT WHEEL ALIGNMENT (See page SA–4)

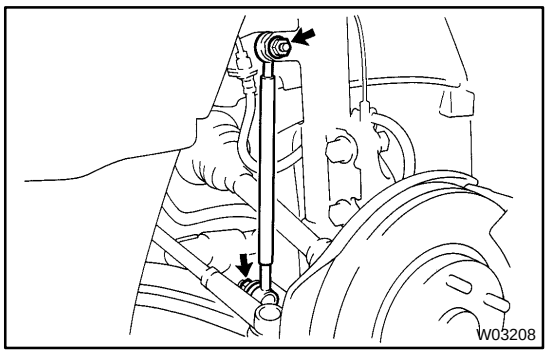
FRONT STABILIZER BAR

COMPONENTS

SA0EN–02



SA0EO–02



REMOVAL

1. REMOVE LEFT AND RIGHT FRONT WHEELS

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

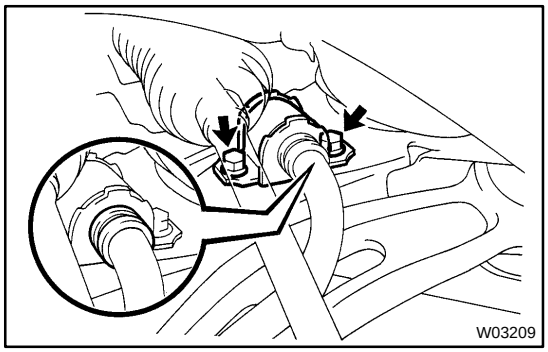
2. REMOVE LEFT AND RIGHT STABILIZER BAR LINKS

Remove the 4 nuts and 2 links.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

HINT:

If the ball joint turns together with the nut, use a 5 mm hexagon wrench to hold the stud.



3. REMOVE LEFT AND RIGHT BRACKETS AND BUSHINGS

Remove the 4 bolts, 2 brackets and bushings.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

HINT:

At the time of installation, install the bushing to the inside of the bushing on the stabilizer bar.

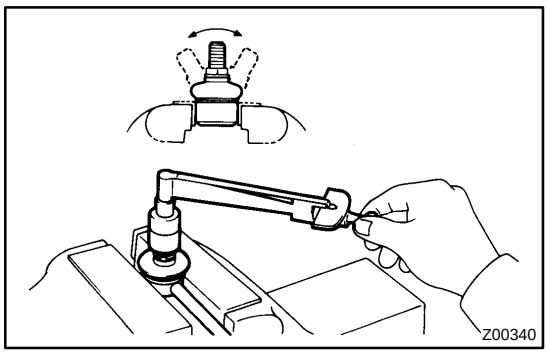
4. REMOVE STABILIZER BAR

Remove the stabilizer bar from the left hand side.

NOTICE:

Be careful not to damage the pressure feed tube.

SA0EP–01



INSPECTION

INSPECT STABILIZER BAR LINK BALL JOINT FOR ROTATION CONDITION

(a) As shown, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the nut continuously one turn each 2 – 4 seconds and take the torque reading on the 5th turn.

Turning torque:
0.05 – 1.0 N·m (0.5 – 10 kgf·cm, 0.4 – 8.7 in.·lbf)

SA0EQ–01

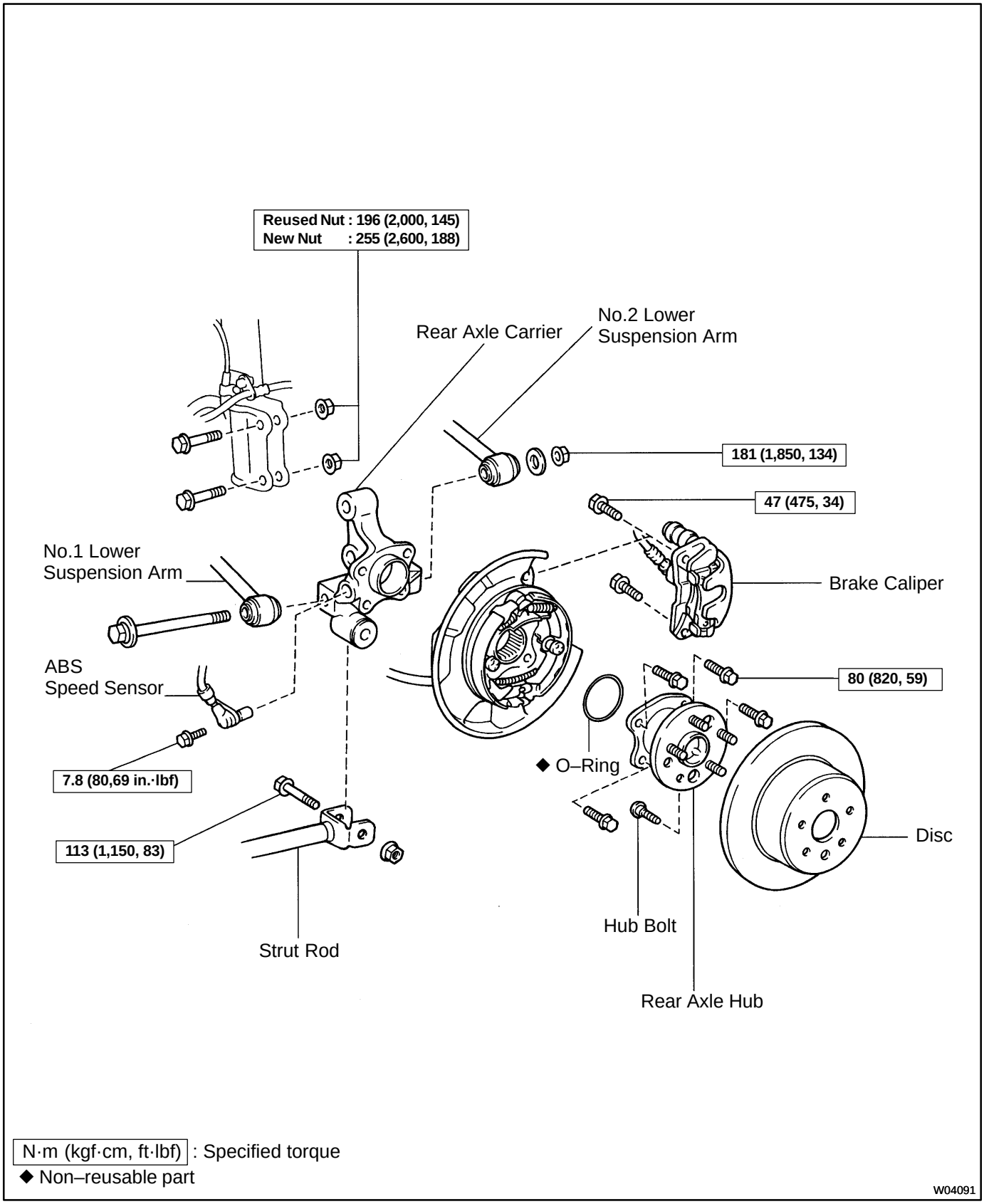
INSTALLATION

Installation is in the reverse order of removal (See page SA–42).

REAR AXLE HUB

COMPONENTS

SA0ER–04



SA0ES–01

REMOVAL

1. REMOVE REAR WHEEL

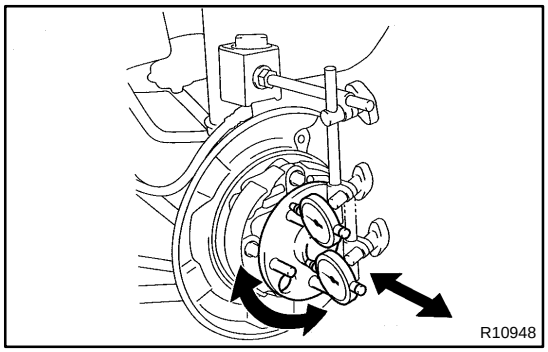
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REMOVE BRAKE CALIPER AND DISC

(a) Remove the brake caliper and disc.

Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)

(b) Support the brake caliper securely.

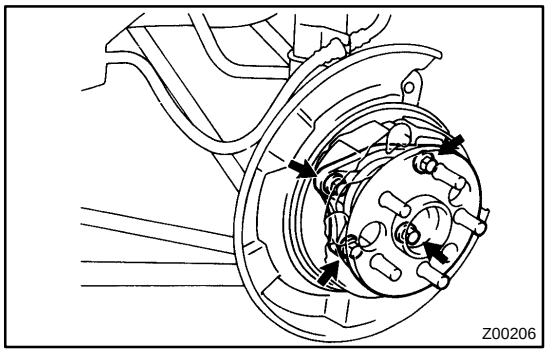


3. CHECK BEARING BACKLASH AND AXLE HUB DEVIATION

(a) Using a dial indicator near the center of the axle hub and check the backlash in the bearing shaft direction.

Maximum: 0.05 mm (0.0020 in.)

If the backlash exceeds the maximum, replace the axle hub with the bearing.



(b) Using a dial indicator, check the deviation at the surface of the axle hub outside the hub bolt.

Maximum: 0.07 mm (0.0028 in.)

If the deviation exceeds the maximum, replace the axle hub with the bearing.

4. REMOVE REAR AXLE HUB

(a) Remove the 4 bolts and rear axle hub.

Torque: 80 N·m (820 kgf·cm, 59 ft·lbf)

(b) Remove the O–ring.

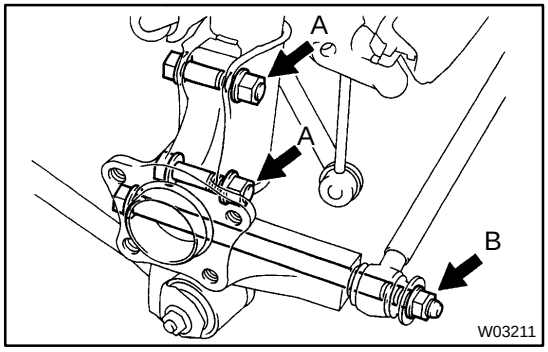
HINT:

At the time of installation, coat a new O–ring with MP grease.

(c) Support the backing plate securely.

5. REMOVE ABS SPEED SENSOR

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)



6. REMOVE REAR AXLE CARRIER

(a) Loosen the 3 nuts.

Torque:

Nut A (Reused nut): 196 N·m (2,000 kgf·cm, 145 ft·lbf)

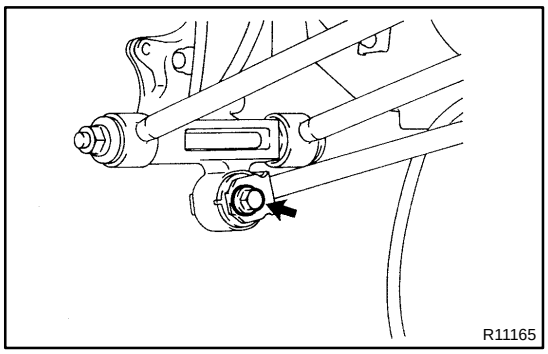
Nut A (New nut): 255 N·m (2,600 kgf·cm, 188 ft·lbf)

Nut B: 181 N·m (1,850 kgf·cm, 134 ft·lbf)

HINT:

At the time of installation, please refer to the following items.

- After stabilizing the suspension, torque the nuts.
- If reusing the 2 nuts, coat the nut's threads with engine oil.



(b) Remove the bolt and nut, and disconnect the strut rod from the rear axle carrier.

NOTICE:

When removing/installing bolt, stop the nut from rotating and loosen/torque the bolt.

Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

(c) Remove the 2 nuts and bolts on the lower side of the shock absorber.

(d) Remove the nut, bolt and No.2 lower suspension arm.

(e) Remove the rear axle carrier.

SA0ET–01

INSTALLATION

Installation is in the reverse order of removal (See page SA–46).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page DI–232 or DI–273) AND REAR WHEEL ALIGNMENT (See page SA–7)

REAR WHEEL HUB BOLT

SA0EU–01

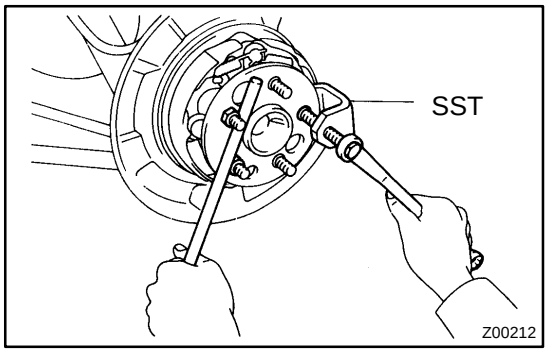
REPLACEMENT

1. REMOVE REAR WHEEL

2. REMOVE BRAKE CALIPER AND DISC

(a) Remove the 2 bolts, brake caliper and disc.

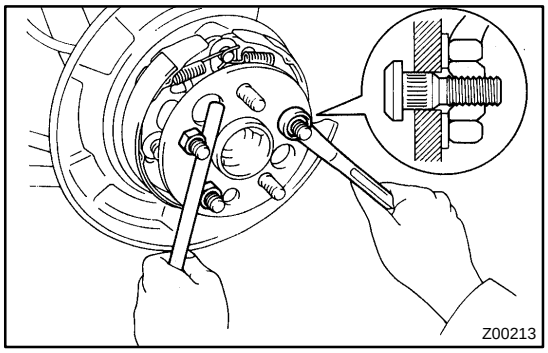
(b) Support the brake caliper securely.



3. REMOVE HUB BOLT

Using SST, remove the hub bolt.

SST 09628–10011



4. INSTALL HUB BOLT

Install a washer and nut to the hub bolt, as shown in the illustration, and install the hub bolt by tightening the nut.

5. INSTALL DISC AND BRAKE CALIPER

Install the disc and brake caliper with the 2 bolts.

Torque: 47 N·m (475 kgf·cm, 34 ft·lbf)

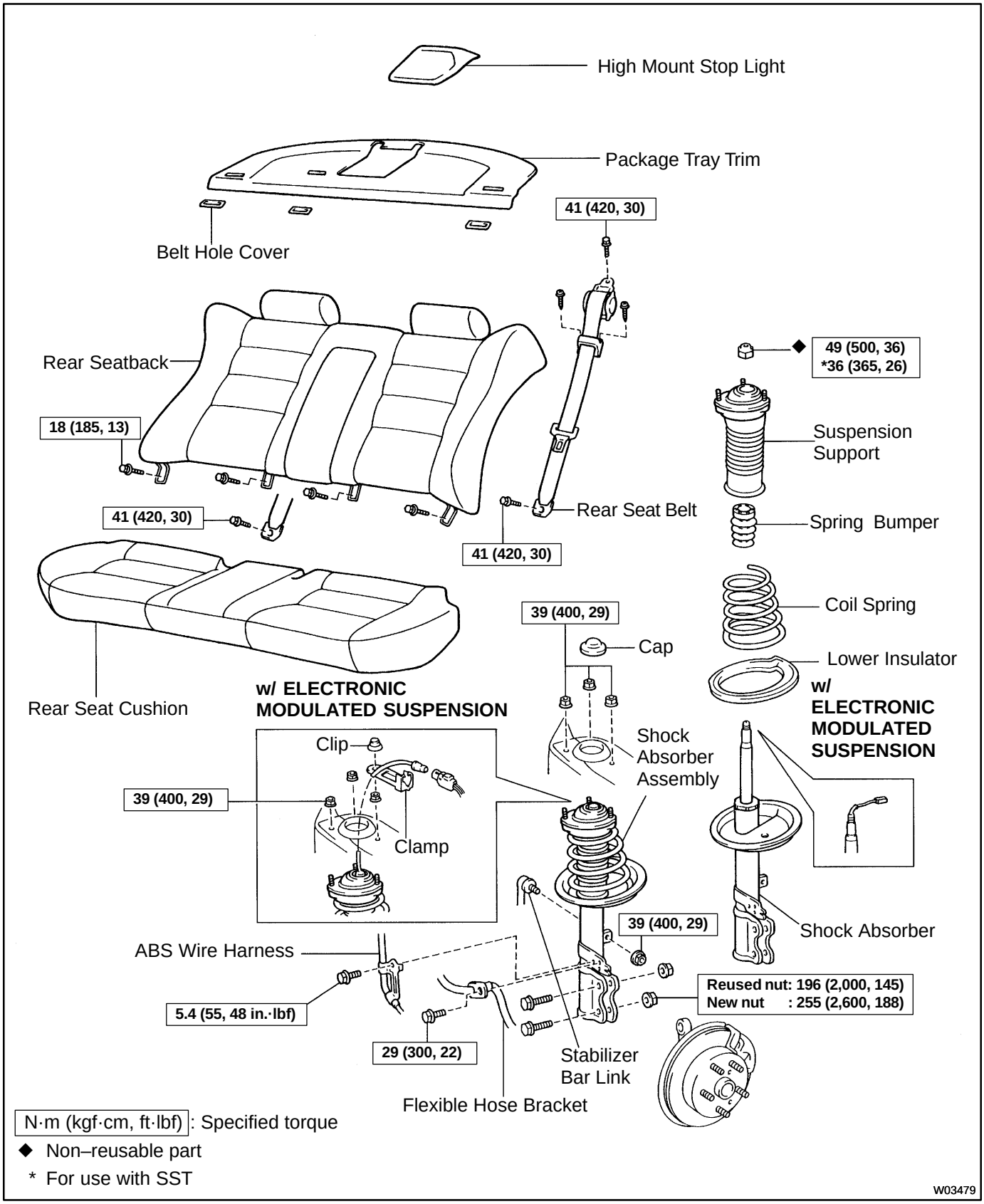
6. INSTALL REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

REAR SHOCK ABSORBER

SA0EV–02

COMPONENTS



N·m (kgf·cm, ft·lbf): Specified torque

◆ Non–reusable part

* For use with SST

W03479

SA0EW–02

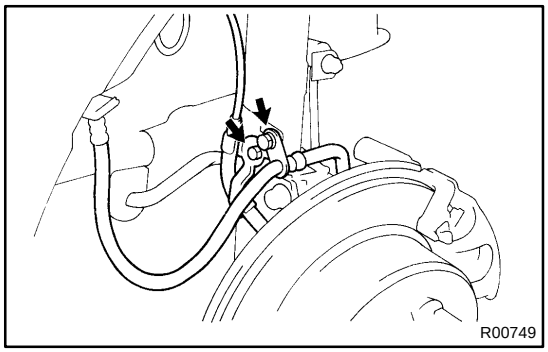
REMOVAL

1. REMOVE THESE PARTS:

- Rear seat cushion and seatback
- Package tray trim
- High mount stop light
- Belt hole cover and rear seat belt

2. REMOVE REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

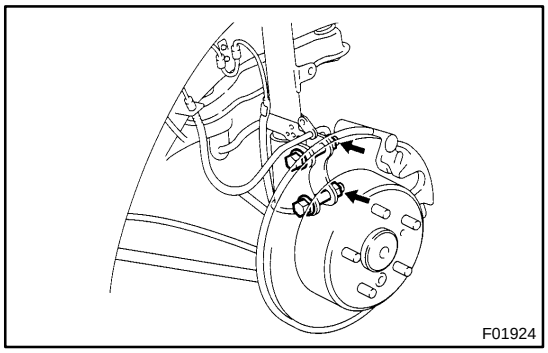


3. REMOVE FLEXIBLE HOSE AND ABS SPEED SENSOR WIRE HARNESS CLAMP FROM SHOCK ABSORBER

Remove the 2 bolts, flexible hose and ABS wire harness clamp.

Torque:
Flexible hose: 29 N·m (300 kgf·cm, 22 ft·lbf)
ABS wire: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

4. DISCONNECT STABILIZER BAR LINK FROM SHOCK ABSORBER (See page SA–65)



5. LOOSEN 2 NUTS ON LOWER SIDE OF SHOCK ABSORBER

(a) Loosen the 2 nuts on the lower side of the shock absorber.

Torque:
Reused nut: 196 N·m (2,000 kgf·cm, 145 ft·lbf)
New nut: 255 N·m (2,600 kgf·cm, 188 ft·lbf)

HINT:

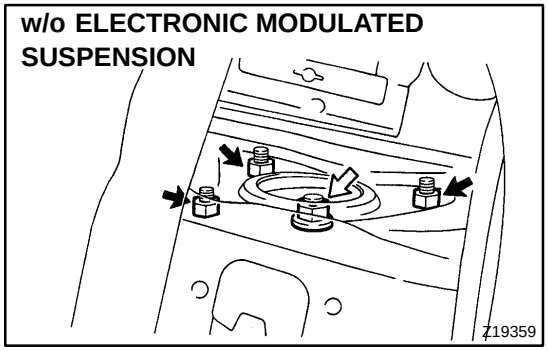
At the time of installation, coat the nut's threads with engine oil.

(b) Support the rear axle carrier with a jack.

6. w/o ELECTRONIC MODULATED SUSPENSION: REMOVE SHOCK ABSORBER WITH COIL SPRING

(a) Remove the cap.

w/o ELECTRONIC MODULATED SUSPENSION



(b) Loosen the nut in the middle of the suspension support.

NOTICE:

Do not remove it.

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

(c) Remove the 3 nuts of the suspension support.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

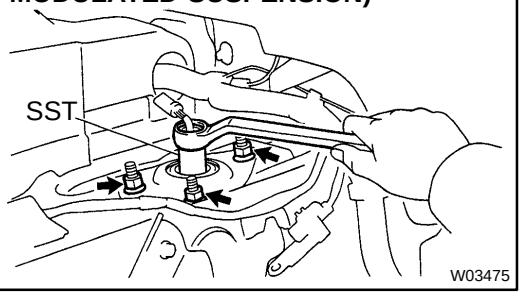
(d) Lower the rear axle carrier and remove the 2 bolts.

(e) Remove the shock absorber with the coil spring.

7. w/ ELECTRONIC MODULATED SUSPENSION: REMOVE SHOCK ABSORBER WITH COIL SPRING

(a) Remove the clip and clamp and disconnect the absorber control actuator connector.

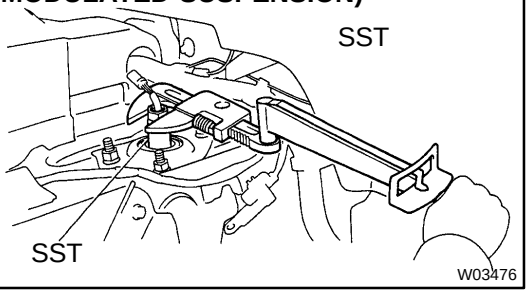
REMOVAL (w/ ELECTRONIC MODULATED SUSPENSION)



(b) Using SST, loosen the nut in middle of the suspension support.
SST 09817–33190

NOTICE:
Do not remove it.

INSTALLATION (w/ ELECTRONIC MODULATED SUSPENSION)



HINT:
At the time of installation, please refer to the following items.

- Using SST, torque the nut.
- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
  SST 09817–33190, 09922–10010
  Torque: 29 N·m (292 kgf·cm, 21 ft·lbf)

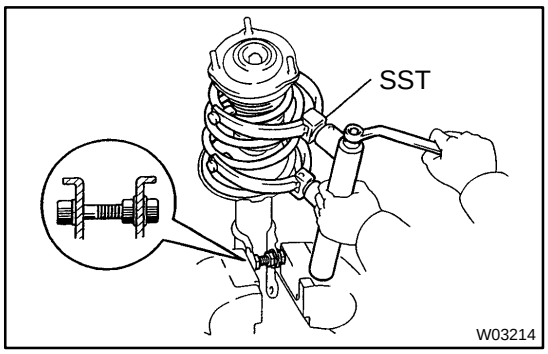
NOTICE:
At the time of installation, please refer to the following item. Use SST (09922–10010) in direction shown in the illustration.

(c) Remove the 3 nuts of the suspension support.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(d) Lower the rear axle carrier and remove the 2 bolts.

(e) Remove the shock absorber with the coil spring.

SA0EX–02



DISASSEMBLY

REMOVE COIL SPRING

(a) Install 2 nuts and a bolt to the bracket at the lower part of the shock absorber and secure it in a vise.

(b) Using SST, compress the coil spring.
SST 09727–30021

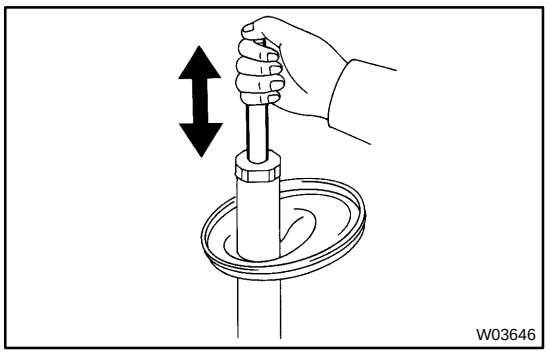
NOTICE:

Do not use an impact wrench. It will damage the SST.

(c) Remove the suspension support nut.
SST 09729–22031

(d) Remove these parts from the shock absorber:
- Suspension support
- Coil spring
- Lower insulator
- Spring bumper

SA0EY–01



INSPECTION

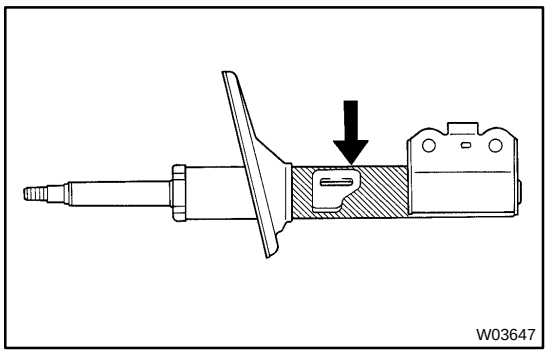
INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual operation sounds.

NOTICE:

When discarding the shock absorber, see DISPOSAL on page SA–55.

SA0F1–01



DISPOSAL

1. FULLY EXTEND SHOCK ABSORBER ROD

2. DRILL HOLE TO REMOVE GAS FROM CYLINDER

Using a drill, make a hole in the cylinder as shown to remove the gas inside.

CAUTION:

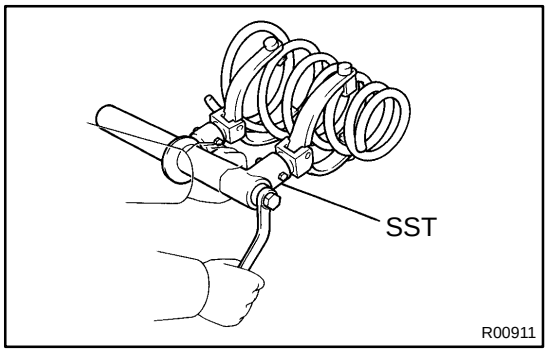
The gas coming out is harmless, but be careful of chips which may fly up when drilling.

SA0EZ–02

REASSEMBLY

1. INSTALL LOWER INSULATOR

2. INSTALL SPRING BUMPER TO PISTON ROD

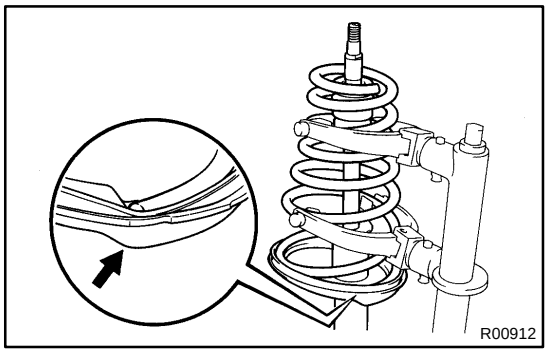


3. INSTALL COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727–30021

NOTICE:

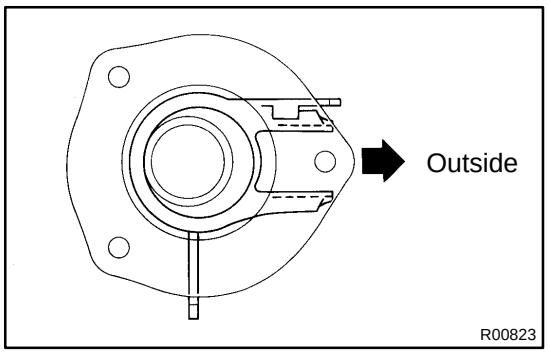
Do not use an impact wrench. It will damage the SST.



(b) Install the coil spring to the shock absorber.

HINT:

Fit the lower end of the coil spring into the gap of the spring lower seat.



4. INSTALL SUSPENSION SUPPORT

(a) Install the suspension support to the piston rod and temporarily tighten a new nut.

(b) Rotate the suspension support and set it in the direction shown in the illustration.

(c) Remove the SST.
SST 09727–30021

HINT:

After removing SST, again check the direction of the suspension support.

SA0F0–01

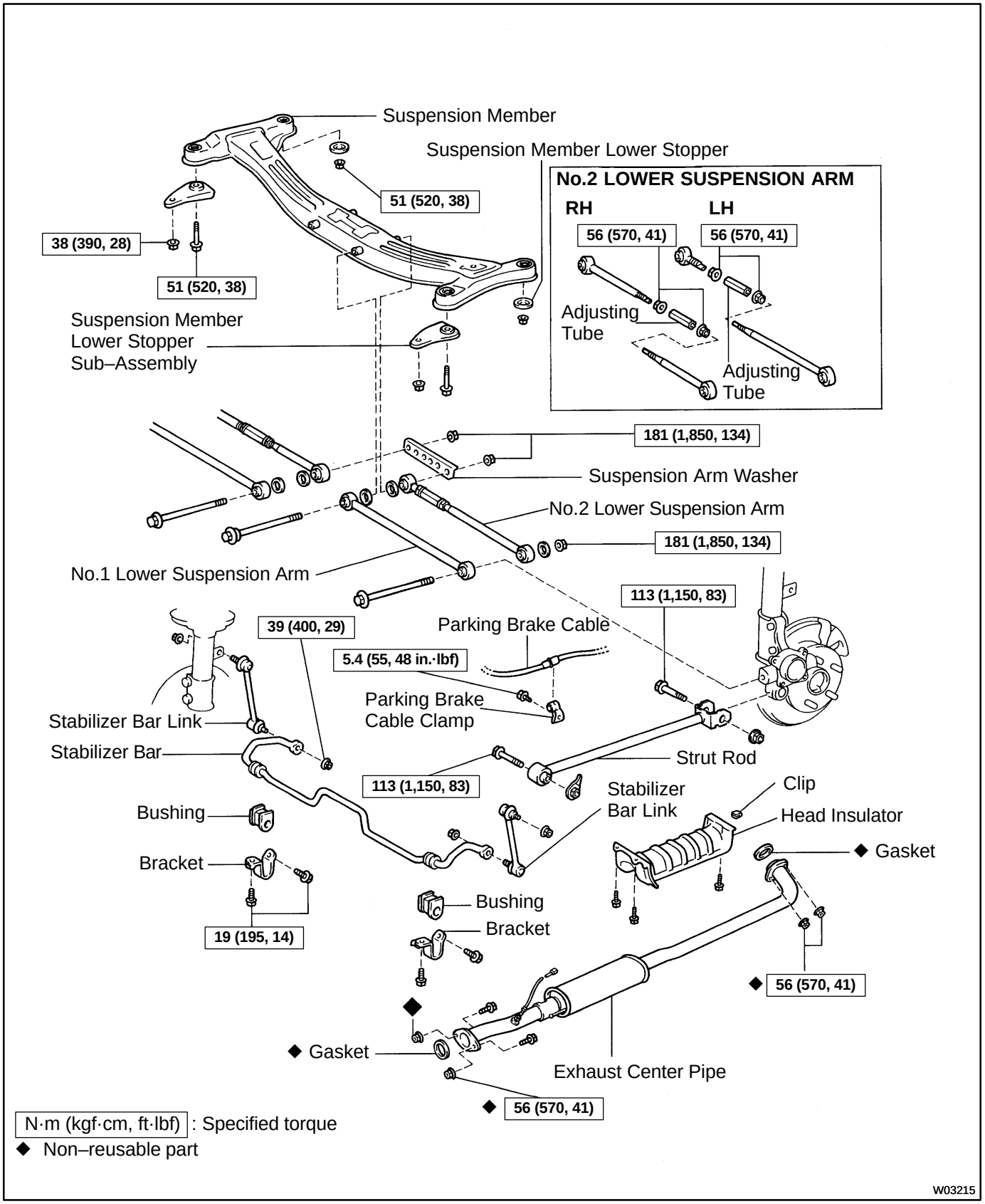
INSTALLATION

Installation is in the reverse order of removal (See page SA–51).
AFTER INSTALLATION, CHECK REAR WHEEL ALIGNMENT (See page SA–7)

REAR LOWER SUSPENSION ARM AND STRUT ROD

SA0F2–02

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

W03215

SA0F3–01

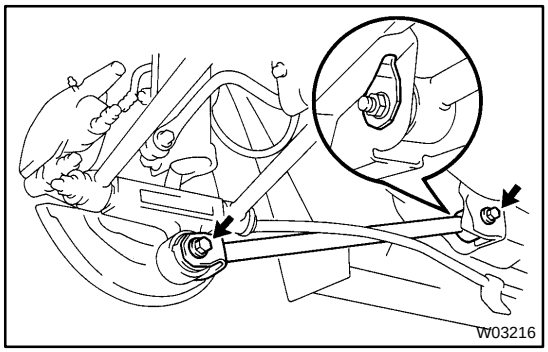
REMOVAL

1. REMOVE REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REMOVE EXHAUST CENTER PIPE

3. REMOVE STRUT ROD

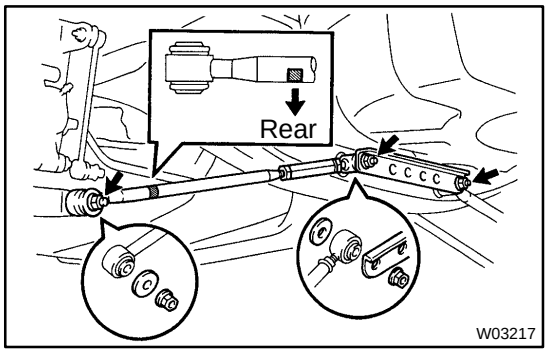
(a) Remove the bolt and disconnect the parking brake cable.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



(b) Remove the 2 bolts and nuts.
Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

HINT:
At the time of installation, after stabilizing the suspension, torque the bolts.

(c) Remove the strut rod.



4. REMOVE NO.2 LOWER SUSPENSION ARM

(a) Remove the 3 nuts, suspension arm washer and washers.
Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)

HINT:
At the time of installation, after stabilizing the suspension, torque the nuts.

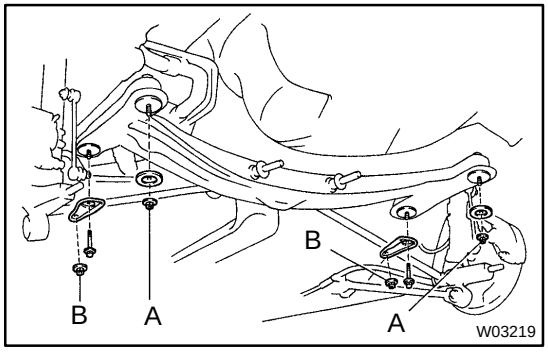
(b) Remove the No.2 lower suspension arm.

HINT:
At the time of installation, face the paint mark to the rearward.

5. REMOVE LEFT AND RIGHT STABILIZER BRACKETS
(See page SA–65)

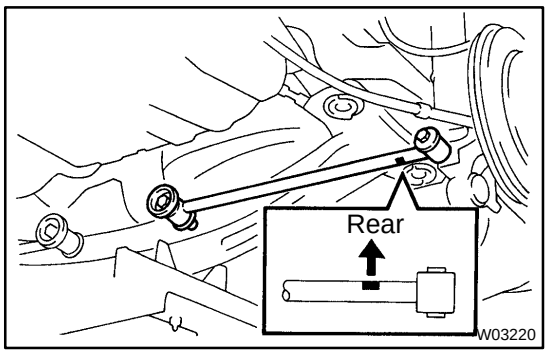
6. REMOVE NO.1 LOWER SUSPENSION ARM

(a) Support the suspension member with a jack.



(b) Remove the 4 nuts, 2 bolts and suspension member lower stoppers.
Torque:
Bolt: 51 N·m (520 kgf·cm, 38 ft·lbf)
Nut A: 51 N·m (520 kgf·cm, 38 ft·lbf)
Nut B: 38 N·m (390 kgf·cm, 28 ft·lbf)

(c) Lower the suspension member.

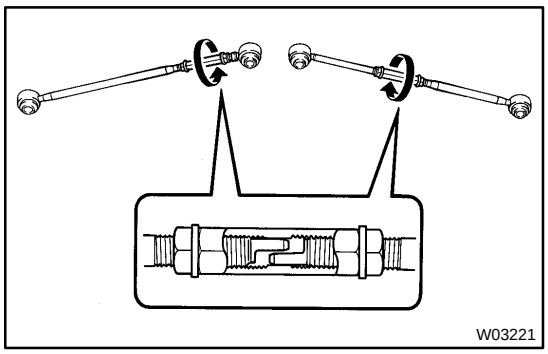


(d) Remove the No.1 lower suspension arm with the 2 bolts and washer.

HINT:

At the time of installation, face the paint mark to the rearward.

SA0F4–01



DISASSEMBLY

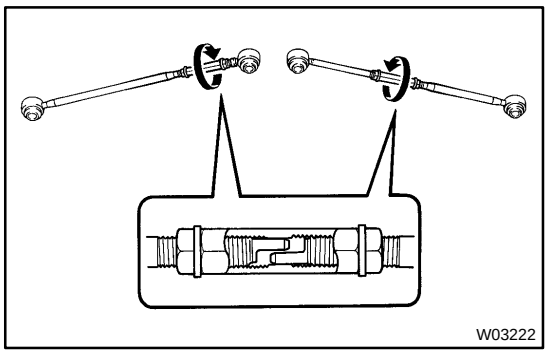
DISASSEMBLE NO.2 LOWER SUSPENSION ARM

(a) Loosen the 2 lock nuts.
(b) Turn and disassemble the No.2 lower suspension arm.
(c) Remove the lock nuts from the No.2 lower suspension arm.

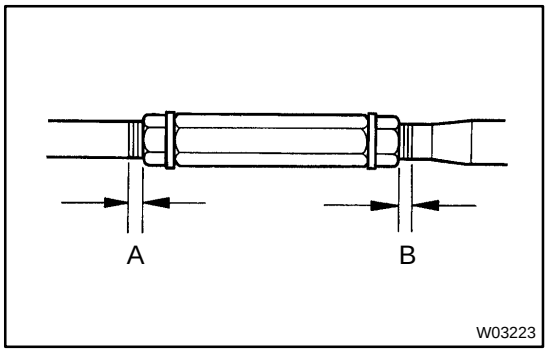
SA0F5–01

REASSEMBLY

ASSEMBLE NO.2 LOWER SUSPENSION ARM

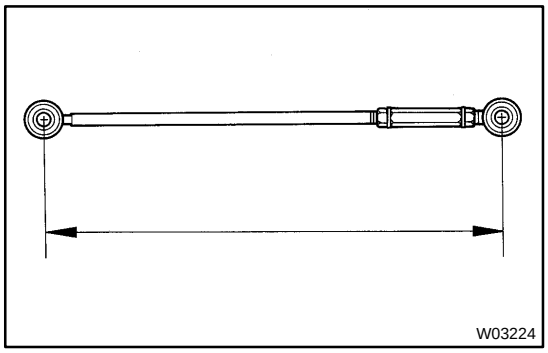


(a) Install the 2 lock nuts to the No.2 lower suspension arm.
(b) Turn the adjusting tube and assemble the No.2 lower suspension arm.



HINT:
When assembling the No.2 lower suspension arm, try to make dimensions A and B shown in the illustration as close as possible.

Maximum difference: 3.0 mm (0.118 in.)



(c) Adjust the No.2 lower suspension arm length by turning the adjusting tube.

Arm length: 512.3 mm (20.169 in.)

(d) Temporarily tighten the 2 lock nuts (See page SA–7).

HINT:
After adjusting the rear wheel alignment, torque the lock nuts.

Torque: 56 N·m (570 kgf·cm, 41 ft·lbf)

SA0F6–01

INSTALLATION

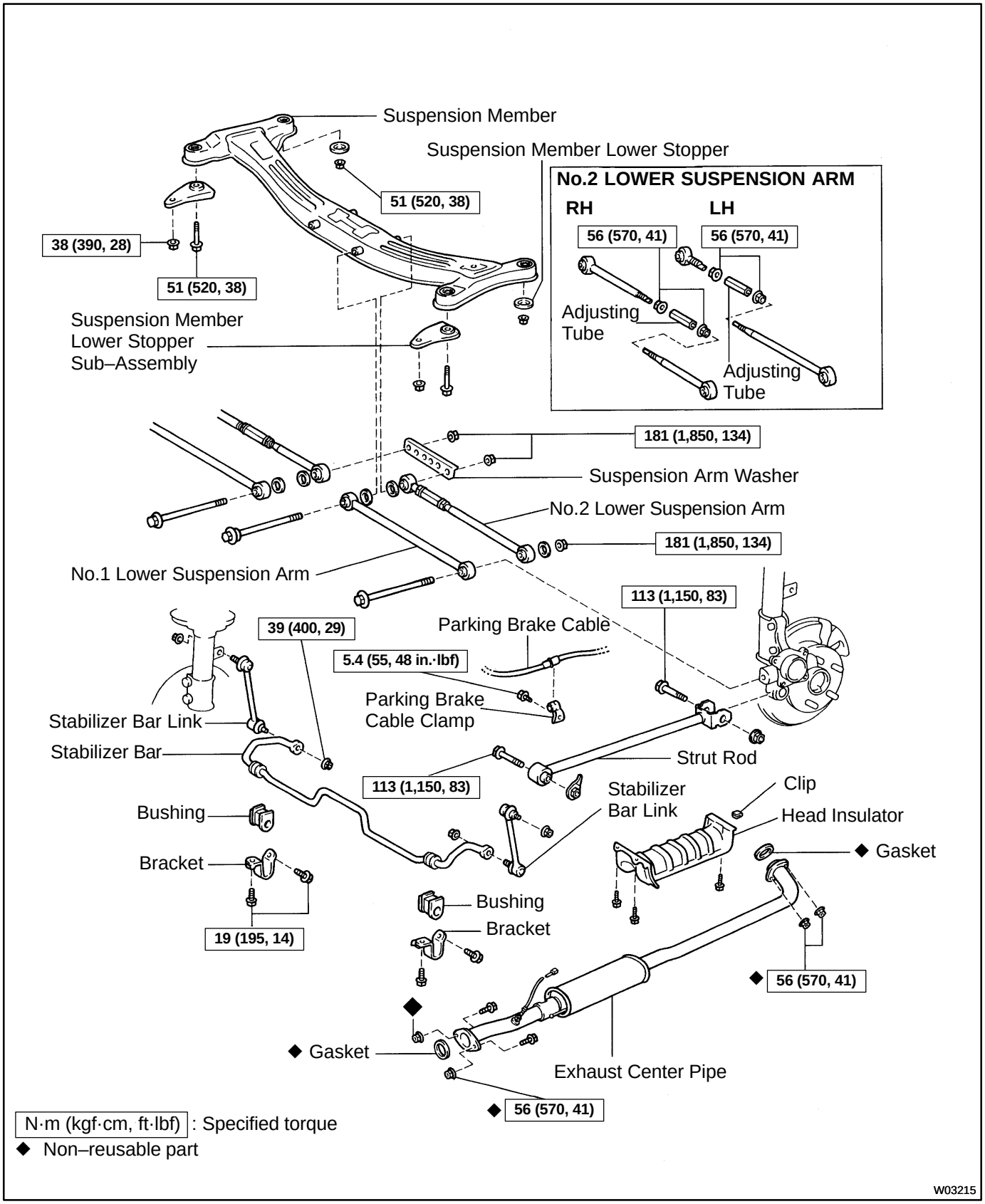
Installation is in the reverse order of removal (See page SA–59).

AFTER INSTALLATION, CHECK REAR WHEEL ALIGNMENT (See page SA–7)

REAR STABILIZER BAR

SA0F7–02

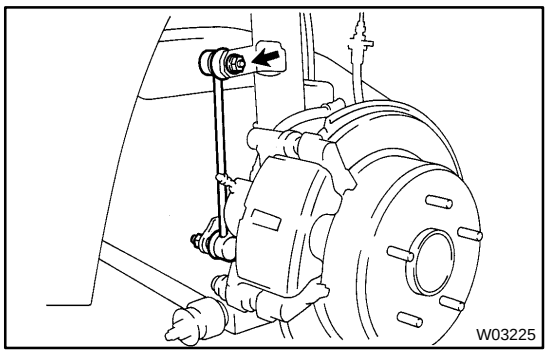
COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

W03215

SA0F8–02



REMOVAL

1. REMOVE REAR WHEELS

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REMOVE LEFT AND RIGHT STABILIZER BAR LINKS

Remove the 4 nuts and 2 links.

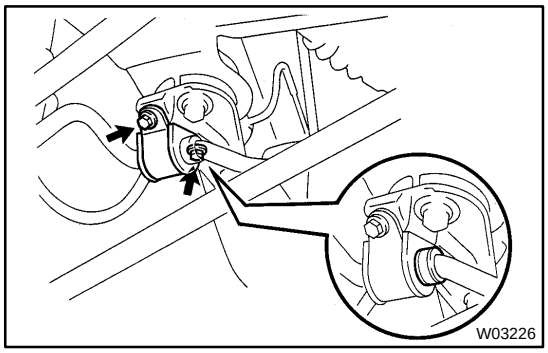
HINT:

If the ball joint turns together with the nut, use a 5 mm hexagon wrench to hold the stud.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

3. REMOVE HEAT INSULATOR

Remove the 3 bolts, clip and heat insulator.



4. REMOVE LEFT AND RIGHT BRACKETS AND BUSHINGS

Remove the 4 bolts, 2 brackets and bushings.

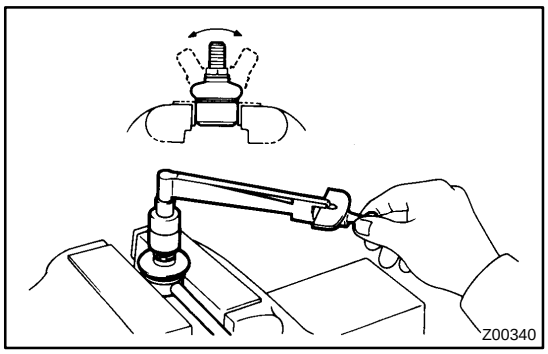
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

HINT:

At the time of installation, install the bushing to the outside of the bushing on the stabilizer bar.

5. REMOVE STABILIZER BAR

SA0F9–01



INSPECTION

INSPECT STABILIZER BAR LINK BALL JOINT FOR ROTATION CONDITION

(a) As shown, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the nut continuously one turn each 2 – 4 seconds and take the torque reading on the 5th turn.

Turning torque:
0.05 – 1.0 N·m (0.5 – 10 kgf·cm, 0.4 – 8.7 in.·lbf)

SA0FA–01

INSTALLATION

Installation is in the reverse order of removal (See page SA–65).

Technical Service Information Bulletin
July 17, 1998

Title:

A/C BLOWER MOTOR MALFUNCTION

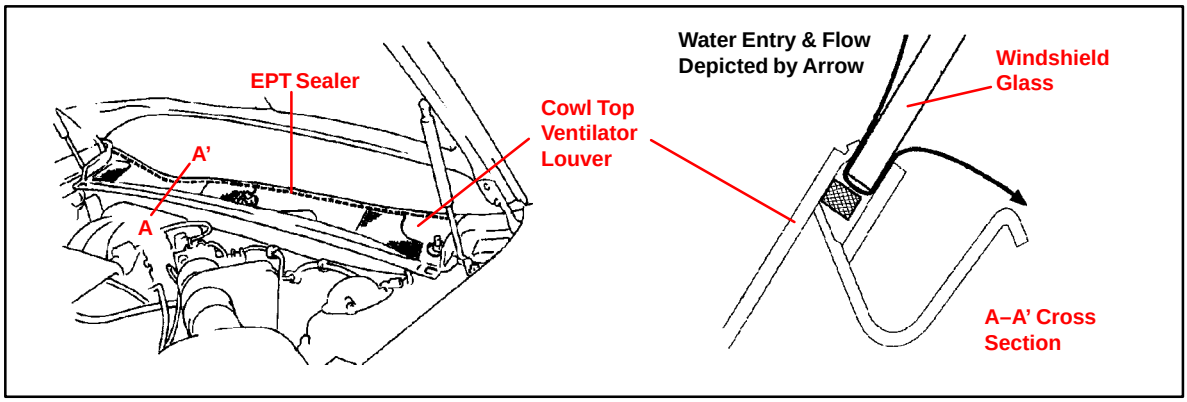
Models:

'97 ES 300

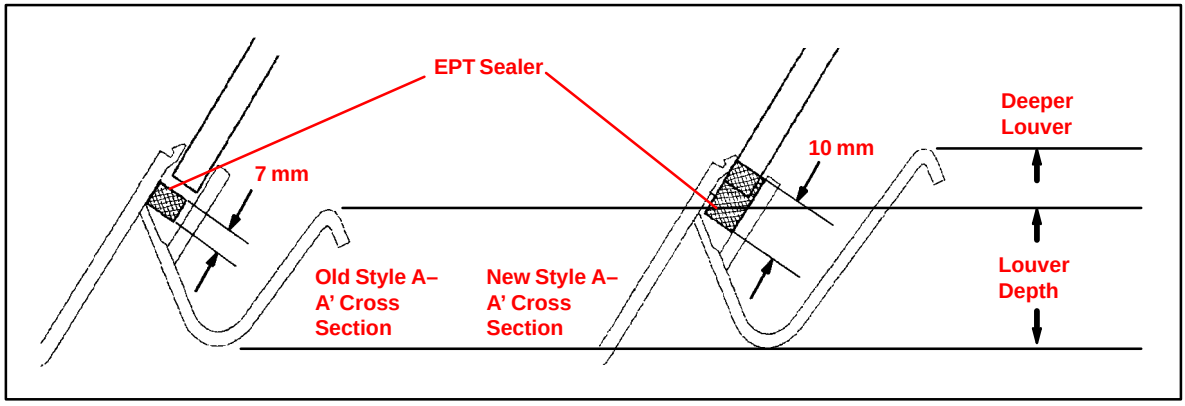
TSIB

Introduction

A Malfunction of the A/C blower motor may be caused by water intrusion into the blower unit due to a poor seal between the windshield and the cowl top ventilation louver.



To prevent this, the amount of caulking sponge sealant (EPT Sealer) applied behind the cowl top ventilation louver has been increased. In addition, the shape of the louver has been changed as shown in the illustrations below.



Affected Vehicles

- **1997** model year **ES 300s** produced **before JT8BF22G*W0096000** at Tsutsumi plant or **before JT8BF22G*W5022600** at Kyushu plant.

Parts Information

OLD PART NUMBER	NEW PART NUMBER	PART NAME
55781–33140	Same	Lower Cowl Top Ventilator, RH
55782–33140	Same	Lower Cowl Top Ventilator, LH

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
EL8001	R&R Blower Motor	0.6	87103–44020	66	83

Applicable Warranty*:

This repair is covered under the Lexus Basic Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

* Warranty application is limited to correction of a problem based upon a customer's complaint.

Repair Procedure

If evidence of water intrusion into the blower motor housing is found such as rusting of the Blower Motor, perform the following operations:

1. Replace the Blower Motor (Refer to the Repair Manual for procedure).
2. Remove wiper arms and the hood to cowl top seal.
3. Replace the cowl top ventilator louver with new part.
4. Reinstall components in reverse order.

Technical Service Information Bulletin
December 16, 2004

Title:

SENSOR INSPECTION FOR AIR CONDITIONING SYSTEM

Models:

'90 – Current All Models

TSIB

Introduction

This service bulletin contains inspection procedures to more precisely confirm proper operation of the following temperature sensors of the air conditioning system. Follow the procedures in this service bulletin when inspecting these sensors. These contents will be reflected in future repair manuals.

- Room Temperature Sensor
- Ambient Temperature Sensor
- Air Duct Sensor
- Evaporator Temperature Sensor
- Solar Sensor
- Room Humidity Sensor

Applicable Vehicles

- **All 1990 – Current** model year **Lexus** vehicles.

Warranty Information

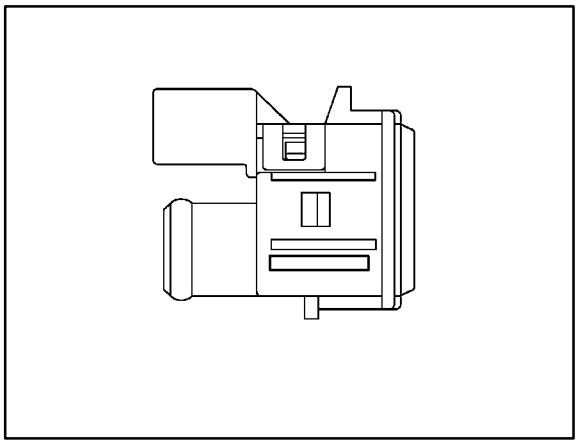
OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Inspection Procedure

1. Inspect Room Temperature Sensor.

A. Measure the sensor resistance.

Resistance Value at 77°F (25°C)	1700 +/– 85Ω



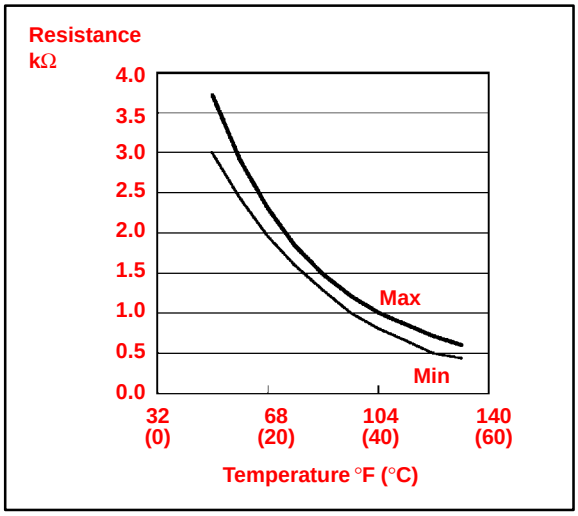
NOTE:

- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

As the temperature increases, the resistance decreases.

TEMPERATURE °F (°C)	SPECIFICATION kΩ
50 (10)	3.00 to 3.73
59 (15)	2.45 to 2.88
68 (20)	1.95 to 2.30
77 (25)	1.60 to 1.80
86 (30)	1.28 to 1.47
95 (35)	1.00 to 1.22
104 (40)	0.80 to 1.00
113 (45)	0.65 to 0.85
122 (50)	0.50 to 0.70
131 (55)	0.44 to 0.60
140 (60)	0.36 to 0.50

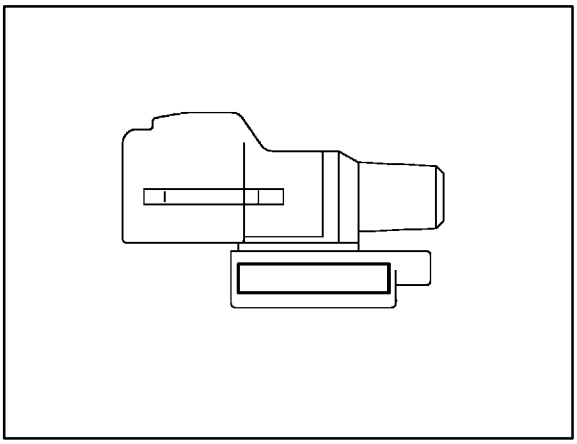


Inspection Procedure (Continued)

2. Inspect Ambient Temperature Sensor.

A. Measure the sensor resistance according to the selected graph (specification).

Resistance Value at 77°F (25°C)	1700 +/– 85Ω



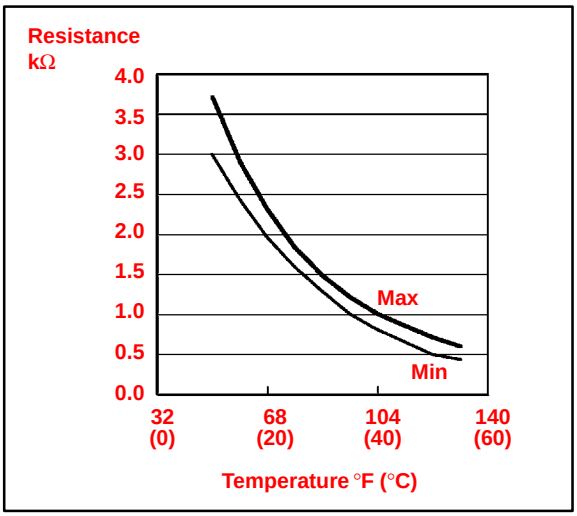
NOTE:

- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

As the temperature increases, the resistance decreases.

TEMPERATURE °F (°C)	SPECIFICATION kΩ
50 (10)	3.00 to 3.73
59 (15)	2.45 to 2.88
68 (20)	1.95 to 2.30
77 (25)	1.60 to 1.80
86 (30)	1.28 to 1.47
95 (35)	1.00 to 1.22
104 (40)	0.80 to 1.00
113 (45)	0.65 to 0.85
122 (50)	0.50 to 0.70
131 (55)	0.44 to 0.60
140 (60)	0.36 to 0.50



Inspection Procedure (Continued)

3. Inspect Air Duct Sensor.

A. Measure the sensor resistance according to the table and graph (specification).

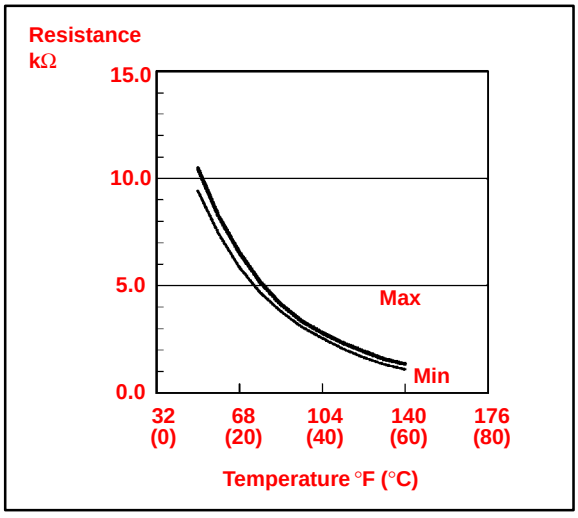
NOTE:

- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

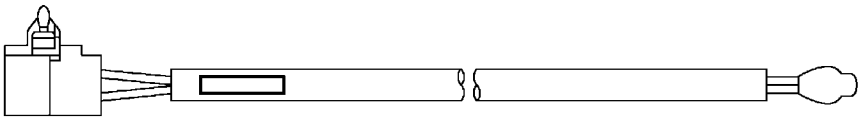
As the temperature increases, the resistance decreases.

TEMPERATURE °F (°C)	SPECIFICATION kΩ
50 (10)	9.48 to 10.49
59 (15)	7.50 to 8.28
68 (20)	5.95 to 6.57
77 (25)	4.77 to 5.25
86 (30)	3.85 to 4.21
95 (35)	3.12 to 3.40
104 (40)	2.53 to 2.79
113 (45)	2.06 to 2.30
122 (50)	1.69 to 1.91
131 (55)	1.39 to 1.59
140 (60)	1.15 to 1.33



Inspection Procedure (Continued)

4. Inspect Evaporator Temperature Sensor.



Select the appropriate graph (specification) using the following table.

NOTE:

Please inspect the sensors for model years not indicated by this bulletin, according to the instructions in the applicable repair manual.

MODEL	MODEL YEAR	COMMENTS	PART NUMBER	GRAPH
ES 300	1992 – 2001		88625–33070	2
ES 300/330	2002 – 2003		88625–17130	2
	2003		88625–33170	3
GS 300	1993 – 1997		88625–3A020	2
GS 300/400/430	1998 – 2002		88625–3A120	2
GX 470	2003 – 2005	Thermistor No. 1	88625–35050	3
		Thermistor No. 2	88625–16210	2
IS 300	2000 – 2001		88625–48010	2
LS 400	1990 – 1992		88625–32040	2
	1993 – 1994		88625–50100	2
	1995 – 2000		88625–50140	2
LS 430	2001 – 2005		88625–50160	2
LX 450	1996 – 1997		88625–60060	2
LX 470	1998 – 2000	Thermistor No. 2	88625–60140	2
	1998 – 2002	Thermistor No. 1	88625–60130	2
	2003 – 2005		88625–47011	2
RX 300	1998 – 2003		88625–48010	2
RX 330	2004	CBU	88625–48050	1
	2004 – 2005	CBU	88625–48060	3
		NAP		
SC 300/400	1991 – 2000		88625–32040	2

Inspection Procedure (Continued)

A. Measure the sensor resistance according to the selected graph (specification).

NOTE:

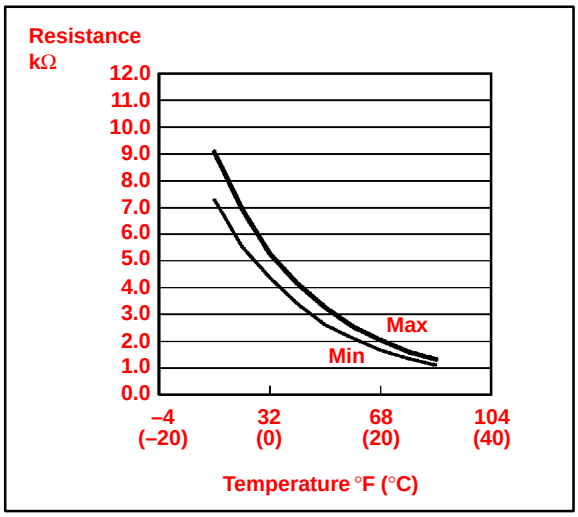
- **Even slightly touching the sensor may change the resistance value. Be sure to hold the connector of the sensor.**
- **When measuring, the sensor temperature must be the same as the ambient temperature.**

HINT:

As the temperature increases, the resistance decreases.

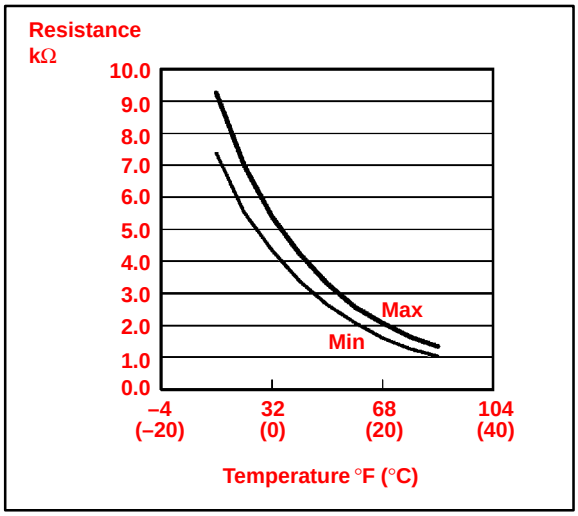
Graph 1:

TEMPERATURE °F (°C)	SPECIFICATION kΩ
14 (–10)	7.30 to 9.10
23 (–5)	5.65 to 6.95
32 (0)	4.40 to 5.35
41 (5)	3.40 to 4.15
50 (10)	2.70 to 3.25
59 (15)	2.14 to 2.58
68 (20)	1.71 to 2.05
77 (25)	1.38 to 1.64
86 (30)	1.11 to 1.32



Graph 2:

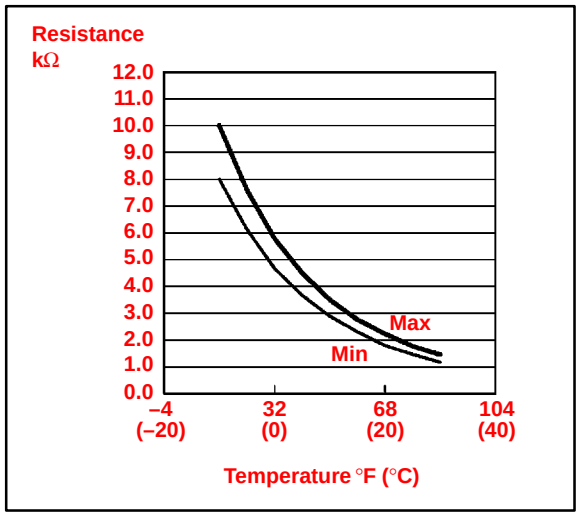
TEMPERATURE °F (°C)	SPECIFICATION kΩ
14 (–10)	7.40 to 9.20
23 (–5)	5.65 to 7.00
32 (0)	4.35 to 5.40
41 (5)	3.40 to 4.20
50 (10)	2.68 to 3.30
59 (15)	2.10 to 2.60
68 (20)	1.66 to 2.10
77 (25)	1.32 to 1.66
86 (30)	1.05 to 1.35



Inspection Procedure (Continued)

Graph 3:

TEMPERATURE °F (°C)	SPECIFICATION kΩ
14 (–10)	8.00 to 10.00
23 (–5)	6.15 to 7.65
32 (0)	4.75 to 5.85
41 (5)	3.70 to 4.55
50 (10)	2.91 to 3.55
59 (15)	2.32 to 2.80
68 (20)	1.85 to 2.22
77 (25)	1.48 to 1.77
86 (30)	1.20 to 1.43



Inspection Procedure (Continued)

5. Inspect Solar Sensor.

Four types of solar sensors are used on Lexus vehicles depending on the vehicle specifications. The inspection procedure for each type of sensor differs from the others. Select the appropriate inspection procedure from the table below according to vehicle specifications and perform the inspection.

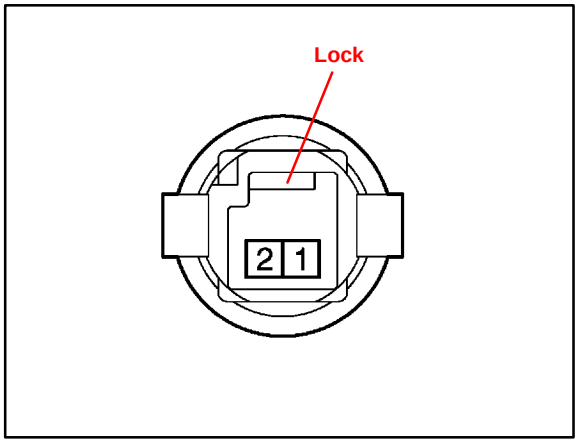
EQUIPPED WITH AUTOMATIC LIGHT CONTROL SYSTEM	A/C SYSTEM WITH RIGHT/LEFT INDEPENDENT TEMPERATURE CONTROL	INSPECTION PROCEDURE
No	No	A
No	Yes	B
Yes	Yes	C
Yes	No	D

Procedure A:

a. Disconnect the solar sensor connector.

b. Measure the resistance between terminals 1 and 2 of the solar sensor under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



NOTE:

- **Terminal 1 of the sensor is always on the right, when the lock is facing up.**
- **When using an analog tester, connect the positive (+) lead to terminal 2 and negative (–) lead to terminal 1 of the solar sensor.**

HINT:

If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.

Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Infinite ohms
When the sensor is exposed to light	Less than infinite resistance

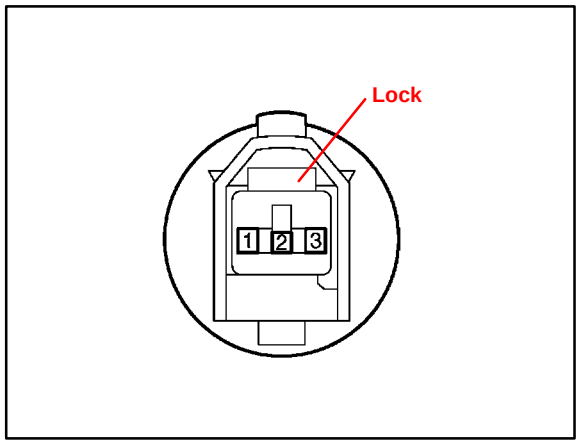
Inspection Procedure (Continued)

Procedure B:

a. Disconnect the solar sensor connector.

b. Measure the resistance between terminals 2 and 3 of the solar sensor under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



NOTE:

When using an analog tester, connect the positive (+) lead to terminal 3 and negative (–) lead to terminal 2 of the solar sensor.

HINT:

If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.

Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Infinite ohms
When the sensor is exposed to light	Less than infinite resistance

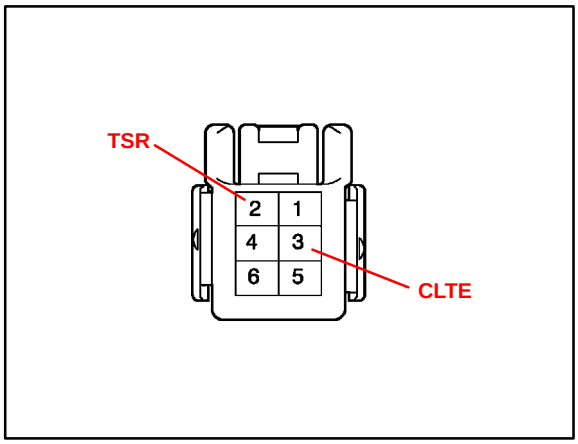
Inspection Procedure (Continued)

Procedure C:

a. Turn the ignition switch ON.

b. Measure the voltage between terminals TSR (+) and CLTE (–) of the connector under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



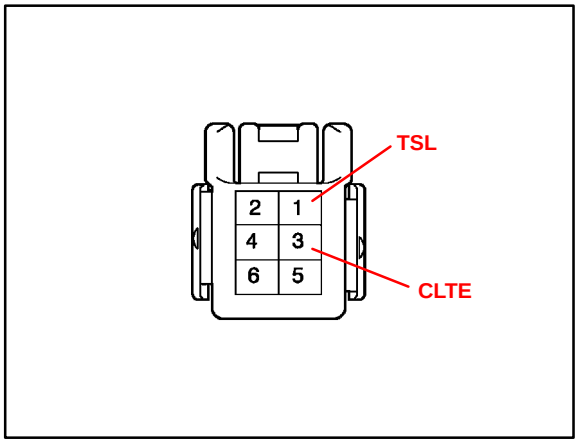
HINT:
- **If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.**
- **Do not disconnect the solar sensor connector.**

Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Below 0.8 V
When the sensor is exposed to light	4.3 +/– 0.3 V

c. Measure the voltage between terminals TSL (+) and CLTE (–) of the connector under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



HINT:
- **If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.**
- **Do not disconnect the solar sensor connector.**

Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Below 0.8 V
When the sensor is exposed to light	4.3 +/– 0.3 V

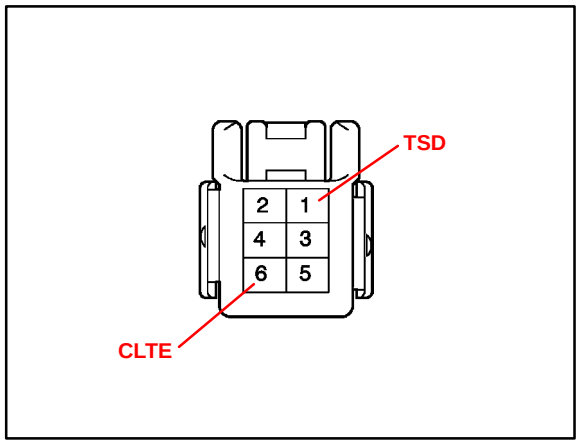
Inspection Procedure (Continued)

Procedure D:

a. Turn the ignition switch ON.

b. Using the tester, measure the voltage between terminals TSD (+) and CLTE (–) of the connector under the following conditions:

- Cover the sensor with a cloth to avoid direct light.
- Expose the sensor to light from a distance of 300 mm (11.81 in.) or less with an inspection light.



HINT:

- **If the light is weak, the sensor may not react. Be sure to use an incandescent light for an inspection light.**
- **Do not disconnect the solar sensor connector.**

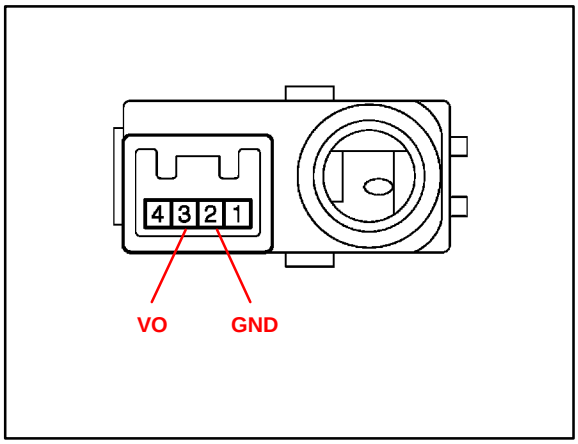
Standard:

CONDITION	SPECIFICATION
When the sensor is covered with a cloth (to avoid direct light)	Below 0.8 V
When the sensor is exposed to light	4.3 +/– 0.3 V

Inspection Procedure (Continued)

6. Inspect Room Humidity Sensor.

Measure the humidity and output voltage of the humidity sensor when the sensor is installed on the vehicle and the temperature at the humidity sensor position (room temperature sensor position) is 77°F (25°C).
If the output voltage is within the specifications according to the graph and table below, the sensor is normal.



HINT:

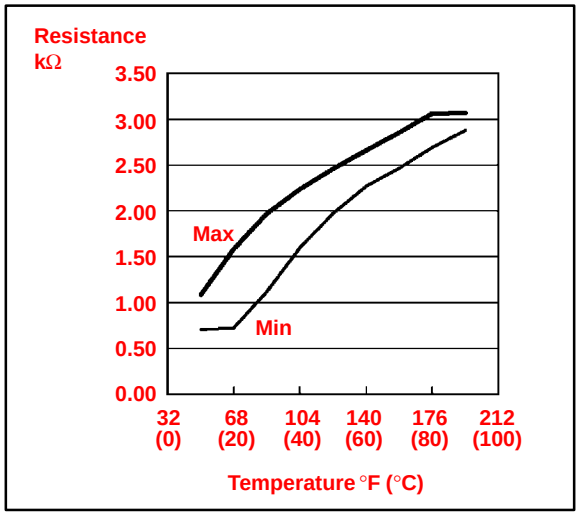
For the inspection procedure of the room temperature sensor, refer to "Room Temperature Sensor Inspection Procedure" in this bulletin.

A. Turn the ignition switch to the ON position.

B. Measure the voltage between terminal VO (3) and GND (2) of the room humidity sensor.

C. Measure the humidity and voltage when the room temperature (humidity sensor position) is 77°F (25°C). According to the result, determine whether the sensor is normal or not.

HUMIDITY (% RH)	OUTPUT VOLTAGE AT 77°F (25°C)
10	0.70 to 1.08 V
20	0.72 to 1.57 V
30	1.13 to 1.95 V
40	1.61 to 2.24 V
50	1.99 to 2.46 V
60	2.26 to 2.66 V
70	2.48 to 2.85 V
80	2.68 to 3.04 V
90	2.87 to 3.05 V



LEXUS

Technical Service Information Bulletin

March 17, 2000

Title:

LEXUS "DINGHY" TOWING GUIDE

Models:

All Models

TSIB

ACCESSORIES

AX001–00

Introduction

The following chart indicates which Lexus vehicles can be Dinghy towed (towed with four wheels on the ground) behind a Motorhome.

CAUTION:

Dinghy towing a vehicle behind a Motorhome requires special towing equipment and accessories. Please see your Motorhome Manufacturer / Service Outlet for recommended towing equipment.

Applicable Vehicles

- **All Models**

YEAR	MODEL	DINGHY TOWABLE		SPEED/DISTANCE LIMITS
		M/T	A/T	
1990–2000	LS 400	Not Towable		–
1992–2000	SC 400/300	Not Towable	Not Towable	–
1993–2000	GS 400/300	Not Towable		–
1992–1998	ES 300	Not Towable		–
1999–2000	ES 300	Yes		55 mph / 200 miles
1999–2000	RX 300 2WD	Yes		55 mph / 200 miles
1999–2000	RX 300 4WD	Yes		55 mph / 200 miles
1996–1997	LX 450	Not Towable		–
1998–2000	LX 470	Not Towable		–

NOTE:

After "Dinghy" Towing, or at the recommended distance limits, let the Engine idle for more than 3 minutes before operating the vehicle or resuming towing.

NOTE:

Vehicles that are Dinghy towable will not sustain internal damage to the transmission or transfer components, as long as speed/distance limits are observed. The transmission must be placed in the "neutral" position when Dinghy towing. Dinghy towing these vehicles does not eliminate the possibility of damage to other vehicle systems (Body, Chassis, Electrical Systems, etc.).

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

May 25, 2001

Title:

RETRO-FIT INTERNAL TRUNK RELEASE KITS

Models:

ES 300, GS 400/300, LS 400 & SC 400/300

TSIB

TSIB REVISION NOTICE:

The parts information updated in this TSIB is red and underlined.

Introduction

In order to respond to requests of our valued customers, we are offering Retro–Fit Internal Trunk Release Kits. These kits allow the trunk to be opened from the inside in case of entrapment.

Applicable Vehicles

MODEL	MODEL CODE	MODEL YEAR	# CLAMPS
ES 300	VCV10, MCV10	1992 – 1996	4
	MCV20	1997 – 2000	4
GS 300	JZS147	1994 – 1997	4
GS 400/300	UZS160, JZS160	1998 – 2000	4
LS 400	UCF10	1993 – 1994	4
	UCF20	1995 – 2000	4
SC 400/300	UZZ30, JZZ31	1992 – 2000	4

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
–	64640–33030	Trunk Release
–	90464–00551	Clamp
–	MDC 00237–LUTRI–01	Installation Instructions

Installation Procedure

Order the appropriate trunk release, at least as many clamps as listed above, and a set of installation instructions. Follow the installation procedure detailed in the installation instructions. Installation time is 0.7 hours.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Technical Service Information Bulletin
March 19, 1999

Title:
LEXUS "DINGHY" TOWING GUIDE

Models:
All Models

TSIB

Introduction

The following chart indicates which Lexus vehicles can be Dinghy towed (towed with four wheels on the ground) behind a Motorhome.

CAUTION:
Dinghy towing a vehicle behind a Motorhome requires special towing equipment and accessories. Please see your Motorhome Manufacturer / Service Outlet for recommended towing equipment.

Affected Vehicles

- **All Models**

YEAR	MODEL	DINGHY TOWABLE		SPEED/DISTANCE LIMITS
		M/T	A/T	
1990 – 1999	LS 400	Not Towable		–
1992 – 1999	SC 300	Not Towable		–
1992 – 1999	SC 400	Not Towable		–
1993 – 1999	GS 300	Not Towable		–
1992 – 1998	ES 300	Not Towable		–
1999	ES 300	N/A	Yes	55 mph / 200 miles
1996 – 1997	LX 450	Not Towable		–
1998 – 1999	LX 470	Not Towable		–
1999	RX 300 2WD	N/A	Yes	55 mph / 200 miles
1999	RX 300 4WD	N/A	Yes	55 mph / 200 miles

NOTE:
After "Dinghy" Towing, let the Engine idle for more than 3 minutes.

NOTE:
Vehicles that are Dinghy towable will not sustain internal damage to the transmission or transfer components. The transmission must be placed in the "neutral" position when Dinghy towing. Dinghy towing these vehicles does not eliminate the possibility of damage to other vehicle systems (Body, Chassis, Electrical Systems, etc.).

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

April 24, 1998

Title:

SEAT BELT EXTENDERS

Models:

All '94 through '98 models, and '99 RX 300

TSIB

BODY

BO001–98

TSB Update Notice:

The information contained in this TSB updates BO007–97 dated October 24, 1997.

Introduction

Lexus customers who find it necessary to increase the length of their seat belts may obtain Seat Belt Extenders at **no cost** through their local Lexus dealer.

- The extender is available in 6 inch, 9 inch, 12 inch, 15 inch and 18 inch lengths.
- The extender is available **only in black.**
- Owners are informed of the seat belt extender availability through the Lexus Owner's Manual included in each vehicle.

The customer *(individual requiring the extender)* must visit a Lexus dealership to have the required measurements made and to complete the seat belt extender worksheet. The worksheet will allow the proper fitting and selection of a seat belt extender for the customer. The dealership personnel should then determine the applicable part number and place a ***Critical Order*** through the ***TDN Parts Network.***

The dealership service department should complete the affixed Seat Belt Extender Label and review the "owner instruction sheet" with the customer. The dealership should give a copy of the completed worksheet to the customer and keep the original in the customer's file.

To assure utmost owner satisfaction, it is recommended that a dealership designate one person to coordinate all activities related to the seat belt extender issue.

From past sales history, it is recommended that dealerships **do not stock** Seat belt extenders due to low demand and the need for customer fitting.

This bulletin contains the following information:

Procedure and Flow Chart ..... Page 2
Application Chart and Notes.....Page 3
Part Number Information .....Page 3
Owner Instructions .....Page 4
Seat Belt Extender Worksheet .....Page 5

Affected Vehicles

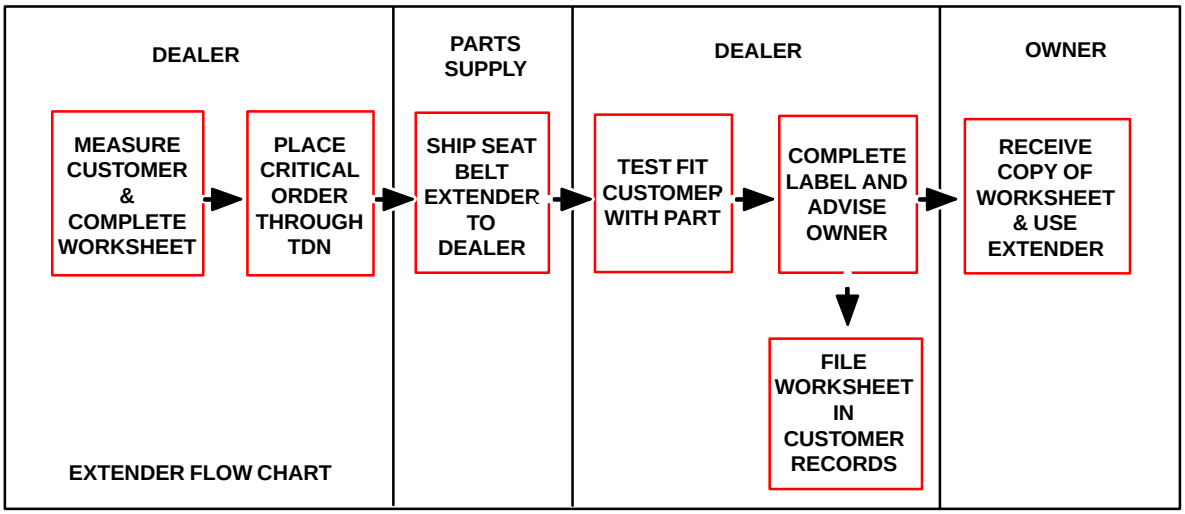
- All **Lexus** models, **1994** through **1998** model years, and **1999 RX 300**.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not applicable to warranty	–	–	–	–

Procedure

1. Owner requests a seat belt extender from dealer.
2. Dealer verifies the need for a seat belt extender and obtains a current copy of this TSB and copies the worksheet.
3. Dealer measures the customer and completes the worksheet. Dealer determines the correct part number and places a Critical Order for the part through the TDN Parts Network.
4. Dealer receives seat belt extender and calls the customer in to check fit of the part.
5. If the seat belt extender fit is good, dealership personnel completes the customer information label on the part, explains usage of the part, and gives the customer a copy of the completed worksheet.
6. Dealer places a copy of the completed worksheet in the customer's records.



Sample Seat Belt Extender Label

CAUTION

THIS SEAT BELT EXTENDER IS TO BE USED ONLY BY: _____

ON VEHICLE: _____

VIN: _____

SEATING POSITION: _____ Driver _____ Passenger _____ Front _____ Rear

USE BY OTHERS, OR IN ANOTHER SEATING POSITION, OR IN ANOTHER VEHICLE COULD REDUCE SEAT BELT RESTRAINT IN AN ACCIDENT AND RESULT IN PERSONAL INJURY.

Front Seat Belt Extender Applications

FRONT SEAT – EXTENDER APPLICATION					
MODEL	**'98**	**'97**	**'96**	**'95**	**'94**
LS 400	R–3	R–3	R–3	R–3	R–3
GS 400	R–5	N/A	N/A	N/A	N/A
GS 300		N–3	N–3	N–3	N–3
SC 400/300	R–3	R–3	R–3	R–3	R–3
ES 300	R–5	R–5	K–4	K–4	K–4
LX 450	N/A	R–3	R–3	N/A	N/A
LX 470	K–5	N/A	N/A	N/A	N/A
RX 300 ('99 MY)	R–5	N/A	N/A	N/A	N/A

Rear Seat Belt Extender Applications

REAR SEAT – EXTENDER APPLICATION					
MODEL	**'98**	**'97**	**'96**	**'95**	**'94**
LS 400	R–3	R–3	R–3	R–3	R–3
GS 400	K–5	N/A	N/A	N/A	N/A
GS 300		K–4	K–4	K–4	K–4
SC 400/300	R–3	R–3	R–3	R–3	R–3
ES 300 (Right & Left)	R–5	R–5	R–3	R–3	R–3
ES 300 (Center)	R–3	R–3*	N/A	N/A	N/A
LX 450	N/A	K–4**	K–4**	N/A	N/A
LX 470	K–5	N/A	N/A	N/A	N/A
RX 300 ('99 MY)	R–5	N/A	N/A	N/A	N/A

NOTICE:

*** The extender must NOT be used for the center rear seat belt (except on '97 and '98 model ES 300s as noted in the chart).**

**** Includes third seat application.**

Parts Information

PART NUMBER PREFIX: 73399–					
SERIES	**LENGTH**				
	6 INCH	**9 INCH**	**12 INCH**	**15 INCH**	**18 INCH**
K–4	–33010	–33020	–33030	–33040	–33050
K–5	–35010	–35020	–35030	–35040	–35050
N–3	–20011	–20021	–20031	–20041	–20051
R–3	–50010	–50020	–50030	–50040	–50050
R–5	–16060	–16070	–16080	–16090	–16100

Owner Instructions

Failure to follow the recommendations indicated below could result in less effectiveness of the seat belt restraint system in case of vehicle collision, causing personal injury.

The seat belt extender must not be used:

a. By anyone other than for whom it was provided (name recorded on seat belt extender).

b. In any vehicle and/or seat position other than the one for which it was provided.

c. When the seat belt extender is provided for rear seat positions (with automatic locking retractor), make sure the retractor is locked when in use.

If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Lexus dealer free of charge.

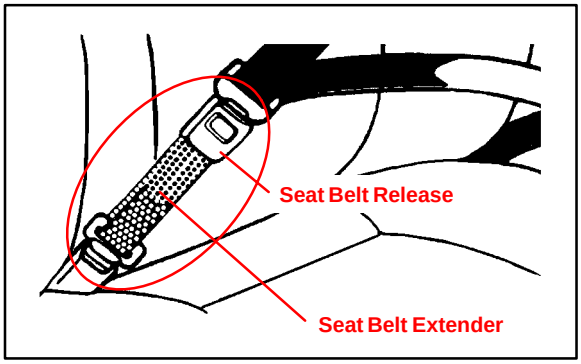
Please contact your local Lexus dealer so that the dealer can order the proper required length for the extender. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Lexus dealer.

CAUTION:

When using the seat belt extender, observe the following. Failure to follow these instructions could result in reduced effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

- **Never use the seat belt extender if you can COMFORTABLY fasten the seat belt without it.**
- **Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person or at a different seating position than the one originally intended for.**

To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the “PRESS” signs on the buckle–release buttons of the extender and the seat belt are both facing outward as shown.



You will hear a click when the tab locks into the buckle.

When releasing the seat belt, press on the buckle–release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

When not in use, remove the extender and store in the vehicle for future use.

SEAT BELT EXTENDER WORKSHEET

PLEASE COPY THIS ORIGINAL WORKSHEET FOR EACH EXTENDER NEEDED

CAUTIONS:

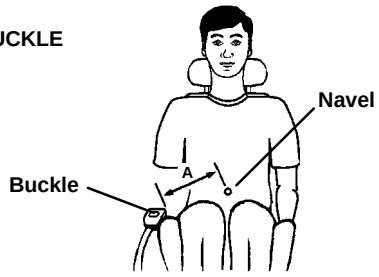
- **To minimize the chance and/or severity of injury in an accident, the seat belt extender must only be used:**
  1. **By the person for whom it was provided**
  2. **In the seat position for which it was provided**
- **The seat belt extender must never be used with any child safety seats.**
- **When the seat belt extender is provided for rear seat positions (with automatic locking retractor), make sure the retractor is locked when extender belt is in use.**

DEALER		SEAT BELT EXTENDER APPLICATION		APPLICANT		
DEALER CODE	DEALER NAME			APPLICANT NAME		
ADDRESS				ADDRESS		
CITY & STATE		ZIP		CITY & STATE	ZIP	PHONE
EMPLOYEE NAME	MODEL YEAR	BODY TYPE		SEATING POSITION	VEHICLE IDENTIFICATION NUMBER	

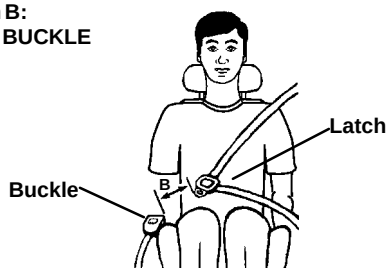
DIRECTIONS FOR DETERMINING PROPER EXTENDER LENGTH

1. **Place the seat in the position the applicant normally uses**
2. **With applicant in the seat, wearing thickest coat expected to be worn, pull belt all the way out and try to buckle belt**
   - **If the belt latches into buckle and feels comfortable against upper chest area, an extender is not needed.**
   - **If belt does not buckle continue with step 3**
   - **If buckle latches but belt has no slack remaining, continue with step 3**
3. **Measure distance between applicant's navel and seat belt buckle (dimension A) and enter on worksheet**
4. **With belt all the way out, measure distance between latch tip and buckle tip (dimension B) and enter on worksheet**
   NOTE: If belt latches but there is no slack enter zero as dimension B
5. **Subtract dimension B from dimension A and record number in check number box on worksheet**
6. **Seat belt extender length is dimension B rounded up to next extender length (without exceeding check number)**
   NOTE: If extender length exceeds check number, an extender can not be provided to the customer

Dimension A:
NAVEL TO BUCKLE



Dimension B:
LATCH TO BUCKLE



SEAT BELT EXTENDER CALCULATION		
DIMENSION A:	DIMENSION B:	CHECK NUMBER:

SEAT BELT EXTENDER AUTHORIZATION

- ***The same seat belt extender can be used for right and left seating applications.*** **Each seat belt extender will have a label identifying the owner, VIN and seating position. Seat belt extenders are available only in black.**
- **Applicant's Signature:** _____ **Date:** _____
  (Actual user of seat belt extender)

LEXUS

Technical Service Information Bulletin

June 9, 2000

Title:

SHOULDER BELT ANCHOR TAPE SET

Models:

'97 – '00 ES 300 & '99 – '00 RX 300

TSIB

Introduction

To improve the appearance of the shoulder belt anchor, the following procedure has been developed.

Applicable Vehicles

- **1999 – 2000** model year **ES 300**
- **1999 – 2000** model year **RX 300**

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
N/A	73205–48010	Tape Set, Shoulder Belt Anchor	1

NOTE: The above tape set contains the fluorocarbon resin tape (2 pieces) and wire (diameter 0.3–0.5 mm).

Warranty Information

OPCODE	MODEL	DESCRIPTION	TIME	OPN	T1	T2
BD0013	ES 300	Clean the RH & LH Shoulder Belt Anchor	0.3	73220–331**–**	61	99
BD0013	RX 300		0.3	73220–480**–**		

Applicable Warranty*:

This repair is covered under the Lexus Basic Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

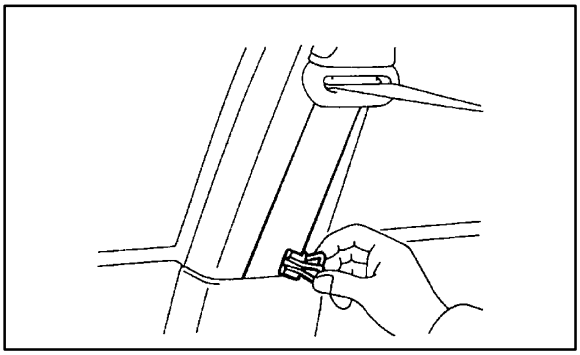
* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Installation Procedure

1. Clean the shoulder belt anchor.
   A. Pull out the seat belt about 300 mm and attach a clip as shown in the illustration.

HINT:

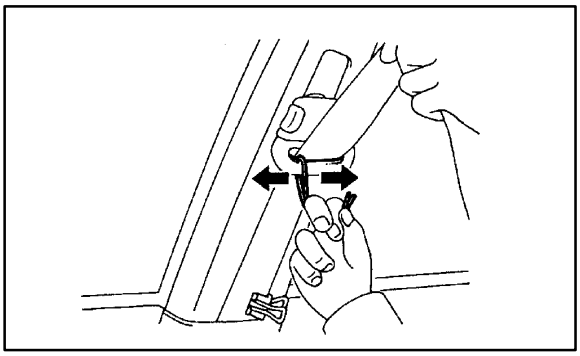
Preventing the seat belt from retraction with a clip will make the following work easier.



Installation Procedure (Continued)

B. Put the wire (from the kit) through the hole of the shoulder belt anchor.

C. Pull both ends of the wire with your hand. Shave off the dirt on the shoulder belt anchor by moving the wire several times as shown in the illustration.



CAUTION:

Wrap the wire ends around a pencil or other common item to prevent the wire from hurting your hand.

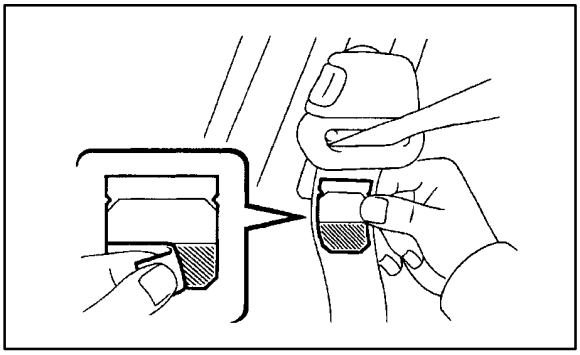
NOTE:

Remove the dirt completely. Otherwise, the fluorocarbon resin tape may not adhere properly.

2. Install the fluorocarbon resin tape.

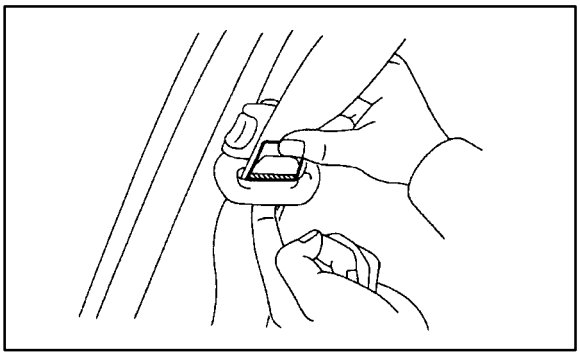
A. Remove the smaller clear film backing from the fluorocarbon resin tape.

B. Place the fluorocarbon resin tape with its adhesive side away from the seat belt as shown in the illustration.



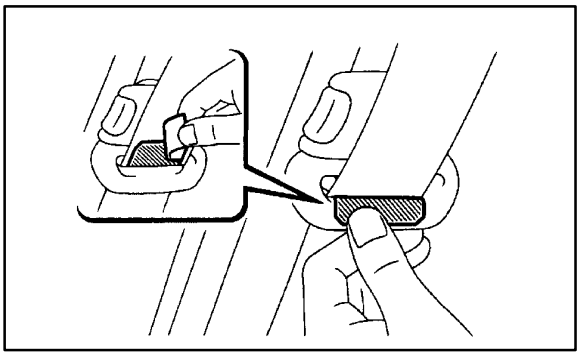
C. While pulling up on the seat belt, pull the fluorocarbon resin tape through the hole of the shoulder belt anchor. Match the center of the tape with the top of the shoulder belt anchor.

D. Secure the lower half of the fluorocarbon resin tape to the back side of the shoulder belt anchor.



Installation Procedure (Continued)

E. Remove the remaining half of the clear film from the fluorocarbon resin tape and secure the tape on the outside of the shoulder belt anchor.

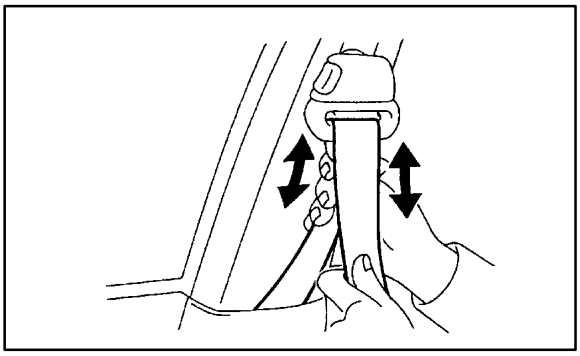


NOTE:

- **Be sure to secure the fluorocarbon resin tape along all edges.**
- **Pay attention not to make any wrinkle or slack in the fluorocarbon resin tape.**
- **Do not reuse removed fluorocarbon resin tape.**

F. Remove the clip from the seat belt.

G. By pulling the seat belt up and down several times as shown in the illustration, securely affix the fluorocarbon resin tape.



3. Affix the fluorocarbon resin tape on the shoulder belt anchor on the other side following the same procedure.

NOTE:

If the seat belt requires cleaning to remove dirt, only use a neutral detergent or lukewarm water to clean. Use the seat belt only after it is completely dried.

LEXUS

Technical Service Information Bulletin

July 3, 1998

Title:

1999 LEXUS SEAT BELT EXTENDERS

Models:

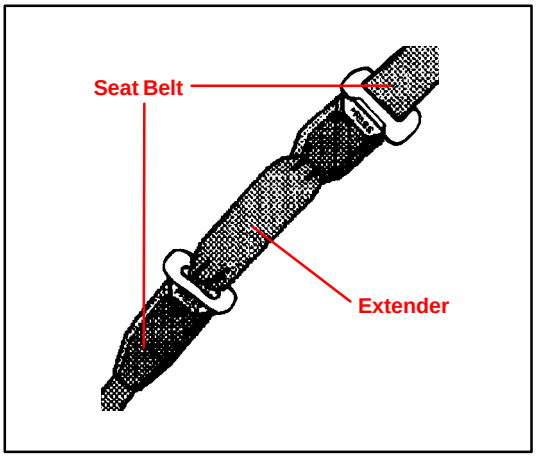
All '95 through '99 models

TSIB

Introduction

Lexus customers who find it necessary to increase the length of their seat belts may obtain Seat Belt Extenders at **no cost** through their local Lexus dealer.

- The extender is available in 6 inch, 9 inch, 12 inch, 15 inch and 18 inch lengths.
- The extender is available **only in black**.
- Owners are informed of the seat belt extender availability through the Lexus Owner's Manual included in each vehicle.



The customer *(individual requiring the extender)* must visit a Lexus dealership to have the required measurements made and to complete the seat belt extender worksheet. The worksheet will allow the proper fitting and selection of a seat belt extender for the customer. The dealership personnel should then determine the applicable part number and place a ***Critical Order*** through the ***TDN Parts Network.***

The dealership service department should complete the affixed Seat Belt Extender Label and review the "owner instruction sheet" with the customer. The dealership should give a copy of the completed worksheet to the customer and keep the original in the customer's file.

To assure utmost owner satisfaction, it is recommended that a dealership designate one person to coordinate all activities related to the seat belt extender issue.

From past sales history, it is recommended that dealerships **do not stock** Seat belt extenders due to low demand and the need for customer fitting.

This bulletin contains the following information:

Procedure and Flow Chart ..... Page 2
Application Chart and Notes..... Page 3
Part Number Information ..... Page 3
Owner Instructions ..... Page 4
Seat Belt Extender Worksheet ..... Page 5

Affected Vehicles

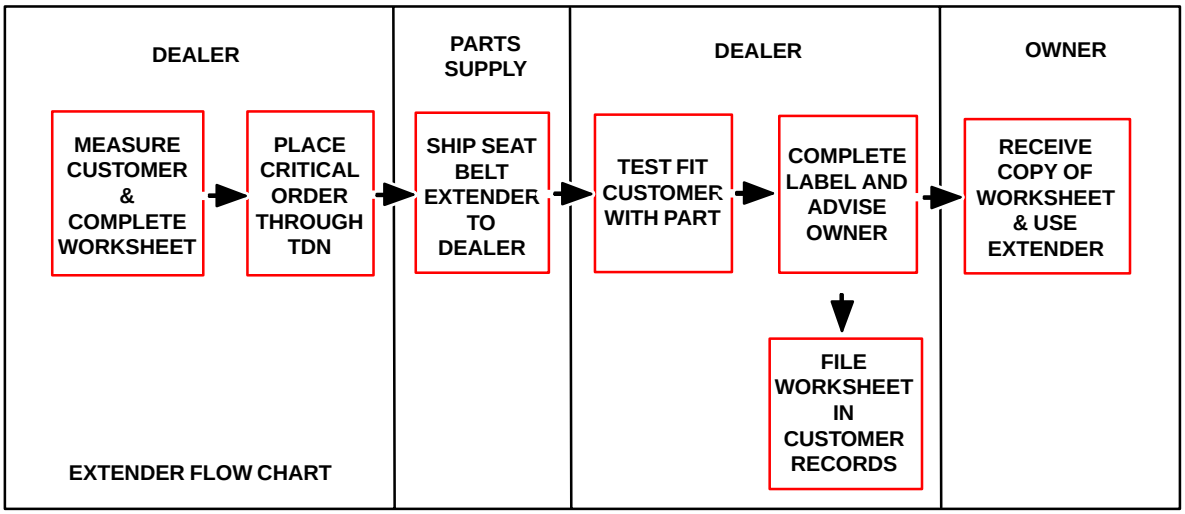
- All **1995** through **1999** model year **Lexus** vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Procedure

1. Owner requests a seat belt extender from dealer.
2. Dealer verifies the need for a seat belt extender and obtains a current copy of this TSB and copies the worksheet.
3. Dealer measures the customer and completes the worksheet. Dealer determines the correct part number and places a Critical Order for the part through the TDN Parts Network.
4. Dealer receives seat belt extender and calls the customer in to check fit of the part.
5. If the seat belt extender fit is good, dealership personnel completes the customer information label on the part, explains usage of the part, and gives the customer a copy of the completed worksheet.
6. Dealer places a copy of the completed worksheet in the customer's records.



Sample Seat Belt Extender Label

CAUTION

THIS SEAT BELT EXTENDER IS TO BE USED ONLY BY: _____

ON VEHICLE: _____

VIN: _____

SEATING POSITION: _____ Driver _____ Passenger _____ Front _____ Rear

USE BY OTHERS, OR IN ANOTHER SEATING POSITION, OR IN ANOTHER VEHICLE COULD REDUCE SEAT BELT RESTRAINT IN AN ACCIDENT AND RESULT IN PERSONAL INJURY.

Front Seat Belt Extender Applications

FRONT SEAT – EXTENDER APPLICATION					
MODEL	**'99**	**'98**	**'97**	**'96**	**'95**
LS 400	R–3	R–3	R–3	R–3	R–3
GS 400/300	R–5	R–5	N–3	N–3	N–3
SC 400/300	R–3	R–3	R–3	R–3	R–3
ES 300	R–5	R–5	R–5	K–4	K–4
LX 470/450	K–5	K–5	R–3	R–3	N/A
RX 300	R–5	N/A	N/A	N/A	N/A

Rear Seat Belt Extender Applications

REAR SEAT – EXTENDER APPLICATION					
MODEL	**'99**	**'98**	**'97**	**'96**	**'95**
LS 400	R–3	R–3	R–3	R–3	R–3
GS 400/300	K–5	K–5	K–4	K–4	K–4
SC 400/300	R–3	R–3	R–3	R–3	R–3
ES 300 (Right & Left)	R–5	R–5	R–5	R–3	R–3
ES 300 (Center)	R–3	R–3	R–3*	N/A	N/A
LX 470/450	K–5	K–5	K–4**	K–4**	N/A
RX 300	R–5	N/A	N/A	N/A	N/A

NOTICE:

*** The extender must NOT be used for the center rear seat belt (except on 1997 through 1999 model ES 300s as noted in the chart).**

**** Includes third seat application.**

Parts Information

PART NUMBER PREFIX: 73399–					
SERIES	**LENGTH**				
	6 INCH	**9 INCH**	**12 INCH**	**15 INCH**	**18 INCH**
K–4	–33010	–33020	–33030	–33040	–33050
K–5	–35010	–35020	–35030	–35040	–35050
N–3	–20011	–20021	–20031	–20041	–20051
R–3	–50010	–50020	–50030	–50040	–50050
R–5	–16060	–16070	–16080	–16090	–16100

Owner Instructions

Failure to follow the recommendations indicated below could result in less effectiveness of the seat belt restraint system in case of vehicle collision, causing personal injury.

The seat belt extender must not be used:

a. By anyone other than for whom it was provided (name recorded on seat belt extender).

b. In any vehicle and/or seat position other than the one for which it was provided.

c. When the seat belt extender is provided for rear seat positions (with automatic locking retractor), make sure the retractor is locked when in use.

If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Lexus dealer free of charge.

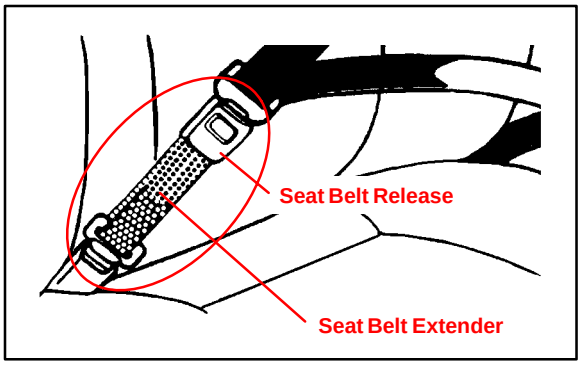
Please contact your local Lexus dealer so that the dealer can order the proper required length for the extender. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Lexus dealer.

CAUTION:

When using the seat belt extender, observe the following. Failure to follow these instructions could result in reduced effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

- **Never use the seat belt extender if you can COMFORTABLY fasten the seat belt without it.**
- **Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person or at a different seating position than the one originally intended for.**
- **The seat belt extender must never be used with any child safety seats.**

To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the "PRESS" signs on the buckle–release buttons of the extender and the seat belt are both facing outward as shown.



You will hear a click when the tab locks into the buckle.

When releasing the seat belt, press on the buckle–release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

When not in use, remove the extender and store in the vehicle for future use.

SEAT BELT EXTENDER WORKSHEET

PLEASE COPY THIS ORIGINAL WORKSHEET FOR EACH EXTENDER NEEDED

CAUTIONS:

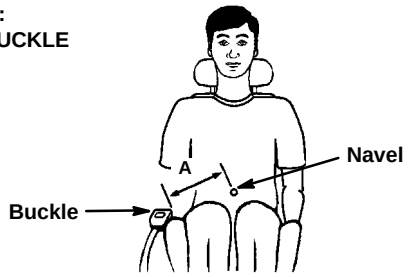
- **To minimize the chance and/or severity of injury in an accident, the seat belt extender must only be used:**
  1 By the person for whom it was provided
  2 In the seat position for which it was provided
- **The seat belt extender must never be used with any child safety seats.**
- **When the seat belt extender is provided for rear seat positions (with automatic locking retractor), make sure the retractor is locked when extender belt is in use.**

DEALER		SEAT BELT EXTENDER APPLICATION		APPLICANT		
DEALER CODE	DEALER NAME			APPLICANT NAME		
ADDRESS				ADDRESS		
CITY & STATE		ZIP		CITY & STATE	ZIP	PHONE
EMPLOYEE NAME	MODEL YEAR	BODY TYPE		SEATING POSITION	VEHICLE IDENTIFICATION NUMBER	

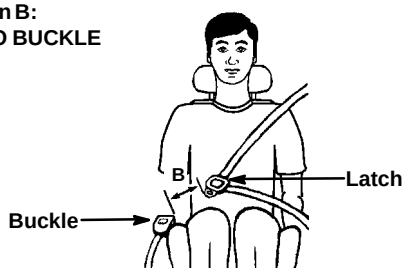
DIRECTIONS FOR DETERMINING PROPER EXTENDER LENGTH

1. **Place the seat in the position the applicant normally uses**
2. **With applicant in the seat, wearing thickest coat expected to be worn, pull belt all the way out and try to buckle belt**
   - **If the belt latches into buckle and feels comfortable against upper chest area, an extender is not needed.**
   - **If belt does not buckle continue with step 3**
   - **If buckle latches but belt has no slack remaining, continue with step 3**
3. **Measure distance between applicant's navel and seat belt buckle (dimension A) and enter on worksheet**
4. **With belt all the way out, measure distance between latch tip and buckle tip (dimension B) and enter on worksheet**
   NOTE: If belt latches but there is no slack enter zero as dimension B
5. **Subtract dimension B from dimension A and record number in check number box on worksheet**
6. **Seat belt extender length is dimension B rounded up to next extender length (without exceeding check number)**
   NOTE: If extender length exceeds check number, an extender can not be provided to the customer

Dimension A:
NAVEL TO BUCKLE



Dimension B:
LATCH TO BUCKLE



SEAT BELT EXTENDER CALCULATION		
DIMENSION A:	DIMENSION B:	CHECK NUMBER:

SEAT BELT EXTENDER AUTHORIZATION

- ***The same seat belt extender can be used for right and left seating applications.*** **Each seat belt extender will have a label identifying the owner, VIN and seating position. Seat belt extenders are available only in black.**
- **Applicant's Signature:** _____ **Date:** _____
  (Actual user of seat belt extender)

LEXUS

Technical Service Information Bulletin

July 29, 2002

Title:

CHILD RESTRAINT SEAT TOP STRAP BRACKET INSTALLATION

Models:

'90 – '00 All Models

TSIB

BODY

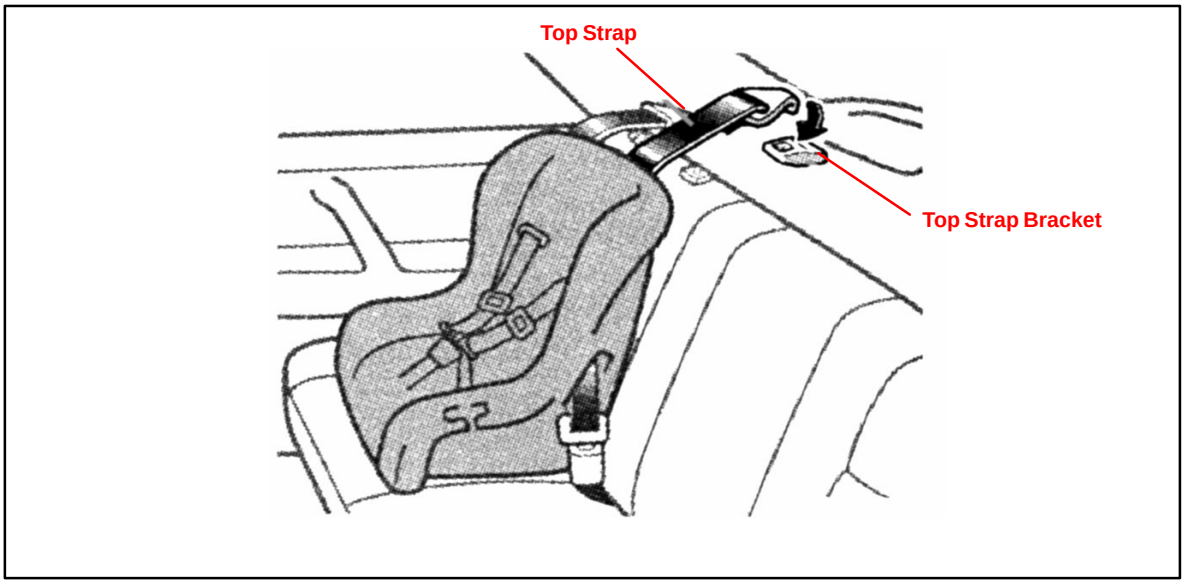
BO004-02

Introduction

Child restraint seat top strap bracket installation procedures are provided to supplement the Owner's Manual. Beginning with 2001 models, the top strap brackets are factory installed.

NOTE:

- **The child restraint seat top strap assembly is not available as a service part. Contact the child restraint seat manufacturer for recommended top strap information, top strap to child restraint seat installation instructions, and top strap retailers.**
- **The top strap brackets can only be installed on vehicles that have nuts welded in place by the factory. The locations of these nuts can be found in the Owner's Manual (for most 1990 and newer models). Lexus does not recommend modifying vehicles that do not have nuts welded in place by the factory. All LX 450 and LX 470 vehicles, prior to 2001 model year, may not have these nuts welded in by the factory.**



Applicable Vehicles

- **1990 – 2000** model year vehicles, **all models.**

Parts Information

PART NUMBER	PART NAME
73709–12010	Bracket Sub–Assembly (Bracket, Bolt, 10 mm Spacer, and Washers)
04731–22012	CRS Kit (two Bolts [15 mm, 30 mm], three Spacers [5 mm, 10 mm, 15 mm], and Locking Clip)

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Installation Procedure

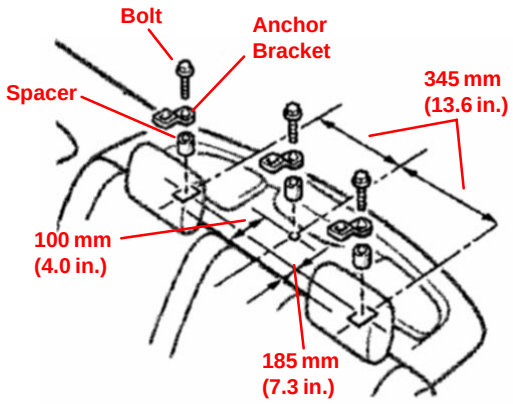
Child Restraint Seat Top Strap Bracket Installation

Obtain the exact year and vehicle model Lexus Owner's Manual before beginning installation.

1. Confirm with the customer which seat location(s) they will be installing the child restraint seat. The Owner's Manual seat section provides an illustration showing available top strap bracket location(s). The illustration page in the Owner's Manual is provided on page 4 of this bulletin.

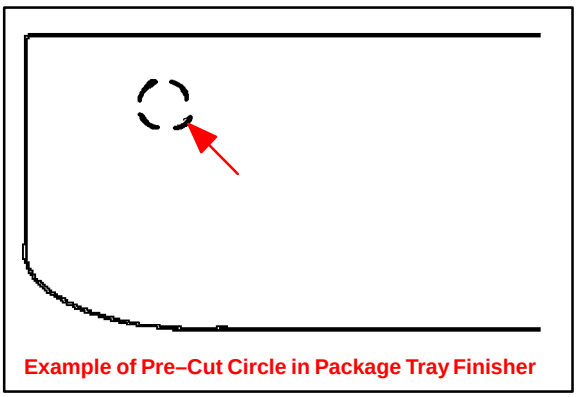
NOTE:

Determine which kit parts are needed for each specific child seat location, by referring to page 4 of this bulletin.



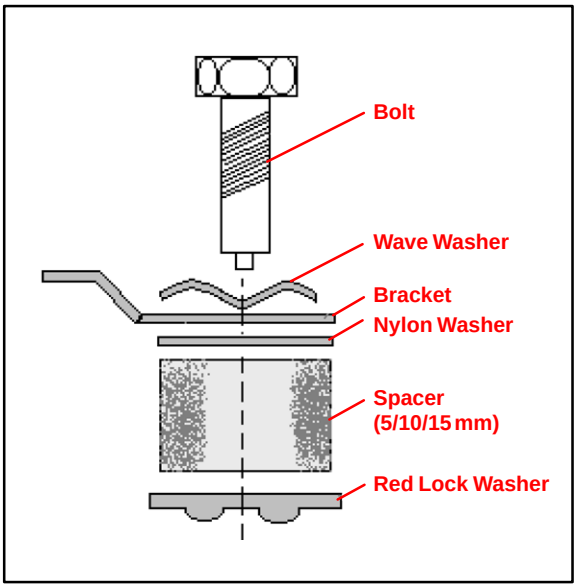
Example of 1999 ES 300 Showing Three (3) Available Bracket Locations

2. Remove a 20 mm diameter area of the carpet or trim material above the bracket mounting location. In some vehicles, a 20 mm circle is already pre–cut into the interior trim material. Once the interior trim material is removed, the nuts welded in by the factory should be visible.



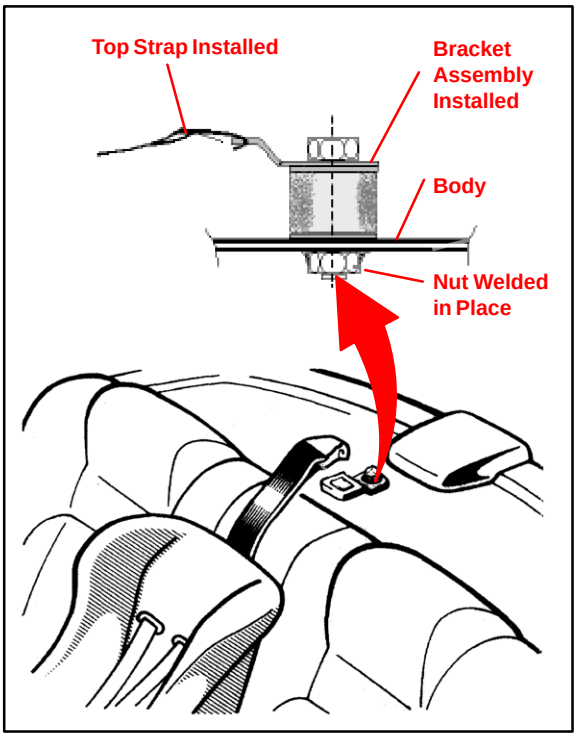
Example of Pre–Cut Circle in Package Tray Finisher

3. If a 5 mm or 15 mm spacer is specified, remove the red lock washer from the Bracket Sub–Assembly (P/N 73709–12010) and remove the 10 mm spacer. Assure the red lock washer is re–installed onto the bolt. If a 5 mm spacer is needed, use the 15 mm bolt from the CRS Kit (P/N 04731–22012).



Installation Procedure (Continued)

4. Install the bracket assembly, according to the directions in the Owner's Manual. Tighten the bolt to 16.5 – 24.7 N–m, (1.68 – 2.52 kgf–m, 12.2 – 18.2 ft–lbf).
   - Assure the top strap is attached to the child seat, according to the child seat manufacturer's instructions.
   - Assure the child seat is installed in the vehicle according to the Lexus Owner's Manual (seat section).



Installation Reference Information

Owner's Manual Installation Reference Information

Page 4 of this bulletin is a reference chart containing:

- Owner's Manual page(s) that provide the illustration showing available top strap bracket location(s). The information goes back to 1990 model year. 2001 models and newer already had the bracket installed by the factory.
- Installation notes, such as bracket spacer sizes for each specific child seat location.

EXAMPLE:

OWNER'S MANUAL	ES 300
1997	pg 89–90 a

This cell contains information on the 1997 ES300

Refer to this page in the Owner's Manual to find the illustration showing available top strap bracket locations.

Installation Note. In this case, all bracket positions on the 1997 ES 300 will require a 15 mm spacer.

INSTALLATION NOTE	COMMENT
a	Spacer – 15 mm for all anchors
b	Spacer – 10 mm for outer, 15 mm for center
c	Spacer – 15 mm for outer, 10 mm for center
d	Spacer – 5 mm for all anchors
N/A	Top strap anchor bracket mounting not available
Standard	No installation necessary, anchor already installed by factory

Installation Reference Information (Continued)

OWNER'S MANUAL	LS 400	ES 300	ES 250	SC 400	SC 300
2000	pg 117–118 Standard	pg 114–115 Standard		N/A	N/A
1999	pg 112–114 a	pg 105–106 a		N/A	N/A
1998	pg 111–113 a	pg 99–100 a		N/A	N/A
1997	pg 98–100 a	pg 89–90 a		pg 91–92 a	pg 91–92 a
1996	pg 79–82 a	pg 67–68 c		pg 72–73 a	pg 72–73 a
1995	pg 77–80 a	pg 67–68 c		pg 70–71 a	pg 70–71 a
1994	pg 74–75 b	pg 68–69 c		pg 67–68 a	pg 67–68 a
1993	pg 74–75 b	pg 60–61 c		pg 67–68 a	pg 67–68 a
1992	pg 62 b	pg 61–62 c		pg 61–62 a	pg 61–62 a
1991	pg 61–62 b		pg 59–60 a		
1990	pg 61 b		pg 55–56 a		

OWNER'S MANUAL	GS 400	GS 300	LX 470	LX 450	RX 300
2000	pg 112–113 Standard	pg 112–113 Standard	N/A		pg 126–127 d
1999	pg 108–109 a	pg 108–109 a	N/A		pg 123–124 d*
1998	pg 107–108 a	pg 107–108 a	N/A		
1997		pg 97–98 a		N/A	
1996		pg 70–72 a		N/A	
1995		pg 69–70 a			
1994		pg 69–70 a			
1993		pg 69–70 a			
1992					
1991					
1990					

* 1999 RX 300 Owner's Manual OM48403U refer to pages 126–127.

LEXUS

Technical Service Information Bulletin

August 11, 2000

Title:

SEAT HEATER REPLACEMENT PROCEDURE

Models:

'97 – '99 & '00 ES 300

TSB

REVISED

BODY

BO005–00

TSB Revision Notice:

The information updated in this TSB is red and underlined.

Introduction

This is to inform you of the seat heater replacement procedure. A change has been made to allow separate installation of the seat heater element.

Applicable Vehicles

- **1997 – 1999,** and **2000** model year **ES 300** vehicles.

'97–'99 ES 300 Parts Information

CURRENT PART NUMBER	PART NAME	QTY
87510–33090*1 87510–0W091*2	Heater Assembly, Front Seat Cushion, RH	1
	Heater Assembly, Front Seat Cushion, LH	1
87510–33100*1 87510–0W101*2	Heater Assembly, Front Seatback, RH	1
	Heater Assembly, Front Seatback, LH	1
71517–33010	Pad, Front Seat Cushion Cover	2

*1 Made by Natsushita (3–pin type)

*2 Made by Scandmec (2–pin type)

'00 MY ES 300 Parts Information

PART NUMBER	PART NAME	QTY
87510–33110	Heater Assembly, Front Seat Cushion, RH	1
	Heater Assembly, Front Seat Cushion, LH	1
87510–33120	Heater Assembly, Front Seatback, RH	1
	Heater Assembly, Front Seatback, LH	1

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
BD9009	Remove and Replace Seat Heater	2.0	87510–33##0	87	71

Applicable Warranty*:

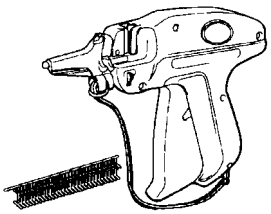
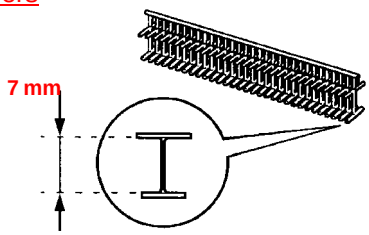
This repair is covered under the Lexus Basic Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Required Tools and Material

- Tacker
- Tacks
- Hog Ring Pliers
- Adhesive Tape

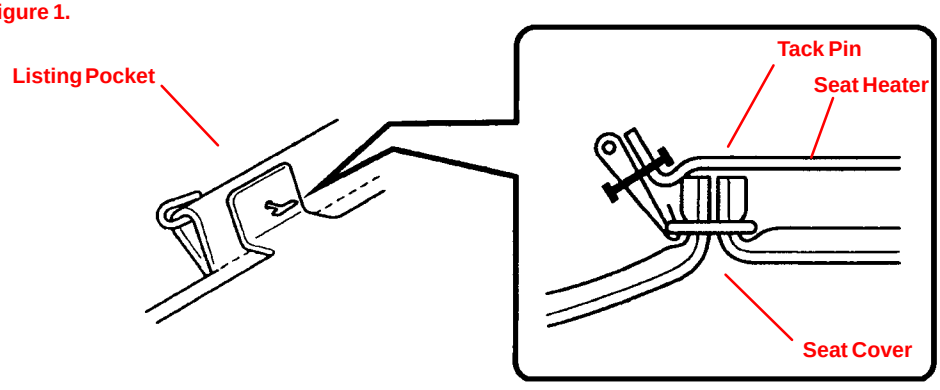
NOTE:
Special Service Tools can be ordered through the Lexus SST program by calling 1–800–933–8335.

ESSENTIAL SPECIAL SERVICE TOOLS			
TOOL NUMBER	**TOOL NAME**	**SUPPLIER**	**QTY**
00002–17750	Seat Heater Attachment Tool 	OTC	1
00002–16500	Fasteners 	OTC	10,000 pieces
00002–01775	Seat Heater Attachment Kit	OTC	1 Set
00002–01780	Seat Heater Tool Replacement Needles	OTC	3

How to use the Tacker:

As shown below, drive in a tack pin with the tacker and fix the seat heater to the seat cover.

Figure 1.



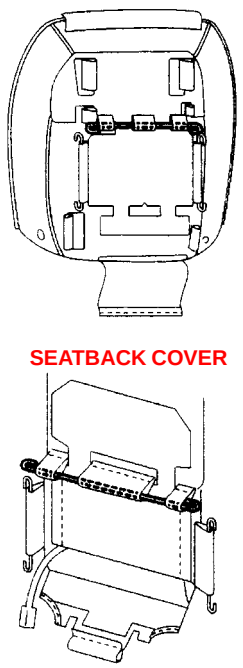
Repair Information

- For the installation/removal of the seat and the disassembly/assembly of the seat cushion assembly, refer to the 2000 model year ES 300 Repair Manual (pages BO–97 through 105).
- Care should be taken during the operation to protect the seat cover from scratches, dirt or accidental cuts.

'97 – '99 ES 300 Repair Procedure

1. **Turn seat cover inside out.**
2. **Remove seat wire.**
   A. Remove the 2 seat wires that are routed from the seat cushion cover and seatback cover. (See Figure 2.)
3. **Remove seat heater.**
   A. Seat cushion cover:
   Cut the 7 tack pins that are fastened to the seat heater, then remove the seat heater.
   B. Seatback cover:
   Cut the 8 tack pins that are fastened to the seat heater, then remove the seat heater.

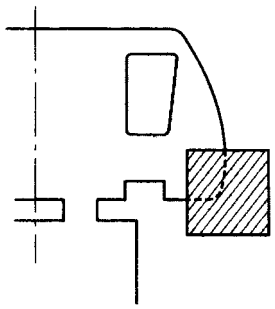
Figure 2.



   C. Using a cutter, cut the piece of felt along the heater's outline as shown in Figure 3.

NOTE:
Do not cause any damage to the seat cushion pad while cutting the felt.

Figure 3.



4. **Seat cushion cover:**
   Install new seat heater.
   Refer to Figure 4 on the following page.
   A. Align the new seat heater by placing the marked side (part number) against the seat cushion cover.

'97 – '99 ES 300 Repair Procedure (Continued)

B. For part A, position the seat heater by aligning the end of the fin with the fold line of the listing pocket.

C. For part B, position the seat heater by aligning the heater's center line with the cover's V slit.

D. Using a tacker, attach the seat heater to the seat cushion cover.

NOTE:

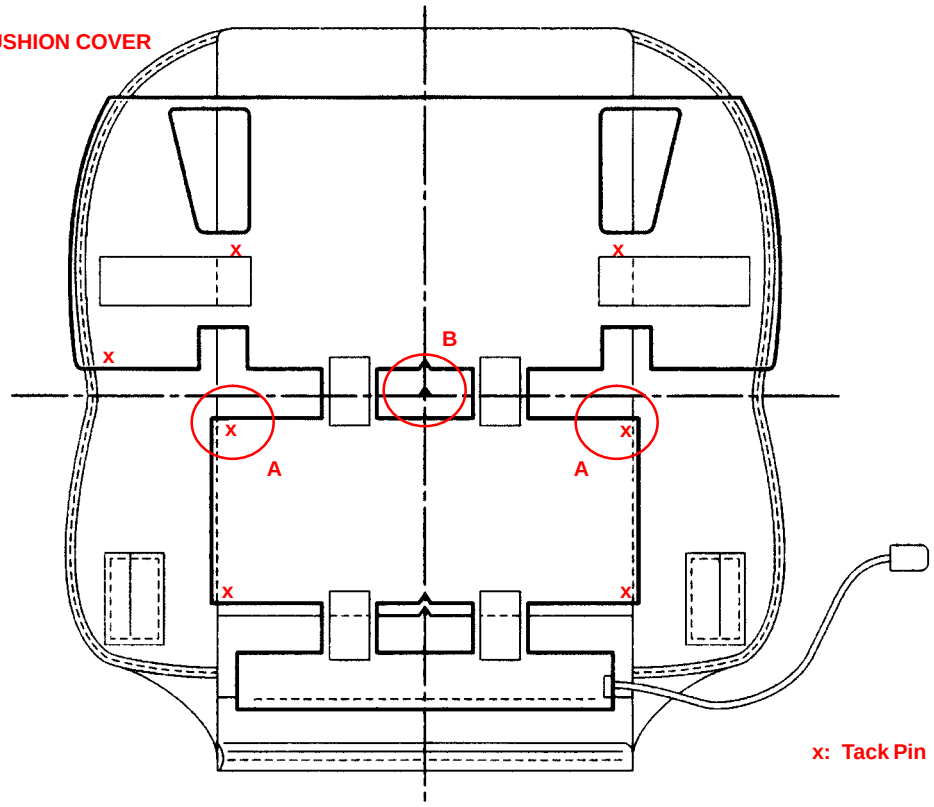
- **Do not substitute other metal parts in place of tack pins.**
- **Insufficient distance between the heater and cover may result in damage to the heater.**

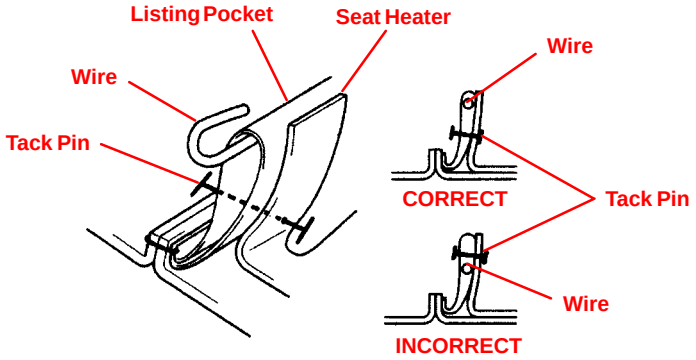
HINT:

- **Attach tack pins on the seam side so that the wire can be passed through the hole from the fold side.**
- **Sewing thread can be substituted for tack pins. However, allow a distance of 6–7 mm (0.24–0.28 in.) between both sewn parts of the heater and cover.**

Figure 4.

SEAT CUSHION COVER





'97 – '99 ES 300 Repair Procedure (Continued)

5. **Seatback cover: Install new seat heater.**

Refer to Figure 5 below.

A. Face the marked side (part number) to the seat cushion pad.

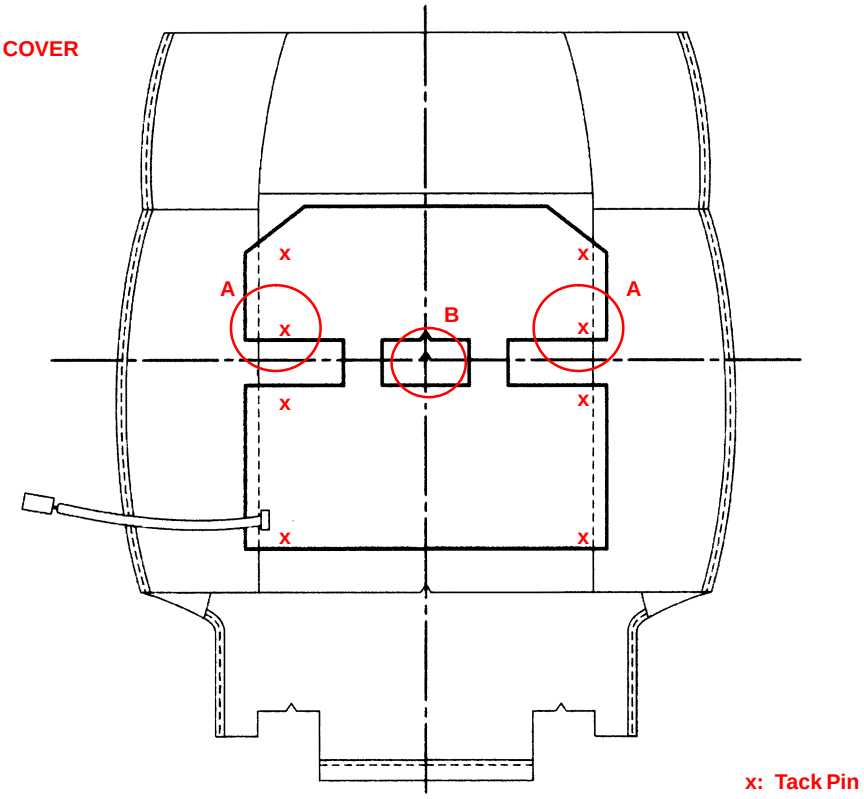
B. For part A, position the seat heater by aligning the end of the fin with the fold line of the listing pocket.

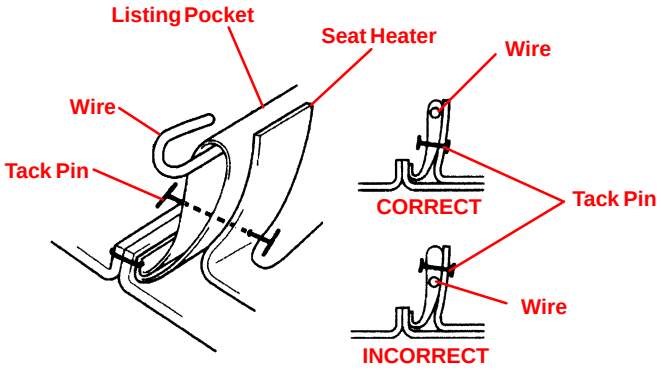
C. For part B, position the seat heater by aligning the heater's center line with the cover's center line.

D. Using a tacker, attach the seat heater to the seatback cover.

NOTE:
- **Do not substitute other metal parts in place of tack pins.**
- **Insufficient distance between the heater and cover may result in damage to the heater.**

Figure 5.
SEATBACK COVER





'97 – '99 ES 300 Repair Procedure (Continued)

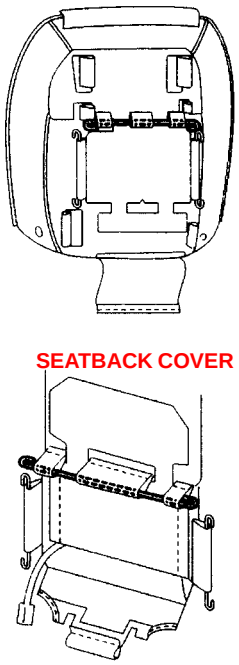
HINT:

- **Attach tack pins on the seam side so that the wire can be threaded through the hole from the fold side.**
- **Sewing thread can be substituted for tack pins. However, allow a distance of 6–7 mm (0.24–0.28 in.) between both sewn parts of the heater and cover.**

6. **Install seat wire.**

   Install the 2 seat wires to the seat cushion cover and seatback cover, as shown in Figure 6.

Figure 6.

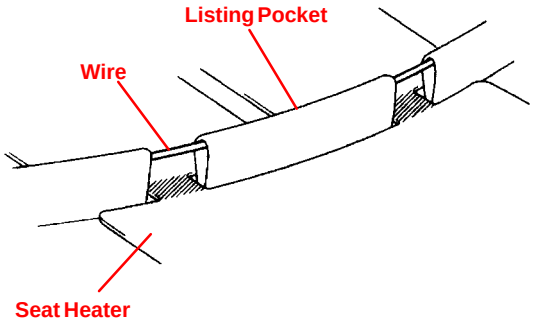


HINT:

Pass the wire over the seat heater as shown in Figure 7.

7. **Reverse seat cover back to its original position.**

Figure 7.



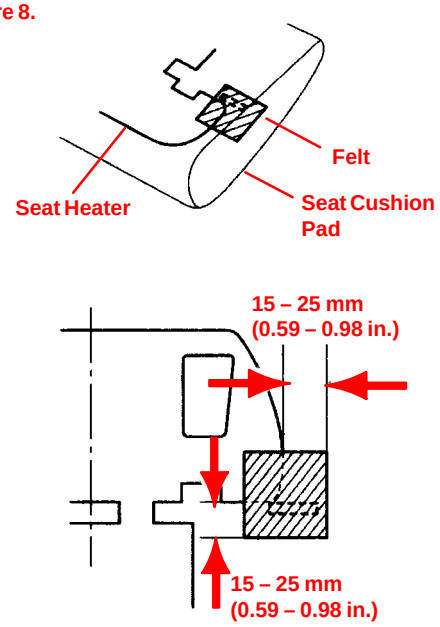
8. **Seat cushion cover: Install seat heater to seat cushion pad.**

   Attach a piece of felt to the seat heater and the pad as illustrated in Figure 8.

9. **Install seat cover.**

   Install the seat covers with new hog rings to the seat cushion pad and the seatback pad.

Figure 8.



'00 MY ES 300 Repair Procedure

Refer to Figure 9 at right.

1. **Turn seat cover inside out.**
2. **Remove seat wire.**

   Remove the seat wires that are passed over the seat heater from the seat cushion cover and the seatback cover.
3. **Remove seat heater.**

   A. Seat cushion cover:
   Cut the 24 tack pins that are fastened to the seat heater, then remove the seat heater.

   B. Seatback cover:
   Cut the 8 tack pins that are fastened to the seat heater, then remove the seat heater.

4. **Seat cushion cover:**
   Install new seat heater.

   Install a new front seat heater as shown in Figure 10 on the following page.

   A. Set the seat heater, marked side (part number) to the seat cushion pad.

   B. For part A, attach the fin of the heater to the cover and fasten them at the margin with a tack pin.

   C. For part B, position the seat heater by aligning the seat heater's center line with the seat cushion cover's V slit.

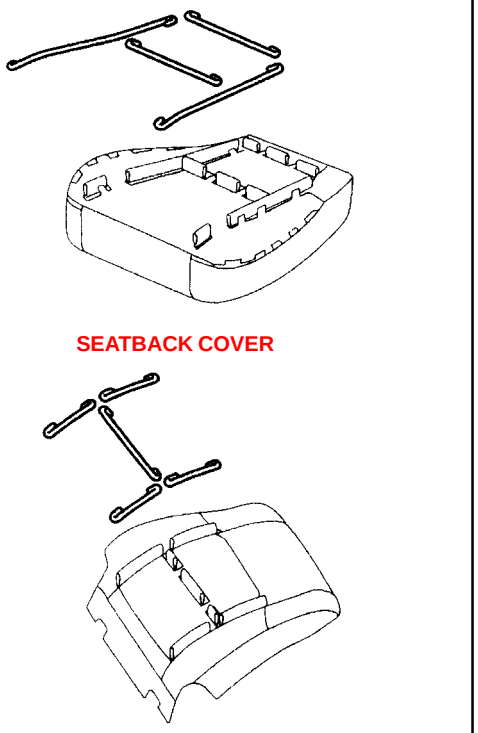
   D. For part C, position the heater by aligning the end of the fin with the fold line of the listing pocket.

   E. Align the V points of 4 and 6 with the seat cover's V cuts and fasten them with tack pins.

   F. Using a tacker, attach tack pins to the side of the seat heater in order from 1 to 12.

NOTE:
- **Do not substitute other metal parts for tack pins.**
- **Insufficient distance between the heater and cover may result in damage to the heater.**

Figure 9.

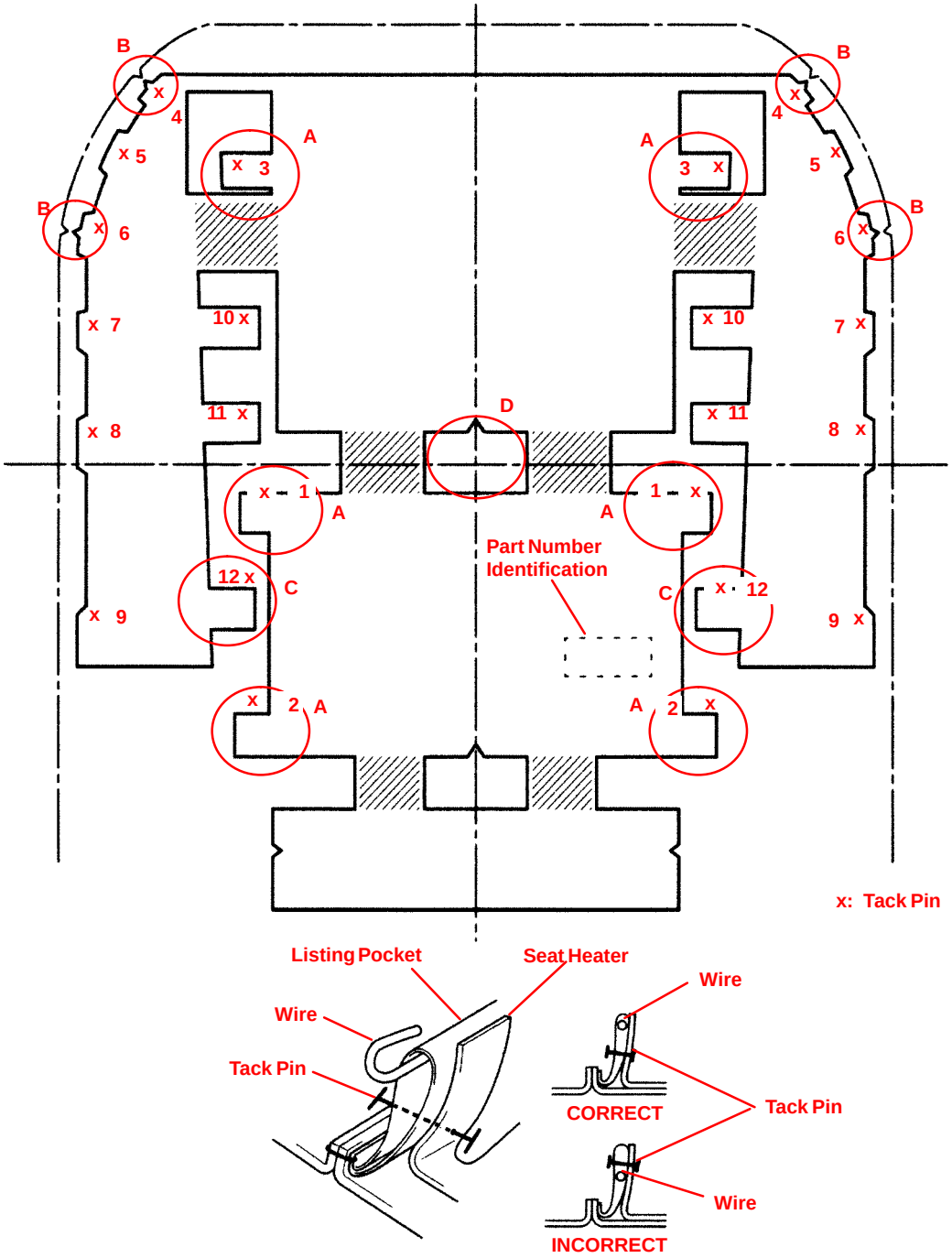


'00 MY ES 300 Repair Procedure (Continued)

HINT:

- **Attach tack pins on the seam side so that the wire can be threaded through the hole from the fold side.**
- **Sewing thread can be substituted for tack pins. However, allow a distance of 6–7 mm (0.24–0.28 in.) between both sewn parts of the heater and cover.**

Figure 10.
SEAT CUSHION COVER



'00 MY ES 300 Repair Procedure (Continued)

5. **Seatback cover: Install new seat heater.**

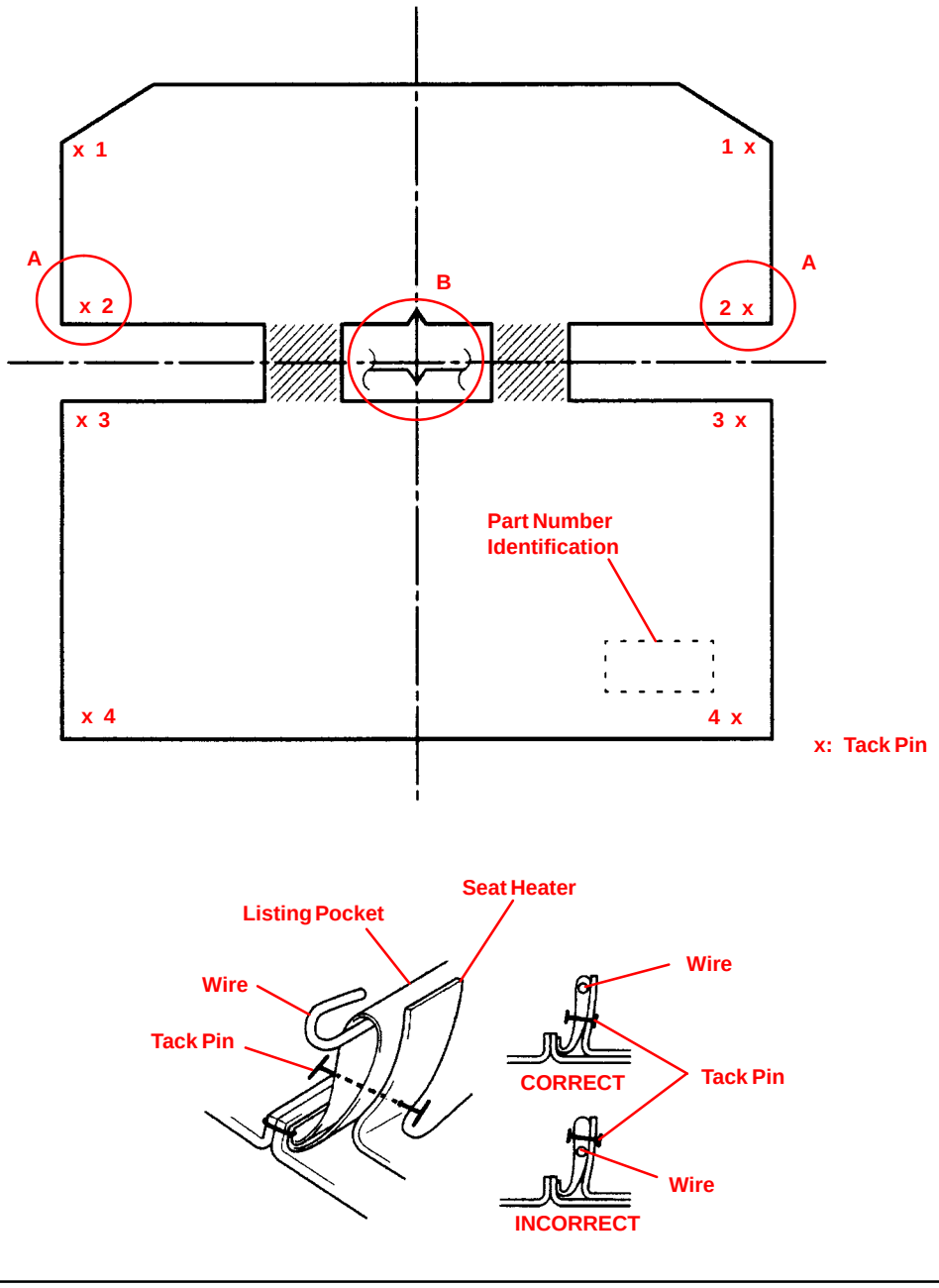
Install a new front seat heater as shown in Figure 11 below.

A. For part A, attach the fin of the seat heater to the cover and fasten them at the margin with a tack pin.

B. For part B, position the seat heater by aligning the seat heater's center line with the seat cushion cover's V slit.

C. Using a tacker, attach tack pins to the side of the seat heater in order from 1 to 4.

Figure 11.
SEATBACK COVER



'00 MY ES 300 Repair Procedure (Continued)

NOTE:

- **Do not substitute other metal parts for tack pins.**
- **Insufficient distance between the heater and cover may result in damage to the heater.**

HINT:

- **Attach tack pins on the seam side so that the wire can be passed through the hole from the fold side.**
- **Sewing thread can be substituted for tack pins. However, allow a distance of 6–7 mm (0.24–0.28 in.) between both sewn parts of the heater and cover.**

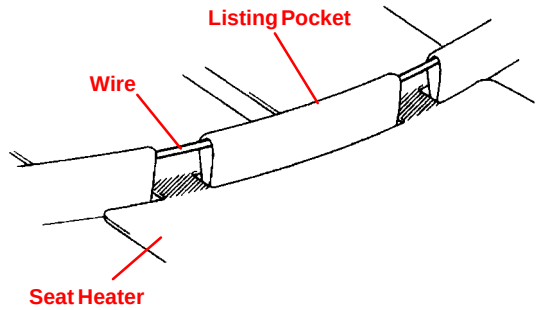
6. **Install seat wires.**

   Install the removed wires to the seat cushion cover and the seatback cover.

HINT:

Pass the wire over the seat heater as shown in Figure 12.

Figure 12.



7. **Reverse seat cover back to its original position.**

LEXUS

Technical Service Information Bulletin

March 23, 2001

Title:

NEW SEAT BELT TONGUE PLATE STOPPER SERVICE PARTS

Models:

All Applicable Models

TSIB

Introduction

A new service part for seat belt tongue plate stoppers has been introduced. Installation procedures are provided to supplement the Repair Manual.

Applicable Vehicles

MODEL	YEAR
LS 400	1990 – 2001
ES 250	1990 – 1991
ES 300	1992 – 2001
SC 400	1992 – 2001
SC 300	1992 – 2001
GS 400	1993 – 2001
GS 300	1993 – 2001
LX 450	1996 – 1998
LX 470	1998 – 2001
RX 300	2000 – 2001

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
N/A	73219–02010	Stopper, Tongue Plate (Black)*
N/A	73219–02020	Stopper, Tongue Plate (Gray)*
N/A	73219–02030	Stopper, Tongue Plate (Beige)*

* Use a stopper color that is closest to the seat belt webbing color.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
BD0046	Install Seat Belt Tongue Plate Stopper	0.1	73219–020#0	62	12

Applicable Warranty*:

This repair is covered under the Lexus Comprehensive Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

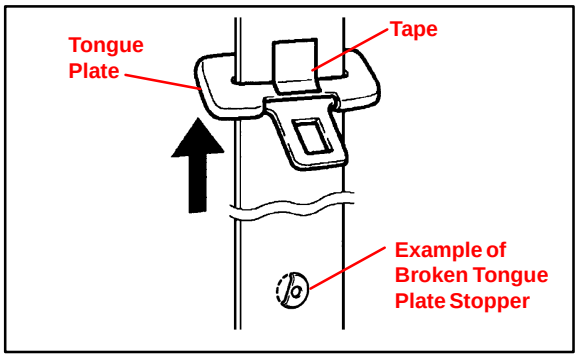
* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Installation Procedure

1. Preparation

A. Shift the Tongue Plate to the upper portion of the Tongue Plate Stopper, and temporarily hold it with a clip or tape.

B. Remove any pieces of the original Tongue Plate Stopper in the webbing with a pair of pliers.



CAUTION:

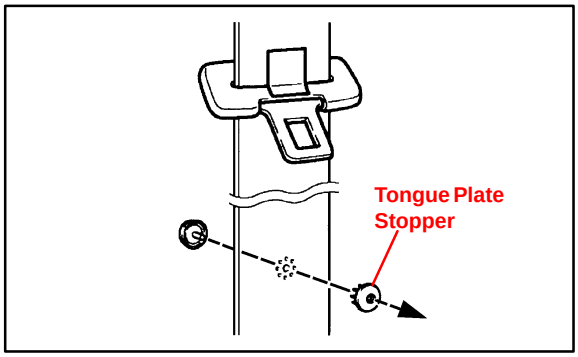
Damaged or weakened seat belts may break in an accident and injure the occupant. The seat belt assembly must be replaced if:

- **The webbing is cut, frayed, worn, or damaged.**
- **It has been used in a severe impact.**

Inspect the entire length of webbing for damage and replace the assembly if needed. Be careful not to damage the webbing during repair.

2. Install the Tongue Plate Stopper

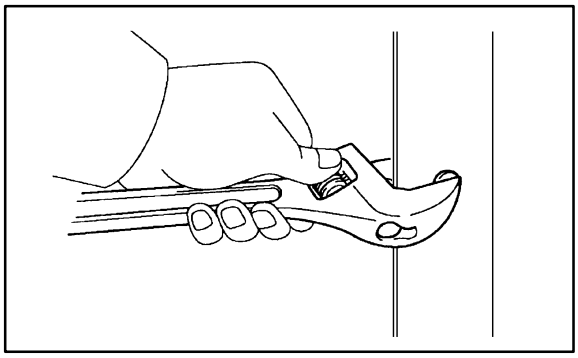
A. Install a new Tongue Plate Stopper in the hole of the webbing.



NOTE:

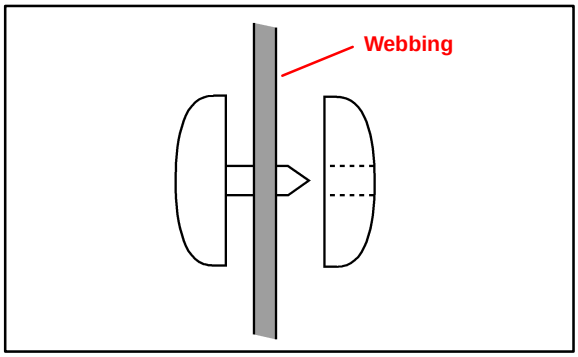
Be aware of the installation direction of the Tongue Plate Stopper as shown in the illustration.

B. Pinch the Tongue Plate Stopper into the webbing using an adjustable wrench, and turn and push the adjustment screw by hand.



HINT:

Press the adjustment screw in order to position the male and female parts of the Tongue Plate Stopper parallel to each other, as shown in illustration.

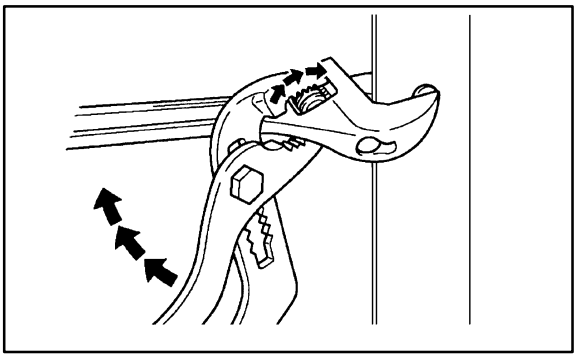


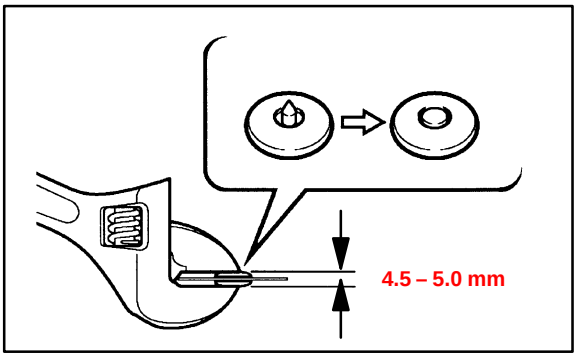
CAUTION:

DO NOT use pliers. They may damage the webbing.

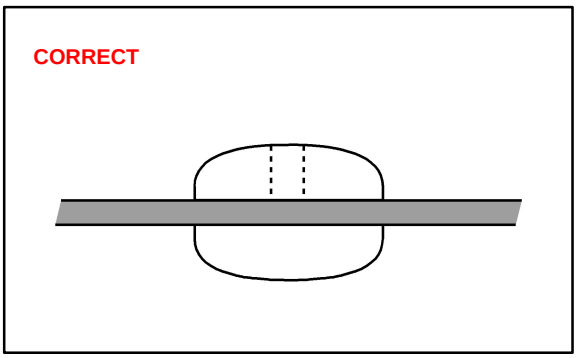
Installation Procedure (Continued)

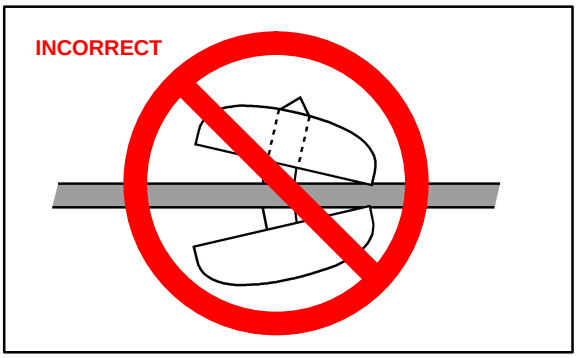
C. When the adjustment screw for the adjustable wrench can't be turned by hand, tighten the adjustment screw using a pair of adjustable joint pliers until the space between jaws of the adjustable wrench is 4.5 – 5.0 mm. (See illustrations.)





D. Check to be sure that the male pin of the Tongue Plate Stopper has become deformed evenly in the hole of the female part and is firmly held to the belt webbing. (See illustrations.)





Technical Service Information Bulletin

September 12, 2003

Title:

TRIM GARNISH LOOSE

Models:

All Models

TSIB

Introduction

Customers may experience an interior trim panel either loose or fitting poorly due to a deformed or missing clip. When a trim garnish (A, B, C or D pillar garnishes, door trim panel, etc.) is removed and reinstalled using the old clips, it may cause the garnish to exhibit a loose condition. To prevent this condition from occurring, ensure that new clips are utilized for all attachment points every time a garnish is reinstalled. When installing new parts, use either the new clips supplied with the part, or order new clips. Refer to the parts catalog for specific part numbers.

Applicable Vehicles

- **All models.**

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

August 10, 2001

Title:

SHOULDER BELT ANCHOR TAPE SET

Models:

All Applicable ES 300, IS 300, LX 450, LX 470 & RX 300

TSIB

Introduction

To assist customers in preventing particle buildup and preserve the appearance of the shoulder belt anchor, the following procedure has been developed.

Applicable Vehicles

- **1997 – 2001** model year **ES 300** vehicles.
- **2000 – 2001** model year **IS 300** vehicles.
- **1996 – 1997** model year **LX 450** vehicles.
- **1998 – 2001** model year **LX 470** vehicles.
- **1999 – 2001** model year **RX 300** vehicles.

Parts Information

CURRENT PART NUMBER	PART NAME
73205–48011	Tape Set, Shoulder Belt Anchor

NOTE:

The above tape set contains the fluorocarbon resin tape (2 pieces) and Velcro tape (1 piece).

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
BD1011	Clean the Shoulder Belt Anchor	0.3	73210–#####–##*1 73220–#####–##*1	61	99

*1 OPN should be part number of whichever belt assembly that the procedure is performed on.

Applicable Warranty*:

This repair is covered under the Lexus Comprehensive Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in-service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

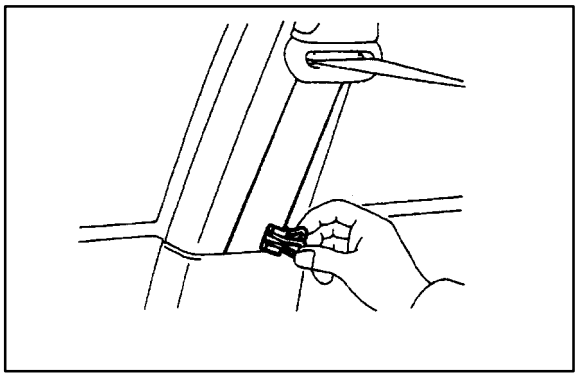
Installation Procedure

1. CLEAN SHOULDER BELT ANCHOR

NOTE:

- **Do not install the tape when the vehicle temperature is below the freezing point.**
- **Do not re–use removed fluorocarbon resin tape.**

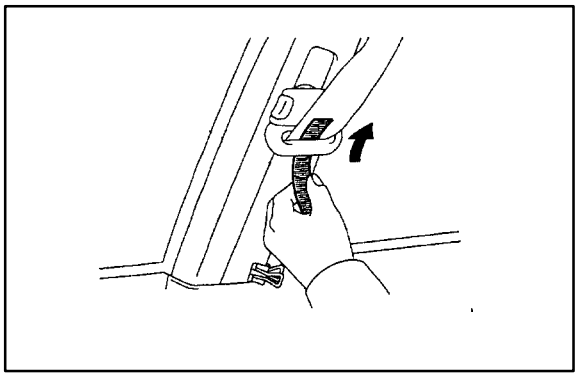
A. Pull out the seat belt about 300 mm and attach a clip as shown in the illustration.



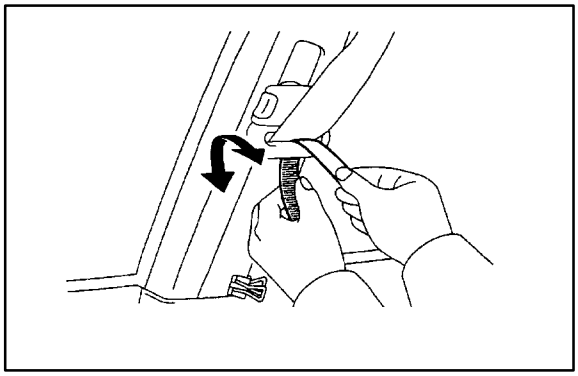
HINT:

Preventing the seat belt from retraction with a clip will make the following work easier.

B. Put the Velcro tape (in the parts kit) through the hole of the shoulder belt anchor, brush–shaped side to the anchor.



C. Pull both ends of the Velcro tape with your hand and shave off the dirt on the shoulder belt anchor by moving the Velcro tape several times as shown in the illustration.



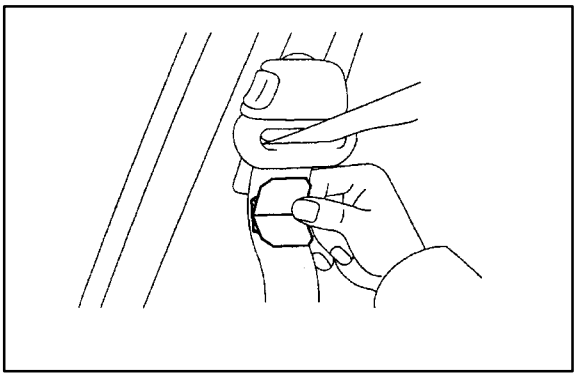
NOTE:

Remove the dirt completely. Otherwise, the fluorocarbon resin tape may not adhere properly.

Installation Procedure (Continued)

2. INSTALL FLUOROCARBON RESIN TAPE

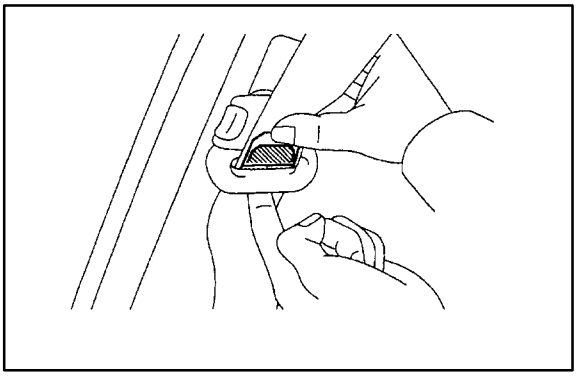
A. Place the fluorocarbon resin tape onto the seat belt as shown in the illustration.



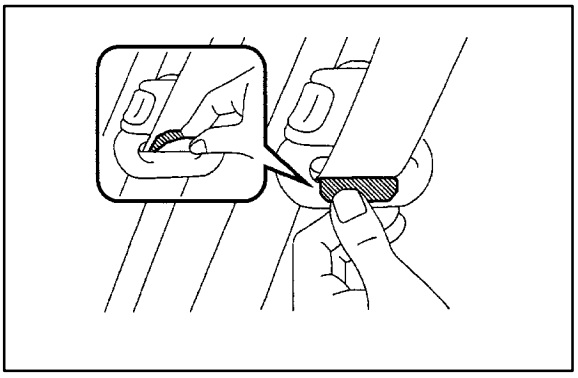
NOTE:

Before installation of the fluorocarbon resin tape, it is necessary to pre–release the colored film about 5 mm for each side. (Not fully released.)

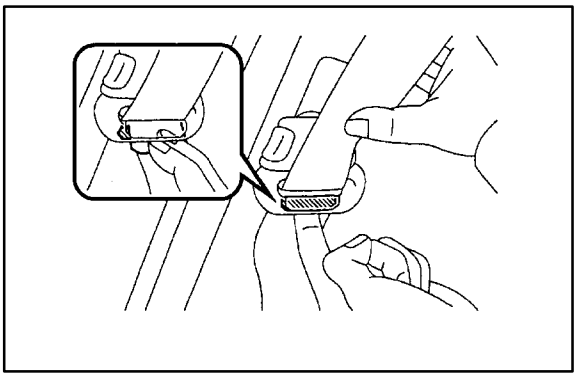
B. By pulling up the seat belt, put the fluorocarbon resin tape through the hole of the shoulder belt anchor. Match the shoulder belt anchor to the center of the tape.



C. Remove the upper side colored film from the fluorocarbon resin tape, and securely affix the tape to the outside of the shoulder belt anchor.



D. Remove the lower side colored film from the fluorocarbon resin tape, and securely affix the tape to the outside of the shoulder belt anchor.



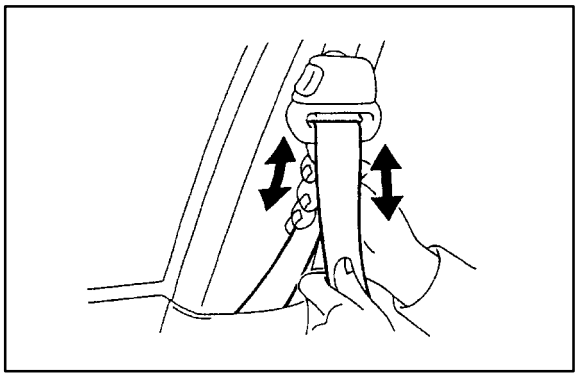
NOTE:

- **Be sure to affix the fluorocarbon tape securely along all edges.**
- **Pay attention not to make any wrinkles or slack in the fluorocarbon resin tape.**

E. Remove the clip.

Installation Procedure (Continued)

F. By pulling the seat belt up and down several times, as shown in the illustration, securely affix the fluorocarbon resin tape and confirm the smoothness of the belt movement.



NOTE:

Affix the fluorocarbon resin tape on the shoulder belt anchor to the other side following the same procedure.

NOTE:

If the seat belt requires cleaning to remove dirt, only use a neutral detergent or lukewarm water to clean. Use the seat belt after it is completely dried, to confirm proper operation.

Technical Service Information Bulletin
November 10, 2005

Title:

SEAT COVER REPLACEMENT FOR SIDE AIRBAG EQUIPPED VEHICLES

Models:

'97 – '06 All Lexus Models

TSIB UPDATE NOTICE:

The information contained in this TSIB supercedes TSIB No. BO004-98. TSIB No. BO004-98 is now obsolete and should be discarded.

Introduction

Beginning in 1997, Lexus introduced side airbags for the LS 400. Starting with 1998, all Lexus vehicles are equipped with side airbags as standard equipment.

Lexus does **NOT** recommend replacement of original seat covers* with non-Lexus leather or other seat cover materials due to the following:

- Seat covers NOT recommended by Lexus may affect side airbag performance, in general or in part, during an accident.
- Modifications that negatively affect side airbag performance can result in severe occupant injuries.
- Seat covers are an integral part of this safety system. Replacing original seat covers* with non-Lexus leather or other seat cover materials may compromise the effectiveness of this safety system.
- The design of the seat is complex, integrating safety and strength with comfort and luxury.

***NOTE:**

Lexus original seat covers that were NOT designed for side airbag equipped seats cannot be used due to the effect on proper airbag performance.

Lexus strongly discourages modifying original equipment seats that have side airbags.

Additionally, Lexus strongly advises against the installation or use of aftermarket seat covers, which could impair the performance of the side airbags in the event of an accident.

Applicable Vehicles

- All **1997 – 2006** model year **Lexus** vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

January 2, 1998

TSIB

Title:

ABS & TRAC ACTUATOR RESISTANCE VALUE CORRECTIONS

Models:

'97 & '98 ES 300

Introduction

Corrections have been made to the resistance value inside of the ABS & TRAC actuator on the pages of the following Repair Manuals

PUBLICATION NUMBER	PUBLICATION NAME	AFFECTED PAGES
RM511U	'97 ES 300 Repair Manual	DI–280, DI–283
RM577U	'98 ES 300 Repair Manual	DI–316, DI–319

Affected Vehicles

- **1997 & 1998 ES 300s.**

Warranty Information

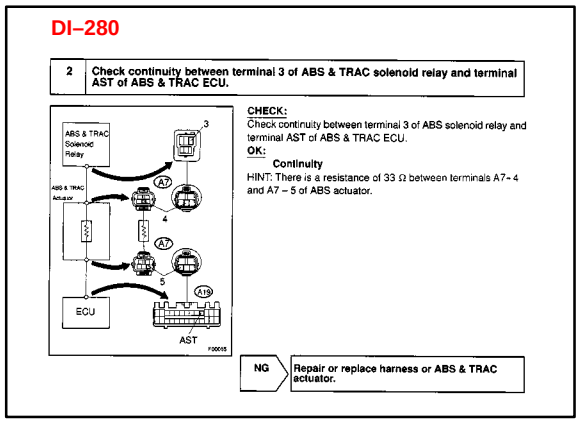
OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not applicable to warranty	–	–	–	–

Correction Information

'97 ES 300 Repair Manual RM511U, Page DI–280

Under INSPECTION PROCEDURE, Item #2 (Diagnostics – ABS & Traction Control System) the resistance value has been corrected to 33 Ohms when measuring between terminals A7–4 and A7–5 of the ABS and TRAC Actuator.

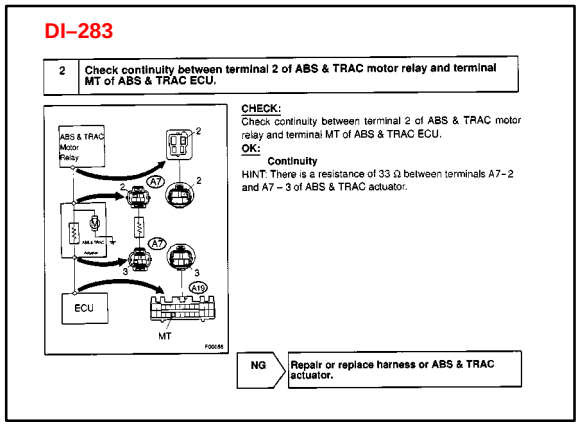
The previous resistance value was 4 – 6 Ohms.



'97 ES 300 Repair Manual RM511U, Page DI–283

Under INSPECTION PROCEDURE, Item #2 (Diagnostics – ABS & Traction Control System) the resistance value has been corrected to 33 Ohms when measuring between terminals A7–2 and A7–3 of the ABS and TRAC Actuator.

The previous resistance value was 4 – 6 Ohms.

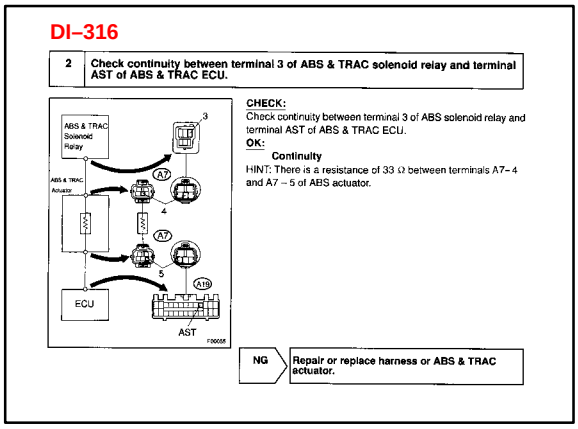


Correction Information (Continued)

’98 ES 300 Repair Manual RM577U, Page DI–316

Under INSPECTION PROCEDURE, Item #2 (Diagnostics – ABS & Traction Control System) the resistance value has been corrected to 33 Ohms when measuring between terminals A7–4 and A7–5 of the ABS and TRAC Actuator.

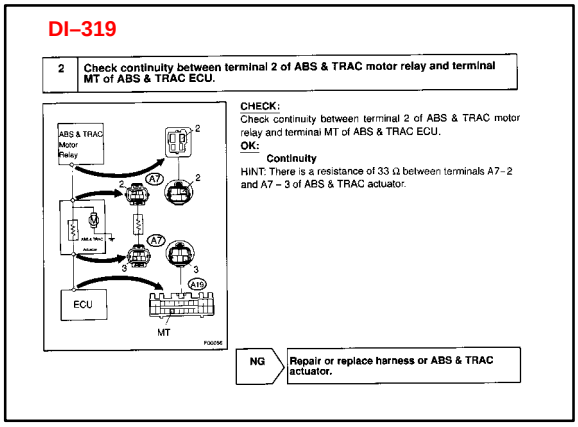
The previous resistance value was 4 – 6 Ohms.



’98 ES 300 Repair Manual RM577U, Page DI–319

Under INSPECTION PROCEDURE, Item #2 (Diagnostics – ABS & Traction Control System) the resistance value has been corrected to 33 Ohms when measuring between terminals A7–2 and A7–3 of the ABS and TRAC Actuator.

The previous resistance value was 4 – 6 Ohms.



LEXUS

Technical Service Information Bulletin

March 26, 1999

Title:

FRONT BRAKE NOISE

Models:

'97–'99 ES 300

TSIB

Introduction

New Front Brake Pads are available to reduce front brake groan or grinding noise on 1997–1999 ES 300.

- **1997 to 1999 ES 300s built before VIN:**

  Tsutsumi: JT8BF28G * * –0179640
  TMK: JT8BF28G * * –5064736

Parts Information

PART NUMBER	PART NAME
04465–33121	Front Brake Pads
04945–33040	Shim Kit (If Needed*)

* Visually inspect Shims for heat discoloration. If discolored, then replace.

Repair Procedure

1. Surface the disc rotors with the "On–Car Brake Lathe" to within serviceable limits.
2. If the rotors are unserviceable or below minimum thickness, replace the rotors.
3. Check any new disc rotors for runout.
4. If the disc rotor runout is over 0.03 mm (0.0012 in), perform phase matching procedure.
5. Replace the front brake pads.
6. Road test.

Warranty Information

OP CODE	COMB	DESCRIPTION	TIME	OPN	T1	T2
473025	A	Grind Front Discs and Replace Pads, Shims (if needed) for Squeak (both sides)	2.1	04465–33121	36	99
		Grind Front Discs and Replace Pads, Shims (if needed) for Vibration (both sides)			21	99
		Grind Front Discs and Replace Pads, Shims (if needed) for Groan/Grinding (both sides)			91	99

Applicable Warranty*:

This repair is covered under the Lexus Basic Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

Technical Service Information Bulletin
October 20, 2000

Title:

BRAKE PAD CLICKING NOISE

Models:

'90 – '00 All Models

TSIB

Introduction

A clicking type noise may be noticed when first applying the brakes after changing vehicle travel direction (*Drive/Forward* to *Reverse, Reverse* to *Drive/Forward*). This is a normal noise caused by the required brake pad–to–caliper clearances. When the direction of travel is changed, the brake pads may "shift" towards the new direction of travel. When the brake pad contacts the caliper, a clicking noise may be heard.

To minimize this clicking noise, a disc brake caliper grease has been made available for use during brake service/maintenance operations. Under normal usage conditions this grease should be effective for a period of 6 months to 1 year.

Applicable Vehicles

- **1990 – 2000** model year **Lexus vehicles, all models.**

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
N/A	08887–80609	Disc Brake Caliper Grease (50 g tube)

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Application Procedure

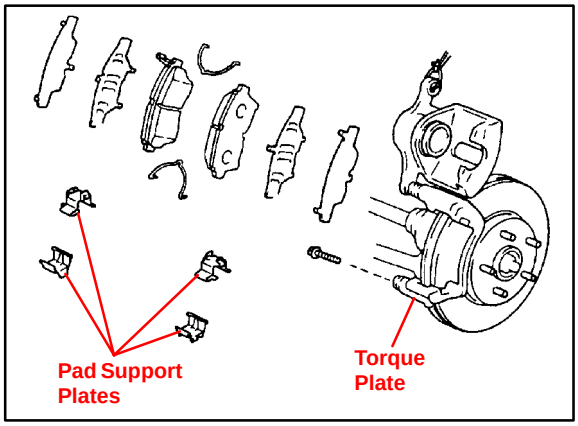
There are two types of brake calipers: floating and fixed. Check the type of brake caliper installed on the vehicle by removing the wheel assembly.

1. Floating Type Brake Caliper

A. Lift up or remove the brake caliper and suspend it securely.

HINT:

Do not disconnect the flexible hose from the brake caliper.



B. If equipped with anti–squeal spring: Remove the anti–squeal springs.

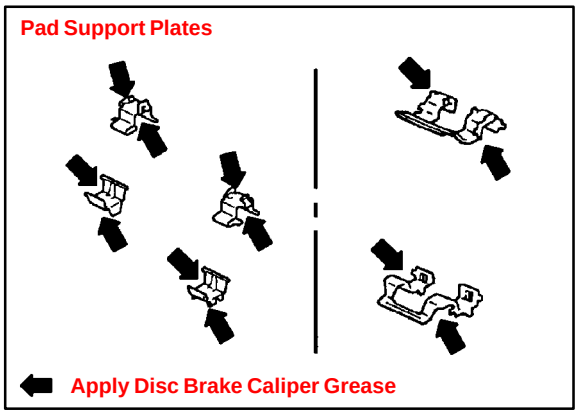
C. Remove the brake pads with anti–squeal shims.

D. Remove the pad support plates from the torque plate. Clean any dust from the pad support plates, torque plates and brake pads.

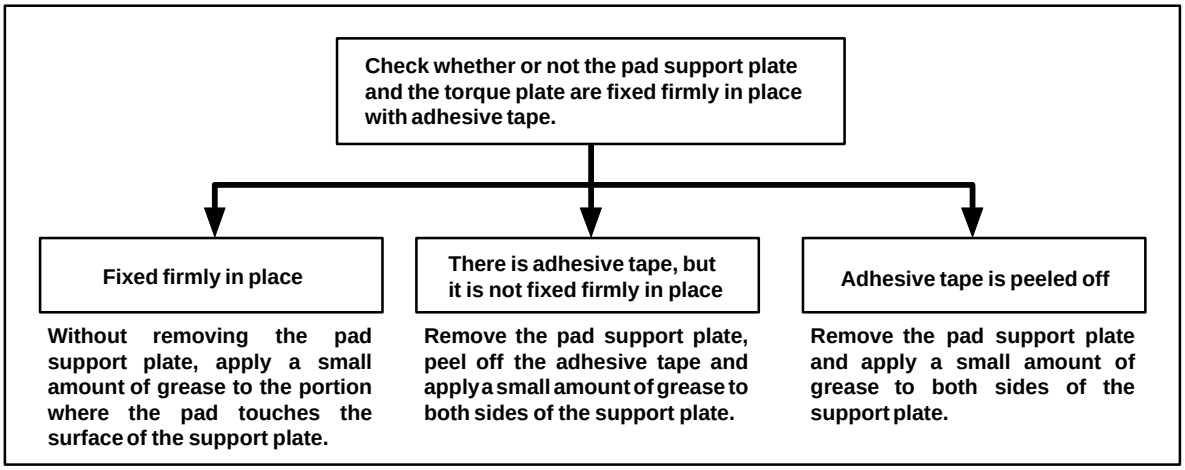
E. Apply a small amount of the disc brake caliper grease (1–2 mm thick) to both sides of the pad support plates.

NOTE:

Do NOT apply grease to the friction surfaces of the brake pads or the disc rotor.



F. If the pad support plate is fixed to the torque plate with adhesive tape, perform the operation according to the following flow chart.



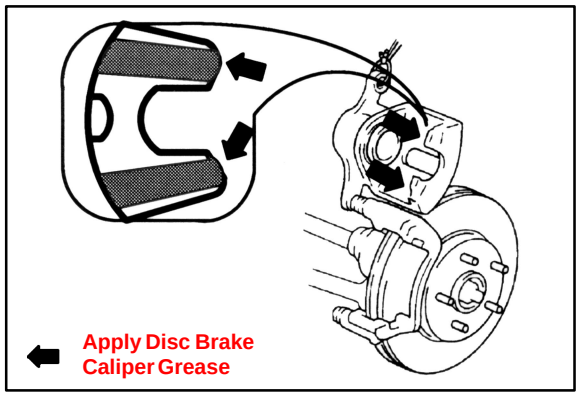
Application Procedure (Continued)

G. Apply a small amount of the disc brake caliper grease (1–2 mm thick) to the caliper as indicated in the illustration.

H. Install the brake pads with the anti–squeal shims.

I. If equipped with anti–squeal spring: Install the anti–squeal springs.

J. Press the piston in firmly and install the brake caliper.



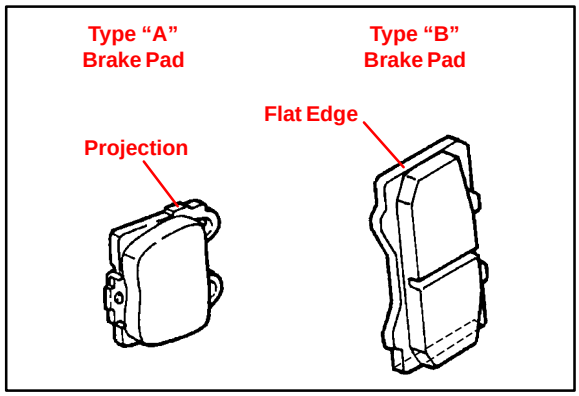
NOTE:
- **Clean excess grease from brake pad and caliper.**
- **Do NOT apply grease to the friction surfaces of the brake pads or the disc rotor.**

K. Install the wheel assembly.

2. Fixed Type Brake Caliper

There are two types of brake pads:

- Type “**A**”: Has a projection on the upper and lower side of the brake pad. (See illustration.)
- Type “**B**”: Has a flat upper and lower edge on the brake pad backing plate.

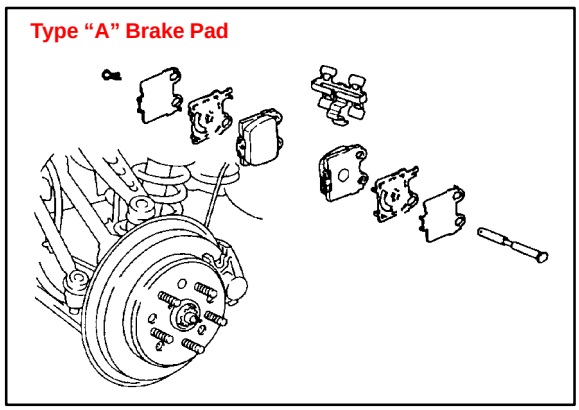


Type “A” Brake Pad

A. Remove the anti–squeal spring, clip and pad guide pin.

B. Remove the brake pads with the anti–squeal shims.

C. Clean any dust from the brake pads.



Application Procedure (Continued)

D. Apply a small amount of the disc brake caliper grease (1–2 mm thick) to the areas indicated in the illustration.

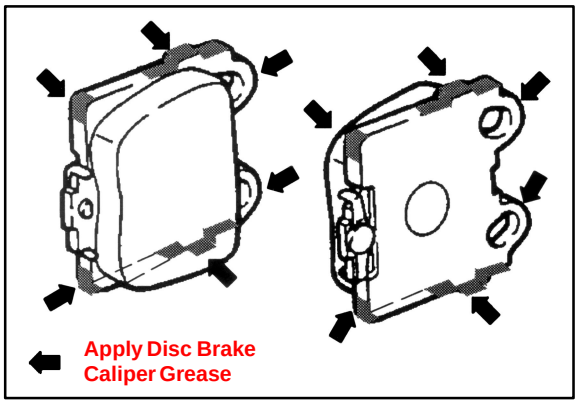
NOTE:
Do NOT apply grease to the friction surfaces of the brake pads or the disc rotor.

E. Install the brake pads with the anti–squeal shims.

NOTE:
Clean excess grease from the brake pads and caliper.

F. Install the pad guide pin, clip and anti–squeal spring.

G. Install the wheel assembly.

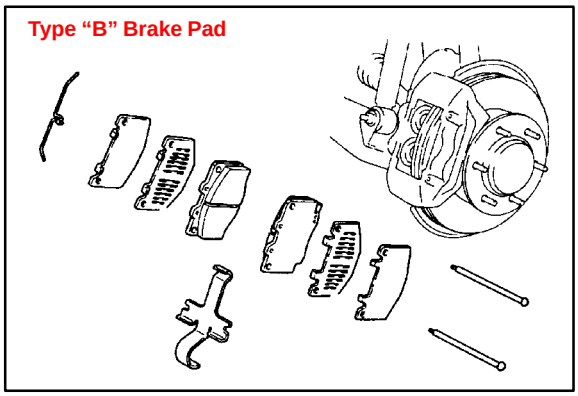


Type “B” Brake Pad

A. Remove the clip, pins and anti–rattle spring/pad retainer clip.

B. Remove the brake pads with the anti–squeal shims.

C. Clean any dust from the brake pads.



D. Apply a small amount of the disc brake caliper grease (1–2 mm thick) to the areas indicated in the illustration.

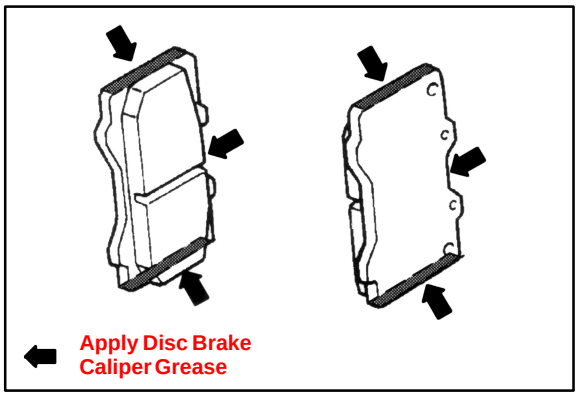
NOTE:
Do NOT apply grease to the friction surfaces of the brake pads or the disc rotor.

E. Install the brake pads with the anti–squeal shims.

NOTE:
Clean excess grease from the brake pads and caliper.

F. Install the pad guide pin, clip and anti–squeal spring.

G. Install the wheel assembly.



LEXUS

Technical Service Information Bulletin

February 24, 2003

Title:

SULFUR ODOR FROM EXHAUST

Models:

All Models

TSIB

ENGINE

EG001-03

Introduction

Some owners of Lexus vehicles may experience a sulfur–like or “rotten egg” odor from the exhaust system. Sulfur is a natural component of crude oil from which gasoline is refined and the amount of sulfur can be decreased through the refining process. The amount of sulfur in fuel sold in California is regulated, however gasoline sold in other states can have substantially higher sulfur content. Sulfur content also varies considerably between gasoline brands and locations.

Applicable Vehicles

- **All Models.**

Repair Procedure

A sulfur odor emitted from the vehicle’s tailpipe does not necessarily indicate that there is an issue with the engine’s running condition, but is most likely directly related to the fuel. If the vehicle is exhibiting an excessive sulfur odor, the following checks should be performed:

- If the MIL light is ON, check for DTCs and repair as necessary.

If no trouble is found after performing the above check, recommend the customer try a different source of fuel.

Replacement of oxygen sensors, air/fuel ratio sensors or catalytic converters will not reduce the odor and will therefore **not** be considered warrantable.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

April 3, 1998

Title:

EVAP SYSTEM DIAGNOSIS: P0441 / P0446

Models:

ES 300, SC 400, LS 400, LX 450

Introduction The following procedure is recommended for repair of MIL "ON" conditions involving confirmed DTC P0441 and P0446.

Affected Vehicles

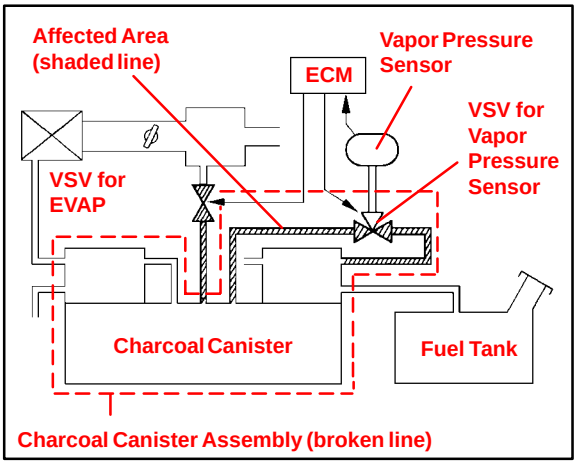
- All **ES 300, SC 400, LS 400, LX 450** that display a code P0441 or P0446.

A. Diagnostics for P0441:

1. Remove Vacuum Hoses between EVAP VSV and Charcoal Canister and discard.
2. If there is a metal vapor pipe between EVAP VSV and Charcoal Canister, clean inside of vapor pipe.
3. Replace EVAP VSV and Charcoal Canister assembly with new parts.
4. Install new vacuum hoses between EVAP VSV and Charcoal Canister.

B. Diagnostics for P0446:

1. Inspect vacuum hoses and pipes between EVAP (Purge) VSV and Charcoal Canister for leaks.
2. Replace Vapor Pressure VSV and Canister.



NOTE:

When performing diagnostics for an occurrence of a MIL "ON" condition, the Diagnostic Trouble Code (DTC) P0441 may be the result of debris in the Evaporative Emission Control System. This may cause blockage of a vapor line, or a stuck VSV, as described in the troubleshooting area of the Repair Manual.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

April 27, 2001

Title:

EVAP SYSTEM OPERATION INFORMATION

Models:

All '96 – '01 Models

TSIB

Introduction

This service bulletin provides supplemental information regarding the system design, operation, and diagnostics of the Early Type (Non–Intrusive) and Late Type (Intrusive) EVAP Systems found on 1996 model year and later OBD II equipped vehicles.

Applicable Vehicles

MODEL	1996	1997	1998	1999	2000	2001
ES 300	Early	Early	Early	Early	Late	Late
GS 300	N/A	N/A	Early	Early	Early	Late
GS 400	N/A	N/A	Early	Early	Early	N/A
GS 430	N/A	N/A	N/A	N/A	N/A	Late
IS 300	N/A	N/A	N/A	N/A	N/A	Late
LS 400	N/A	N/A	Early	Early	Late	N/A
LS 430	N/A	N/A	N/A	N/A	N/A	Late
LX 470	N/A	N/A	Early	Early	Early	Early
RX 300	N/A	N/A	N/A	Early	Late	Late
SC 300	N/A	N/A	Early	Early	Late	N/A
SC 400	N/A	Early	Early	Early	Late	N/A

Contents

This bulletin is divided into the following sections:

Early Type and Late Type EVAP System Outline

1. Early Type Description . . . . . Pages 2–4

2. Late Type Description . . . . . Pages 4–5

3. Late Type System Monitor Sequence . . . . . Pages 6–8

Diagnostic Tips For Late Type EVAP System . . . . . Pages 8–11

Warranty Information

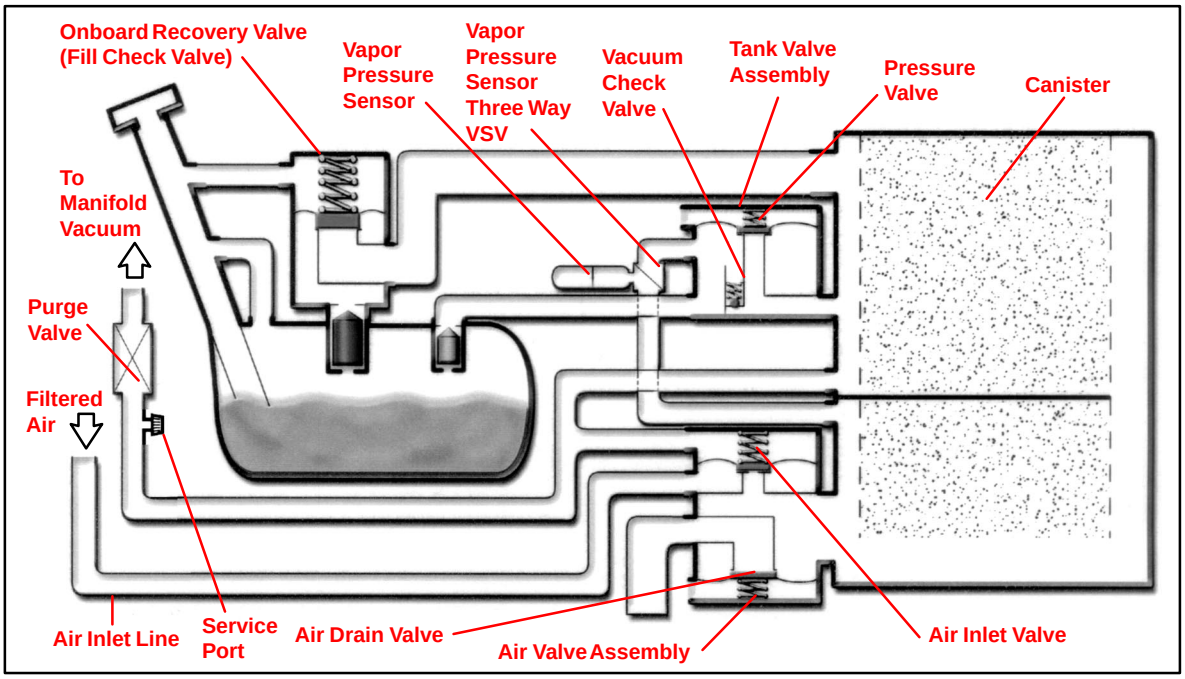
OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Early Type System Description

Early Type (Non–Intrusive) EVAP System Overview

There are a variety of EVAP systems in use with different monitoring strategies. It is essential that the EVAP system be correctly identified before beginning diagnosis. The Repair Manual is the best source for this information. The following information covers the different systems.

The first system described is the Early Type (Non–Intrusive) EVAP System. Refer to the Applicable Vehicles chart for applicability information.



Purge Operation

When the engine has reached predetermined parameters (closed loop, engine temp. above 125®F, etc.), stored fuel vapors are purged from the canister whenever the purge VSV is opened by the ECM. At the appropriate time, the ECM will turn on the purge VSV.

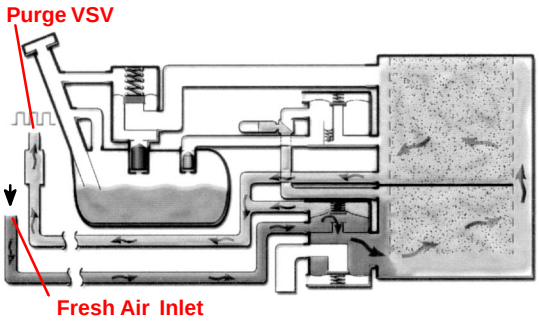


Figure 1. Purge Operation

The ECM will change the duty ratio cycle of the purge VSV thus controlling purge flow volume. Purge flow volume is determined by manifold pressure and the duty ratio cycle of the purge VSV. Atmospheric pressure is allowed into the canister to ensure that purge flow is constantly maintained whenever purge vacuum is applied to the canister (see Figure 1).

Early Type System Description (Continued)

ORVR Operation

During refueling, low pressure above the diaphragm in the onboard recovery valve lifts allowing fuel vapors into the charcoal canister. At the same time, the air drain valve opens and the charcoal absorbs the fuel vapors (see Figure 2).

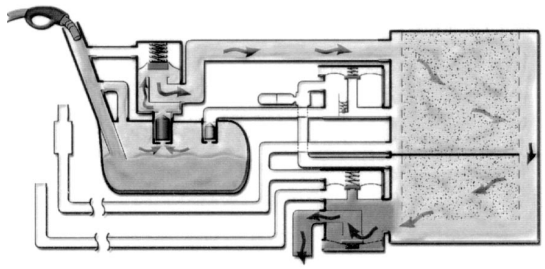


Figure 2. ORVR Operation

Early Type (Non–Intrusive) EVAP System DTCs

EVAP Monitor Leak Operation P0440

The ECM tests for leaks by measuring EVAP system pressure in the lines, charcoal canister, and fuel tank. When the EVAP pressure is higher or lower than atmospheric pressure, the ECM concludes that no leaks are present. EVAP pressure is measured by the vapor pressure sensor. If either the tank or canister purge side is at atmospheric pressure under specific conditions, the ECM determines there is a leak.

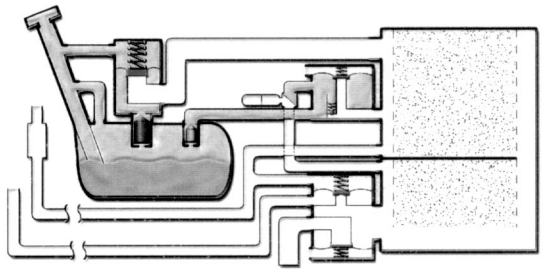


Figure 3. Fuel Tank Side of System

If DTC P0440 is present, the leak is on the fuel tank side of the EVAP system. This also includes the lines between the fuel tank and part of the canister. When the Vapor Pressure sensor is measuring tank pressure, the ECM is observing changes in pressure and comparing tank pressure to atmospheric pressure. No difference in pressure indicates a leak. The ECM may take 20 minutes or more to complete testing the fuel tank side (see Figure 3).

Canister Leak Detection P0446

When the ECM switches the vapor pressure VSV to canister side, the ECM measures canister pressure. A leak on the canister side can set multiple DTCs (see Figure 4).

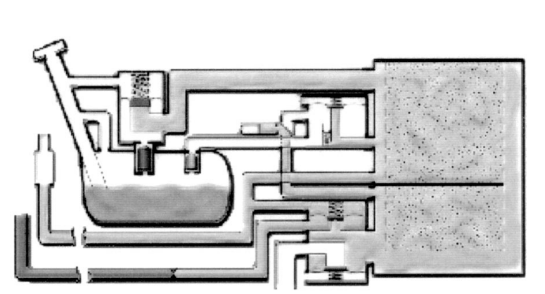


Figure 4. Canister Side of System

Early Type System Description (Continued)

Vapor Purge Flow P0441

The EVAP monitor is designed to detect:

- Restricted vapor purge flow when the purge VSV is open
- Inappropriate vapor purge flow when the purge VSV is closed

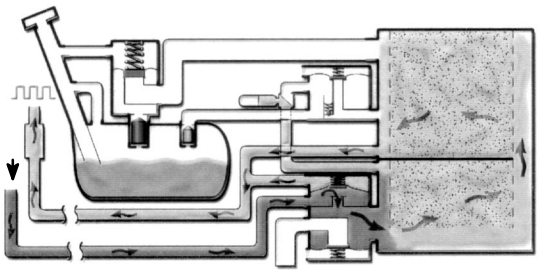


Figure 5. Flow During Purge Operation

Under normal purge conditions, pressure pulsations generated by the cycling of the purge VSV are present in the canister and detected by the Vapor Pressure sensor.

Three–Way VSV P0446

The three–way VSV is connected to the Vapor Pressure sensor, canister, and fuel tank. This VSV allows the Vapor Pressure sensor to detect either canister or tank pressure.

There are two modes the ECM can use to determine if the three–way VSV is malfunctioning. The three–way VSV is judged to be normal if there is pressure difference between the tank and canister when the three–way VSV is switched to look at the charcoal canister and fuel tank side of system.

If there isn't any pressure difference between the fuel tank and canister, the ECM looks for the following conditions:

- During purging, pressure pulsations generated by the purge VSV are not present in the canister as detected by Vapor Pressure sensor, the three–way VSV is judged to be defective.
- If there are pressure pulsations detected by the Vapor Pressure sensor present in the fuel tank, the three–way VSV is judged to be defective.

Late Type System Description

Late Type (Intrusive) EVAP System Overview

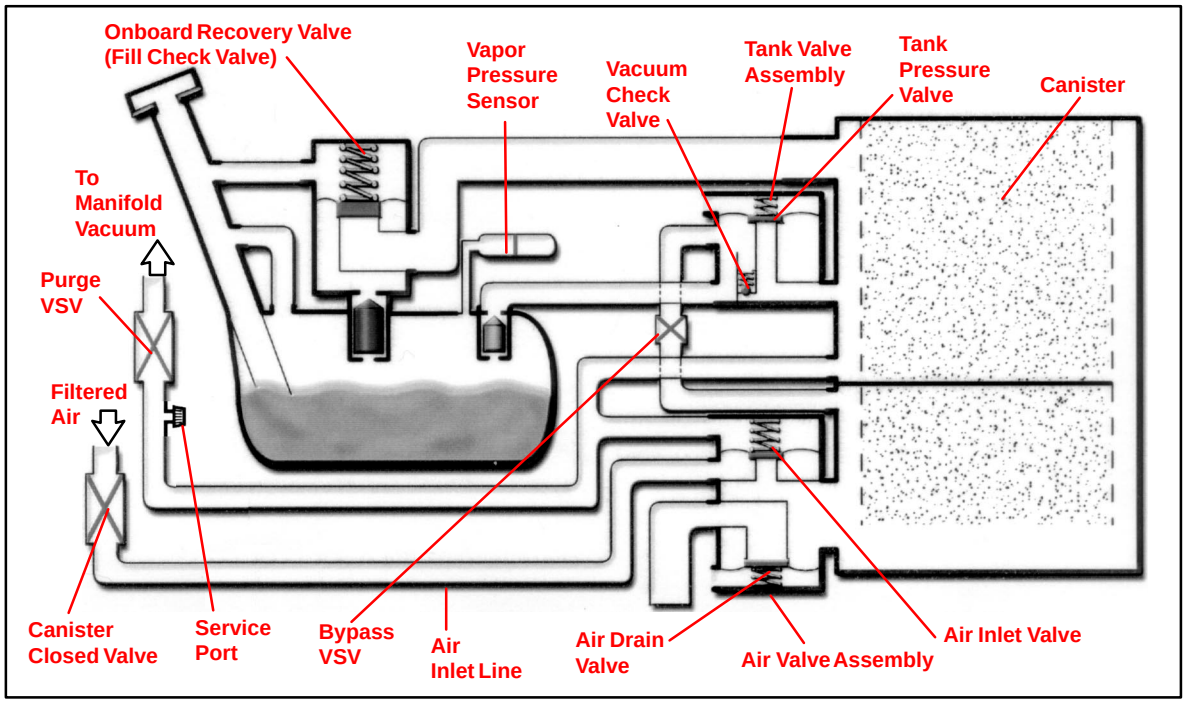
The Late Type EVAP System, also known as the Intrusive type, was developed to meet the very stringent, mandated standard of detecting a hole 0.020 inch (0.5 mm). This system uses many of the same components as the early type EVAP system. Purge, vacuum relief, pressure relief, and ORVR operations are identical to the early type. Refer to the Applicable Vehicles chart for applicability information.

The following changes were made to the Late Type EVAP System:

- Vapor pressure sensor connected to the fuel tank.
- Bypass VSV in the place of the three way VSV.
- Canister Closed Valve (CCV) on the air inlet line.

Late Type System Description (Continued)

Late Type (Intrusive EVAP System)



Tank Side

The bypass VSV and the fill check valve assembly isolates the tank pressure side from the canister side (see Figure 1).

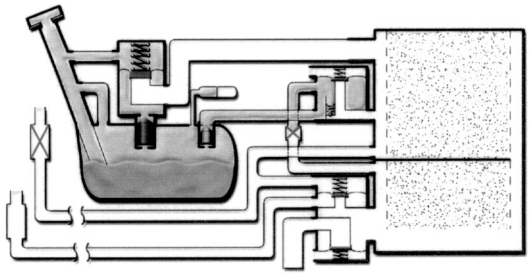


Figure 1. Fuel Tank Side of System

Canister Side

The bypass VSV and the Fill Check valve also isolate the canister side from the tank side (see Figure 2).

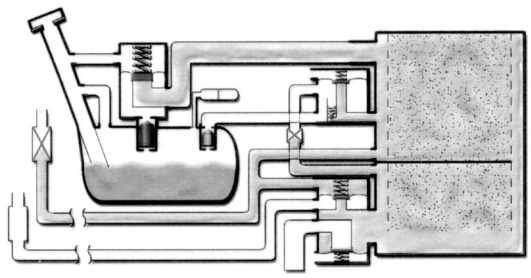


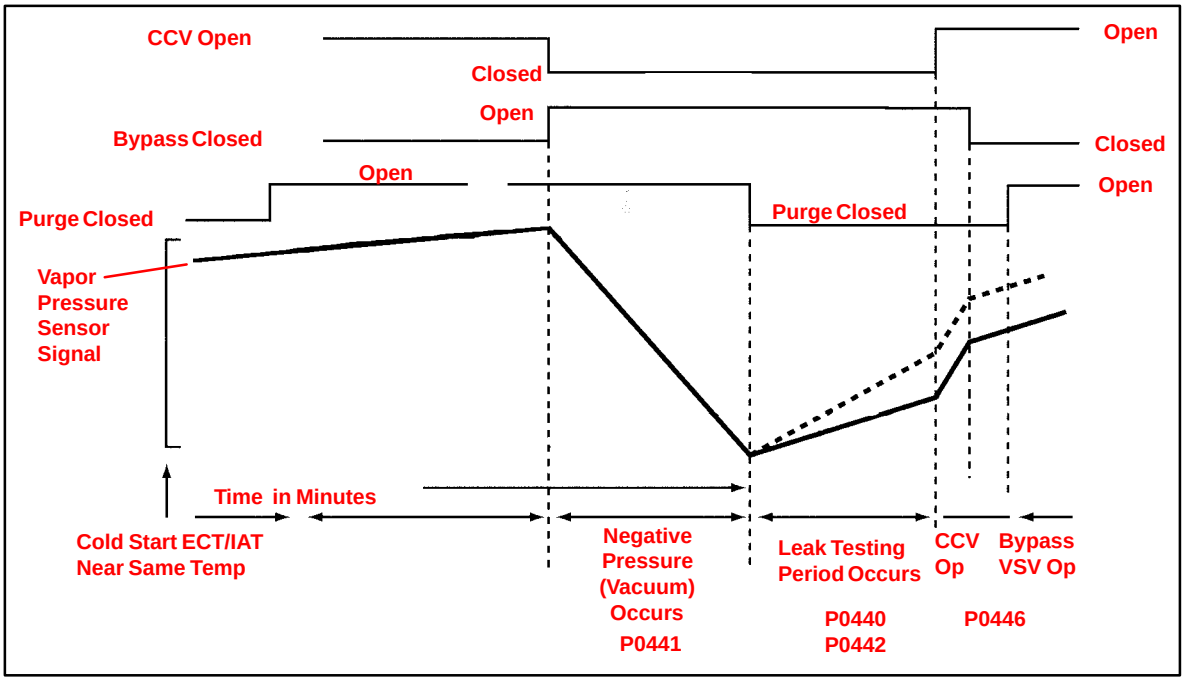
Figure 2. Canister Side of System

Late Type System Monitor Sequence

Late Type (Intrusive) EVAP System Monitor Sequence

The monitoring sequence for leak detection is different from that of the Early Type EVAP System. The Late Type applies a very small vacuum to the EVAP system. The ECM then determines if there is a problem in the system based on the vapor pressure sensor signal.

Monitor Sequence



Monitor Operation

The monitor sequence begins with a cold engine start. The IAT and ECT sensors must have approximately the same temperature reading.

The ECM is constantly monitoring fuel tank pressure. As the temperature of the fuel increases, pressure slowly rises.

The ECM will purge the charcoal canister at the appropriate time (see Figure 1). With bypass VSV closed, pressure will continue to rise in fuel tank.

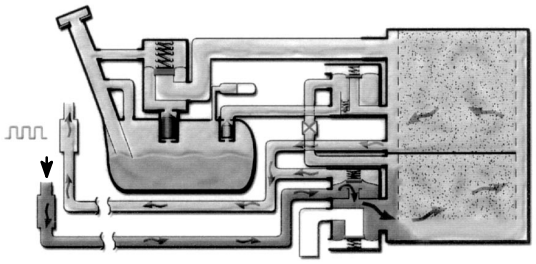


Figure 1. Canister Purge

Late Type System Monitor Sequence (Continued)

Purge VSV Operation – P0441

At a predetermined point, the ECM closes the CCV and opens the Bypass VSV causing vacuum to increase in the entire EVAP system.

The ECM continues to operate the purge VSV until the vacuum is increased to a specified point at which time the ECM closes the purge VSV (see Figure 2).

If the vacuum did not increase, or if the vacuum increased beyond the specified limit, the ECM judges the purge VSV and related components to be faulty.

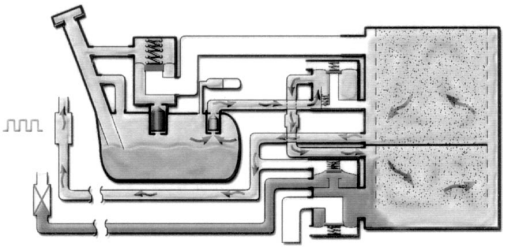


Figure 2. Vacuum Application

Hole Detection P0440 and P0442

The rate of pressure increase as detected by the vapor pressure signal indicates the if there is a leak and if it is a large or small leak.

After purge valve operation, the purge VSV is turned off sealing the vacuum in the system and the ECM begins to monitor the pressure increase (see Figure 3). Some increase is normal. A very rapid, sharp increase in pressure indicates a leak in the EVAP system and sets the DTC P0440.

This monitoring method is also able to distinguish what is called the small leak detection. A pressure rise just above normal indicates a very small hole and will set the DTC P0442.

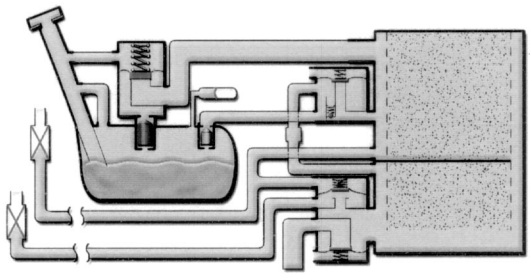


Figure 3. System Sealed

Vent Control, CCV Operation P0446

This stage checks the CCV and vent (air inlet side) operation. When the vapor pressure rises to a specified point, the ECM opens the CCV. Pressure will increase rapidly because of the air allowed into the system. No increase or an increase below specified rate of pressure increase indicates a restriction on the air inlet side.

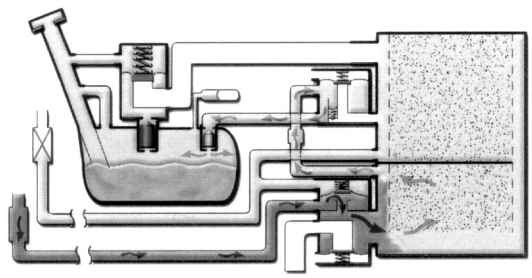


Figure 4. CCV Opens

Late Type System Monitor Sequence (Continued)

Bypass VSV Operation P0446

In the next stage, the ECM closes the bypass VSV. This action blocks air entering the fuel tank side of the system. The pressure rise on the fuel tank side is no longer as great. If there was no change in pressure, the ECM will conclude the bypass VSV did not close.

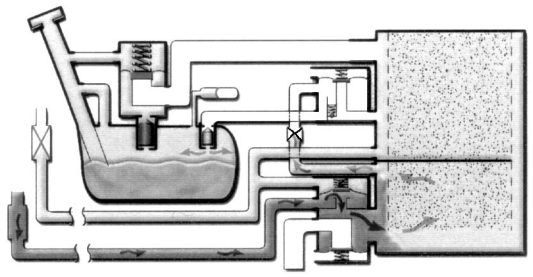


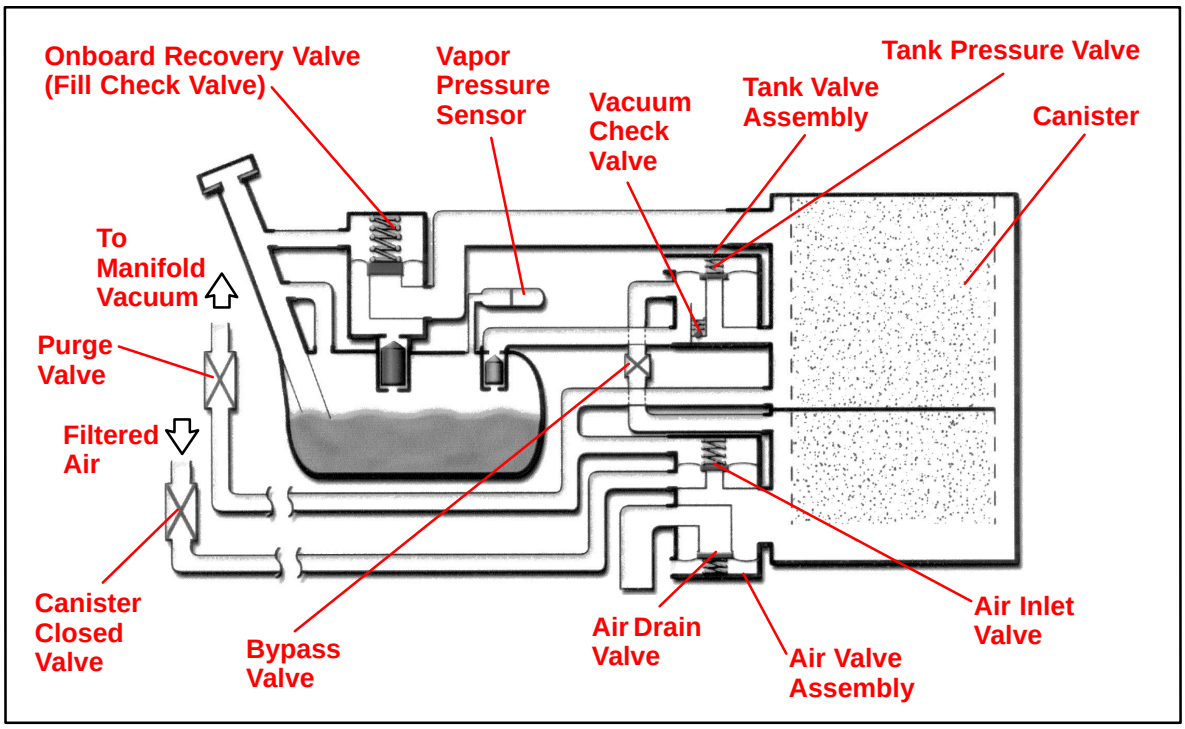
Figure 5. Bypass VSV Closes

Diagnostic Tips for Late Type EVAP System

This diagnostic process tests the EVAP System. The following diagnostic tips may be used in conjunction with the Diagnostic Procedures for EVAP DTCs listed in the Repair Manual. They may be used for all Late Type (Intrusive) EVAP Systems and for all EVAP DTCs. Refer to the Applicable Vehicles chart for applicability information.

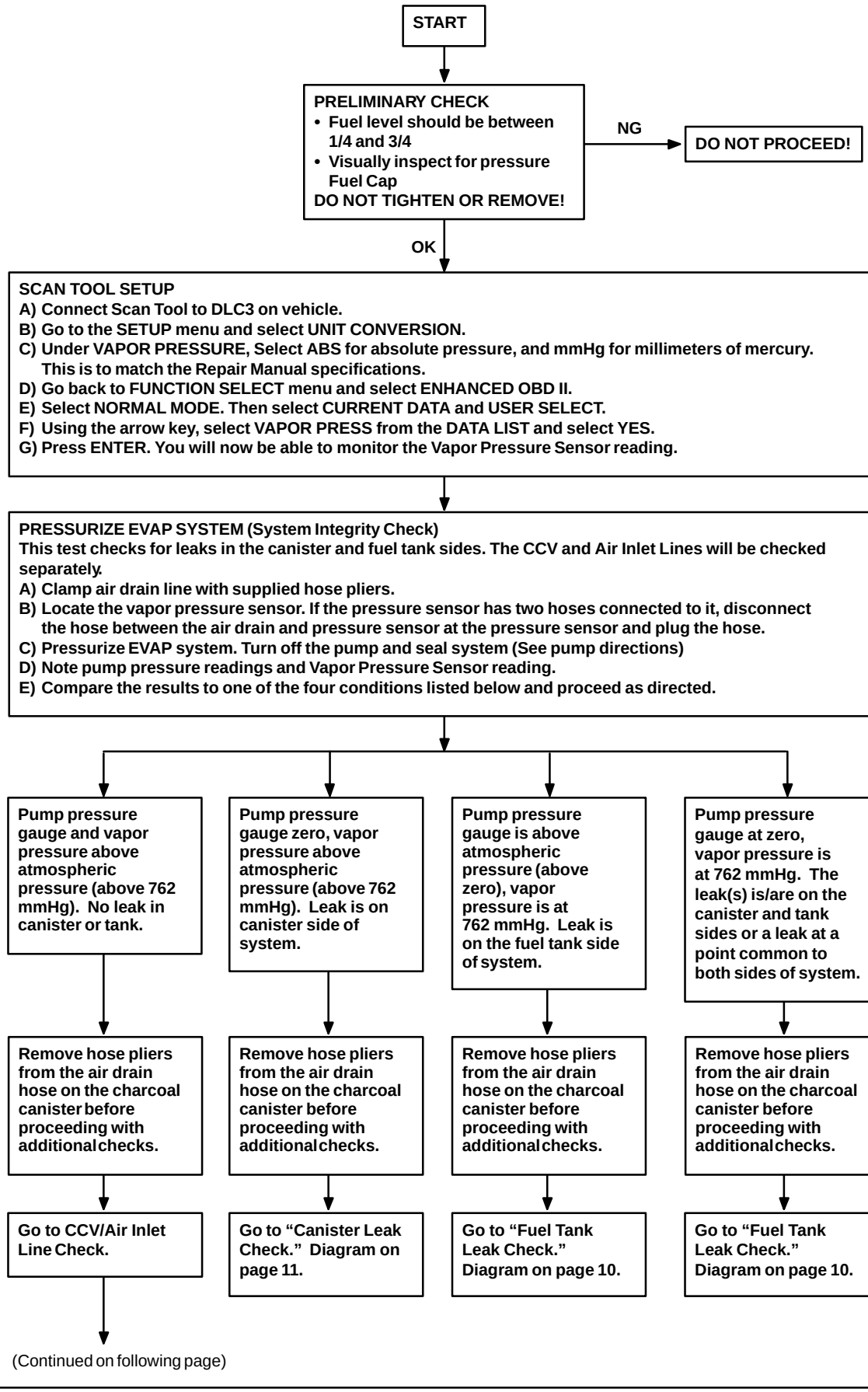
The EVAP System Pressure Test Kit (P/N 00002–6872A) and the Scan Tool can be used to diagnose the EVAP System. Measuring EVAP System pressures using the EVAP System Pressure Tester Gauge and the Scan Tool can aid in the identification of leaks in the system.

System Outline



Diagnostic Tips for Late Type EVAP System (Continued)

Diagnostic Process Flow Chart



(Continued on following page)

Diagnostic Tips for Late Type EVAP System (Continued)

Diagnostic Process Flow Chart (Continued)

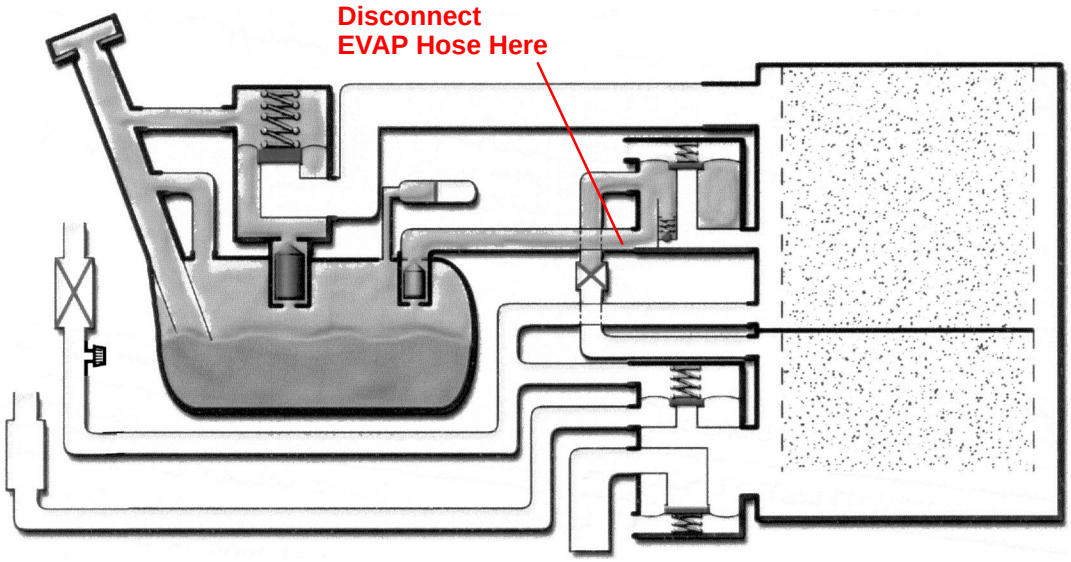
(Continued from previous page)

CCV and Air Inlet Line Check.

A) Disconnect the air inlet line from the charcoal canister.
B) Using the supplied step–down brass adapter (or equivalent) connect the Pressure Supply Hose to the air inlet line.
C) Using the Scan Tool Active Test, turn on the CCV. This will close the CCV.
D) Pressurize the line. Once pressurized, turn off the pump and seal the line (Pressure Hold Switch to "Closed" and Vent Switch to "Closed"). Pressure should hold. If not, check CCV and connections.
E) Next, using the Scan Tool, turn off the CCV. This will open the CCV. The pressure should decrease. If not, check the CCV and connections.
F) After completing the test, reconnect air inlet line to charcoal canister.

Go to "Return Vehicle to Service" on page 11.

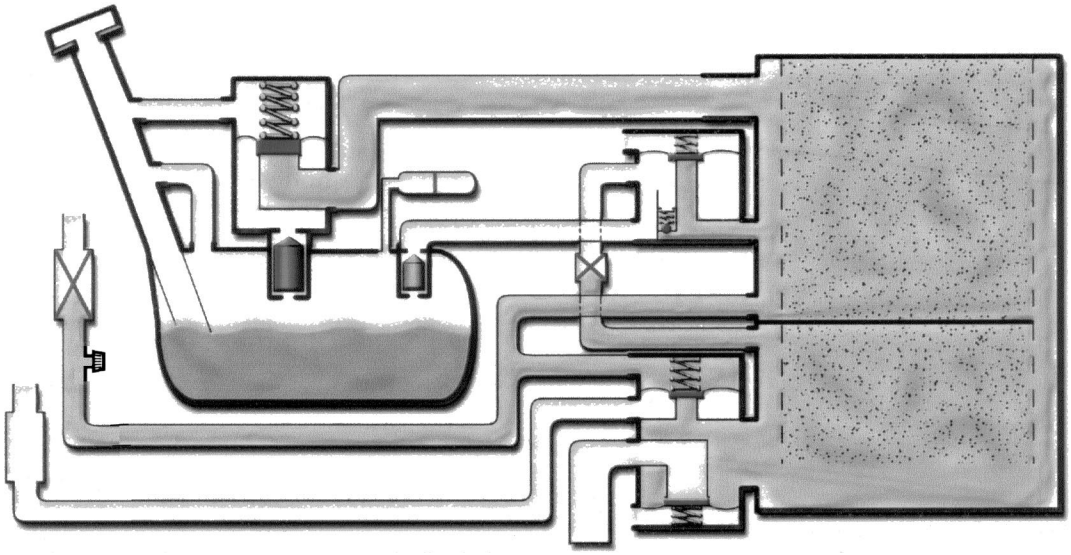
Fuel Tank Leak Check



A. Using the supplied brass step–down adapter, disconnect the EVAP hose from the charcoal canister side as indicated above. Connect Pressure Supply hose from Pressure Test Kit to the EVAP hose and pressurize the fuel tank to 30 mmHg (4 kPa / 0.58 psi).
B. Check that the internal pressure of the tank will hold for 1 minute. Check shaded areas for leaks (soapy water can be used for leak detection). If pressure holds, then perform the Canister Leak Check.
C. When done, reconnect the EVAP line hose to the charcoal canister.

Diagnostic Tips for Late Type EVAP System (Continued)

Canister Leak Check



A. Connect the Pressure Supply hose from the Pressure Test Kit to the Green EVAP System Service Port located on the EVAP Purge VSV line in the engine compartment.
B. Using the directions on the inside of the EVAP System Pressure Test Kit lid, pressurize the EVAP system. Once pressurized, turn off the pump and seal the system (Pressure Hold Switch to "Closed" and Vent Switch to "Closed")
C. With system pressurized at EVAP Service Port, check shaded areas for leaks (soapy water can be used for leak detection).

Return Vehicle to Service

A. After performing above checks, be sure to reconnect all lines and verify that all plugs and hose pliers used for diagnosis have been removed.
B. For additional diagnostic procedures and information, refer to the appropriate Repair Manual.

Technical Service Information Bulletin
February 8, 2002

Title:

READINESS MONITOR DRIVE PATTERNS

Models:

All '96 – '02

Introduction

The On–Board Diagnostic (OBDII) system is designed to monitor the performance of emission–related components and report any detected abnormalities in the form of Diagnostic Trouble Codes (DTCs). Since the various components need to be monitored during different driving conditions, the OBDII system is designed to run separate monitoring programs called Readiness Monitors. Many state Inspection and Maintenance (I/M) programs require that vehicles complete their Readiness Monitors prior to beginning an emissions test.

The current status of the Readiness Monitors can be seen by using the Lexus Diagnostic Tester with version 9.0 software (or newer), or a generic OBDII Scantool. To view the Readiness Monitor status using the Lexus Diagnostic Tester, select "Monitor Status" from the Enhanced OBDII Menu. A status of "complete" indicates that the necessary conditions have been met to run the performance tests for the related Readiness Monitor.

The Readiness Monitor will be reset to "incomplete" if:

- ECU has lost power (battery or fuse).
- DTCs have been cleared.
- The conditions for running the Readiness Monitor have not been met.

In the event that any Readiness Monitor shows "incomplete," follow the appropriate Readiness Monitor Drive Pattern to change the readiness status to "complete." **Refer to the Readiness Monitor Drive Pattern Application Table to determine which drive pattern should be followed.**

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Applicable Vehicles

- **All 1996 – 2002** model year **Lexus** vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Terms & Definitions

J1930 TERM	J1930 DEFINITION	TOYOTA/LEXUS DIAGNOSTIC TESTER PARAMETER
IAT	Intake Air Temperature	Intake Air
ECT	Engine Coolant Temperature	Coolant Temp

Required Tools & Material

TOOLS & MATERIAL	PART NUMBER	QUANTITY
Lexus Diagnostic Tester Kit	01001270	1
12 Megabyte Diagnostic Tester Program Card with version 9.0a Software (or later)	01002593-005	1

NOTE:

A generic OBDII Scantool can be used in place of the Toyota Diagnostic Tester.

CAUTION:

Strict observance of posted speed limits, traffic laws and road conditions are required when performing these drive patterns.

NOTE:

- **These drive patterns represent the fastest method to satisfy all necessary conditions which allow the specific readiness monitor to complete.**
- **In the event that the drive pattern must be interrupted (possibly due to traffic conditions or other factors) the drive pattern can be resumed and, in most cases, the readiness monitor will still set to "complete."**
- **To ensure rapid completion of readiness monitors, avoid sudden changes in vehicle load and speed (driving up and down hills and/or sudden acceleration).**

Readiness Monitor Drive Pattern Application Tables

MODEL YEAR	MODEL	ENGINE	CATEGORY	DRIVE PATTERN NUMBER*									
				EGR		CATALYST		EVAP			O2S/AF SENSOR		HTR
				1	2	3	4	5	6	7	8	9	10
1996	LS 400	1UZ–FE		X		X		X			X		X
	GS 300	2JZ–GE		X		X				X	X		X
	SC 400	1UZ–FE		X		X				X	X		X
	SC 300	2JZ–GE		X		X				X	X		X
	ES 300	1MZ–FE		X		X		X			X		X
	LX 450	1FZ–FE			X	X		N/A			X		X
1997	LS 400	1UZ–FE		X		X		X			X		X
	GS 300	2JZ–FE		X		X				X	X		X
	SC 400	1UZ–FE		X		X				X	X		X
	SC 300	2JZ–GE		X		X				X	X		X
	ES 300	1MZ–FE		X		X		X			X		X
	LX 450	1FZ–FE			X	X		N/A			X		X

*** Readiness Monitor Drive Patterns:**

1. EGR (All Except 1FZ–FE Engine)
2. EGR (For 1FZ–FE Engine)
3. Catalyst (O2S Type)
4. Catalyst (AF Sensor Type)
5. EVAP (Internal Pressure Monitor/Non–Intrusive Type)
6. EVAP (Vacuum Pressure Monitor/Intrusive Type)
7. EVAP (Without Leak Detection)
8. Oxygen Sensor Monitor (Front & Rear O2S System)
9. Oxygen/AF Sensor Monitor (Front AF Sensor & Rear O2S System)
10. Oxygen/AF Sensor Heater Monitor

Readiness Monitor Drive Pattern Application Tables (Continued)

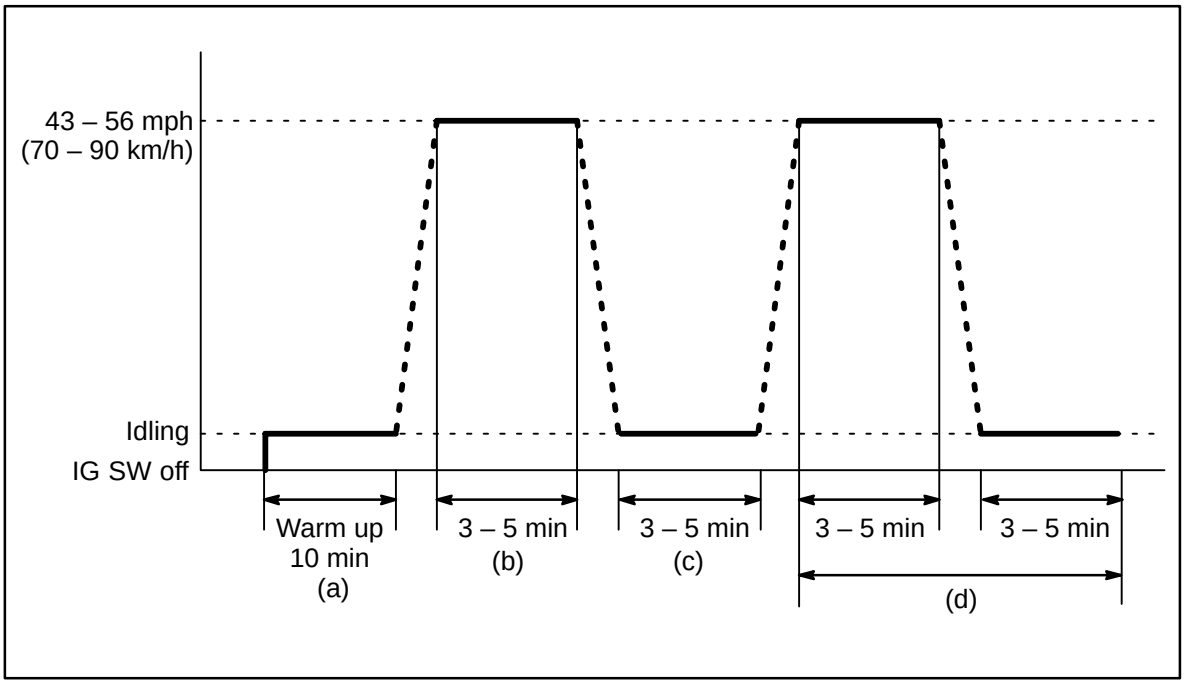
MODEL YEAR	MODEL	ENGINE	CATEGORY	DRIVE PATTERN NUMBER*									
				EGR		CATALYST		EVAP			O2S/AF SENSOR		HTR
				1	2	3	4	5	6	7	8	9	10
1998	LS 400	1UZ–FE		N/A		X		X			X		X
	GS 300	2JZ–FE				X		X			X		X
	SC 400	1UZ–FE				X		X			X		X
	SC 300	2JZ–GE				X		X			X		X
	ES 300	1MZ–FE	Fed	X		X		X			X		X
			CA	X			X	X				X	X
	LX 470	2UZ–FE		X		X		X			X		X
1999	LS 400	1UZ–FE		N/A		X		X			X		X
	GS 400	1UZ–FE				X		X			X		X
	GS 300	2JZ–FE				X		X			X		X
	SC 400	1UZ–FE				X		X			X		X
	SC 300	2JZ–FE				X		X			X		X
	ES 300	1MZ–FE					X	X				X	X
	LX 470	2UZ–FE				X		X			X		X
	RX 300	1MZ–FE					X	X				X	X
2000	LS 400	1UZ–FE		N/A		X			X		X		X
	GS 400	1UZ–FE				X		X			X		X
	GS 300	2JZ–FE				X			X		X		X
	SC 400	1UZ–FE				X			X		X		X
	SC 300	2JZ–FE				X			X		X		X
	ES 300	1MZ–FE					X		X			X	X
	LX 470	2UZ–FE				X		X			X		X
	RX 300	1MZ–FE					X		X			X	X
2001	LS 430	3UZ–FE		N/A		X			X		X		X
	GS 430	3UZ–FE				X			X		X		X
	GS 300	2JZ–FE				X			X		X		X
	IS 300	2JZ–FE				X			X		X		X
	ES 300	1MZ–FE					X		X			X	X
	LX 470	2UZ–FE				X		X			X		X
	RX 300	1MZ–FE					X		X			X	X
2002	LS 430	3UZ–FE		N/A		X			X		X		X
	GS 430	3UZ–FE				X			X		X		X
	GS 300	2JZ–FE				X			X		X		X
	SC 430	3UZ–FE				X			X		X		X
	IS 300	2JZ–FE				X			X		X		X
	ES 300	1MZ–FE					X		X			X	X
	LX 470	2UZ–FE				X			X		X		X
	RX 300	1MZ–FE					X		X			X	X

*** Readiness Monitor Drive Patterns:**

1. EGR (All Except 1FZ–FE Engine)
2. EGR (For 1FZ–FE Engine)
3. Catalyst (O2S Type)
4. Catalyst (AF Sensor Type)
5. EVAP (Internal Pressure Monitor/Non–Intrusive Type)
6. EVAP (Vacuum Pressure Monitor/Intrusive Type)
7. EVAP (Without Leak Detection)
8. Oxygen Sensor Monitor (Front & Rear O2S System)
9. Oxygen/AF Sensor Monitor (Front AF Sensor & Rear O2S System)
10. Oxygen/AF Sensor Heater Monitor

Readiness Monitor Drive Patterns: EGR Monitors

DRIVE PATTERN NO. 1: EGR Monitor (All Except 1FZ–FE Engine)



Preconditions

The monitor will not run unless:

- MIL is OFF.
- Altitude is 7800 feet (2400 m) or less.
- IAT (Intake Air) is 14 ™F (–10 ™C) or greater.

Drive Pattern Procedure

Connect the OBDII Scantool to the DLC3 connector to check monitor status and preconditions.

a. If IAT (Intake Air) is less than 50 ™F (10 ™C) when starting the engine, idle the engine for approximately 10 minutes.
b. Drive the vehicle at 43 – 56 mph (70 – 90 km/h) for a period of 3 – 5 minutes.

NOTE:
- **Do not allow the Throttle Position (TP) to exceed 30%.**
- **Drive with smooth throttle operation and avoid sudden acceleration.**

c. Stop the vehicle and let the engine idle for 3 – 5 minutes.
d. Repeat steps “b” and “c” once.

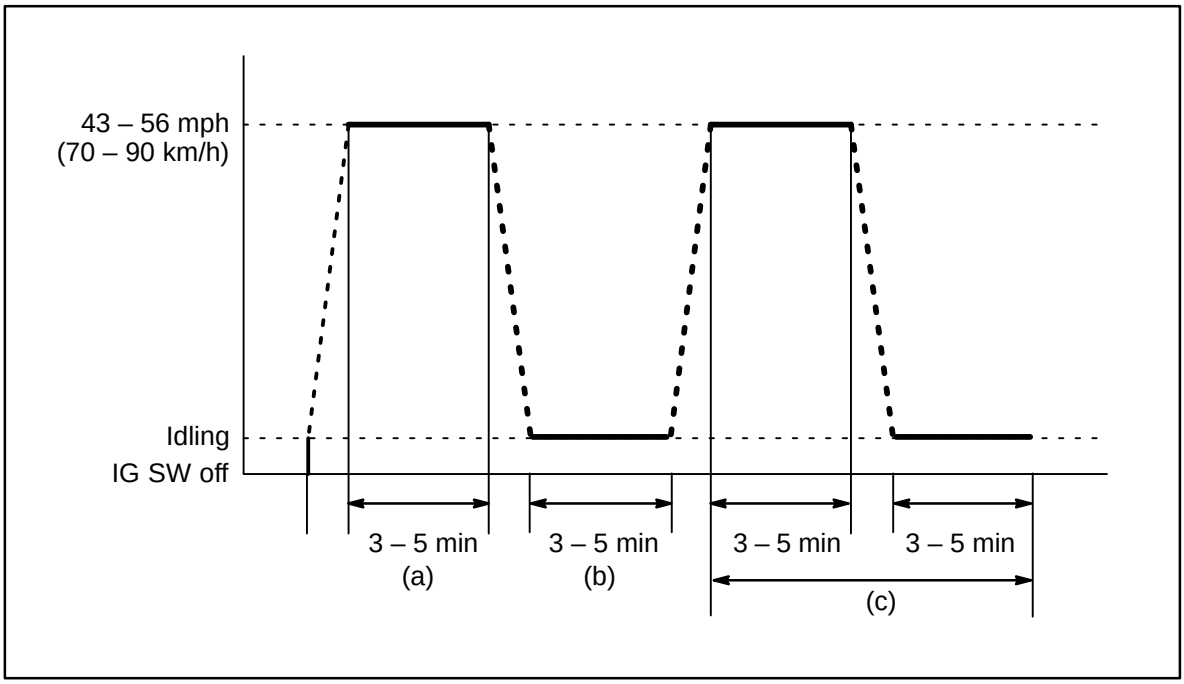
If readiness status does not switch to “complete,” ensure preconditions are met, turn the ignition OFF, then repeat steps “b” through “d.”

NOTE:

The readiness status may not switch to “complete” after the first drive pattern trip if a Pending Code has been set (first trip for a two–trip DTC).
- **Pending Codes are available from the DTC Info Menu in Enhanced OBDII.**
- **Pending Codes indicate a POTENTIAL problem was detected. A second trip is needed to confirm the DTC prior to diagnosis.**
- **Once a second trip is completed, a current DTC will be stored.**

Readiness Monitor Drive Patterns: EGR Monitors (Continued)

DRIVE PATTERN NO. 2: EGR Monitor (for 1FZ–FE Engine)



Preconditions

The monitor will not run unless:

- MIL is OFF.
- Altitude is 7800 feet (2400 m) or less.
- IAT (Intake Air) is 14 °F (–10 °C) or greater.
- ECT (Coolant Temp) is less than 104 °F (40 °C).

Drive Pattern Procedure

Connect the OBDII Scantool to DLC3 to check monitor status and preconditions.

a. Start the engine and as soon as safely possible begin driving the vehicle at 43 – 56 mph (70 – 90 km/h) for a period of 3 – 5 minutes.

NOTE:
- **Do not allow the Throttle Position (TP) to exceed 30%.**
- **Drive with smooth throttle operation and avoid sudden acceleration.**

b. Stop the vehicle and let the engine idle for 3 – 5 minutes.

c. Repeat steps “a” and “b” once.

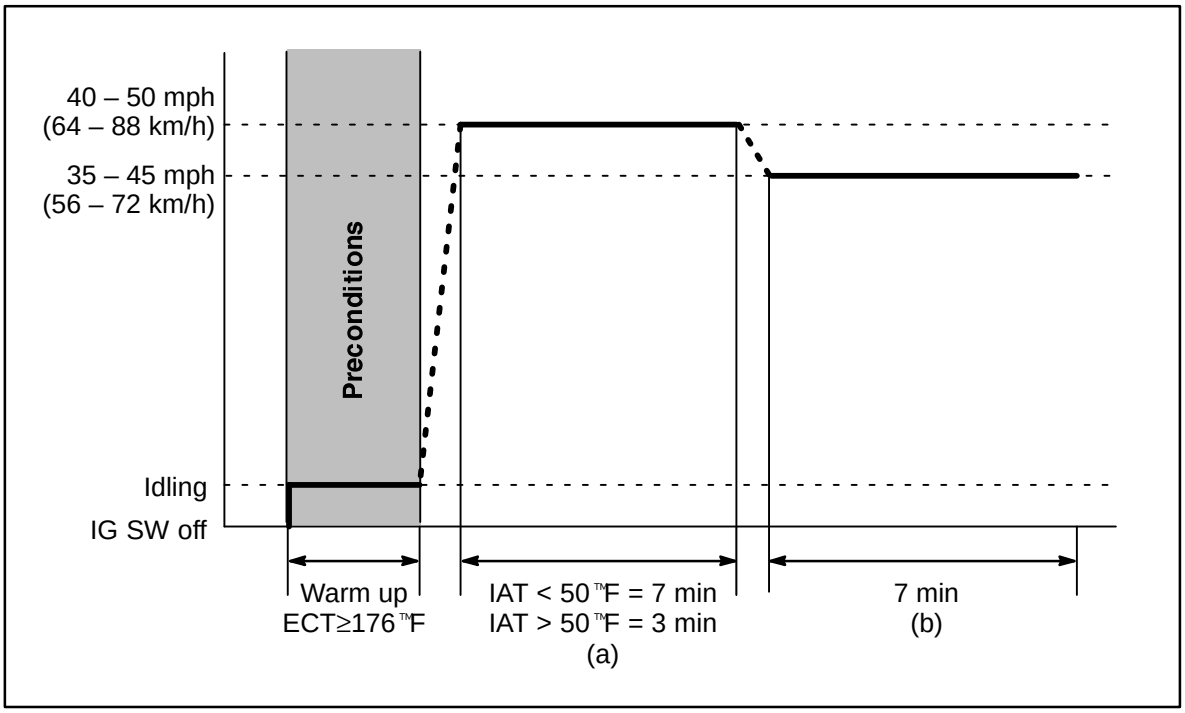
If readiness status does not switch to “complete,” ensure preconditions are met, turn the ignition OFF, then repeat steps “a” through “c.”

NOTE:

The readiness status may not switch to “complete” after the first drive pattern trip if a Pending Code has been set (first trip for a two–trip DTC).
- **Pending Codes are available from the DTC Info Menu in Enhanced OBDII.**
- **Pending Codes indicate a POTENTIAL problem was detected. A second trip is needed to confirm the DTC prior to diagnosis.**
- **Once a second trip is completed, a current DTC will be stored.**

Readiness Monitor Drive Patterns: Catalyst Monitors

DRIVE PATTERN NO. 3: Catalyst Monitor (O2S Type)



Preconditions

The monitor will not run unless:

- MIL is OFF.
- ECT (Coolant Temp) is 176 ™F (80 ™C) or greater.
- IAT (Intake Air) is 14 ™F (–10 ™C) or greater.*

*** For 2002 MY and later vehicles:** The readiness test can be completed in cold ambient conditions (less than 14 ™F / –10 ™C), if the drive pattern is repeated a second time after cycling the ignition OFF.

Drive Pattern Procedure

Connect the OBDII Scantool to DLC3 to check monitor status and preconditions.

Note the IAT (Intake Air) value during engine startup. The driving time must be adjusted during step “a” based upon IAT (Intake Air) value at startup.

a. Drive the vehicle at 40 – 55 mph (64 – 88 km/h) for the time described below:
   - If IAT (Intake Air) was less than 50 ™F (10 ™C) when the engine was started, drive for 7 minutes.
   - If IAT (Intake Air) was greater than 50 ™F (10 ™C) when the engine was started, drive for 3 minutes.

b. Drive the vehicle at 35 – 45 mph (56 – 72 km/h) for approximately 7 minutes.

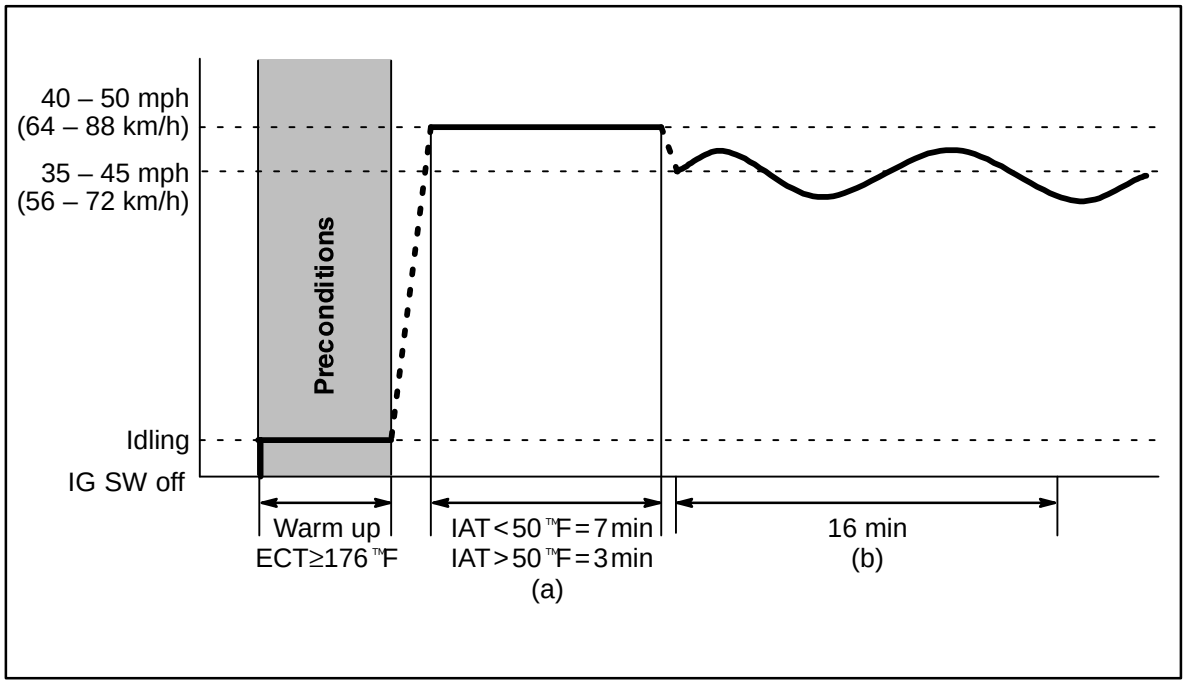
NOTE:
- **Drive with smooth throttle operation.**
- **Avoid sudden acceleration.**
- **Avoid sudden deceleration as much as possible with the throttle fully closed.**

If readiness status does not switch to “complete,” ensure preconditions are met, turn the ignition OFF, then repeat steps “a” and “b.”

NOTE:
The readiness status may not switch to “complete” after the first drive pattern trip if a Pending Code has been set (first trip for a two–trip DTC).
- **Pending Codes are available from the DTC Info Menu in Enhanced OBDII.**
- **Pending Codes indicate a POTENTIAL problem was detected. A second trip is needed to confirm the DTC prior to diagnosis.**
- **Once a second trip is completed, a current DTC will be stored.**

Readiness Monitor Drive Patterns: Catalyst Monitors (Continued)

DRIVE PATTERN NO. 4: Catalyst Monitor (AF Sensor Type)



Preconditions

The monitor will not run unless:

- MIL is OFF.
- ECT (Coolant Temp) is 176 ™F (80 ™C) or greater.
- IAT (Intake Air) is 14 ™F (–10 ™C) or greater.*

*** For 2002 MY and later vehicles:** The readiness test can be completed in cold ambient conditions (less than 14 ™F / –10 ™C), if the drive pattern is repeated a second time after cycling the ignition OFF.

Drive Pattern Procedure

Connect the OBDII Scantool to DLC3 to check monitor status and preconditions.

Note the IAT (Intake Air) value during engine startup. The driving time must be adjusted during step “a” based upon IAT (Intake Air) value at startup.

a. Drive the vehicle at 40 – 55 mph (64 – 88 km/h) for the time described below:
   - If IAT (Intake Air) was less than 50 ™F (10 ™C) when the engine was started, drive for 7 minutes.
   - If IAT (Intake Air) was greater than 50 ™F (10 ™C) when the engine was started, drive for 3 minutes.

b. Drive the vehicle allowing speed to fluctuate between 35 – 45 mph (56 – 72 km/h) for about 16 minutes.

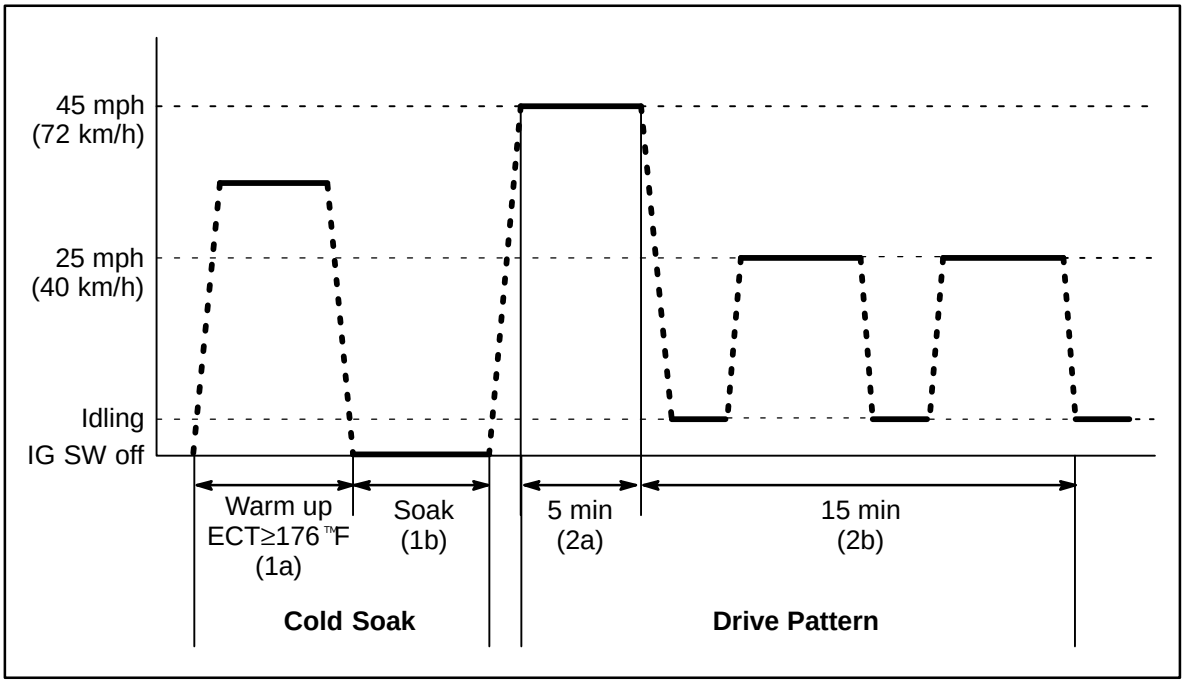
NOTE:
- **Drive with smooth throttle operation.**
- **Avoid sudden acceleration.**
- **Avoid sudden deceleration as much as possible with the throttle fully closed.**

If readiness status does not switch to “complete,” ensure preconditions are met, turn the ignition OFF, then repeat steps “a” and “b.”

NOTE:
The readiness status may not switch to “complete” after the first drive pattern trip if a Pending Code has been set (first trip for a two–trip DTC).
- **Pending Codes are available from the DTC Info Menu in Enhanced OBDII.**
- **Pending Codes indicate a POTENTIAL problem was detected. A second trip is needed to confirm the DTC prior to diagnosis.**
- **Once a second trip is completed, a current DTC will be stored.**

Readiness Monitor Drive Patterns: EVAP Monitors

DRIVE PATTERN NO. 5: EVAP Monitor (Internal Pressure Monitor/Non–Intrusive Type)



Cold Soak Preconditions

The monitor will not run unless:

- MIL is OFF.
- Fuel level is between 1/2 to 3/4 full.
- Altitude is 7800 feet (2400 m) or less.

IMPORTANT:

A cold soak must be performed prior to conducting the drive pattern to complete the Internal Pressure Readiness Monitor.

Cold Soak Procedure

1a. Start the engine and allow ECT (Coolant Temp) to reach 176°F (80°C) or greater. (This can be done by letting the engine idle or by driving the vehicle.)

1b. Let the vehicle cold soak for 8 hours or until the difference between IAT (Intake Air) and ECT (Coolant Temp) is less than 13°F (7°C).

- **Example 1**
  - ECT (Coolant Temp) = 75°F (24°C).
  - IAT (Intake Air) = 60°F (16°C).
  - Difference between ECT (Coolant Temp) and IAT (Intake Air) is 15°F (8°C).
    - ⇒ The monitor will not run because the difference between ECT (Coolant Temp) and IAT (Intake Air) is greater than 13°F (7°C).

- **Example 2**
  - ECT (Coolant Temp) = 70°F (21°C).
  - IAT (Intake Air) = 68°F (20°C).
  - Difference between ECT (Coolant Temp) and IAT (Intake Air) is 2°F (1°C).
    - ⇒ The monitor will run because the difference between ECT (Coolant Temp) and IAT (Intake Air) is less than 13°F (7°C).

Readiness Monitor Drive Patterns: EVAP Monitors (Continued)

Drive Pattern Preconditions

The monitor will not run unless:

- MIL is OFF.
- Fuel level is between 1/2 to 3/4 full.
- Altitude is 7800 feet (2400 m) or less.
- ECT (Coolant Temp) is between 40°F and 95°F (4.4°C – 35°C).
- IAT (Intake Air) is between 40°F and 95°F (4.4°C – 35°C).
- Cold Soak Procedure has been completed.

NOTE:

Before starting the engine, the difference between ECT (Coolant Temp) and IAT (Intake Air) must be less than 13°F (7°C). (Refer to Examples 1 and 2 on previous page.)

Drive Pattern Procedure

- Connect the OBDII Scantool to DLC3 to check monitor status and preconditions.
- Release the pressure in the fuel tank by removing and then reinstalling the fuel tank cap.
- Start the engine and begin driving as directed.

NOTE:

- **Do not turn the ignition off until the drive pattern is complete.**
- **Drive on smooth roads to reduce excessive fuel sloshing.**

2a. Start the engine and as soon as safely possible begin driving at approximately 45 mph (72km/h) for 5 minutes. (See illustration on previous page.)

2b. Drive the vehicle at approximately 25 mph (40 km/h) for 15 minutes and include a minimum of two stops for approximately 30 seconds. (See illustration on previous page.)

The monitor should complete within approximately 20 minutes. If it does not, ensure preconditions are met and repeat the drive pattern process beginning with the Cold Soak Procedure.

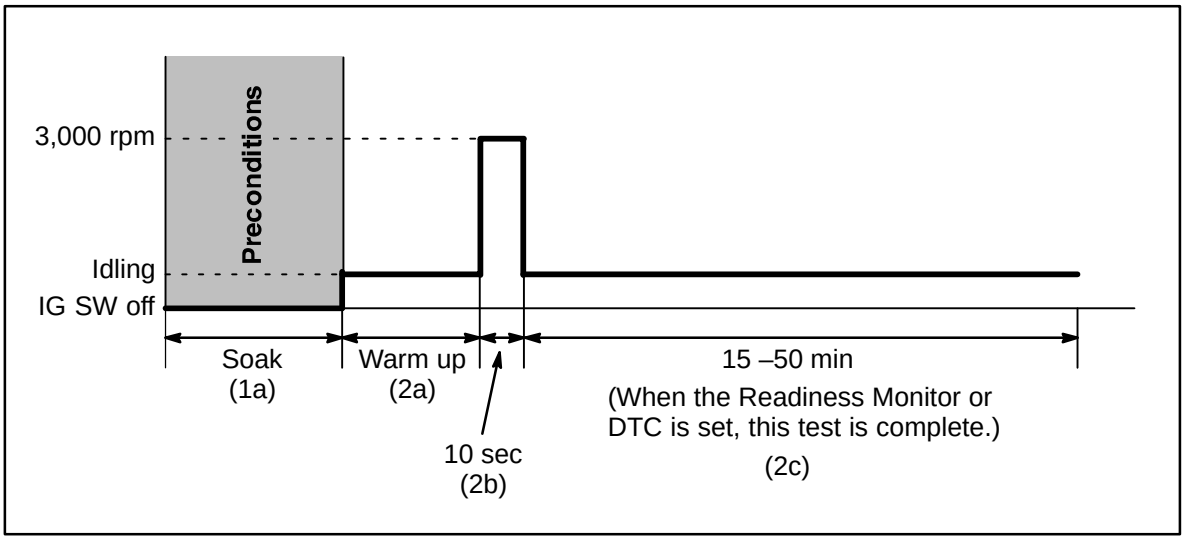
NOTE:

The readiness status may not switch to “complete” after the first drive pattern trip if a Pending Code has been set (first trip for a two–trip DTC).

- **Pending Codes are available from the DTC Info Menu in Enhanced OBDII.**
- **Pending Codes indicate a POTENTIAL problem was detected. A second trip is needed to confirm the DTC prior to diagnosis.**
- **Once a second trip is completed, a current DTC will be stored.**

Readiness Monitor Drive Patterns: EVAP Monitors (Continued)

DRIVE PATTERN NO. 6: EVAP Monitor (Vacuum Pressure Monitor/Intrusive Type)



Cold Soak Preconditions

The monitor will not run unless:

- MIL is OFF.
- Fuel level is between 1/2 to 3/4 full.
- Altitude is 7800 feet (2400 m) or less.

Cold Soak Procedure

1a. Let the vehicle cold soak for 8 hours or until the difference between IAT (Intake Air) and ECT (Coolant Temp) is less than 13 ™F (7 ™C).

- **Example 1**
  - ECT (Coolant Temp) = 75 ™F (24 ™C).
  - IAT (Intake Air) = 60 ™F (16 ™C).
  - Difference between ECT (Coolant Temp) and IAT (Intake Air) is 15 ™F (8 ™C).
    - ⇒ The monitor will not run because the difference between ECT (Coolant Temp) and IAT (Intake Air) is greater than 13 ™F (7 ™C).

- **Example 2**
  - ECT (Coolant Temp) = 70 ™F (21 ™C).
  - IAT (Intake Air) = 68 ™F (20 ™C).
  - Difference between ECT (Coolant Temp) and IAT (Intake Air) is 2 ™F (1 ™C).
    - ⇒ The monitor will run because the difference between ECT (Coolant Temp) and IAT (Intake Air) is less than 13 ™F (7 ™C).

Readiness Monitor Drive Patterns: EVAP Monitors (Continued)

Drive Pattern Preconditions

The monitor will not run unless:

- MIL is OFF.
- Fuel level is between 1/2 to 3/4 full.
- Altitude is 7800 feet (2400 m) or less.*
- ECT (Coolant Temp) is between 40°F and 95°F (4.4°C – 35°C).
- IAT (Intake Air) is between 40°F and 95°F (4.4°C – 35°C).*
- Cold Soak Procedure has been completed.

*** For 2002 MY and later vehicles:** The readiness test can be completed in cold ambient conditions (less than 40°F / 4.4°C) and/or at high altitudes (more than 7800 feet / 2400 m) if the complete drive pattern (including Cold Soak) is repeated a second time after cycling the ignition OFF.

NOTE:

Before starting the engine, the difference between ECT (Coolant Temp) and IAT (Intake Air) must be less than 13°F (7°C). (Refer to Examples 1 and 2 on previous page.)

Drive Pattern Procedure

- Connect the OBDII Scantool to DLC3 to check monitor status and preconditions.
- Release the pressure in the fuel tank by removing and then reinstalling the fuel tank cap.

2a. Start the engine and allow it to idle until ECT (Coolant Temp) is 167°F (75°C) or greater. (See illustration on previous page.)

2b. Race the engine at 3,000 rpm for approximately 10 seconds. (See illustration on previous page.)

2c. Allow the engine to idle with the A/C ON (to create a slight load) for 15 – 50 minutes. (See illustration on previous page.)

NOTE:

If the vehicle is not equipped with A/C put a slight load on the engine by doing the following:

- **Securely set the parking brake.**
- **Block the drive wheels with wheel chocks.**
- **Allow the vehicle to idle in drive for 15 – 50 minutes.**

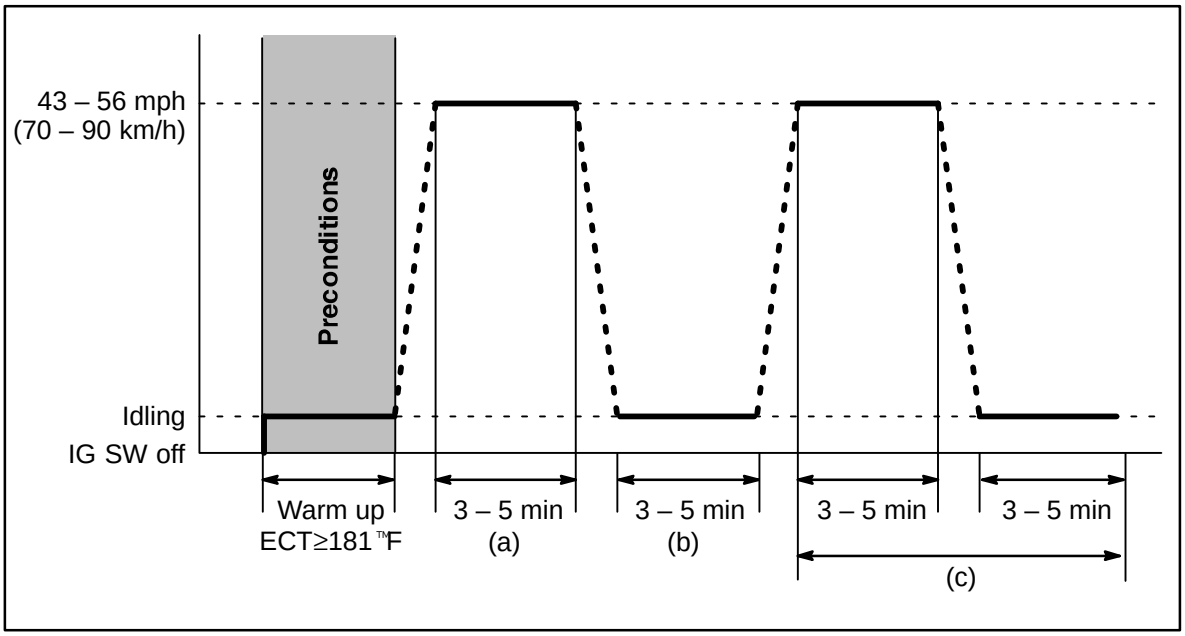
NOTE:

The readiness status may not switch to “complete” after the first drive pattern trip if a Pending Code has been set (first trip for a two–trip DTC).

- **Pending Codes are available from the DTC Info Menu in Enhanced OBDII.**
- **Pending Codes indicate a POTENTIAL problem was detected. A second trip is needed to confirm the DTC prior to diagnosis.**
- **Once a second trip is completed, a current DTC will be stored.**

Readiness Monitor Drive Patterns: EVAP Monitors (Continued)

DRIVE PATTERN NO. 7: EVAP Monitor (Without Leak Detection)



Preconditions

The monitor will not run unless:

- MIL is OFF.
- Altitude is 7800 feet (2400 m) or less.
- ECT (Coolant Temp) is 181°F (83°C) or greater.
- IAT (Intake Air) is 41°F (5°C) or greater.

Drive Pattern Procedure

Connect the OBDII Scantool to DLC3 to check monitor status and preconditions.

a. Drive the vehicle at 43 – 56 mph (70 – 90 km/h) for a period of 3 – 5 minutes.

NOTE:
- **Do not allow the Throttle Position (TP) to exceed 30%.**
- **Drive with smooth throttle operation and avoid sudden acceleration.**

b. Stop the vehicle and let the engine idle for 3 – 5 minutes.

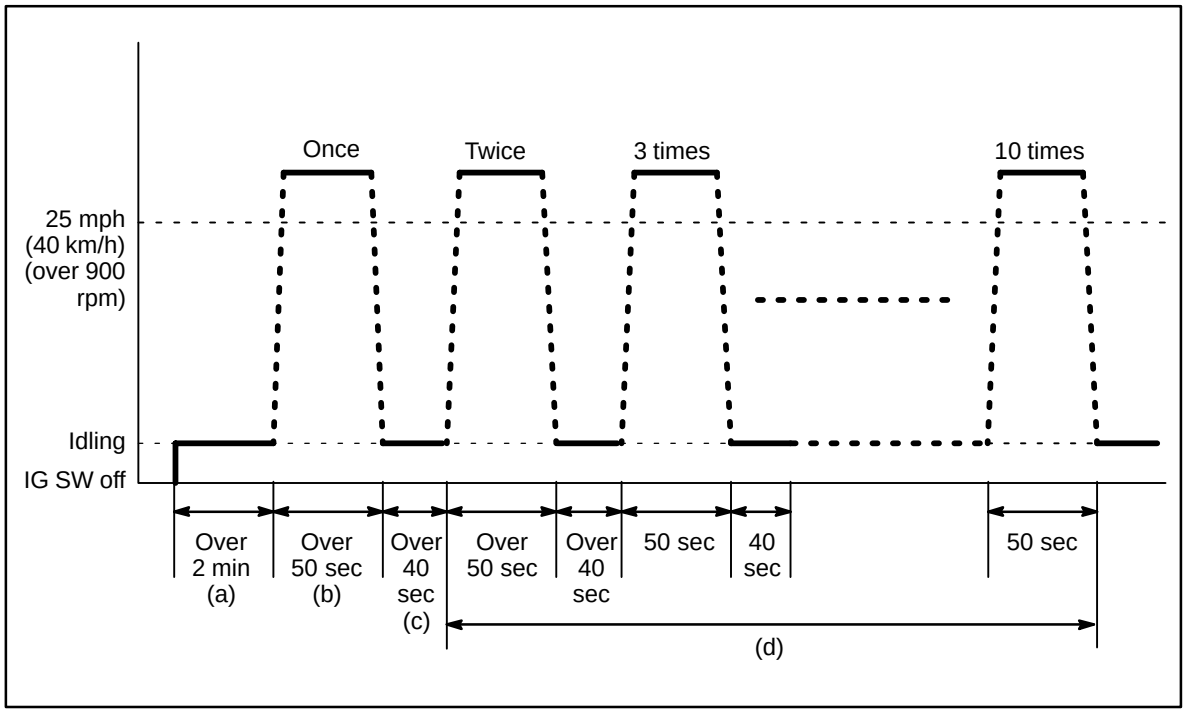
c. Repeat steps “a” and “b” once.

If readiness status does not switch to “complete,” ensure preconditions are met, turn the ignition OFF, then repeat steps “a” through “c.”

NOTE:
The readiness status may not switch to “complete” after the first drive pattern trip if a Pending Code has been set (first trip for a two–trip DTC).
- **Pending Codes are available from the DTC Info Menu in Enhanced OBDII.**
- **Pending Codes indicate a POTENTIAL problem was detected. A second trip is needed to confirm the DTC prior to diagnosis.**
- **Once a second trip is completed, a current DTC will be stored.**

Readiness Monitor Drive Patterns: Oxygen Monitors

DRIVE PATTERN NO. 8: Oxygen Sensor Monitor (Front and Rear O2S System)



Preconditions

The monitor will not run unless:

- MIL is OFF.

Drive Pattern Procedure

Connect the OBDII Scantool to DLC3 to check monitor status and preconditions.

a. Start the engine and allow it to idle for 2 minutes or more.

b. Drive the vehicle at 25 mph (40 km/h) or more for at least 50 seconds. Be sure engine speed remains above 900 rpm.

c. Stop the vehicle and allow the engine to idle for 40 seconds or more.

d. Perform steps “b” and “c” ten times.

If readiness status does not switch to “complete,” ensure preconditions are met, turn the ignition OFF, then repeat steps “a” through “d.”

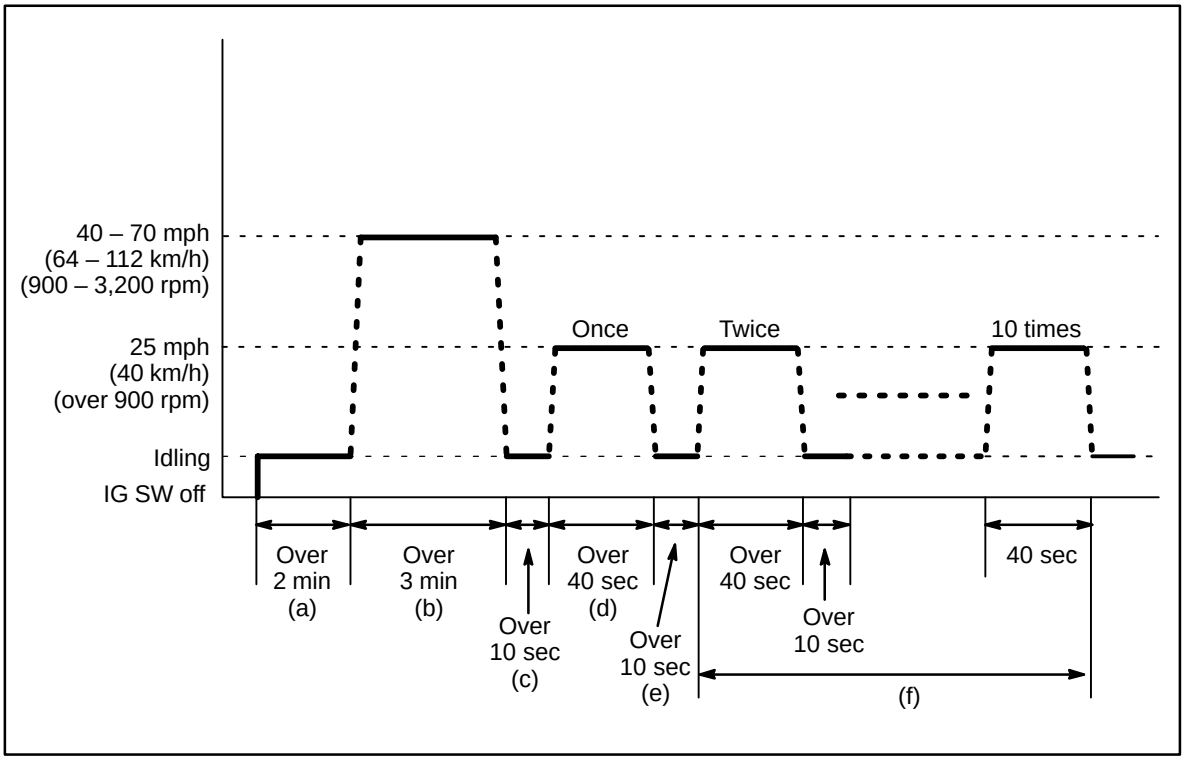
NOTE:

The readiness status may not switch to “complete” after the first drive pattern trip if a Pending Code has been set (first trip for a two–trip DTC).

- **Pending Codes are available from the DTC Info Menu in Enhanced OBDII.**
- **Pending Codes indicate a POTENTIAL problem was detected. A second trip is needed to confirm the DTC prior to diagnosis.**
- **Once a second trip is completed, a current DTC will be stored.**

Readiness Monitor Drive Patterns: Oxygen Monitors (Continued)

DRIVE PATTERN NO. 9: Oxygen/Air Fuel Ratio Sensor Monitor (Front AF Sensor and Rear O2S System)



Preconditions

The monitor will not run unless:

- MIL is OFF.

Drive Pattern Procedure

Connect the OBDII Scantool to DLC3 to check monitor status and preconditions.

a. Start the engine and allow it to idle for 2 minutes or more.

b. Drive the vehicle at 40 – 70 mph (64 – 112 km/h) or more for at least 3 minutes. Be sure to maintain engine speed between 900 and 3,200 rpm.

c. Stop the vehicle and allow the engine to idle for 10 seconds or more.

d. Drive the vehicle at 25 mph (40 km/h) for at least 40 seconds or more. Be sure to maintain engine speed above 900 rpm.

e. Stop the vehicle and allow the engine to idle for 10 seconds or more.

f. Perform steps “d” and “e” ten times.

If readiness status does not switch to “complete,” ensure preconditions are met, turn the ignition switch OFF, then repeat steps “a” through “f.”

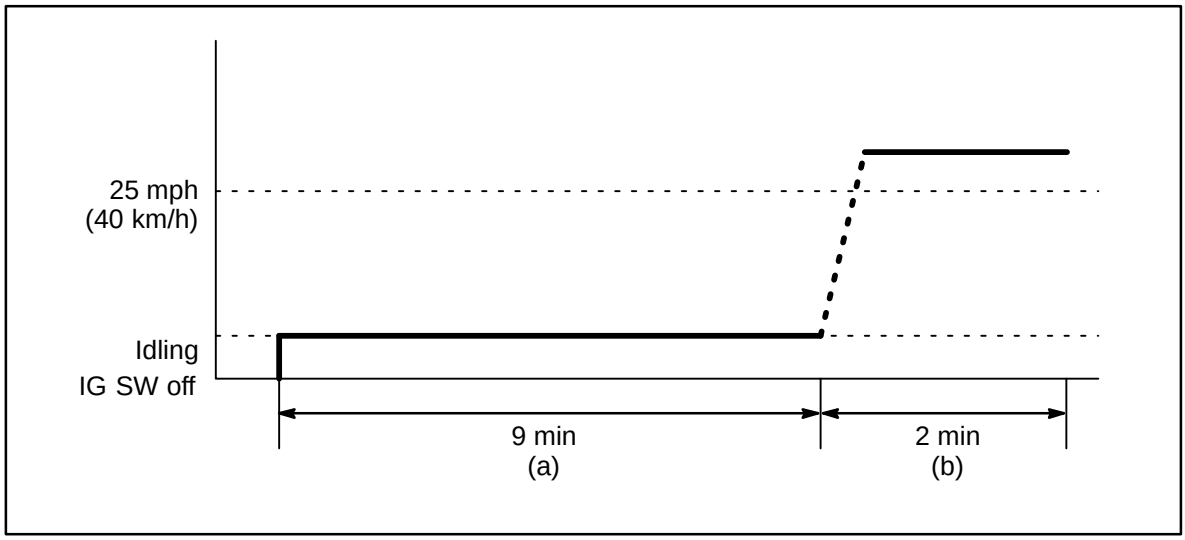
NOTE:

The readiness status may not switch to “complete” after the first drive pattern trip if a Pending Code has been set (first trip for a two–trip DTC).

- **Pending Codes are available from the DTC Info Menu in Enhanced OBDII.**
- **Pending Codes indicate a POTENTIAL problem was detected. A second trip is needed to confirm the DTC prior to diagnosis.**
- **Once a second trip is completed, a current DTC will be stored.**

Readiness Monitor Drive Patterns: Oxygen Monitors (Continued)

DRIVE PATTERN NO. 10: Oxygen/AF Sensor Heater Monitor



Preconditions

The monitor will not run unless:

- MIL is OFF.

Drive Pattern Procedure

Connect the OBDII Scantool to DLC3 to check monitor status and preconditions.

a. Start the engine and allow it to idle for 9 minutes.

b. Drive the vehicle at 25 mph (40 km/h) or more for at least 2 minutes.

If readiness status does not switch to “complete,” ensure preconditions are met, turn the ignition OFF, then repeat steps “a” and “b.”

NOTE:

The readiness status may not switch to “complete” after the first drive pattern trip if a Pending Code has been set (first trip for a two–trip DTC).

- **Pending Codes are available from the DTC Info Menu in Enhanced OBDII.**
- **Pending Codes indicate a POTENTIAL problem was detected. A second trip is needed to confirm the DTC prior to diagnosis.**
- **Once a second trip is completed, a current DTC will be stored.**

LEXUS

Technical Service Information Bulletin

May 29, 1998

Title:

CHARCOAL CANISTER INTERCHANGEABILITY

Models:

'95 – '98 ES 300

TSIB

Introduction

Charcoal Canister Assembly supply parts have been changed to simplify parts production and permit interchangeability with current model vehicles.

Affected Vehicles

- **1995 – 1998** model year **ES 300.**

Parts Information

The following table contains the part number replacement data for the involved models:

OLD PART NUMBER	NEW PART NUMBER	APPLICATION
77740–07011	77740–07012	9508–9604 prod. 96MY ES300
77740–33071	77740–33072	9604–9608 prod. 96MY ES300
77740–33061	77740–33062	9608– prod. 97–98 MY ES300

NOTE:

New part numbers are fully interchangeable with previous part numbers.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

March 28, 2005

Title:

RADIATOR CAP INSPECTION

Models:

All Models

TSIB

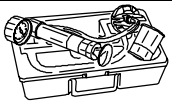
Introduction

The procedure for inspecting the radiator cap has been revised. Please refer to the following procedures when inspecting the radiator cap on all Lexus models.

Applicable Vehicles

- **All Lexus models.**

Required Equipment

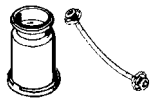
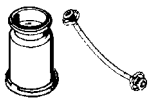
MANUFACTURER	EQUIPMENT	QTY
Snap–On/Sun SVTS262A (or equivalent)	Cooling System Tester (Radiator Cap Tester) 	1

NOTE:
Additional Lexus Approved Dealer Equipment may be ordered by calling Lexus Approved Dealer Equipment at 1–800–368–6787.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Required SSTs

ITEM NO.	SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QTY	DRW**
1	**Radiator Cap Test Set*** 	09230–00030–02	1	7
2	**Radiator Cap Test Set (Small)*** 	09230–00020–02	1	7

* Essential SSTs.

** Refers to drawer number in SST Storage System.

NOTE:

Additional SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

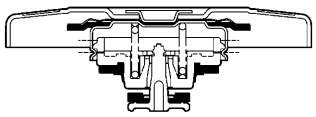
Radiator Cap Identification Procedure

1. Use the illustration below to identify the vehicle's radiator cap type and kPa rating.
2. Proceed to the required inspection procedure for the radiator cap and kPa rating.

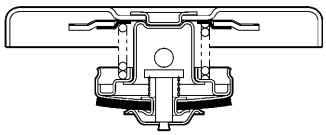
Radiator Cap Identification

kPa Rating

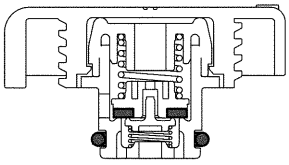
N–Cap



Compact Cap

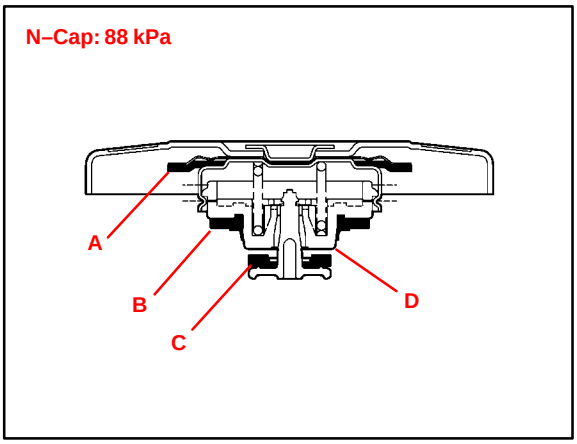


Plastic Cap



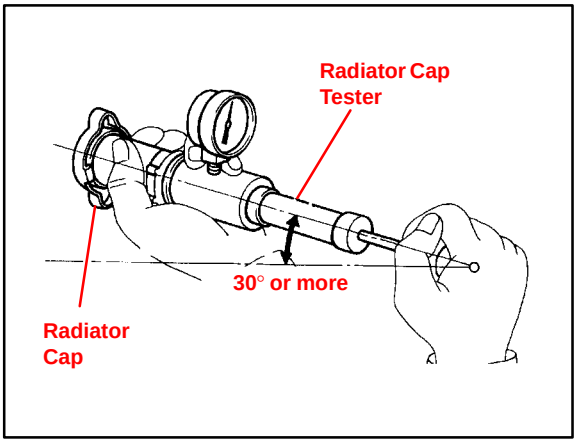
Radiator Cap Inspection Procedure

Type: N–cap, 88 kPa



1. Remove coolant and any foreign material on rubber points "A," "B," and "C."
2. Check that points "A," "B," and "C" are not deformed, cracked, or swollen.
3. Check that points "C" and "D" are not stuck together.
4. Apply engine coolant to points "B" and "C" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
5. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
6. When using the radiator cap tester, tilt it more than 30 degrees.
7. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

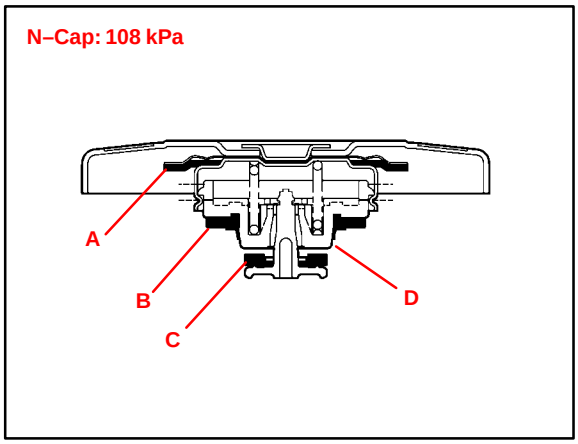
Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	74.0 to 103.0 kPa (0.75 to 1.05 kgf/cm^2, 10.7 to 14.9 psi)
Minimum standard value (for in–service cap)	59 kPa (0.60 kgf/cm^2, 8.53 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

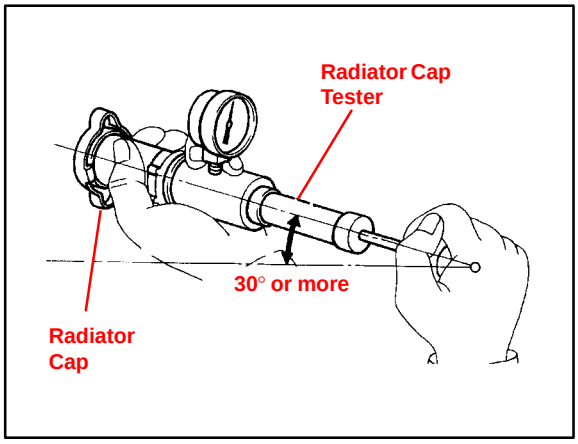
Radiator Cap Inspection Procedure (Continued)

Type: N–cap, 108 kPa



1. Remove coolant and any foreign material on rubber points "A," "B," and "C."
2. Check that points "A," "B," and "C" are not deformed, cracked, or swollen.
3. Check that points "C" and "D" are not stuck together.
4. Apply engine coolant to points "B" and "C" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
5. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
6. When using the radiator cap tester, tilt it more than 30 degrees.
7. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

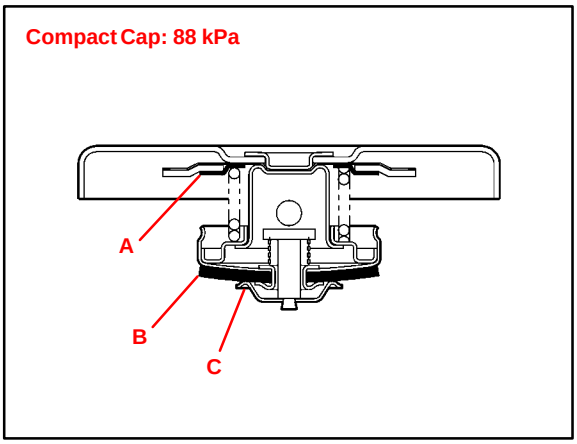
Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	93.3 to 122.7 kPa (0.95 to 1.25 kgf/cm^2, 13.5 to 17.8 psi)
Minimum standard value (for in–service cap)	78.5 kPa (0.80 kgf/cm^2, 11.38 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

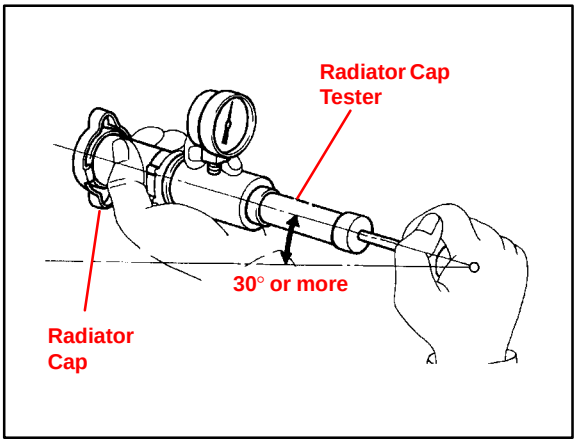
Radiator Cap Inspection Procedure (Continued)

Type: Compact Cap, 88 kPa



1. Remove coolant and any foreign material on rubber points "A," "B," and "C."
2. Check that points "A" and "B" are not deformed, cracked, or swollen.
3. Check that points "B" and "C" are not stuck together.
4. Apply engine coolant to point "B" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
5. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
6. When using the radiator cap tester, tilt it more than 30 degrees.
7. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

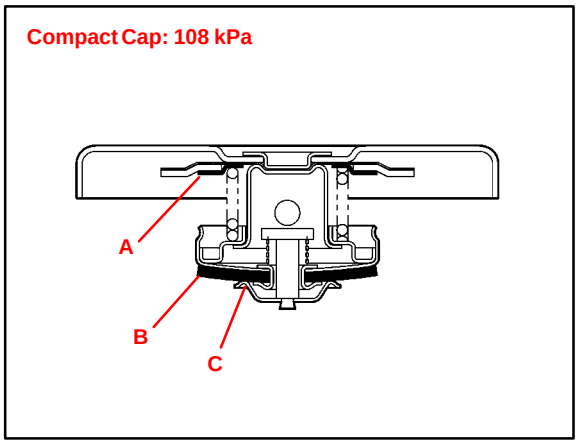
Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	74.0 to 103.0 kPa (0.75 to 1.05 kgf/cm^2, 10.7 to 14.9 psi)
Minimum standard value (for in–service cap)	59 kPa (0.60 kgf/cm^2, 8.53 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

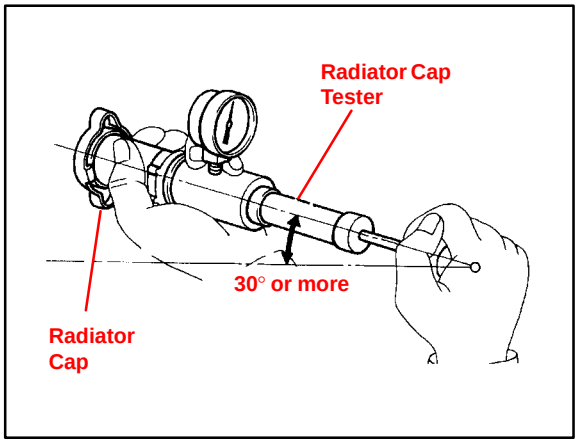
Radiator Cap Inspection Procedure (Continued)

Type: Compact Cap, 108 kPa



1. Remove coolant and any foreign material on rubber points "A," "B," and "C."
2. Check that points "A" and "B" are not deformed, cracked, or swollen.
3. Check that points "B" and "C" are not stuck together.
4. Apply engine coolant to point "B" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
5. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
6. When using the radiator cap tester, tilt it more than 30 degrees.
7. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second



HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	93.3 to 122.7 kPa (0.95 to 1.25 kgf/cm^2, 13.5 to 17.8 psi)
Minimum standard value (for in–service cap)	78.5 kPa (0.80 kgf/cm^2, 11.38 psi)

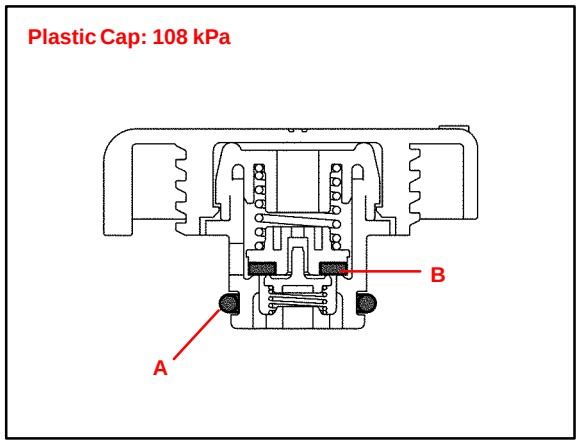
If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

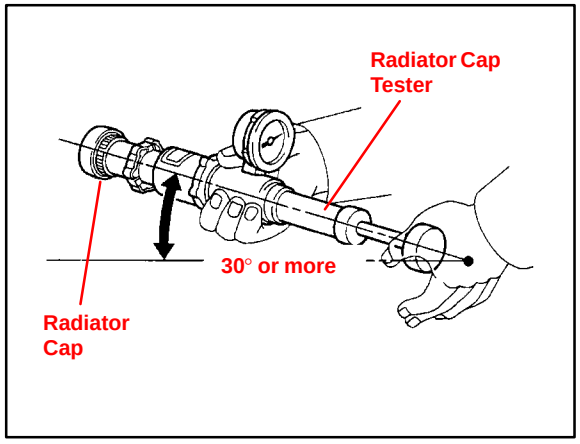
Radiator Cap Inspection Procedure (Continued)

Type: Plastic Cap, 108 kPa

1. Remove coolant and any foreign material on O–ring "A."
2. Check that O–ring "A" is not deformed, cracked, or swollen.
3. Apply engine coolant to O–ring "A" and rubber point "B" before using the radiator cap tester.
   - Radiator Cap Tester: Snap–On/Sun P/N SVTS262A (or equivalent)
4. Before installing the radiator cap tester, use the applicable radiator cap adaptor provided in the following SST kits in conjunction with the radiator cap tester:
   - SST P/N 09230–00030–02 (09231–10080–01) or 09230–00020–02 (09231–10060–01)
5. When using the radiator cap tester, tilt it more than 30 degrees.
6. Pump the radiator cap tester several times, and check the maximum pressure.

   Pumping speed: 1 pump/second





HINT:

Stop pumping when the valve opens and read the gauge. The gauge must be within the standard values listed below when the pressure valve opens. The cap is considered OK when the pressure holds steady or falls very slowly, but holds within the standard values listed below for one minute.

Specification:

VALVE OPENING PRESSURE	SPECIFIED CONDITION
Standard value (for brand–new cap)	93.3 to 122.7 kPa (0.95 to 1.25 kgf/cm^2, 13.5 to 17.8 psi)
Minimum standard value (for in–service cap)	78.5 kPa (0.80 kgf/cm^2, 11.38 psi)

If the maximum pressure is less than the minimum standard value, replace the radiator cap sub–assembly.

Technical Service Information Bulletin
September 3, 2004

Title:

ENGINE BANK 1 AND BANK 2 A/F AND O2 IDENTIFICATION

Models:

Applicable Models

TSIB

Introduction

This service bulletin provides information on the proper identification of engine bank 1 and engine bank 2 for correct A/F sensor and oxygen sensor replacement.

This bulletin contains information that identifies engine bank 1 and engine bank 2 on the following engines: 1MZ–FE, 3MZ–FE, 1UZ–FE, 2UZ–FE and 3UZ–FE.

- Bank 1 (B1) refers to the bank that includes cylinder No. 1.
- Bank 2 (B2) refers to the bank opposite bank 1.
- Sensor 1 (S1) refers to the sensor that is located before the catalytic converters.
- Sensor 2 (S2) refers to the sensor that is located after the catalytic converters.

Applicable Vehicles

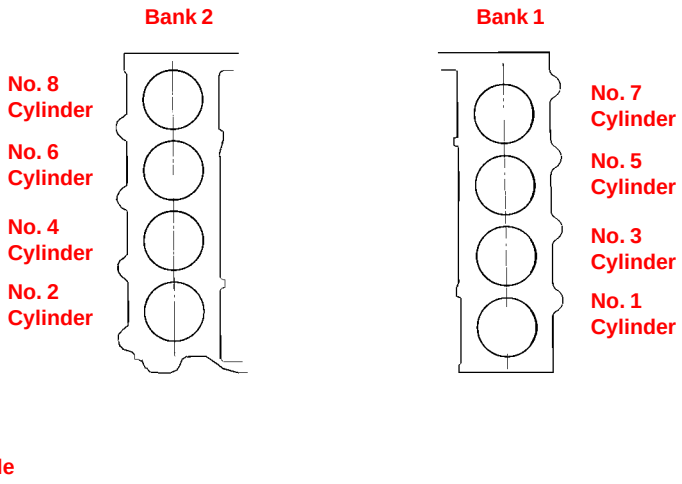
- **1994 – 2003** model year **ES 300** vehicles equipped with **1MZ–FE engine**.
- **2004** model year **ES 330** and **RX 330** vehicles equipped with **3MZ–FE engine**.
- **1998 – 2000** model year **GS 400** vehicles equipped with **1UZ–FE engine**.
- **2003 – 2004** model year **GX 470** vehicles equipped with **2UZ–FE engine**.
- **1990 – 2000** model year **LS 400** vehicles equipped with **1UZ–FE engine**.
- **2001 – 2004** model year **LS 430** and **GS 430** vehicles equipped with **3UZ–FE engine**.
- **1998 – 2004** model year **LX 470** vehicles equipped with **2UZ–FE engine**.
- **1999 – 2003** model year **RX 300** vehicles equipped with **1MZ–FE engine**.
- **1992 – 2000** model year **SC 400** vehicles equipped with **1UZ–FE engine**.
- **2002 – 2004** model year **SC 430** vehicles equipped with **3UZ–FE engine**.

Warranty Information

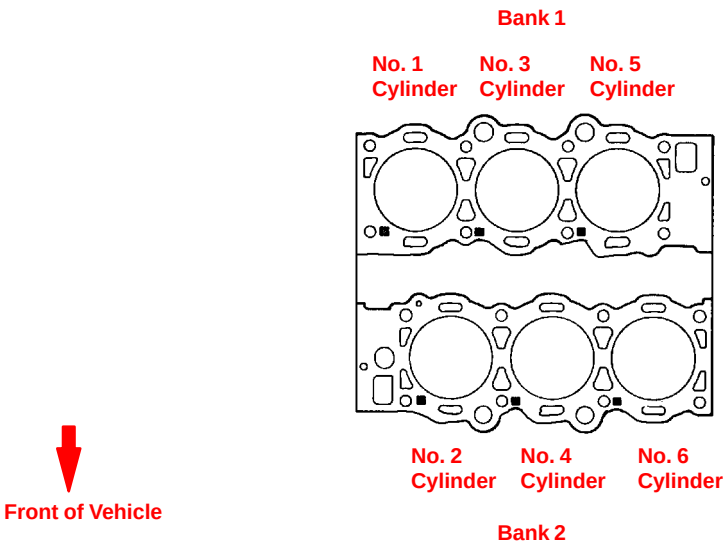
OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Engine Bank Identification

1UZ–FE, 2UZ–FE and 3UZ–FE Engine Bank Identification

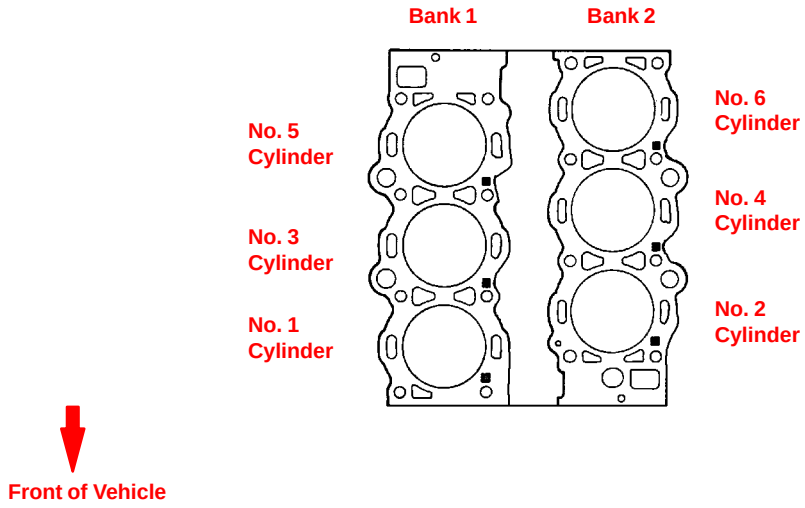


1MZ–FE and 3MZ–FE Engine Bank Identification



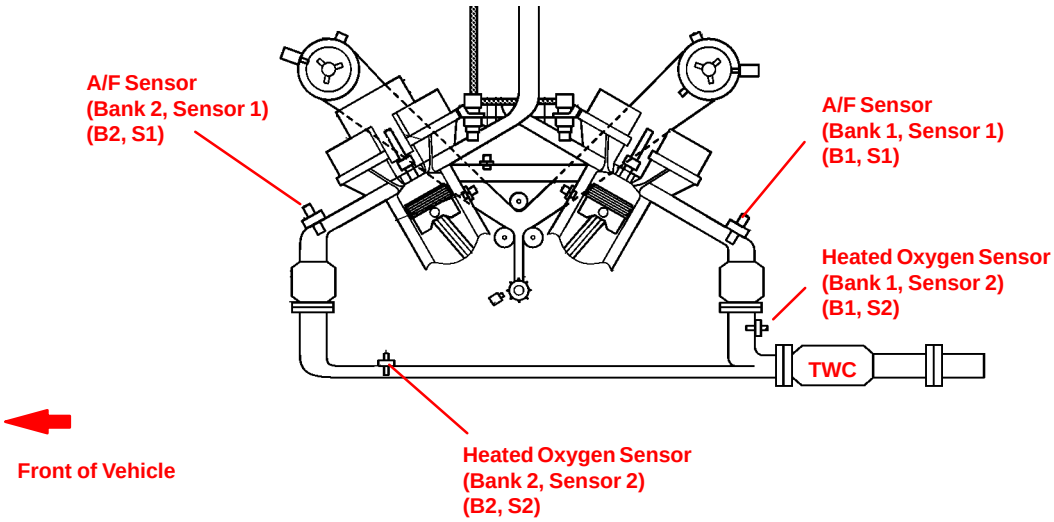
Engine Bank Identification (Continued)

5VZ–FE and 1GR–FE Engine Bank Identification



A/F and O2 Sensor Identification

Sensor Identification (Example of FWD V6)



LEXUS

Technical Service Information Bulletin

February 4, 2000

Title:

WIRELESS OPERATION IMPROVEMENT

Models:

'97 – '99 ES 300

TSIB

ELECTRICAL

EL001–00

Introduction

The antenna matching in the Door Control Receiver has been changed to improve the operating range of the wireless trunk opener function on 1997–1999 ES 300 vehicles.

Applicable Vehicles

- **1997 – 1999 ES 300 vehicles produced before the VIN's listed below.**

Production Change Information

MODEL	ENDING VIN
1999 ES 300	JT8BF28G * X0168000
1999 ES 300	JT8BF28G * X5059850

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
89741–33150	89741–33151	Door Control Receiver

Repair Procedure

1. Replace the Door Control Receiver using the part number specified.
2. Route the wire harness away from the ECU to assure the best performance.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
891101	R & R Door Control Receiver	0.3	89741–33150	87	99

Applicable Warranty*:

This repair is covered under the Lexus Basic Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

LEXUS

Technical Service Information Bulletin

May 4, 2001

Title:

TURN SIGNALS FLASHING ABNORMALLY

Models:

'97 – '01 ES 300

TSIB

Introduction

Some 1997 – 2001 model year ES 300 vehicles may exhibit a condition in which turn signals on one side of the vehicle (either left or right) flash at a different rate than the other side. To correct this situation, the shape of the front turn signal socket has been modified to improve the ground circuit of the bulb.

Applicable Vehicles

- **1997 – 2001** model year **ES 300** vehicles built prior to the VINs specified below.

Production Change Information

MODEL/PLANT	STARTING VIN
MCV20 (Tsutsumi Plant)	JT8BF28G#10293663
MCV20 (TMK Plant)	JT8BF28G#15105850

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
99159–10332	90075–60051	Plug Assy, Front Turn Signal Lamp

Repair Procedure

1. Replace the front turn signal plug assembly, on the side that operates abnormally.
2. Inspect the bulb. If wear is visible on the bottom contacts and/or side contact, replace the bulb.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
EL1010	R & R Front Turn Signal Plug Assembly	0.3	99159–10332	87	41

Applicable Warranty*:

This repair is covered under the Lexus Basic Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in-service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

LEXUS

Technical Service Information Bulletin

April 10, 1998

Title:

CIGARETTE LIGHTER SERVICE

Models:

All Model

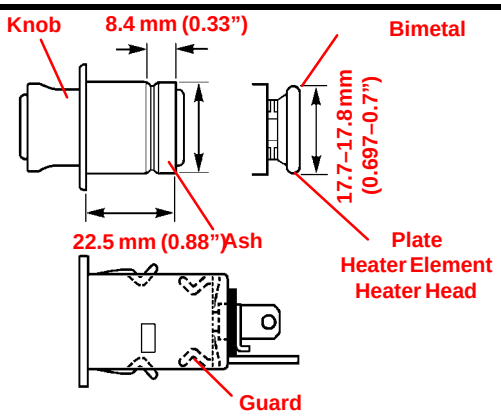
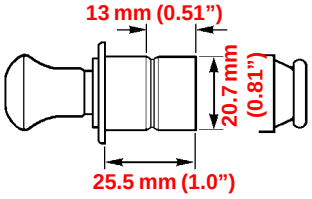
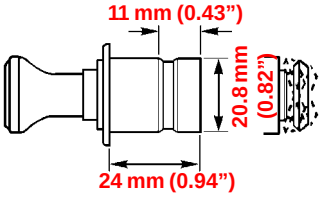
TSIB

Introduction

When receiving customer complaints to repair the lighter or lighter socket, please carefully investigate the cause of the failure to prevent further occurrences. If the customer uses the wrong size lighter element or power accessory plug, damage may occur to the lighter socket. When applicable, instruct the customer to replace the lighter element with original equipment components or to use an appropriate sized accessory plug. Dimensional information included within this document will instruct you on component specifications.

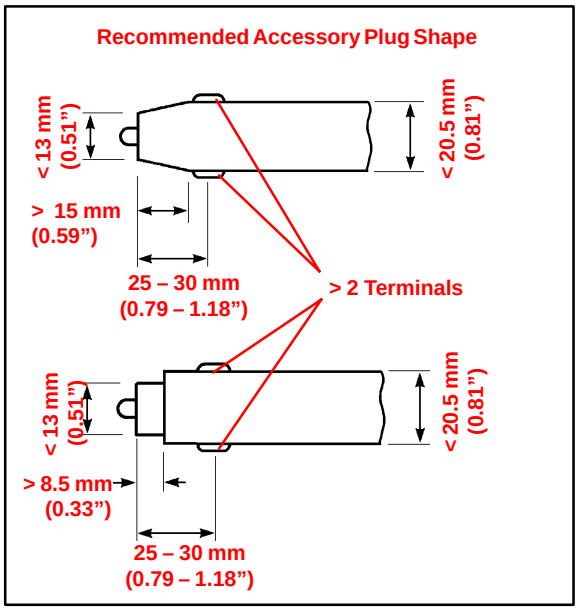
Service Procedure

1. Determine if the lighter is original equipment by using the specifications shown.
   a. If the vehicle has a non–genuine lighter element, it has the possibility to cause a short circuit between the lighter element and the lighter socket, which can result in an open fuse.
   b. A non–genuine lighter element may cause a rattle or bend the socket bimetal contacts.
   c. If a non–genuine lighter element is being used, advise the customer to use an original equipment element.

TYPE	DRAWING WITH DIMESIONS	FEATURES
Genuine		No Problem to use.
Non–Genuine		Too long an ash guard will contact bimetal (positive circuit) plate and cause fuse to melt.
		Excessive free play on the heater head which allows contact between heater element, socket body and bimetal plate, will cause fuse to melt.

Service Procedure (Continued)

2. If the lighter element is original equipment and the lighter socket is bent or pulled out of the dash, please ask the customer about the accessory plug being used in the lighter socket.
    a. The attached specifications in the drawing provide the maximum recommended size of accessory plug. If the customer is using an accessory plug larger than recommended, please advise the customer to use a plug of appropriate size.
    b. Using a power plug larger than the given dimensions may damage the lighter socket.
    c. If the vehicle has a power point socket, advise the customer to use this socket instead of the lighter socket.



Affected Vehicles

- **All** models, **all** model years

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

September 12, 1997

Title:

AIR CONDITIONING EVAPORATOR ODOR

Models:

’92–96 ES 300, ’93–’94 LS 400, All GS 300, SC 300/400, LX 450.

Introduction

A musty odor may be emitted from the air conditioning system of some vehicles which are usually operated in areas with high temperature and humidity. It is most noticeable when the air conditioner is first turned “ON” after the vehicle has been parked for several hours. The odor could result from one or more of the following conditions:

1. Blockage of the evaporator housing drain pipe, resulting in the build up of condensation.

2. Microbial growth in the evaporator, arising from dampness in the evaporator housing where the cooling air flow is dehumidified.

To address excessive air conditioning evaporator odor, check the evaporator housing drain pipe for blockage. If no problems are found, the evaporator and housing should be cleaned and disinfected using the general procedure given on page 2, and the model specific procedure on the pages indicated in the Table of Contents at the bottom of this page.

Affected Vehicles

- While this procedure may be used on any Lexus vehicle, this bulletin gives details specifically for the **’92–’96 ES 300, all GS 300, ’93–’94 LS 400, all SC 300/400 and the LX 450.**

Tools & Materials

PART NUMBER	DESCRIPTION OF TOOLS & MATERIALS	QUANTITY	SOURCE
08821–00810–01	Spray Gun Kit	1	OTC
08821–00811–01	Spray Gun (replacement)	(1)	OTC
08821–00812–01	Spray Gun Nozzle (replacement)	(1)	OTC
08821–00813–01	Freshener Mixing Container (replacement)	(1)	OTC
08821–00801–DS	Air Conditioning Freshener	1 per vehicle	TMS

CAUTION:
Wear safety glasses, protective mask, and gloves while working with the freshener.

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	No applicable warranty information	–	–	–	–

Table of Contents

MODEL	PAGE	MODEL	PAGE	MODEL	PAGE	MODEL	PAGE
GENERAL	2	ES 300	3	GS 300	5	LS 400	7
		SC 300	9	SC 400	9	LX 450	11
General Procedure applies to all models and model years. The Specific Model Sections cover only the listed “affected models.”							

General Procedure

1. Preparation of freshener solution:

   (a) Invert freshener container and shake vigorously for 30 seconds.
   (b) Mix 3.4 fl. oz. of freshener (1 container) with 30 fl. oz. to make 1 qt. of solution.

2. Drying the evaporator:
   - Dry the evaporator for 10 minutes with the following settings:
     A/C: . . . . . Off
     Air Outlet: . . . . . Foot
     Mode: . . . . . Recirc.
     Blower: . . . . . High
     Temp: . . . . . Max Warm

3. Evaporator Treatment Preparation:

   (a) Ensure availability of 30–45 psi compressed air to be used with spray gun for application of freshener.
   (b) Place a tray under the evaporator housing drain hose to collect used cleaning solution.
   (c) Place shop cloth under the evaporator housing in the vehicle to prevent cleaning solution from dripping onto the floor mat.

4. Vehicle Preparation: **See specific model section.**

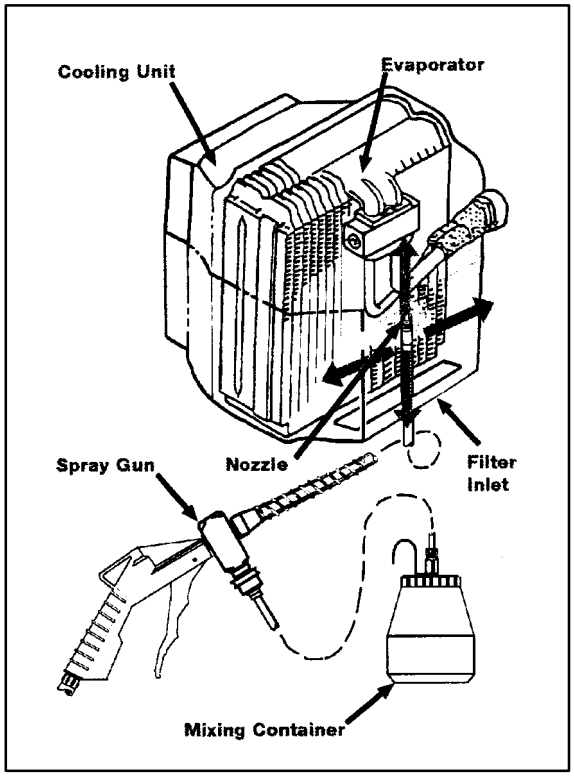
5. Evaporator treatment:

   (a) Set HVAC mode as follows:
   A/C: . . . . . Off
   Air Outlet: . . . . . Face
   Mode: . . . . . Fresh
   Blower: . . . . . High
   Temp: . . . . . Max Warm
   Windows: . . . . . Open
   (b) Insert spray nozzle into the filter inlet and spray the entire quantity (1 qt.) of freshener solution into the evaporator while moving the nozzle around to cover the complete evaporator surface.
   (c) Turn the blower OFF.

6. Reinstallation of Parts.

7. Completion of Treatment.

   (a) Dry the evaporator for 30 minutes with the following settings:
   A/C: . . . . . Off
   Air Outlet: . . . . . Foot
   Mode: . . . . . Recirc.
   Blower: . . . . . High
   Temp: . . . . . Max Warm
   Windows: . . . . . Closed
   (b) If the vehicle still has alcohol smell, open windows for ventilation. Do not turn on the AC switch until the evaporator is completely dry as this can reduce the effectiveness of the solution.

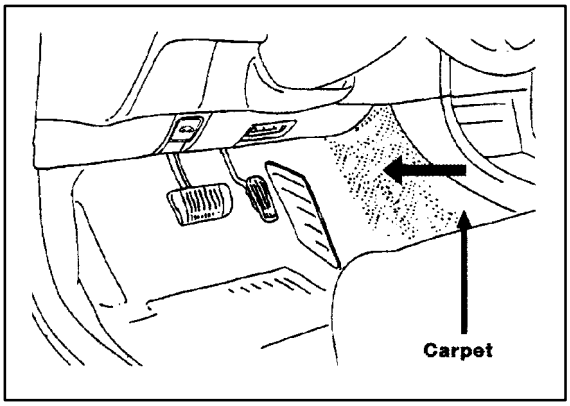


CAUTION
Do not get into the vehicle during this drying operation.

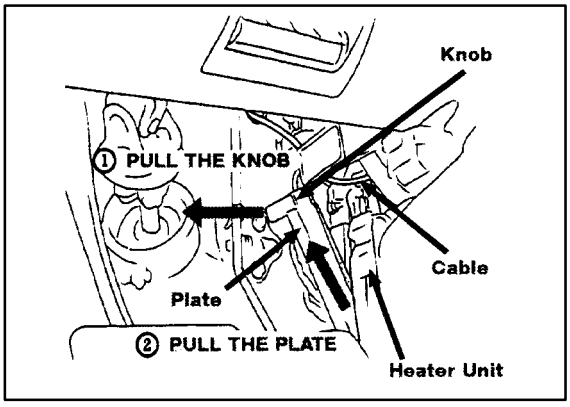
ES 300 ('92–'96)

1. Removal of parts.

(a) Pull down the carpet from the center console as indicated by red arrow in the illustration.



(b) Remove the plate on the side of the heater unit using steps ① and ②, indicated with red arrows to show direction, in the illustration.

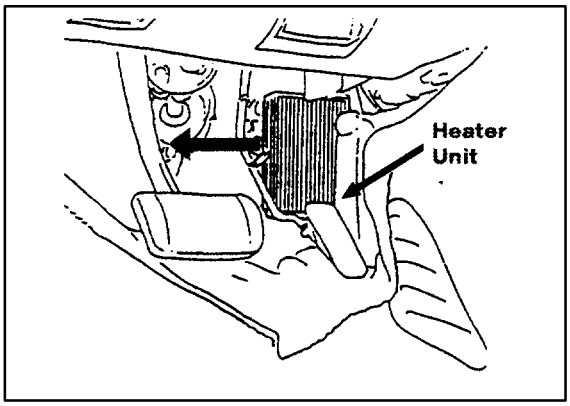


CAUTION:
Do not bend the cable.

NOTE:
The Plate will be reused.

(c) Remove the filter.

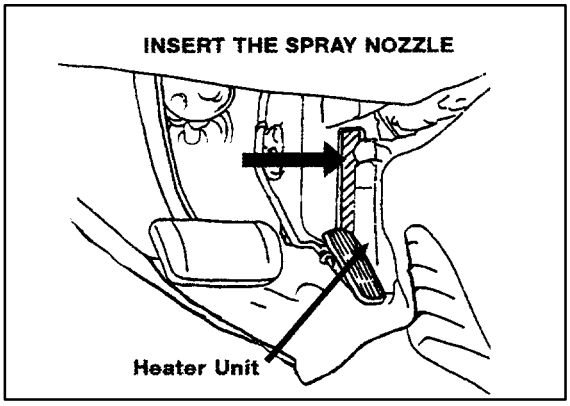
(d) Remove the blower controller.



2. Clean the Evaporator.

- Follow the general procedures given on page 2.

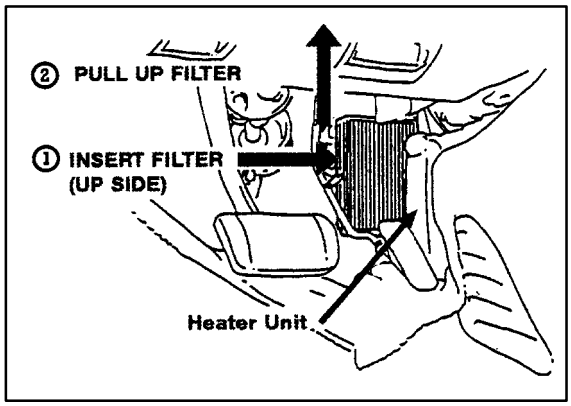
NOTE:
Location for insertion of spray nozzle is indicated by the red arrow in the illustration.



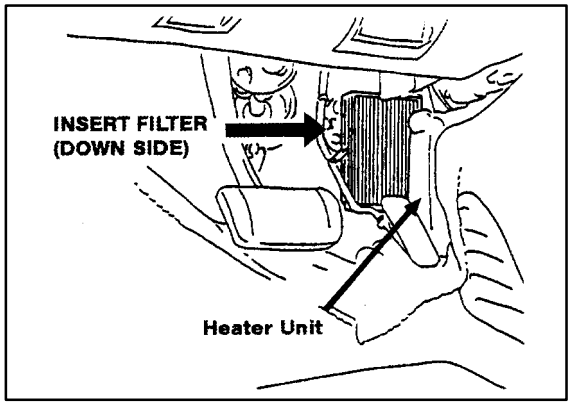
ES 300 ('92–'96)
(Continued)

3. Reinstallation of parts.

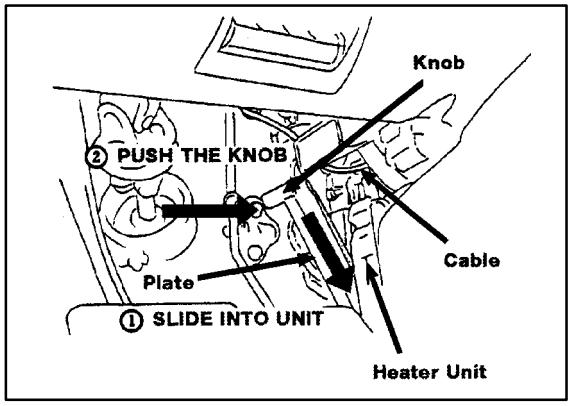
(a) Insert the filter (up side) into the heater unit following the numbered steps shown in the illustration.



(b) Insert the filter (down side) into the heater unit.



(c) Reinstall the plate on the side of the heater unit using steps ① and ②, indicated with **red** arrows to show direction, in the illustration.



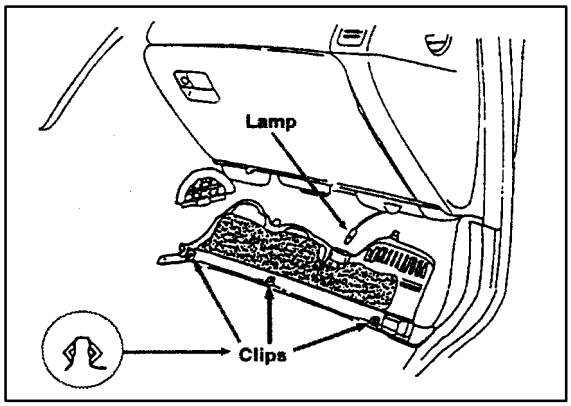
CAUTION:
Confirm that the plate is secure.

(d) Restore the carpet to its original position taking care not to bend the cable.

GS 300 1. Removal of parts.

(a) Remove the undercover.

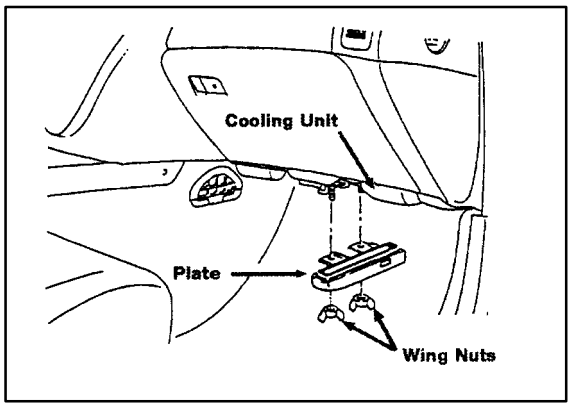
NOTE:
Pull down the clip areas (3 places) of the Undercover to remove.



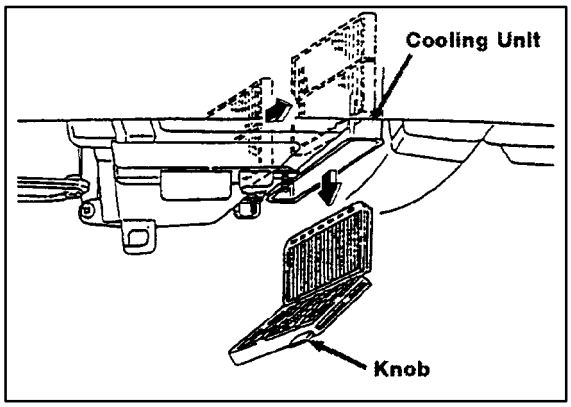
(b) Remove the lamp.

(c) Remove the (2) wing nuts and the plate on the bottom of the cooling unit.

CAUTION:
The plate and wing nuts will be reused.



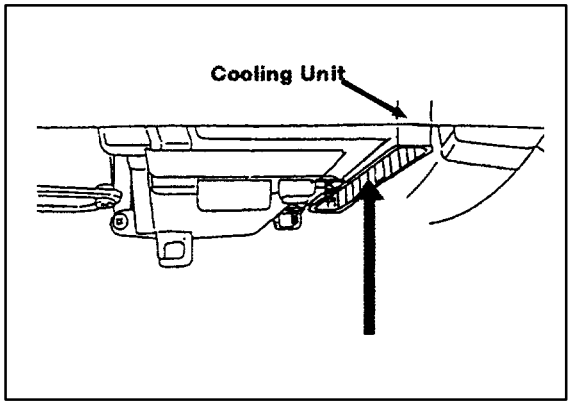
(d) Remove the (2) filters from the cooling unit.



2. Clean the Evaporator.

- Follow the general procedures given on page 2.

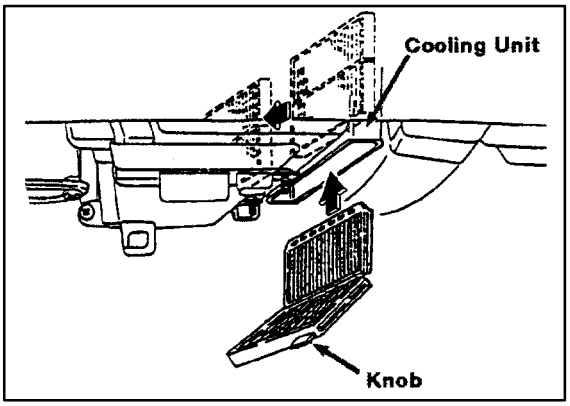
NOTE:
Location for insertion of spray nozzle is indicated by the red arrow in the illustration.



GS 300 (Continued)

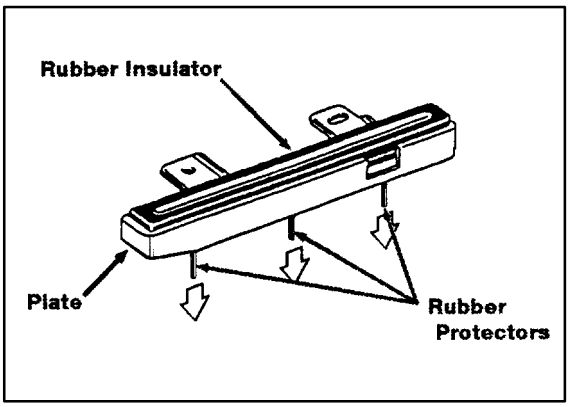
3. Reinstallation of parts.

(a) Insert the (2) filters into the cooling unit as shown in the illustration.



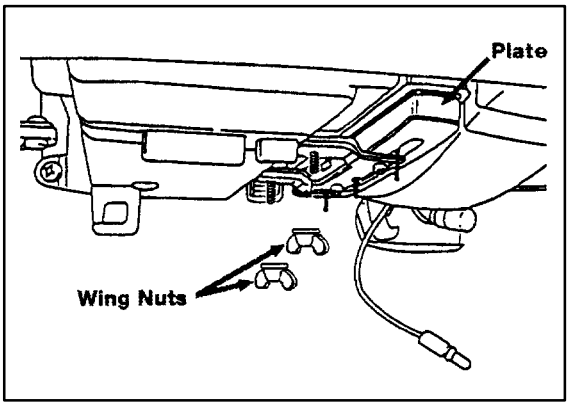
NOTE:
Insert a clean air filter with it's knob facing downwards, then slide it forward and install the second filter in the same manner.

(b) Assemble the rubber insulator on the plate.



CAUTION:
To prevent the cooling unit from leaking water, pull the three rubber projections from the other side of the plate to make sure that the rubber insulator seals properly against the plate.

(c) Install the plate on the cooling unit and secure with the (2) wing nuts.



CAUTION:
To prevent water leaks, verify that the cooling unit and plate are fully secure before tightening the wing nuts.

NOTE:
Before installing the plate on the cooling unit, coat the rubber insulator with water for easier assembly.

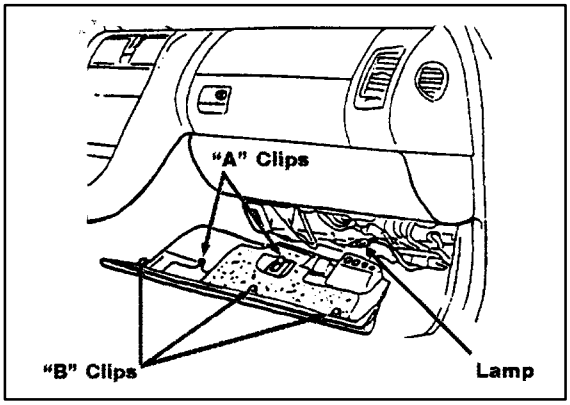
(d) Reinstall the lamp.

(e) Reassemble the Undercover.

LS 400 ('93–'94)

1. Removal of parts.

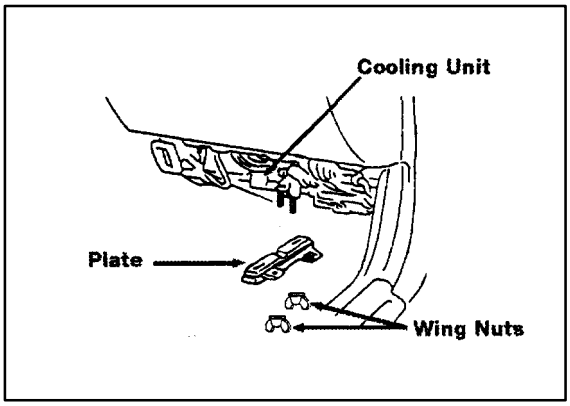
   (a) Remove the undercover.



NOTE:
- **Remove the front of "A" clips.**
- **Pull down the three "B" clip areas of the Undercover to remove.**

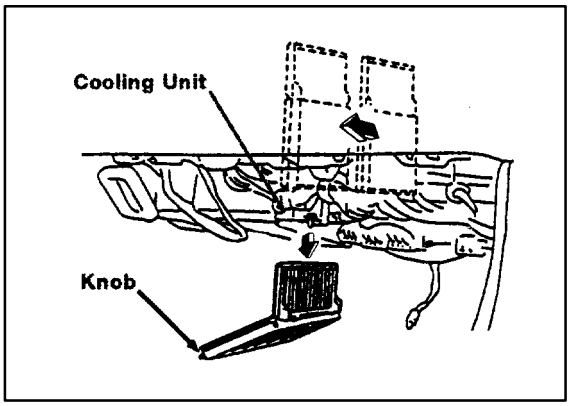
   (b) Remove the lamp.

   (c) Remove the (2) wing nuts and the plate on the bottom of the cooling unit.



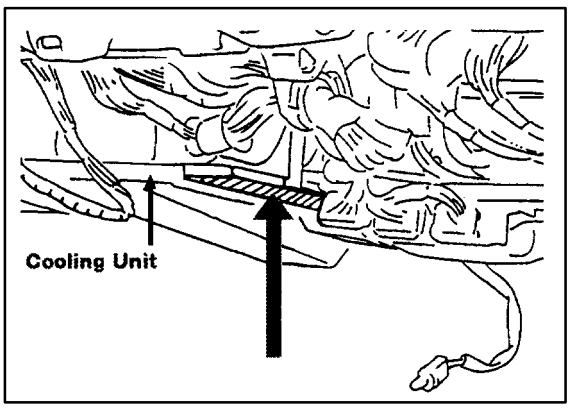
CAUTION:
The plate and wing nuts will be reused.

   (d) Remove the (2) filters from the cooling unit.



2. Clean the Evaporator

   - Follow the general procedures given on page 2.

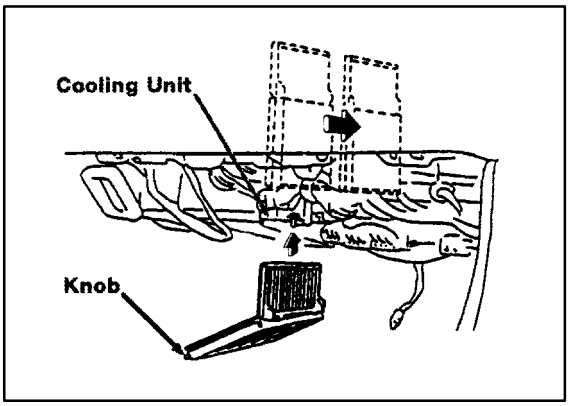


NOTE:
Location for the insertion of spray nozzle is indicated by the red arrow in the illustration.

LS 400 ('93–'94) (Continued)

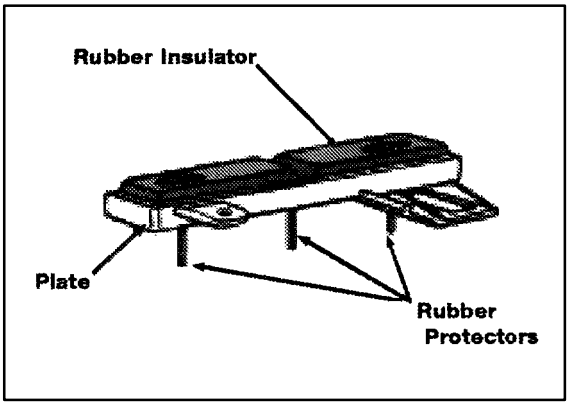
3. Reinstallation of parts.

(a) Insert the (2) filters into the cooling unit as shown in the illustration.



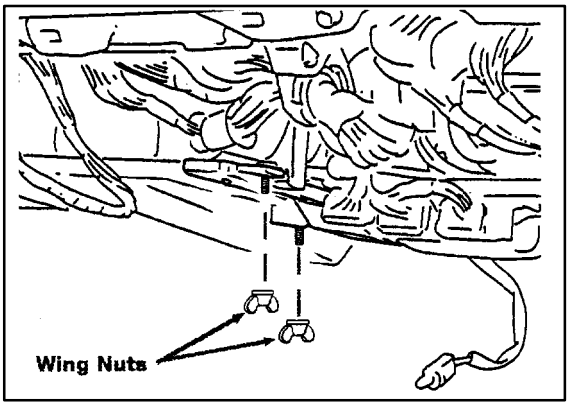
NOTE:
Insert a clean air filter with it's knob facing downwards, then slide it forward and install the second filter in the same manner.

(b) Assemble the rubber insulator on the plate.



CAUTION:
To prevent the cooling unit from leaking water, pull the three rubber projections from the other side of the plate to make sure that the rubber insulator seals properly against the plate.

(c) Install the plate on the cooling unit and secure with the (2) wing nuts.

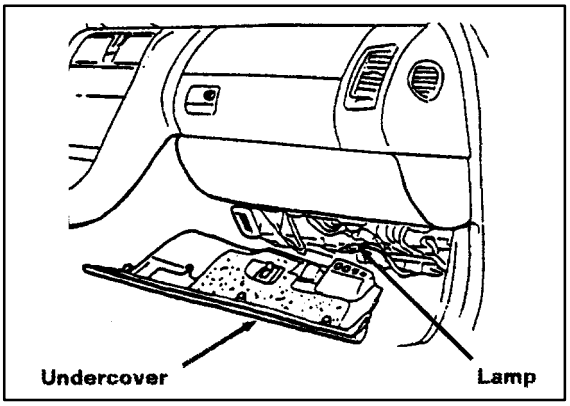


CAUTION:
To prevent water leaks, verify that the cooling unit and plate are fully secure before tightening the wing nuts.

NOTE:
Before installing the plate on the cooling unit, coat the rubber insulator with water for easier assembly.

(d) Reinstall the lamp.

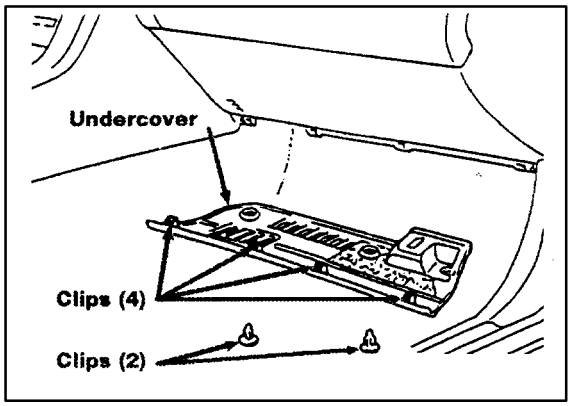
(e) Reassemble the Undercover.



SC 300
SC 400

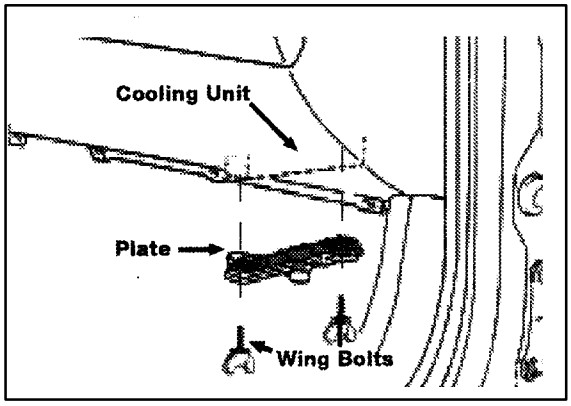
1. Removal of parts.

   (a) Remove two clips using the clip remover then remove the undercover.



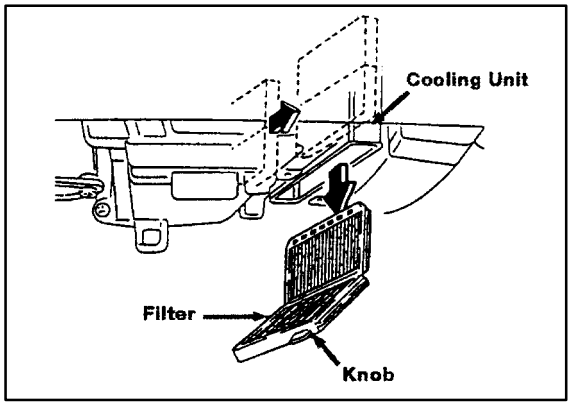
> **NOTE:**
> **Pull down the clip areas (4 places) of the Undercover to remove.**

   (b) Remove the (2) wing nuts and the plate on the bottom of the cooling unit.



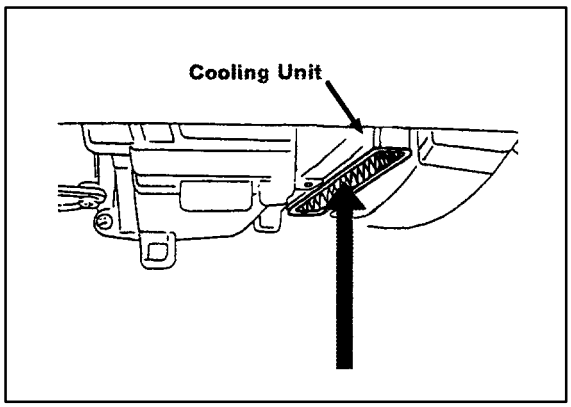
> **CAUTION:**
> **The plate and wing nuts will be reused.**

   (c) Remove the (2) filters from the cooling unit.



2. Clean the Evaporator

   - Follow the general procedures given on page 2.

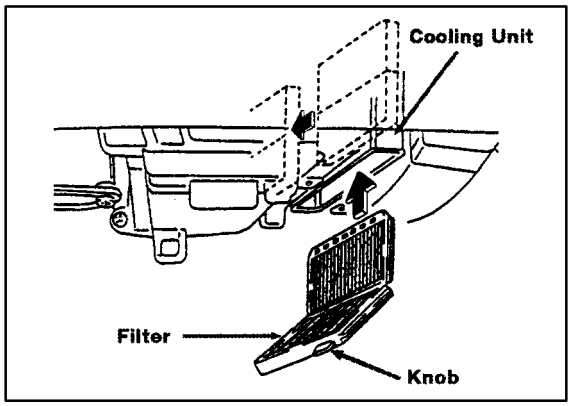


> **NOTE:**
> **Location for the insertion of spray nozzle is indicated by the red arrow in the illustration.**

SC 300
SC 400
(Continued)

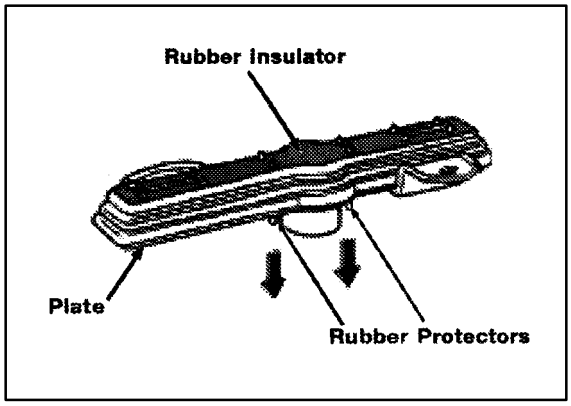
3. Reinstallation of parts.

(a) Insert the (2) filters into the cooling unit as shown in the illustration.



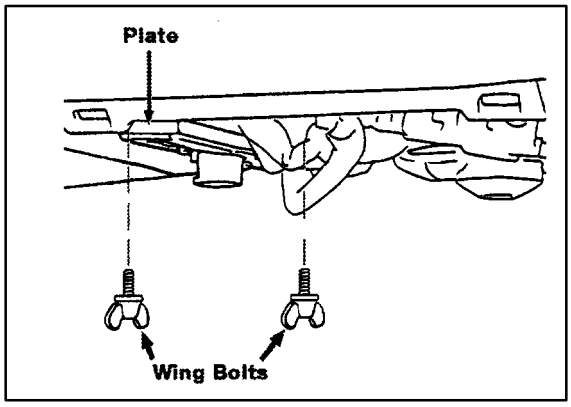
NOTE:
Insert a clean air filter with it's knob facing downwards, then slide it forward and install the second filter in the same manner.

(b) Assemble the rubber insulator on the plate.



CAUTION:
To prevent the cooling unit from leaking water, pull the three rubber projections from the other side of the plate to make sure that the rubber insulator seals properly against the plate.

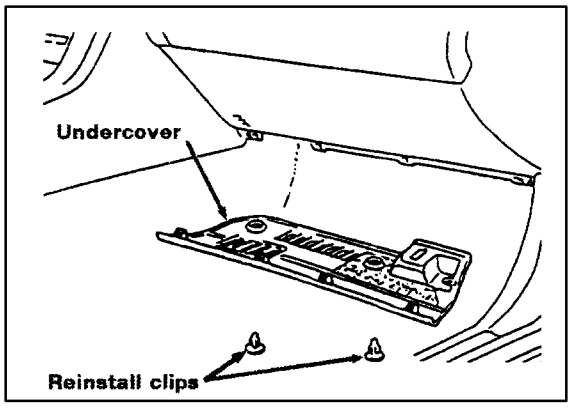
(c) Install the plate on the cooling unit and secure with the (2) wing nuts.



CAUTION:
To prevent water leaks, verify that the cooling unit and plate are fully secure before tightening the wing nuts.

NOTE:
Before installing the plate on the cooling unit, coat the rubber insulator with water for easier assembly.

(d) Reassemble the Undercover.



LX 450 1. Removal of parts.

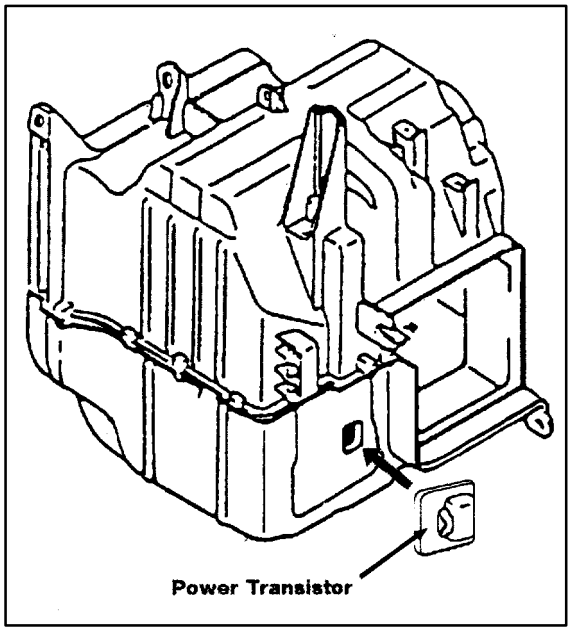
(a) Remove the glove compartment door.
(b) Remove the A/C Amplifier.
(c) Remove power transistor.

2. Clean the Evaporator

- Follow the general procedures given on page 2.

3. Reinstallation of parts.

- Reinstall the parts in reverse order of removal described in step 1.



LEXUS

TECHNICAL SERVICE INFORMATION

REF: HEATING & AIR CONDITIONING
NO: AC003-96
DATE: JUNE 7, 1996
MODEL: ALL MODELS

Title **A/C COMPRESSOR MAINTENANCE FOR STORED VEHICLES**

When a vehicle is stored for a long period, the volume of oil in the A/C compressor may decrease due to oil flow into the condenser, pipes, etc.

If the A/C system is turned on at high engine RPM after a long storage period, A/C compressor damage may result.

To minimize the possibility of damage to the A/C compressor while storing a vehicle, perform the following recommended procedure at least once a month to lubricate the compressor.

RECOMMENDED PROCEDURE FOR A/C COMPRESSOR LUBRICATION:

1. Turn off A/C And blower switches prior to starting engine.
2. Start and warm–up engine until engine speed drops below 1,000 RPM.
3. Turn on the A/C system using the following settings:
   - A/C switch: On
   - Blower Speed: High
   - Engine speed: Below 1,000 RPM
4. Keep A/C on with engine idling for 30 seconds.
5. Turn off A/C system and stop engine.

Lexus Supports ASE Certification

LEXUS

TECHNICAL SERVICE INFORMATION

REF: AUDIO

NO: AU001–96

MODEL: ALL MODELS

Title **STATIC NOISE ON WEAK AM STATIONS**

Some Lexus audio systems may exhibit audible electrical noise on weak AM stations when various electrical accesssories (turn signals, rear defogger, cruise control, brakes, etc.) are operated.

Poor antenna grounding can cause this condition.

To eliminate or reduce the intensity of the noise use the following repair procedure:

REPAIR PROCEDURE:

1. Play the radio on a strong, static–free AM station and slowly move the tip of the antenna mast forward and back approximately 2 inches (Fig. 1). If static noise is not heard, go to Step 2. If static noise is heard during antenna movement, replace the antenna mast and go to Step 3.

NOTE: Do not touch the antenna mast with your bare hands. Use a glove or non-metallic object to move the antenna. (If you touch the antenna with your hands, you will change the antenna sensitivity).

2. Remove the antenna mast and inspect the base of the mast for corrosion and damage. Clean with 1500 grit sandpaper (Fig. 2).

3. Remove the antenna assembly and inspect the inner fender around the antenna hole for corrosion. Clean with 1500 grit sandpaper (Fig. 3).

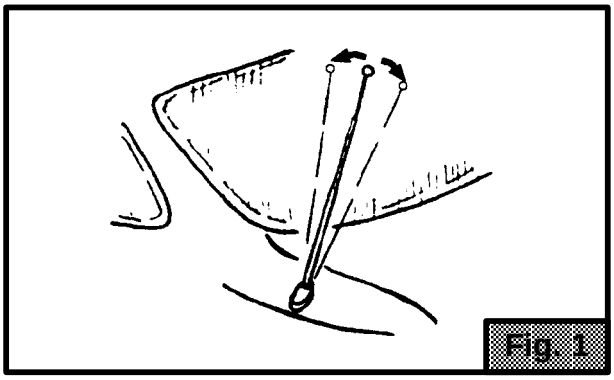


Fig. 1

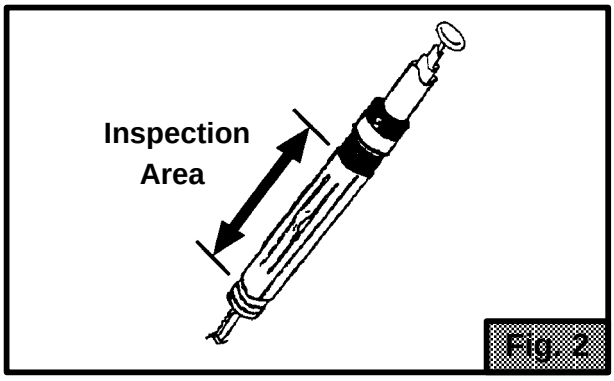


Fig. 2

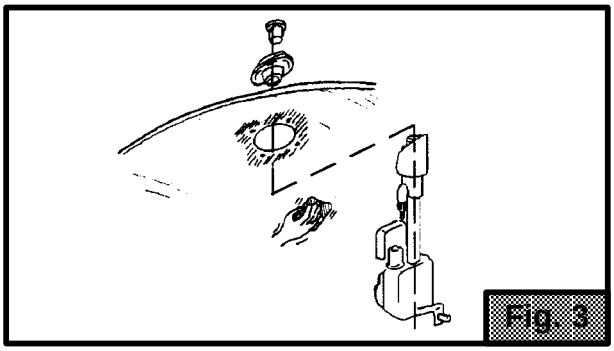
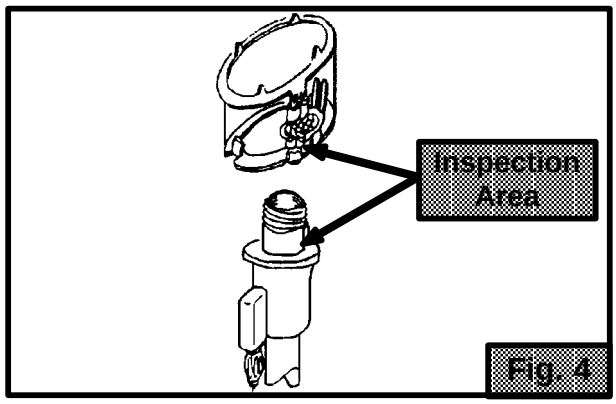


Fig. 3

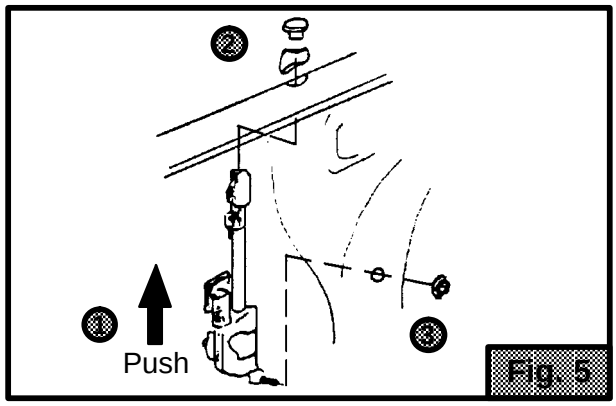
Lexus Supports ASE Certification

REPAIR PROCEDURE (Cont'd):

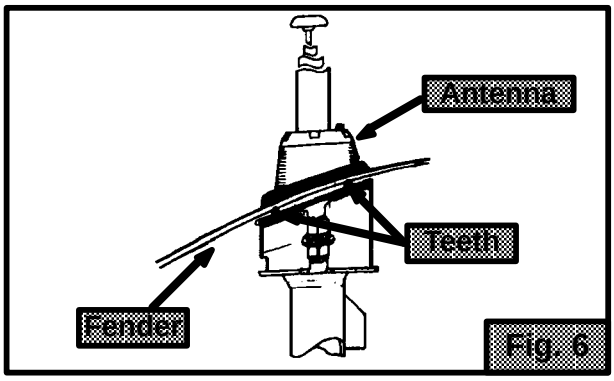
4. Remove the antenna spacer grommet at the top of the antenna assembly and inspect for corrosion. Clean with 1500 grit sandpaper (Fig. 4).



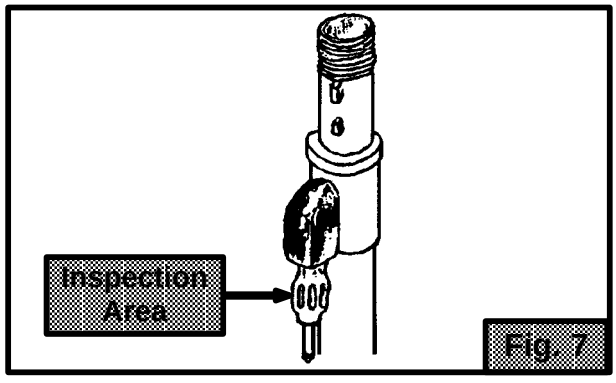
5. Reinstall the antenna assembly. Be sure to install the external antenna nut (escutcheon) first. Then install the nut which holds the assembly to the inner bracket (Fig. 5).



6. Check to make sure that the teeth on the antenna spacer grommet make good contact with the inner fender well (Fig. 6).



7. Inspect the antenna cable connection and clean as necessary. Reconnect the antenna cable, the wire harness and the drain hose (Fig. 7).



WARRANTY INFORMATION:

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
EL5001	Listed TSIB repair procedure (All Items)	1.0	86300–XXXXX	76	73

LEXUS
Technical Service Information Bulletin
May 16, 1997

Title:

CLEANING CASSETTE TAPE HEADS AND CAPSTANS

Models:

All Models

TSIB
AUDIO
AU001–97
REVISED

Introduction

The cassette tape head and capstan should be cleaned regularly to prevent poor sound quality and/or cassettes from jamming.

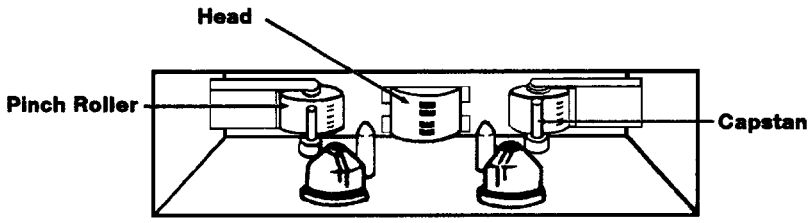


Fig. 1

Conditions

The following conditions can easily be avoided by regularly cleaning the head with a tape cleaner and only using good quality cassettes.

Poor Sound Quality due to Dirty Head

Since the tape head contacts the cassette tape, the tape head accumulates metal oxides and dirt particles from the tape. In time, a layer of dirt forms on the tape head resulting in poor transfer of information between the tape and the tape head. This typically causes a reduction of higher frequencies or a reduction of the brightness in sound quality.

Tape Speed

Tape speed is controlled by the tape capstan and pinch rollers. If the capstan and pinch rollers accumulate dirt, the tape may slip causing the music to play too fast or too slow.

Jamming

Dirt can make the capstans sticky, causing the tape to become entangled in the cassette mechanism. This can cause the cassette to become jammed in the player.

Cassette Tape Head Cleaners

To reduce the occurrence of these conditions, the following approved cassette cleaners are available through the non–parts system (Material Distribution Center).

TOOLS & MATERIALS	MATERIAL NUMBER	DESCRIPTION
Allsop 3 Cassette Recorder Cleaner	00113–AS710–00	Cleaning Cassette and Cleaning Solution with Instruction Sheet

NOTE:
Allow 15 minutes for the cleaning fluid to evaporate before playing a tape.

Cassette Tape Care Procedure

The following precautions should be taken to keep cassettes in good condition:

1. Remove the cassette from the player when the cassette is not in use.

2. Store the cassette in its case.

3. Store the cassette in a cool, dry area away from direct sunlight and magnetic components such as speakers.

4. Avoid touching the tape itself. This could result in poor sound quality or sound drop out.

5. Keep the tape tightly wound as shown in figure 2. Tape speed can be affected by loosely wound tape.

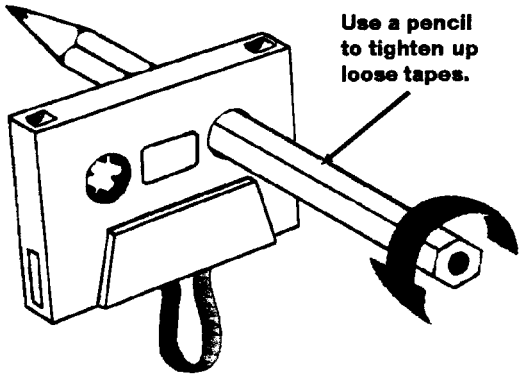


Fig. 2

6. Avoid inserting a cassette into the player if the cassette label is loose or peeling as shown in figure 3. This can cause a cassette to become stuck in the player.

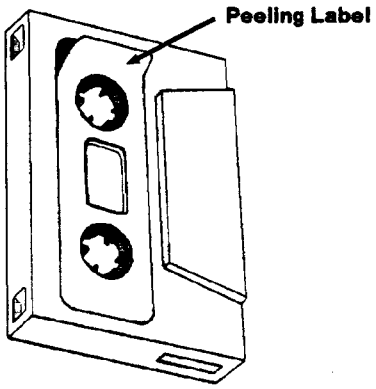


Fig. 3

7. Use cassettes that are 90 minutes or less in length. Cassettes over 90 minutes use extremely thin tape that is subject to stretch, resulting in poor sound quality.

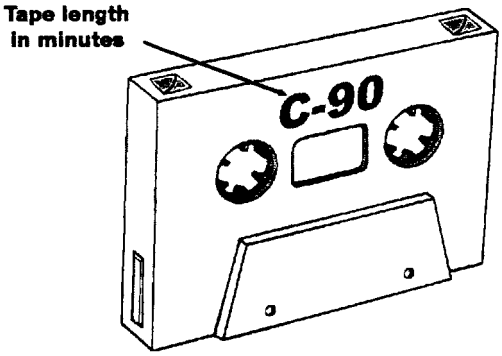


Fig. 4

LEXUS

Technical Service Information Bulletin

February 21, 1997

Title:

WIND NOISE REPAIR KIT

Models:

All Models

TSIB

BODY
BO001-97

Introduction

A kit containing special foam sponge material has been developed. This kit, when used in conjunction with procedures outlined in the Interior and Wind Noise Diagnosis Manual (P/N 00246-30015) and Lexus Service Information Bulletins, should enable effective wind noise repairs.

Affected Vehicles

- **All Models**

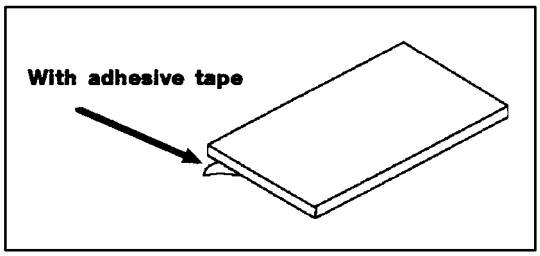
Parts Information

PART NUMBER	PART NAME	SIZE (MM)	QTY
08231-00810	Kit, Wind Noise	– – –	1
08231-00811*	Caulking Sponge Sealant No. 1	297 x 150 (T = 3.0)	2
08231-00812*	Caulking Sponge Sealant No. 2	297 x 150 (T = 5.0)	2
08231-00813*	Caulking Sponge Sealant No. 3	297 x 150 (T = 10.0)	2
08231-00814*	Caulking Sponge Sealant No. 4	297 x 150 (T = 3.0)	2
08231-00815*	Caulking Sponge Sealant No. 5	297 x 150 (T = 5.0)	2
08231-00816*	Caulking Sponge Sealant No. 6	297 x 150 (T = 5.0)	2

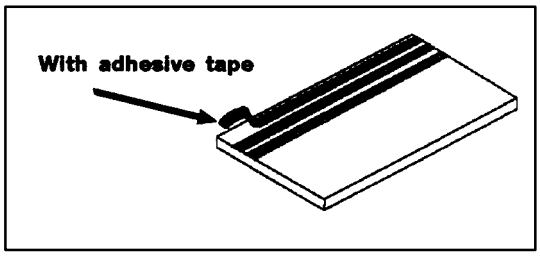
* All of these parts are included in the kit.

Kit Components

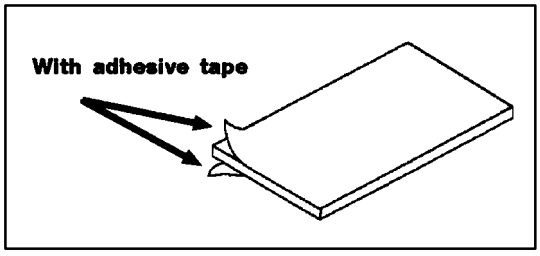
1. Caulking Sponge Sealant No. 1, No. 2 and No. 3 (Ept-sealer).



2. Caulking Sponge Sealant No. 4 and No. 5 (Ept-sealer). This sheet is divided into 27 strips, 5 mm wide.



3. Caulking Sponge Sealant No. 6 (Ept-sealer).



LEXUS

TECHNICAL SERVICE INFORMATION

REF: BODY

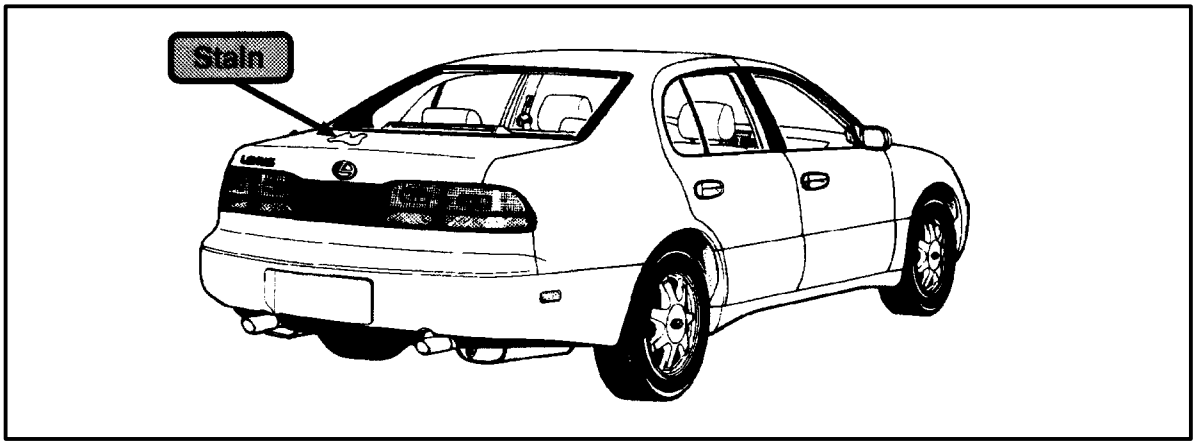
NO: BO002–96

DATE: AUGUST 9, 1996

MODEL: ALL MODELS

Title **STAINS ON RAPGARD APPLIED AREAS**

On some Lexus models, when Rapgard is removed from the vehicle, a stain is left on the paint surface. This stain can be seen under the clear coat and is not a defect of the clear coat. The stain corresponds to a wrinkled area of Rapgard which retained liquids, such as window washer fluid, that left a discoloration.



REPAIR PROCEDURE:

To remove a stain from a vehicle, heat the stain surface to a temperature of 70°C – 80°C. When the stain is removed it will not reappear.

Equipment –

1. Infrared lamp or dryer to heat the surface.
2. Aluminum foil or a damp cloth to protect plastic parts from deformation.

Procedure –

1. Apply aluminum foil to adjoining plastic parts or cool with damp cloth periodically.
2. Use an infrared lamp or dryer on the stain developed area and heat for 5 to 10 minutes at 70°C – 80°C.
3. After heating for 5 minutes, check whether the stain has disappeared. If the stain still remains, reheat the area and check again.

NOTE: Take care that the body's paint surface temperature does not become too high.

WARRANTY INFORMATION:

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
BD6004	Remove stains from paint surface caused by Rapgard	0.6	53301–XXXXX	61	99

LEXUS

TECHNICAL SERVICE INFORMATION

REF: BODY

NO: BO003–96

DATE: NOVEMBER 15, 1996

MODEL: ALL MODELS

Title **SEAT BELT EXTENDERS FOR 1993 THROUGH 1997 MODELS**

Lexus customers who find it necessary to increase the length of their seat belts may obtain Seat Belt Extenders at no cost through their local Lexus dealer.

- The extender is available in black only, in 6, 9, 12, 15 and 18 inch lengths.
- Owners are informed of the seat belt extender availability through the Lexus Owner's Manual included in each vehicle.

The customer *(individual requiring the extender)* must visit a Lexus Dealership to have the required measurements made and to complete the seat belt extender worksheet. The worksheet will allow the proper fitting and selection of a seat belt extender for the customer. The dealership personnel should then determine the applicable part number and place a *Critical Order* through the *TDN Parts Network.*

Included in this bulletin is the information covering the1993 through 1997 model years:

Contents	Page
Flow Chart	2
Application/Part Number	3
Owner Instruction Sheet	4
Statement from Owner's Manual	5
Seat Belt Extender Worksheet	6

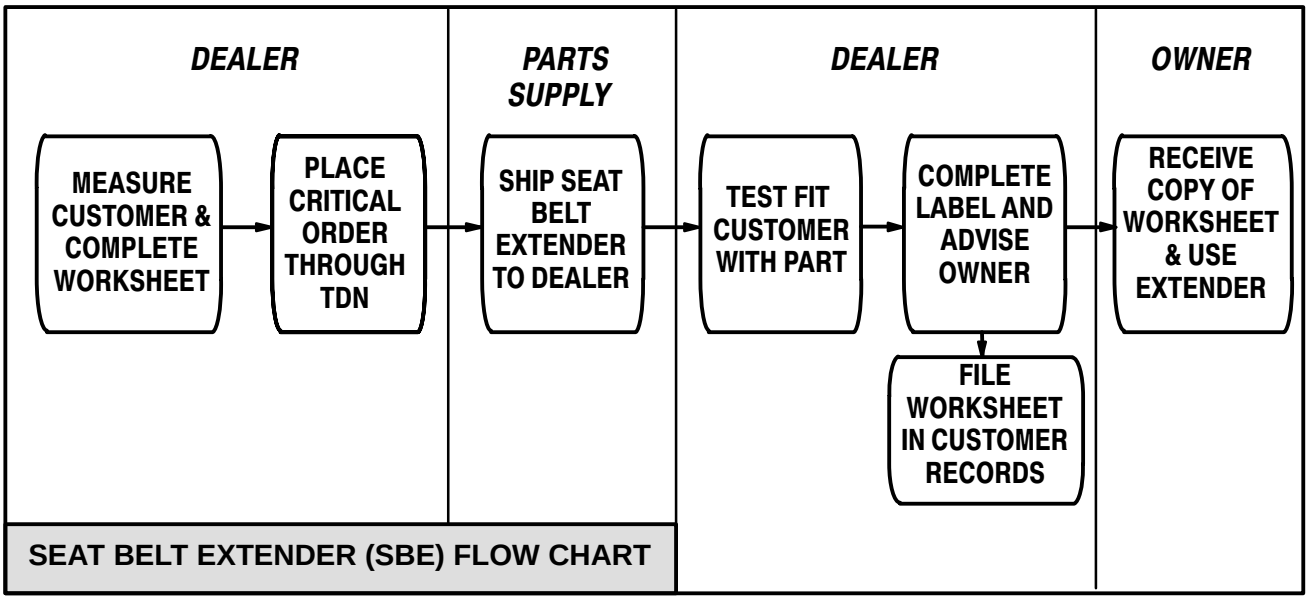
The dealership service department should complete the affixed Seat Belt Extender Label and review the "owner instruction sheet" with the customer. The dealership should give a copy of the completed worksheet to the customer and keep the original in the customer's file.

To assure utmost owner satisfaction, it is recommended that a dealership designate one person to coordinate all activities related to the seat belt extender issue.

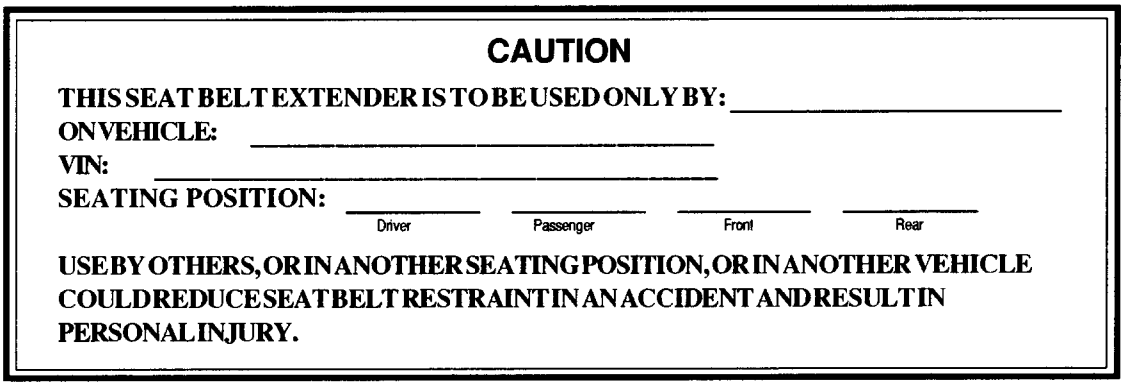
From past sales history, it is recommended that dealerships **do not** stock seat belt extenders due to low demand and the need for customer fitting.

PROCEDURE:

1. Owner requests a seat belt extender from the dealer.
2. Dealer verifies the need for a seat belt extender, obtains a current copy of the TSB, and copies the worksheet.
3. Dealer measures the customer and completes the worksheet. Dealer determines the correct part number and places a Critical Order for the part through the TDN Parts Network.
4. Dealer receives the seat belt extender and calls the customer in to check fit of the part.
5. If the seat belt extender fit is OK, dealership personnel complete the customer information label on the part, explains usage of the part to customer, then gives customer a copy of the completed worksheet.
6. Dealer places a copy of the completed worksheet in the customer's records.



SAMPLE SEAT BELT LABEL:



PART NUMBER INFORMATION:

Locate the series code on the ***series application*** charts, then use the ***part number by length*** chart to identify the correct part number for the specific customer.

FRONT SEAT EXTENDER SERIES APPLICATION TABLE:

Model	1997	1996	1995	1994	1993
LS 400	R-3	R-3	R-3	R-3	R-3
GS 300	N-3	N-3	N-3	N-3	N-3
SC 400	R-3	R-3	R-3	R-3	R-3
SC 300	R-3	R-3	R-3	R-3	R-3
ES 300	R-5	K-4	K-4	K-4	K-4
LX 450	R-3	R-3	-	-	-

REAR SEAT EXTENDER SERIES APPLICATION TABLE:

Model	1997	1996	1995	1994	1993
LS 400	R-3	R-3	R-3	R-3	R-3
GS 300	K-4	K-4	K-4	K-4	K-4
SC 400	R-3	R-3	R-3	R-3	R-3
SC 300	R-3	R-3	R-3	R-3	R-3
ES 300.. Right & Left	R-5	R-3	R-3	R-3	R-3
ES 300..Center	R-3*	-	-	-	-
LX 450	K-4**	K-4**	-	-	-

NOTE: **The extender must not be used for the center rear seat belt (except '97 model ES 300 as noted in the chart).*
***Includes third seat application.*

PART NUMBER BY REQUIRED LENGTH (73399–):

SERIES	6 INCH	9 INCH	12 INCH	15 INCH	18 INCH
K-4	33010	33020	33030	33040	33050
N-3	20011	20021	20031	20041	20051
R-3	50010	50020	50030	50040	50050
R-5	16060	16070	16080	16090	16100

OWNER INSTRUCTION FOR PERSONALIZED SEAT BELT EXTENDER:

CAUTION FOR USE OF SEAT BELT EXTENDERS:

1. Never use the seat belt extender if you can fasten the seat belt without it.

2. Remember the seat belt extender provided for you may not be safe when used in a different vehicle, or for another person or at a seating position different than specified.

3. When the seat belt extender is provided for a rear seat position (with automatic locking retractor), make sure the retractor is locked when in use.

4. FAILURE TO FOLLOW THESE INSTRUCTIONS COULD RESULT IN A LESS EFFECTIVE SEAT BELT RESTRAINT SYSTEM IN CASE OF A VEHICLE ACCIDENT, CAUSING PERSONAL INJURY.

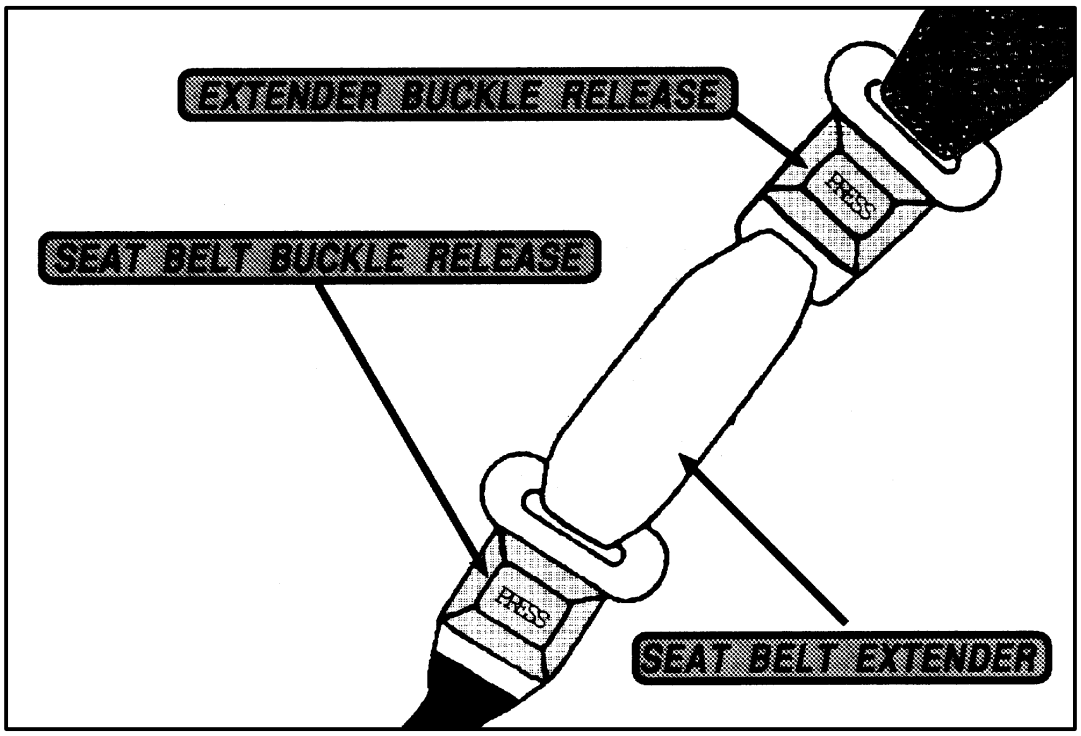
USING THE SEAT BELT EXTENDER:

1. Connect the seat belt extender to the seat belt by inserting the tab into the seat belt buckle so the buckle release buttons of the seat belt extender and the seat belt are located on the same side as shown in the illustration. You will hear a click when the tab properly locks into the buckle.

2. MAKE SURE THAT THE CONNECTION IS SECURE AND THE SEAT BELT EXTENDER IS NOT TWISTED.

3. When releasing the seat belt, press on the buckle release button on the seat belt extender, not on the seat belt. This helps prevent damage to the vehicle interior and seat belt extender.

4. When not in use, remove the extender and store in the vehicle.



OWNER'S MANUAL TEXT:

SEAT BELT EXTENDER

If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Lexus dealer free of charge.

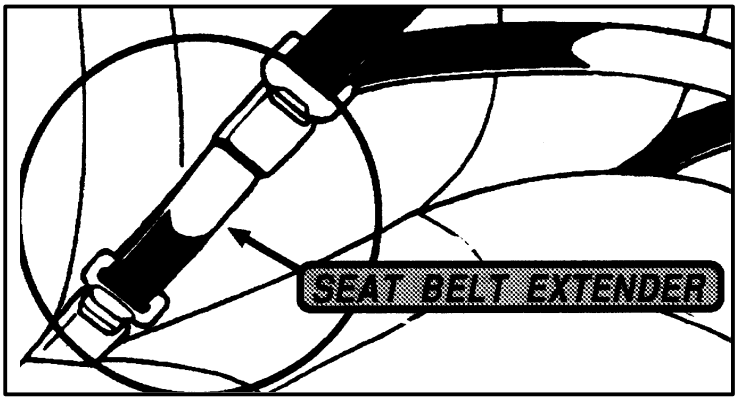
Please contact your local Lexus dealer so that the dealer can order a seat belt extender of the proper required length. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Lexus dealer.

CAUTION:

When using the seat belt extender, observe the following. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of a vehicle accident, increasing the chance of personal injury.

- Never use the seat belt extender if you can fasten the seat belt without it.

- Remember that the seat belt extender provided for you may not be safe when used on a different vehicle, or for another person and/or at different seating positions than specified.



To connect the seat belt extender to the seat belt, insert the tab into the seat belt buckle so that the buckle release buttons of the seat belt extender and the seat belt are both facing outward as shown.

You will hear a click when the tab locks into the buckle. When releasing the seat belt, press on the buckle–release button on the seat belt extender, not on the seat belt. This helps prevent damage to the vehicle interior and seat belt extender itself.

When not in use, remove the seat belt extender and store in the vehicle for future use.

CAUTION:

After inserting the tab, make sure that the connection is secure and the seat belt extender is not twisted.

SEAT BELT EXTENDER WORKSHEET

Please copy this original worksheet for each extender needed.

CAUTION: To minimize the chance and/or severity of injury in an accident, the seat belt extender must not be used:

- By anyone but the person for whom it was provided, and
- In any vehicle or seat specified other than the one for which it was provided, and
- With any car child safety seats.

When the seat belt extender is provided for rear seat positions (with automatic locking retractor), make sure the retractor is locked when in use.

In all cases seat belts must be worn below the abdomen by pregnant women.

DEALER	PLEASE PRINT CLEARLY	APPLICANT

DEALER CODE	DEALER NAME		APPLICANT NAME		
ADDRESS			ADDRESS		
CITY AND STATE		ZIP CODE	CITY AND STATE	ZIP CODE	TELEPHONE
DEALER EMPLOYEE NAME	MODEL YEAR	BODY TYPE	SEAT POSITION F / R	VEHICLE IDENTIFICATION NUMBER	

DIRECTIONS FOR DETERMINING PROPER EXTENDER LENGTH

1. Place the seat in the position the person normally uses.
2. With the person in the seat, extend the seat belt as much as possible and see if the belt latches.
3. If the buckle latches but has no slack remaining, the dimension for Figure 2 is zero. If the seat belt does not latch, measure the distance from the seat belt latch edge to the seat belt buckle as shown in Figure 2 below, and note the dimension.
4. Measure the lap area directly below the navel to the edge of the buckle as shown in Figure 1 and note the dimension.
5. The difference between Figure 1 and Figure 2 measurements is the "Allowable Margin". (Do not use this dimension for the extender length.)
6. Take the measurement in Figure 2 and round it up to the next extender size available, without exceeding the "Allowable Margin".

FIGURE 1
DIMENSION FROM NAVEL TO BUCKLE

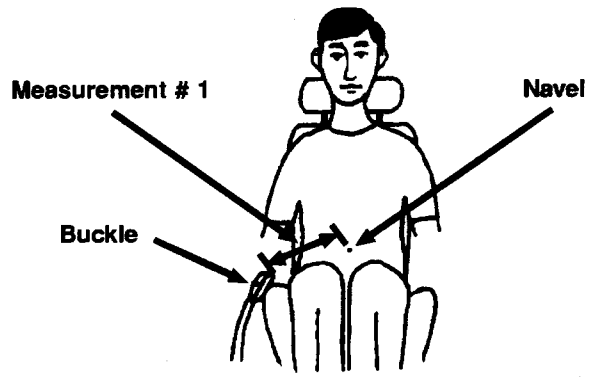
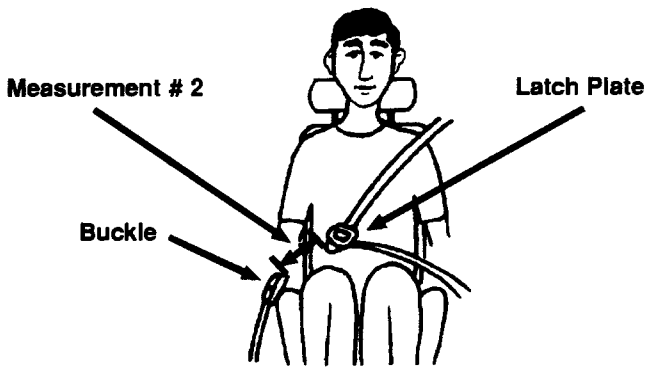


FIGURE 2
DIMENSION FROM LATCH TO BUCKLE



Measurement #1 (Figure 1) - Measurement #2 (Figure 2) = "Allowable Margin"

_____ - _____ = _____

NOTE: The length of the extender must not exceed the "Allowable Margin", due to design and construction features

AUTHORIZATION

The same extender can be used for right and left seating applications. Each seat belt extender will be affixed with a label identifying the owner, vehicle VIN and seating position. Extenders are available in one color only.

_____ APPLICANT'S SIGNATURE
(Actual user of seat belt extender)

_____ DATE

LEXUS
Technical Service Information Bulletin
April 4, 1997

Title:

FRONT ASHTRAY RECEPTACLE BUZZ NOISE

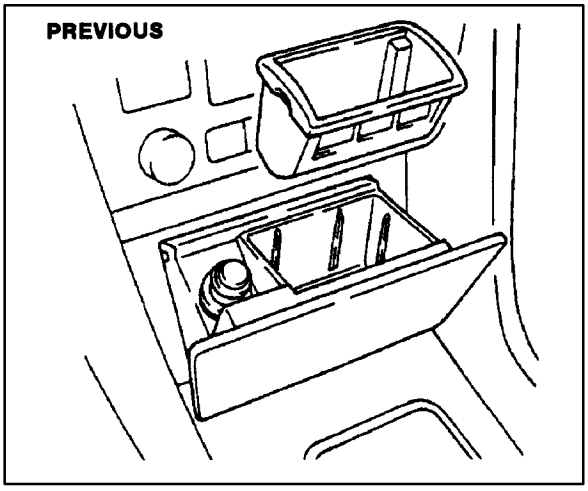
Models:

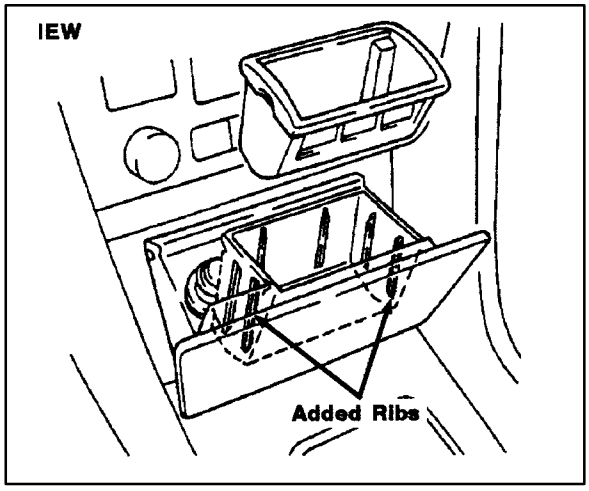
'97 ES 300

TSIB

Introduction

Lexus implemented a production change to eliminate a noise in the ashtray receptacle. The receptacle now has 2 additional ribs eliminating a buzzing noise between the ashtray insert and receptacle.





Production Change Information

- **1997 ES 300** starting with **VIN JT8BF22G#V0008640**

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
BD7006	Ashtray Receptacle Assembly	0.2	74110-33060	91	57

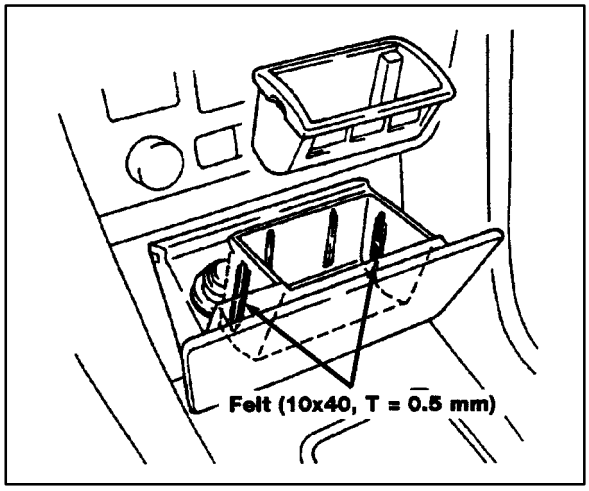
Applicable Warranty:
3 years or 36,000 miles.

Field-Fix Procedures

1. Remove the ashtray insert.
2. Install 1 piece of felt to each rib of the ashtray insert.

   Use felt size of 10 x 40 x 0.5 mm to each rib.

NOTE:
Confirm that the ashtray insert is fully seated in the receptacle after the field-fix procedure is completed.



LEXUS

TECHNICAL SERVICE INFORMATION

REF: BODY

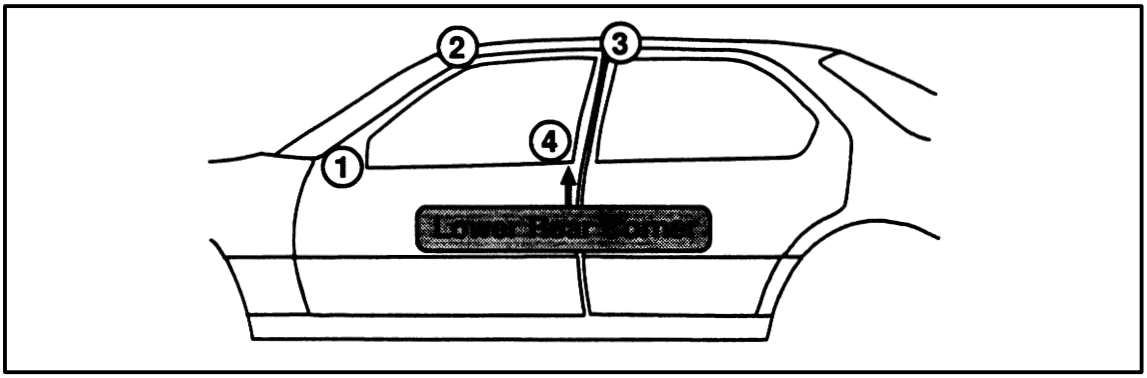
NO: BO004–96

DATE: DECEMBER 6, 1996

MODEL: ES 300

Title **AIR LEAK NOISE FROM FRONT DOOR GLASS AT LOWER REAR CORNER**

To prevent a possible air leak (sometimes described as wind noise) at the lower rear corner of the front door glass, TMC implemented a production change to the interior door trim panel improving the seal between the door glass and door weather strip. The revised trim panel applies light additional pressure on the weather strip effectively eliminating an air leak at the #4 corner.

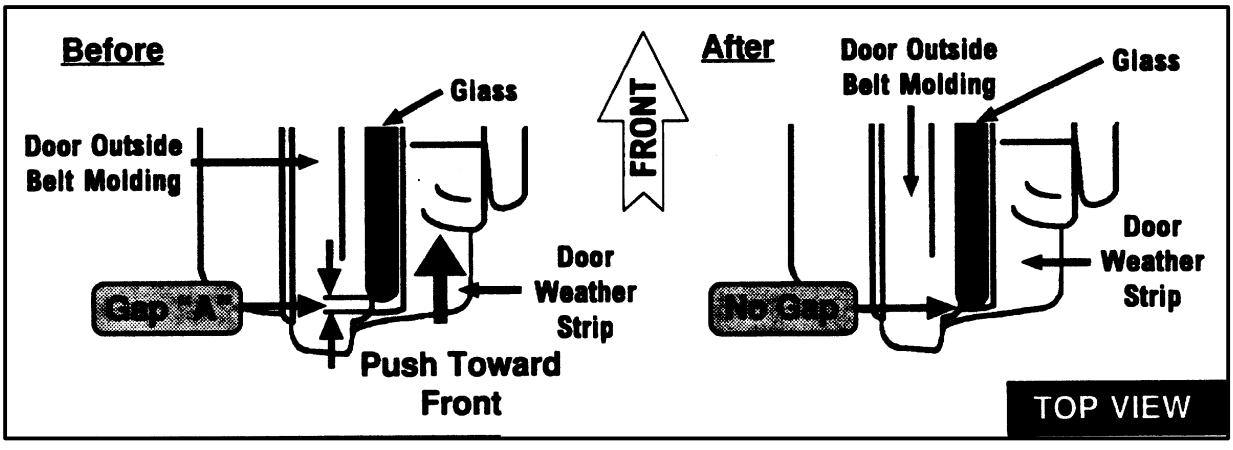


PRODUCTION EFFECTIVE:

Starting VIN: JT8BF22G * V0012715

FIELD–FIX METHOD:

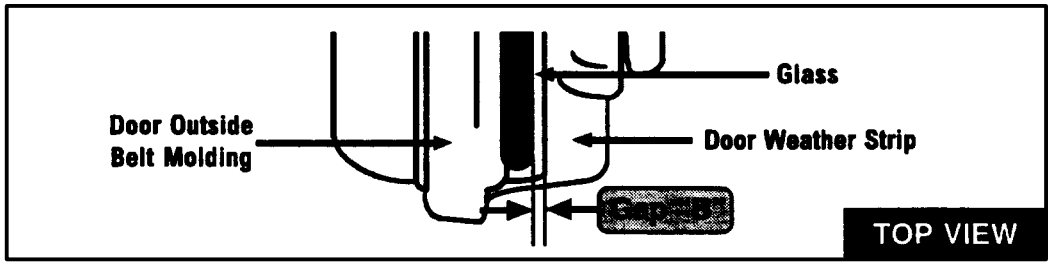
- Apply hand pressure at the top rear of the front door weather strip to eliminate any gap (“A”) between the edge of the glass and weather strip.



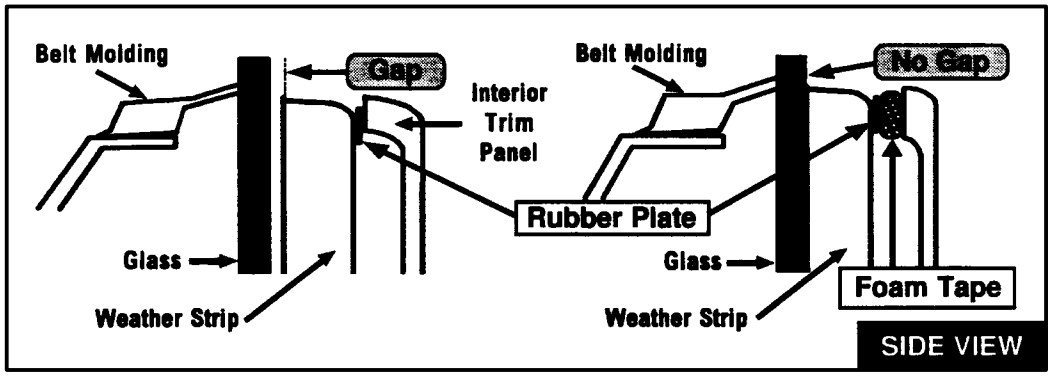
- While sitting in the driver seat, close the door. Make certain it is closed completely.

FIELD–FIX METHOD (CONT'D):

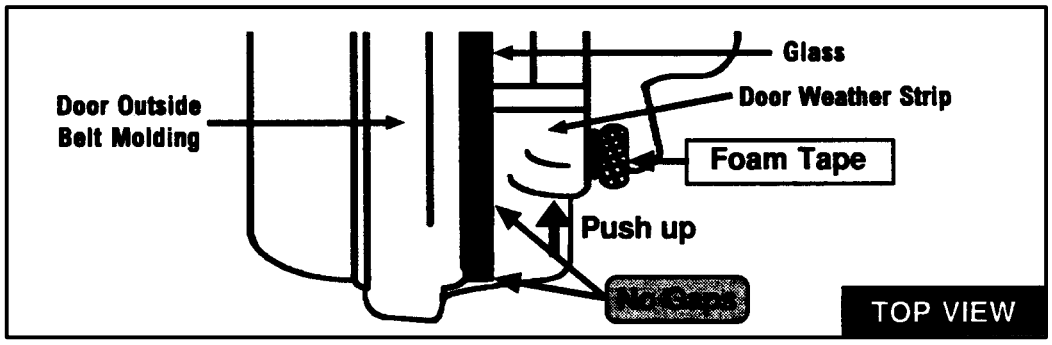
- Measure the gap between the weather strip ("B") and the door glass at the lower rear inside corner of the glass.



- Apply a thickness of foam tape equal to the measured gap plus 1 mm to the door weather strip rubber plate. Pull the weather strip rearward far enough to expose the plate, then apply foam tape (7 mm x 14 mm) to the rubber plate.



- After foam tape is applied to the rubber plate, push the weather strip back into its fully seated position. No gaps should exist at edge of glass or inside of glass at weatherstrip.



CAUTION: Apply only a thickness of foam tape as necessary to eliminate the gap. Using more than the measured amount will interfere with the normal operation of the weather strip to glass in the full down position.

WARRANTY INFORMATION:

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
BD6009	Air leak Noise from front door glass at lower rear corner (#4)	0.5	68173–33020 (RH) 68174–33010 (LH)	59	57

Applicable Warranty Coverage: 4 years/50,000 miles Comprehensive Warranty.

LEXUS
Technical Service Information Bulletin
May 30, 1997

Title:

MOON ROOF RATTLE ON 1997 ES 300

Models:

'97 ES 300

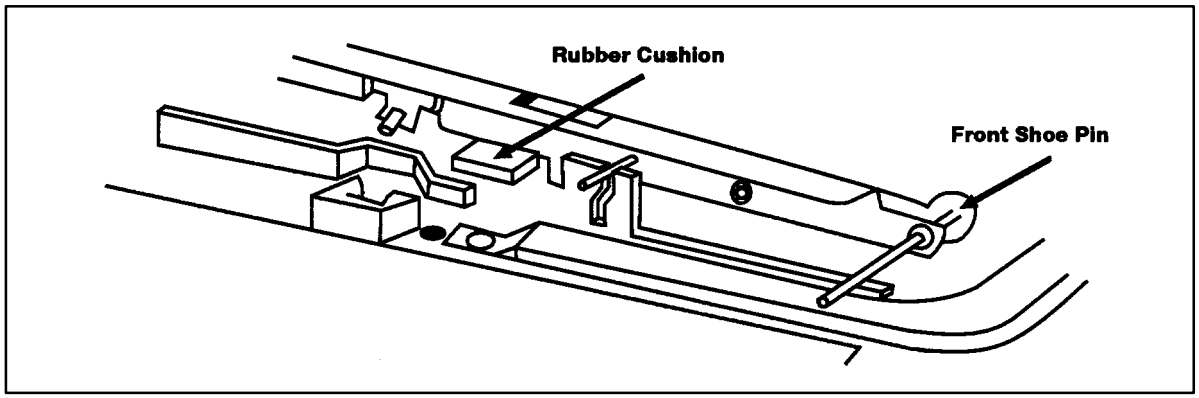
TSIB
BODY
BO004-97
REVISED

Introduction

On some 1997 ES 300 vehicles, a rattle noise from the moon roof sliding rail assembly may be evident. If the noise exists, it is most apparent driving over highway type dots with the moon roof open approximately 100 mm.

Two changes were implemented:

- Increased viscosity of the grease at the front shoe pin.
- Stiffened the rubber cushion on the siding rail.



Product Change Information

VIN	PRODUCTION CHANGE
JT8BF22G * V0003340	Increased Grease Viscosity
JT8BF22G * V0048965	Stiffened Rubber Cushion

Parts Information

NOTE:
Part numbers remain unchanged.

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
BD7008	Moon Roof Panel R&R and install adhesive back felt tape and grease (both sides), verify condition resolved	0.6	63201-33050	91	43

Field-Fix Procedures

Verify the concern by either road test or static check (static check is to open moon roof approximately 100 mm, then tap lightly by hand on front edge of panel).

If a rattle exists, correct this condition by following the field-fix procedures outlined below:

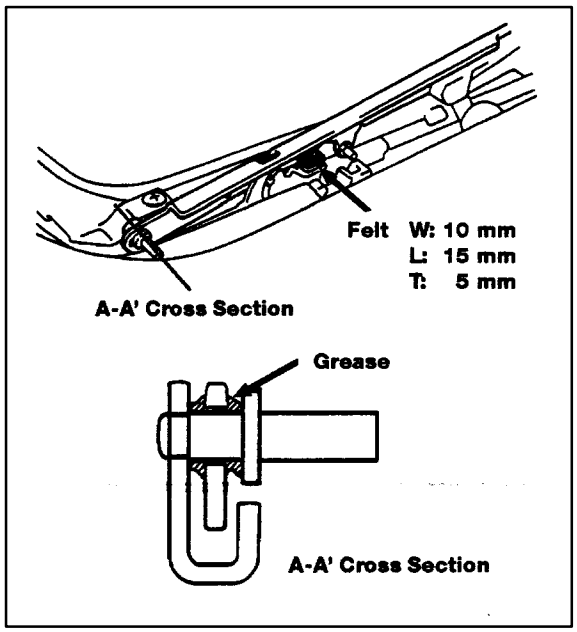
- Remove the moon roof glass panel by first removing the black plastic covers at the base of the moon roof glass on both right and left sides.

> **NOTE**:
> **This must be done from inside the vehicle.**

- Remove the (4) attaching torx head screws holding the moon roof glass panel in place.
- Carefully remove the moon roof glass panel and store it in the trunk while making repairs.
- Use the electric switch to place the assembly in the TILT UP position.
- clean the light gray rubber stop, with a VOC compliant wax and grease remover approved for use in your area. (Check local regulations.)
- Place adhesive back felt tape (W: 10 mm, L:15 mm, T:5 mm) on the rubber stop (both sides).
- Apply high viscosity grease (P/N 00289-1WG00 or equivalent) to the front shoe pin.
- Engage the electric switch returning the assembly to the neutral position.
- Reinstall the moon roof glass panel and make the appropriate flushness adjustments before tightening the attaching screws.

  Flush adjustment specifications:

  ±1.5 mm at front (overflush)
  0 + 1.5 mm at rear (overflush)
  0 – 1.0 mm at rear (underflush)



- Engage the electric switch moving the moon roof panel rearward approximately 100 mm.
- Check for a rattle by tapping lightly (static check) on the front edge of the moon roof glass panel.
- Torque the attaching screws according to the repair manual.
- Reinstall the plastic covers.
- Test drive the vehicle to confirm no noise exists.

LEXUS
Technical Service Information Bulletin
July 25, 1997

Title:

V–BRACE REAR POPPING NOISE

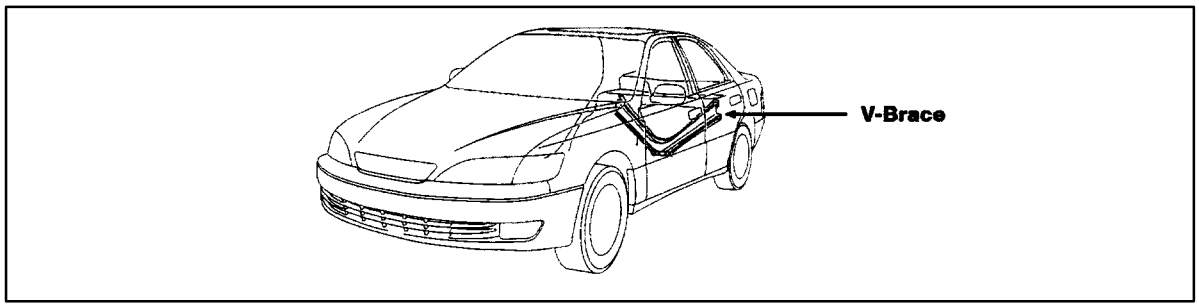
Models:

'97 ES 300

TSIB
BODY
BO005–97
REVISED

Introduction

Some 1997 ES 300s may exhibit a "popping" noise emitting from the rear of the vehicle, especially when turning left or right ar low speeds (10 to 20 m.p.h.) or when going over speed bumps. This noise may be caused by insufficient "V–Brace" weld nut and bolt torque.



Affected Vehicles

- **1997 ES 300s**

Required Tools & Materials

- 3/8" Ratchet with 8" Extension Bar
- 12 mm Deep Well Socket
- Torque Wrench
- Slotted Screw Driver
- Thread Lock Adhesive (Locktite® 242).

Warranty Information

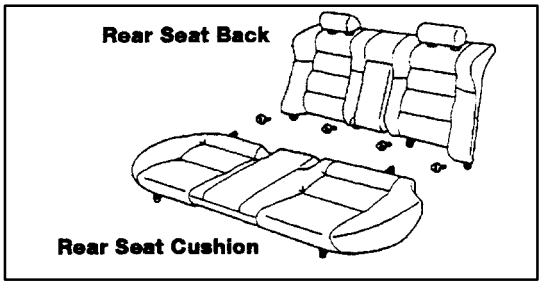
OPCODE	DESCRIPTION	TIME	OPN	T1	T2
710041	Rear Seat Back Assembly	0.3	64241–33010	62	81

Applicable Warranty:
This repair is covered under the Lexus Comprehensive Warranty. This warranty is in effect 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

Repair Procedure

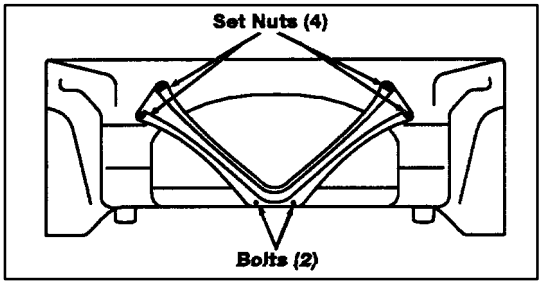
1. Remove the rear seat.

NOTE:
Refer to the Repair Manual (Page BO–86) for seat removal and installation.



2. Remove the 4 set nuts and 2 bolts and apply thread lock adhesive to the threads.
3. Torque the set nuts and bolts on the "V–Brace."

   Torque: 13 ft·lbf (18 N·m, 185 kgf·cm)



4. Reinstall the rear seat.
5. Confirm the condition has been repaired by test driving.

LEXUS
Technical Service Information Bulletin
September 5, 1997

Title:

DASH UNDER COVER LOOSE/FALLING

Models:

'97 ES 300

TSIB

BODY
BO006–97

Introduction

Some ES 300 models may experience the lower dash under cover (below glove compartment) coming loose and/or falling off. The main engine wire harness routing was modified to prevent excessive down force on the under cover.

Production Change Information

- **1997 ES 300s** starting with VINs **JT8BF22G*V0039230**

Warranty Information

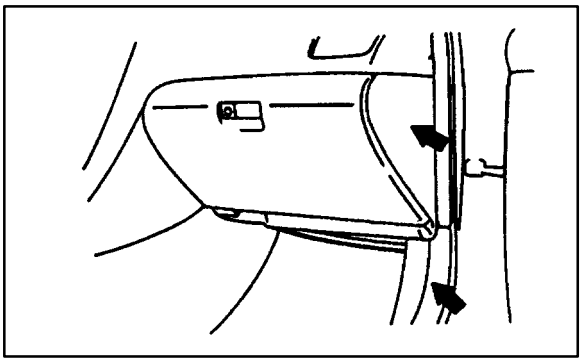
OPCODE	DESCRIPTION	TIME	OPN	T1	T2
BD7017	Move engine wire harness under lower dash	0.5	55607–33040	62	99

Applicable Warranty:
This repair is covered under the Lexus Comprehensive Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

Repair Procedure

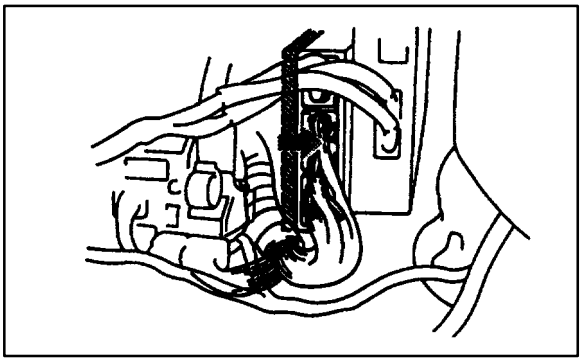
NOTE:
Refer to the ES 300 Repair Manual (Page RS–19) in addition to the illustrations below.

1. Remove the lower dash under cover (No. 2 Under Cover), front door scuff plate and glove compartment assembly (Lower Instrument Panel) as shown in the repair manual.



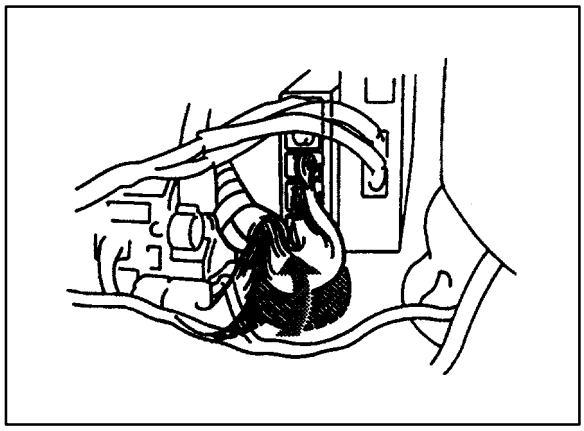
NOTE:
DO NOT disconnect yellow SRS Junction Block.

2. Move the Engine Control Module (ECM) to the right in order to gain clearance between the blower unit junction block and the ECM.



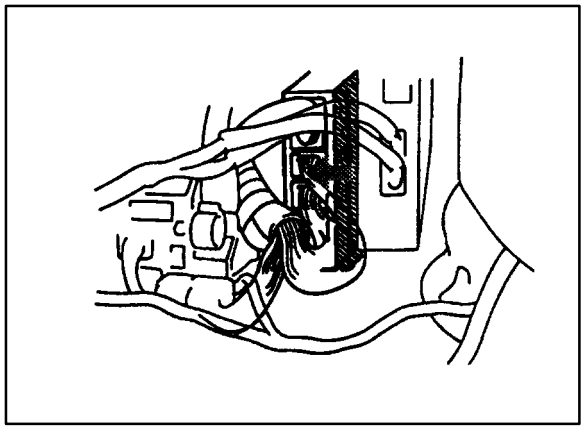
Repair Procedure (Continued)

3. Reposition the engine wire harness by lifting it up between the ECM and the blower unit. Position the engine wire harness on the right side end of the blower junction block as shown.



4. If necessary, move the ECM back to it's original position.

5. Reinstall the glove compartment assembly, front door scuff plate and clip the SRS junction connector back into position on the lower dash under cover (No. 2 Under Cover). Carefully reinstall the lower dash cover, taking care that the rear locating pin and the right rear locating tab are correctly positioned.



LEXUS
Technical Service Information Bulletin
October 24, 1997

Title:
SEAT BELT EXTENDERS

Models:
All '94 through '98 models

TSIB
BODY
BO007-97

Introduction

Lexus customers who find it necessary to increase the length of their sear belts may obtain Seat Belt Extenders at **no cost** through their local Lexus dealer.

- The extender is available in 6 inch, 9 inch, 12 inch, 15 inch and 18 inch lengths.
- The extender is available **only in black**.
- Owners are informed of the seat belt extender availability through the Lexus Owner's Manual included in each vehicle.

The customer (*individual requiring the extender*) must visit a Lexus dealership to have the required measurements made and to compete the seat belt extender worksheet. The worksheet will allow the proper fitting and selection of a seat belt extender for the customer. The dealership personnel should then determine the applicable part number and place a **Critical Order** through the ***TDN Parts Network***.

The dealership service department should compete the affixed Seat Belt Extender Label and review the "owner instruction sheet" with the customer. The dealership should give a copy of the completed worksheet to the customer and keep the original in the customer's file.

To assure utmost owner satisfaction, it is recommended that a dealership designate one person to coordinate all activities related to the seat belt extender issue.

From past sales history, it is recommended that dealerships **do not stock** Seat belt extenders due to low demand and the need for customer fitting.

This bulletin contains the following information:

Procedure and Flow Chart . . . . . Page 2
Application Chart and Notes . . . . . Page 3
Part Number Information . . . . . Page 3
Owner Instructions . . . . . Page 4
Seat Belt Extender Worksheet . . . . . Page 5

Affected Vehicles

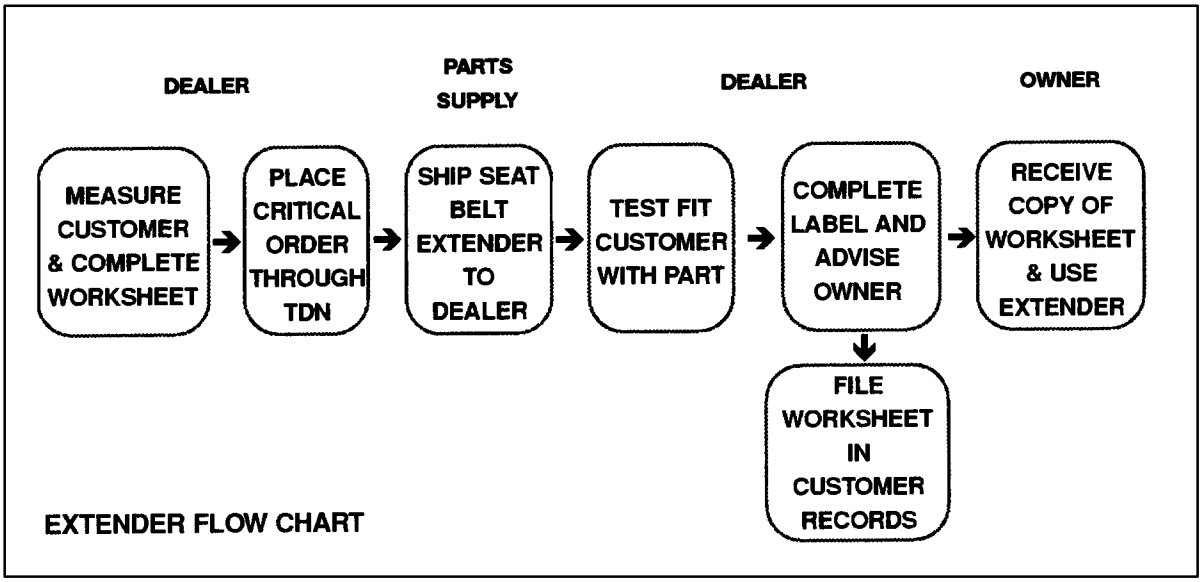
- All **Lexus** models, **1994** through **1998** model years.

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not applicable to warranty	–	–	–	–

Procedure

1. Owner requests a seat belt extender from dealer.
2. Dealer verifies the need for a seat belt extender and obtains a current copy of this TSB and copies the worksheet.
3. Dealer measures the customer and completes the worksheet. Dealer determines the correct part number and places a Critical Order for the part through the TDN Parts Network.
4. Dealer receives seat belt extender and calls the customer in to check fit of the part.
5. If the seat belt extender fit is good, dealership personnel completes the customer information label on the part, explains usage of the part, and gives the customer a copy of the completed worksheet.
6. Dealer places a copy of the completed worksheet in the customer's records.



EXTENDER FLOW CHART

Sample Seat Belt Extender Label

CAUTION

THIS SEAT BELT EXTENDER IS TO BE USED ONLY BY: _____

ON VEHICLE: _____

VIN: _____

SEATING POSITION: _____ _____ _____ _____

Driver Passenger Front Rear

USE BY OTHERS, OR IN ANOTHER SEATING POSITION, OR IN ANOTHER VEHICLE COULD REDUCE SEAT BELT RESTRAINT IN AN ACCIDENT AND RESULT IN PERSONAL INJURY.

Front Seat Belt Extender Applications

FRONT SEAT - EXTENDER APPLICATION					
MODEL	**'98**	**'97**	**'96**	**'95**	**'94**
LS 400	R–3	R–3	R–3	R–3	R–3
GS 400	R–5	N/A	N/A	N/A	N/A
GS 300	R–5	N–3	N–3	N–3	N–3
SC 400	R–3	R–3	R–3	R–3	R–3
SC 300	R–3	R–3	R–3	R–3	R–3
ES 300	R–5	R–5	K–4	K–4	K–4
LX 450	N/A	R–3	R–3	N/A	N/A

Rear Seat Belt Extender Applications

REAR SEAT - EXTENDER APPLICATION					
MODEL	**'98**	**'97**	**'96**	**'95**	**'94**
LS 400	R–3	R–3	R–3	R–3	R–3
GS 400	K–5	N/A	N/A	N/A	N/A
GS 300		K–4	K–4	K–4	K–4
SC 400	R–3	R–3	R–3	R–3	R–3
SC 300					
ES 300 (Right & Left)	R–5	R–5	R–3	R–3	R–3
ES 300 (Center)	R–3	R–3*	N/A	N/A	N/A
LX 450	N/A	K–4**	K–4**	N/A	N/A

NOTE:

*** The extender must NOT be used for the center rear seat belt (except on '97 and '98 model ES 300s as noted in the chart).**

**** Includes third seat application.**

Parts Information

PART NUMBER PREFIX: 73399-					
SERIES	**LENGTH**				
	6 INCH	**9 INCH**	**12 INCH**	**15 INCH**	**18 INCH**
K–4	–33010	–33020	–33030	–33040	–33050
K–5	–35010	–35020	–35030	–35040	–35050
N–3	–20011	–20021	–20031	–20041	–20051
R–3	–50010	–50020	–50030	–50040	–50050
R–5	–16060	–16070	–16080	–16090	–16100

Owner Instructions

Failure to follow the recommendations indicated below could result in less effectiveness of the seat belt restraint system in case of vehicle collision, causing personal injury.

The seat belt extender must not be used:

a. By anyone other than for whom it was provided (name recorded on seat belt extender).

b. In any vehicle and/or seat position other than the one for which it was provided.

c. When the seat belt extender is provided for rear seat positions (with automatic locking retractor), make sure the retractor is locked when is use.

If your seat belt cannot be fastened securely because it is not long enough, a personalized seat belt extender is available from your Lexus dealer free of charge.

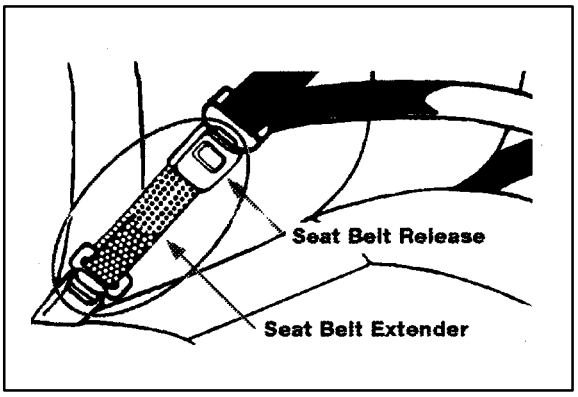
Please contact your local Lexus dealer so that the dealer can order the proper required length for the extender. Bring the heaviest coat you expect to wear for proper measurement and selection of length. Additional ordering information is available at your Lexus dealer.

CAUTION:

When using the seat belt extender, observe the following. Failure to follow these instructions could result in less effectiveness of the seat belt restraint system in case of vehicle accident, increasing the chance of personal injury.

- **Never use the seat belt extender if you can COMFORTABLY fasten the seat belt without it.**
- **Remember that the extender provided for you may not be safe when used on a different vehicle, or for another person or at a different seating position than the one originally intended for.**

To connect the extender to the seat belt, insert the tab into the seat belt buckle so that the "PRESS" signs on the buckle–release buttons of the extender and the seat belt are both facing outward as shown.



You will hear a click when the tab locks into the buckle.

When releasing the seat belt, press on the buckle–release button on the extender, not on the seat belt. This helps prevent damage to the vehicle interior and extender itself.

When not in use, remove the extender and store in the vehicle for future use.

SEAT BELT EXTENDER WORKSHEET

PLEASE COPY THIS ORIGINAL WORKSHEET FOR EACH EXTENDER NEEDED

CAUTIONS:

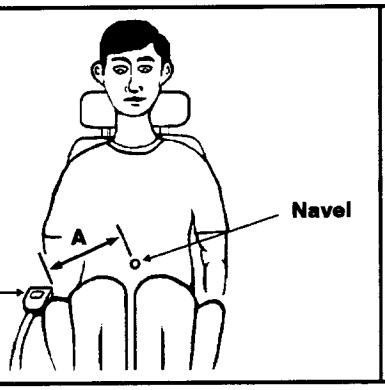
- **To minimize the chance and/or severity of injury in an accident, the seat belt extender must only be used:**
  1. **By the person for whom it was provided**
  2. **In the seat position for which it was provided**
- **The seat belt extender must never be used with any child safety seats.**
- **When the seat belt extender is provided for rear seat positions (with automatic locking retractor), make su th retractor is locked when extender belt is in use.**

DEALER	SEAT BELT EXTENDER APPLICATION		APPLICANT		
DEALER CODE	DEALER NAME		APPLICANT NAME		
ADDRESS			ADDRESS		
CITY & STATE		ZIP	CITY & STATE	ZIP	PHONE
EMPLOYEE NAME	MODEL YEAR	BODY TYPE	SEATING POSITION	VEHICLE IDENTIFICATION	

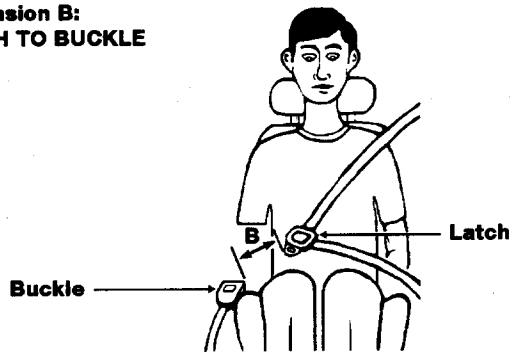
DIRECTIONS FOR DETERMINING PROPER EXTENDER LENGTH

1. **Place the seat in the position the applicant normally uses**
2. **With applicant in the seat, wearing thickest coat expected to be worn, pull belt all the way out and try to buckle belt**
   - **If the belt latches into buckle and feels comfortable against upper chest area, an extender is not needed**
   - **If belt does not buckle continue with step 3**
   - **If buckle latches but belt has no slack remaining, continue with step 3**
3. **Measure distance between applicant's navel and seat belt buckle (dimension A) and enter on worksheet**
4. **With belt all the way out, measure distance between latch tip and buckle tip (dimension B) and enter on worksheet**
   NOTE: If belt latches but there is no slack enter zero as dimension B
5. **Subtract dimension B from dimension A and record number in check number box on worksheet**
6. **Seat belt extender length is dimension B rounded up to next extender length (without exceeding check number)**
   NOTE: If extender length exceeds check number, an extender can not be provided to the customer

Dimension A:
NAVEL TO BUCKLE



Dimension B:
LATCH TO BUCKLE



SEAT BELT EXTENDER CALCULATION		
DIMENSION A:	DIMENSION B:	CHECK NUMBER:

SEAT BELT EXTENDER AUTHORIZATION

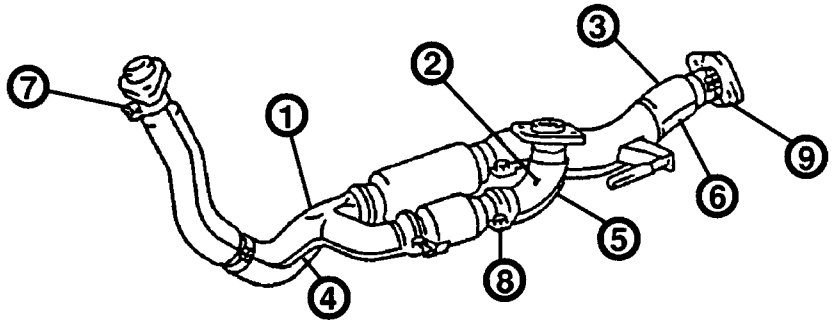
- ***The same seat belt extender can be used for right and left seating applications.*** **Each seat belt extender will have a label identifying the owner, VIN and seating position. Seat belt extenders are available only in black.**
- **Applicant's Signature:**_____ **Date:**
  (Actual user of seat belt extender)

Title **EXHAUST PIPE PROTECTOR AND CLAMP**

For ES 300s with 1MZ–FE engines, exhaust pipe protectors and clamps are now available as separate supply parts. Part numbers and installation instructions for these parts are provided below.

PART NUMBER INFORMATION:

NUMBER	PART NAME	PART NUMBER	QUANTITY
1	Protector, Exhaust Pipe, Upper No. 2	17522–20010	1
2	Protector, Exhaust Pipe, Upper No. 3	17523–20010	1
3	Protector, Exhaust Pipe, Upper No. 4	17524–62020	1
4	Protector, Exhaust Pipe, Lower No. 2	17594–20010	1
5	Protector, Exhaust Pipe, Lower No. 3	17595–20010	1
6	Protector, Exhaust Pipe, Lower No. 4	17596–62020	1
7	Clamp	90461–12350	1
8	Clamp	90461–12385	1
9	Clamp	90461–12353	1



REPLACEMENT PROCEDURE:

Install protector so there is no noticeable gap or interference between exhaust pipe and protector.

Torque: 100 kgf-cm (7ft-lbs)

LEXUS

TECHNICAL SERVICE INFORMATION

REF: ENGINE

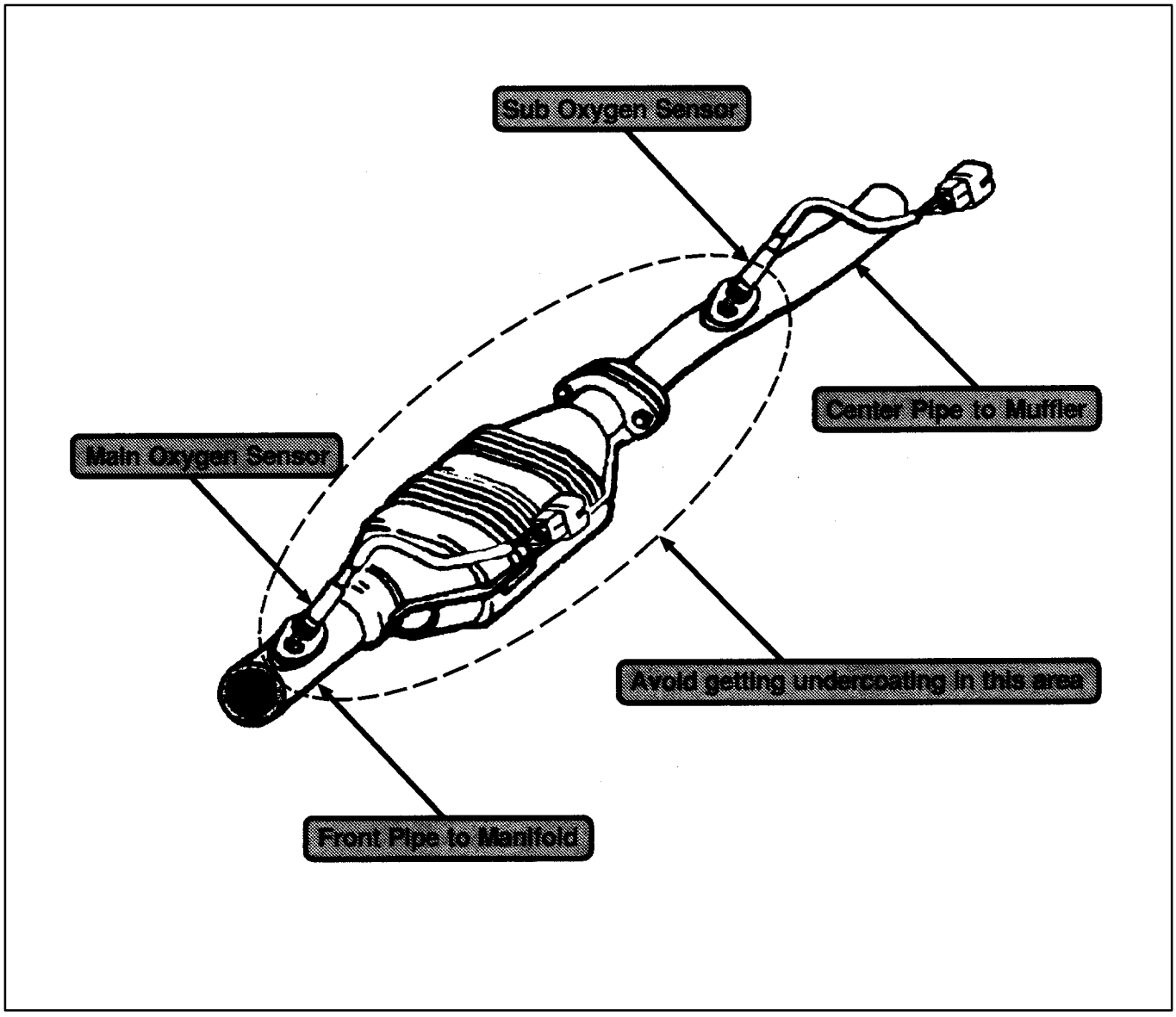
NO: EG004–96

DATE: OCTOBER 11, 1996

MODEL: ALL MODELS

Title **UNDERCOATING ON OXYGEN SENSORS**

During vehicle processing by Dealers, care must be taken to avoid applying undercoating in the area surrounding the Oxygen Sensors. Application of undercoating on or near the Oxygen Sensors can cause insufficient air to flow around the sensor, and inaccurate information storage by the ECM. If this condition occurs, the Malfunction Indicator Light (MIL) may illuminate.



LEXUS
Technical Service Information Bulletin
May 16, 1997

Title:

TAIL PIPE CONTACT WITH HEAT SHIELD

Models:

'97 ES 300

TSIB

Introduction

To prevent contact between the tail pipe and heat shield when turning quickly and/or going over bumps, the Exhaust Pipe Support No. 4 has been changed to prevent excessive movement of the tail pipe assembly.

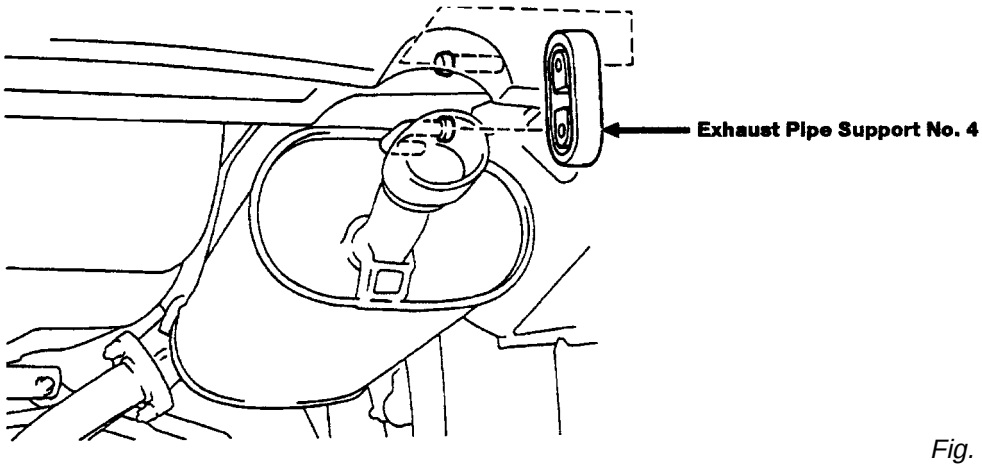


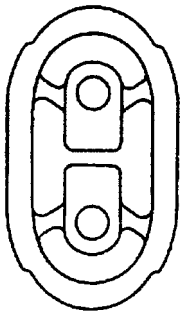
Fig. 1

Affected Vehicles

- **1997 Model Year ES 300** produced **before VIN JT8BF22G#V0021520**.

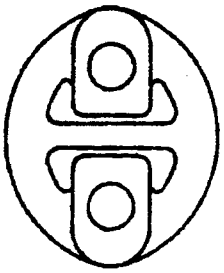
Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
17565–20050	17565–11160	Support, Exhaust. Pipe No. 4



Previous

Fig. 2



Current

Fig. 3

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
170281	Exhaust pipe support bracket (for tailpipe)	0.4	17565–20050	91	57

Repair Procedure

1. Remove original exhaust pipe support No. 4 then loosen nuts (as indicated by red arrows in figure 4) to turn the flange of the tail pipe.

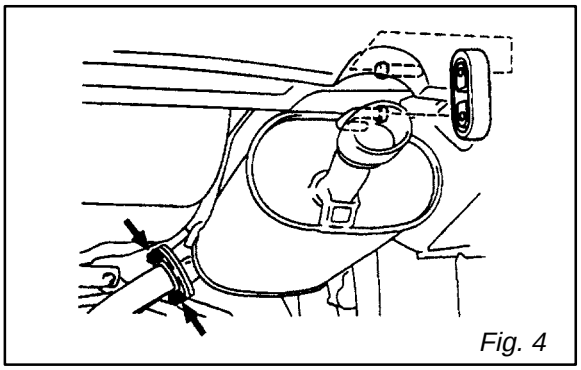


Fig. 4

2. Reposition muffler assembly by pulling down tail pipe assembly (as shown by large arrow in figure 5). While holding tail pipe down, retighten nuts as indicated by two red arrows.

   Torque: 41 ft•lbs (56 N•m, 570 Kgf•cm)

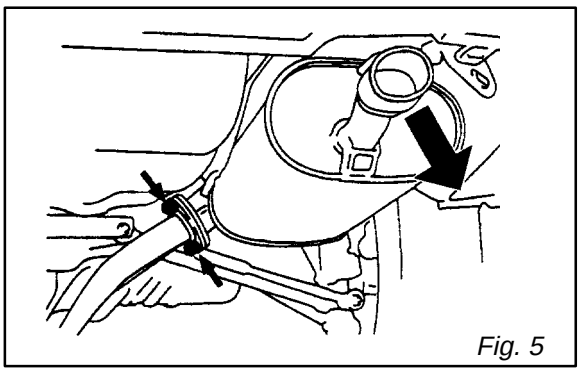


Fig. 5

3. Loosen nuts attaching center exhaust pipe to front exhaust pipe (indicated by red arrows in figure 6). Reposition center pipe by turning counterclockwise as shown. While holding pipe in position, retighten nuts.

   Torque: 41 ft•lbs (56 N•m, 570 Kgf•cm)

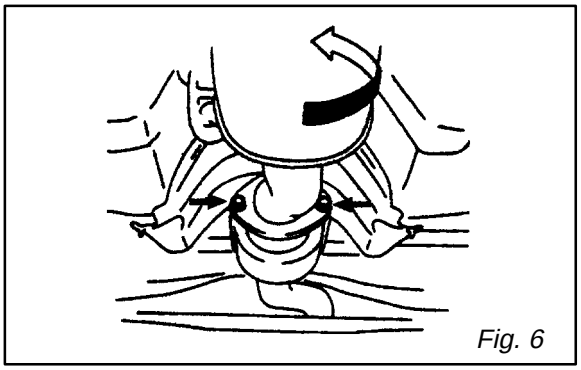


Fig. 6

4. Install new exhaust pipe support No. 4, (P/N 17565–11160).

5. Confirm that clearance between tail pipe and heat shield (A – A' & B – B') is within specification.

   A – A' . . . . . 15 – 27 mm (0.6 – 1.1 in.)
   B – B' . . . . . 20 – 30 mm (0.8 – 1.2 in.)

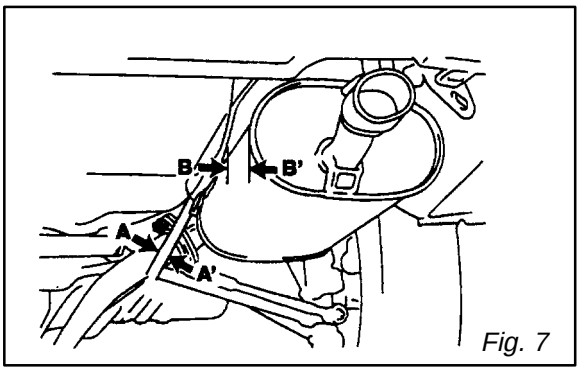


Fig. 7

NOTE:
If clearance is not within specification repeat steps 1 through 4 as required.

LEXUS
Technical Service Information Bulletin
May 30, 1997

Title:

CHARCOAL CANISTER HUMMING NOISE

Models:

'96 – '97 ES 300

Introduction

To eliminate "humming" noise from the charcoal canister at idle or low engine speeds, a revised vacuum hose is now available as a replacement part.

Affected Vehicles

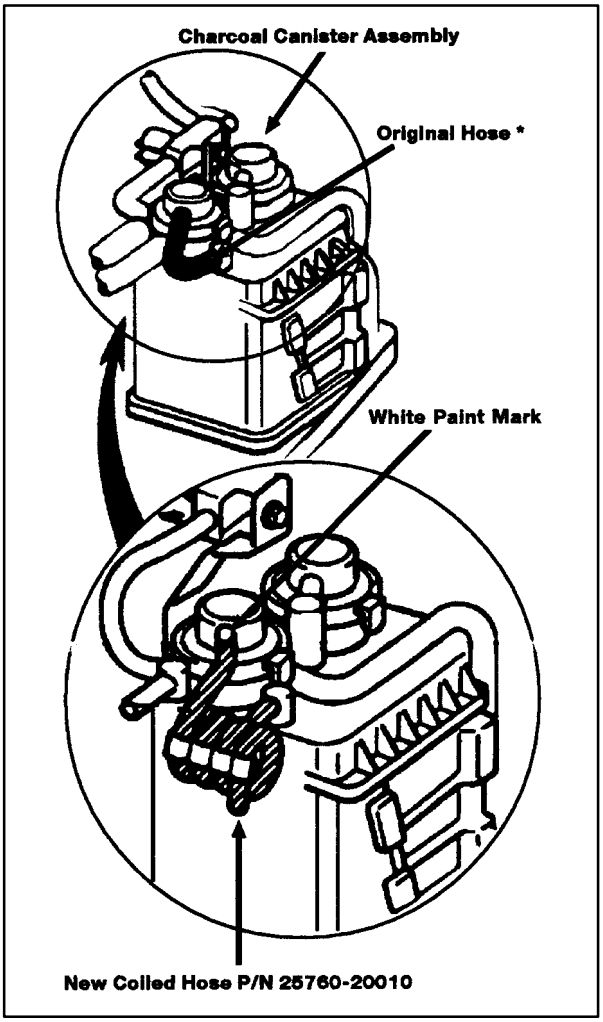
- All **1996 & 1997** Model Year **ES 300s**.

Parts Information

PREVIOUS PART NUMBER	NEW PART NUMBER	PART NAME
N/A*	25760–20010	Hose Assembly, Vacuum Transmitting

Repair Procedure

1. Remove original hose and discard.
2. Install new hose, connecting the end with white paint dot to the diaphragm port as shown.



*** NOTE**
Original hose is not listed as a replacement part but as part of the Charcoal Canister Assembly.

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
EG7002	Hose Assembly, Vacuum Transmitting	0.5	25760–20010	91	99

LEXUS
Technical Service Information Bulletin
June 20, 1997

Title:

SEAT HEATERS INOPERATIVE

Models:

'97 ES 300

TSIB

Introduction

The electrical connectors for the seat heater are identical in shape and may be inadvertantly cross–connected. Should a customer state that the seat heaters do not operate, it is possible that the control switches are connected improperly. This may be caused by the connection of the right–side heater switch to the left seat and connection of the left side switch to the right seat. If neither seat heater operates, follow the diagnostic procedures listed in the service manual.

Affected Vehicles

- A new assembly check procedure was adopted starting with **VIN JT8BF22G*V0023701** to avoid the possible occurrence of this condition.

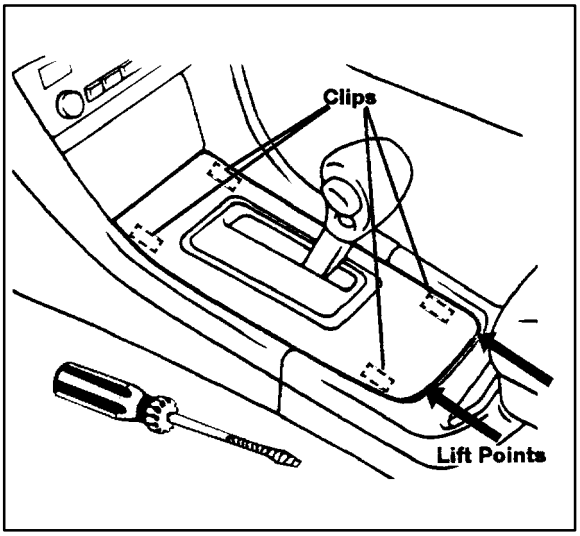
Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
BD6011	Reverse seat heater switch connectors	0.3	84751–33030	72	57

Repair Procedure

1. Lift up the console panel from the back side using a screwdriver.

NOTE:
Take care not to damage the panel. Place tape over the screwdriver tip before attempting this procedure.



2. Inspect the seat heater switch connectors:
   - The **BLACK** seat heater switch connector should be installed in the **DRIVER'S** side switch.
   - The **BLUE** seat heater switch connector should be installed in the **PASSENGER'S** side switch.
3. Reverse position of connectors as necessary.
4. Reinstall the console panel.

Title **BATTERY MAINTENANCE FOR IN–STOCK VEHICLES**

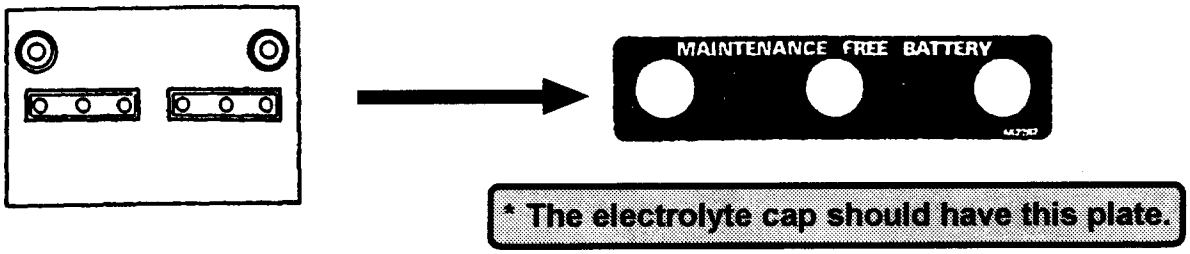
A battery in a stored vehicle is subject to conditions which can reduce its performance and life. These conditions include storage period, temperature, parasitic drain, and battery load. Because of these factors, battery inspection and maintenance are required in order to ensure proper operation and optimal battery life.

As a matter of policy, Lexus does not provide battery warranty coverage for discharged and/or failed batteries due to lack of maintenance; it is the dealer's responsibility to maintain the specified state of charge of the vehicle's battery while in stock.

BATTERY MAINTENANCE RECOMMENDATIONS:

1. A monthly battery inspection is required under normal conditions. If your dealership is located in an area subject to extreme temperatures (hot or cold), periodic maintenance may need to be performed on a more frequent basis. When maintenance requires removal of filler plugs on vehicles with "maintenance free" batteries, new labels are available via the following part numbers:

PART NUMBER	QUANTITY	APPLICABLE BATTERY SIZE
28898–50130	2	80D26L
28898–50140	2	75D31L and 95D31L



* The electrolyte cap should have this plate.

BATTERY MAINTENANCE RECOMMENDATIONS (Cont'd):

2. To reduce battery drain during storage of in–stock vehicles, the dome light fuse of each vehicle should be removed. It is recommended that the fuse remain disconnected until time of delivery. This procedure can reduce battery discharge 60–80 percent. **Additionally, for vehicles in storage for 30 days or more, the negative battery cable should always be disconnected to further reduce battery discharge.**

NOTE 1: For your reference, the electrical systems made inoperative by removing the dome light fuse, are indicated in the appropriate Electrical Wiring Diagram.

NOTE 2: Additional battery maintenance information is available in the Lexus Warranty Reference And Administration Procedures Manual (Policy # 4.10 pages 1–4).

Two test procedures are currently available for evaluating battery performance. These include:

1. Open–Circuit Voltage Test Procedure

2. Specific Gravity Test Procedure

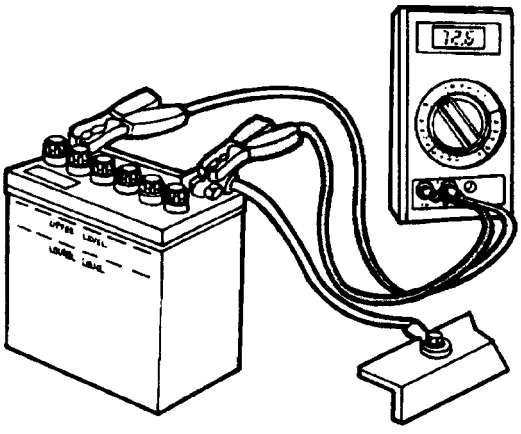
OPEN–CIRCUIT VOLTAGE TEST PROCEDURE:

1. If the battery has recently been charged or if the engine has been run in the last hour, there will be a surface charge on the battery. To remove the surface charge, turn on the headlights for two minutes.

NOTE: Turn off headlights before proceeding with test.

2. With the key out of the ignition, all doors closed, and all electrical accessories off, connect the voltmeter across the battery terminals.

3. Read the voltmeter.



Compare measured voltage to open circuit voltage chart:

OPEN CIRCUIT VOLTAGE (OCV) CHART

RESULTS	OPEN CIRCUIT VOLTAGE	% STATE OF CHARGE	EQUIVALENT SPECIFIC GRAVITY
OK	12.65 Volts	100%	1.265 @ 80°F
	12.40 Volts	75%	1.225 @ 80°F
NG	Less Than 12.40 Volts	<= 50%	1.190 @ 80°F

TEST RESULTS:

1. A fully charged battery will have an open–circuit voltage of at least 12.6 volts.

2. The minimum acceptable voltage is 12.4 volts. If the reading is less than 12.4 volts, charging is necessary. Use the slow charging procedure described below.

CHARGING PROCEDURE:

1. If the test results indicate a charge is necessary, a slow–constant 10–amp or less charge rate is recommended until the battery reaches a full state of charge. Be sure to periodically check and maintain the proper electrolyte levels during charging.

CAUTION: Insure that the charger is turned off before connecting or disconnecting the leads. Always connect the negative lead last. When disconnecting, always disconnect the negative lead first.

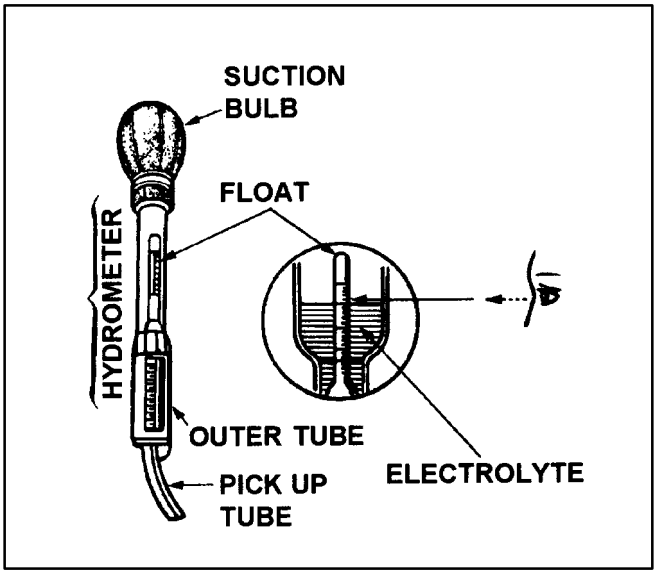
NOTE: For additional information on battery inspection and testing procedures, see “Battery/Starter Circuit Inspection And Testing Procedures” in the “Technicians Handbook For Electrical Circuits And Diagnosis Course” (MDC # 00246–42917).

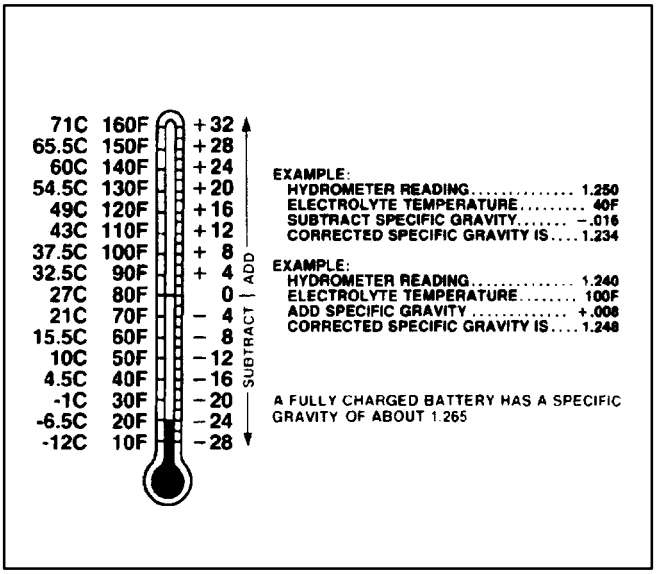
SPECIFIC GRAVITY TEST PROCEDURE:

1. Remove the vent caps or plugs from the battery cells.

2. Take the specific gravity readings with a temperature corrected hydrometer. Follow the procedure described by the manufacturer of your hydrometer.

3. Record the specific gravity of each cell.





TEST RESULTS:

1. A fully charged battery will have a specific gravity reading of approximately 1.265 at 80°F.

2. The minimum standard for this test is a specific gravity reading of 1.190. If the reading is less than 1.190, charging is necessary. Use the slow charging procedure described in this TSIB.

3. A difference of 0.050 or more between highest and lowest cell readings indicates a problem battery. Should you encounter this situation, attempt one recharge using the slow charging procedure described in this TSIB. Allow the battery to stabilize at least 20 minutes after the charge cycle is complete. Recheck the specific gravity of each cell. If the deviation in cell readings still exceeds 0.050, the battery must be replaced.

4. After battery service is complete, reinstall the battery caps/plugs and replace the plug labels as applicable.

LEXUS

TECHNICAL SERVICE INFORMATION

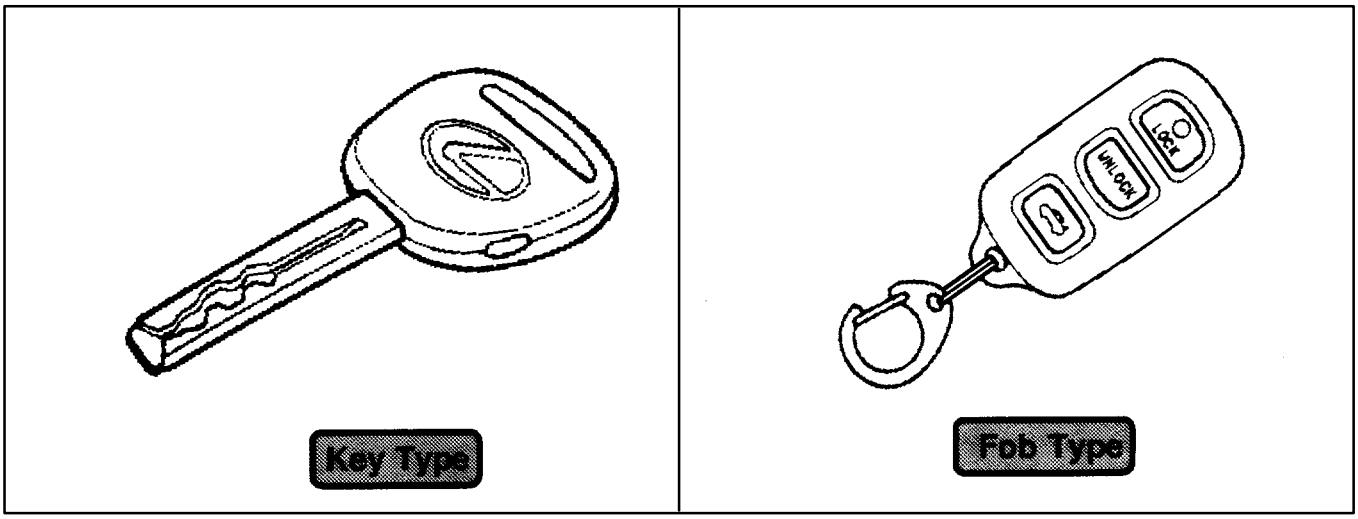
REF: ELECTRICAL

NO: EL003–96

DATE: AUGUST 9, 1996

MODEL: LS 400, GS 300, SC 300, SC 400, ES 300

The following information applies to all 1996 and previous models, except the LX 450, and to both transmitter types shown below:



FEATURES AND LIMITATIONS:

The following features and limitations of Lexus wireless door lock control systems must be thoroughly understood before proceeding with diagnosis.

In the following information, the word **"transmitter"** is used to describe the signal generating device that is an integral part of the key or fob and **"receiver"** is used to describe the wireless door lock ECU.

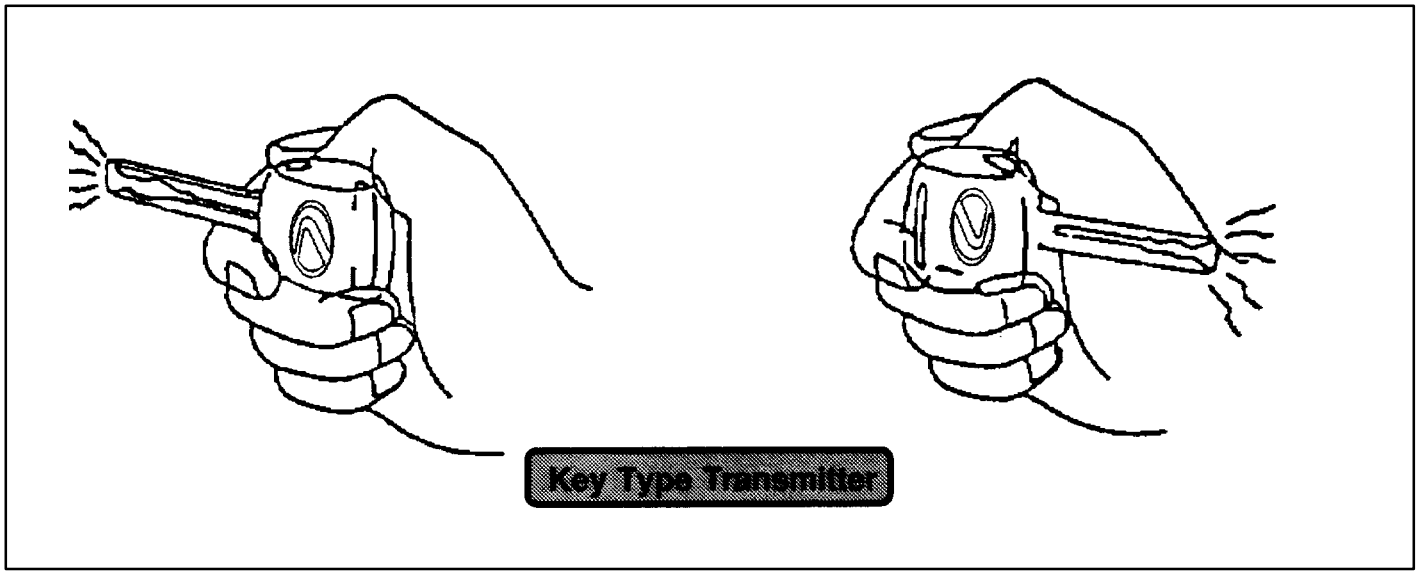
TRANSMITTER CHARACTERISTICS AND RANGE:

1. Weak radio frequency (RF) waves are used by the transmitter to operate the wireless door lock control system. Strong radio waves or RF noise from other sources may shorten the operating distance or prevent operation.

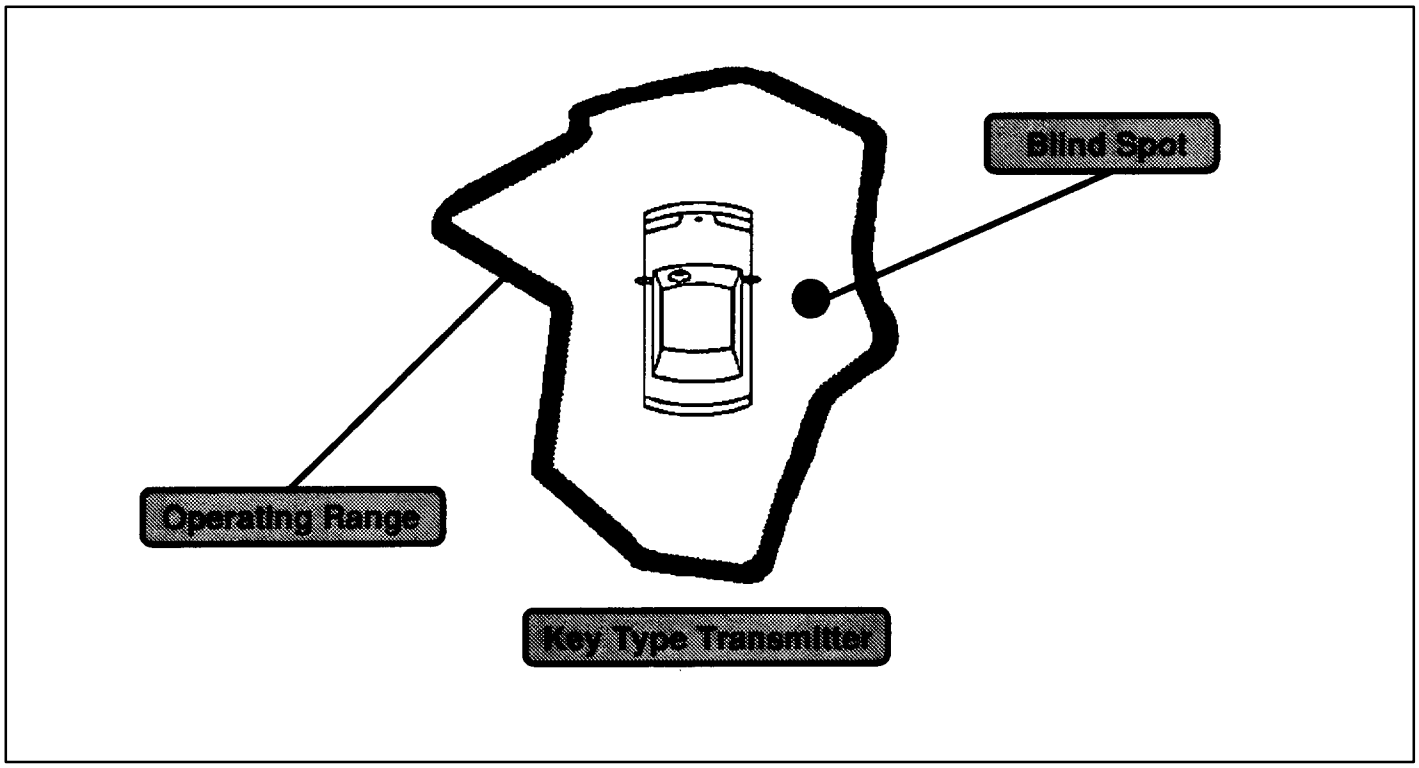
2. When the transmitter battery is weak, operation may be normal for the first one or two activations and then stop as the remaining battery capacity is depleted.

TRANSMITTER CHARACTERISTICS AND RANGE (Cont'd):

3. On key type transmitters, the metal portion of the key serves as an antenna during transmitter operation. For optimum performance, the path between the metal portion of the key and the vehicle should not be obstructed by the operator's hand or other objects.



4. On key type transmitters, the operating distance of the transmitter varies from front to back and side to side as shown below.



NOTE: Diagram represents only a generalized view which may vary depending on the model and operating conditions. Fob type transmitters accommodate a larger transmitter and battery which typically provide increased operating range.

SPECIAL FUNCTIONS:

1. Transmitter Auto Power Off Function *:

Transmitting stops automatically after continually pressing the transmitter button for a fixed amount of time.

- Key type transmitter *: 0.8 – 1.2 seconds
- Fob type transmitter: approximately 10 seconds

***** This power saving feature was added to key type transmitters after the following VINs:

PRODUCTION EFFECTIVE:

MODEL	VIN
SC 300	JT8JZ31C**0017065
SC 400	JT8UZ30C**0035393
GS 300	JT8JS47E**0021034
LS 400	JT8UF11E**0145224
ES 300	JT8GK13T**0001033

2. Auto Lock Function:

If the vehicle is unlocked with the transmitter, the doors will automatically relock if no door is opened within 30 seconds.

3. Chatter Prevention Function:

When the receiver picks up the correct specified code the first time, it rejects subsequent code signals. It stops reception until transmission is suspended for 0.5 seconds or longer to prevent door lock chattering.

4. Transmitter Switch Misoperation Prevention Function:

When the ignition key is in the ignition key cylinder, the receiver will suspend signal reception.

WIRELESS DOOR LOCK CONTROL SYSTEM DIAGNOSIS:

IMPORTANT: All wireless diagnosis must start at this point and proceed as directed. Diagnostic information from this point forward assumes that all preceding steps have been properly performed. If steps are performed improperly or started beyond this point, an erroneous diagnosis may be obtained.

Start here by performing the following power door lock control and theft deterrent system checks:

1. Verify that both interior power door lock control switches will lock and unlock **all** doors.
2. Verify that driver and passenger door key locks will lock and unlock* **all** doors.
3. Verify that the theft deterrent system will arm when all doors are closed and locked.

***** Driver's door key lock must be cycled twice to unlock all doors.

If any of the above items do not operate normally, refer to either the (Power) Door Lock Control System or Theft Deterrent System section of the repair manual for diagnosis. The wireless feature is an enhancement to the power door lock control system and is dependent on proper operation of the power door lock control and theft deterrent systems.

Choose the applicable problem area from the chart shown below and refer to the listed procedure for diagnosis.

Matrix Chart Of Problem Symptoms:

PROBLEM	PROCEDURE	PAGE NUMBER
Wireless inoperative at all times	A	5
Wireless intermittently inoperative	B	7
Wireless has reduced operating distance	B	7
Wireless inoperative at specific locations	C	8

PROCEDURE A – WIRELESS INOPERATIVE AT ALL TIMES:

1. Check battery capacity (See Page 9 – Battery Capacity Check Procedure).

2. Set FM radio to 94.9 MHz* and press the transmitter button while holding transmitter near radio antenna. If noise interference cannot be heard on the radio when the transmitter is depressed, the transmitter is faulty. This test is only used to identify a faulty transmitter, a positive result does not guarantee transmitter integrity or sufficient battery capacity.

* **This test cannot be performed on and does not apply to vehicles equipped with a fob type transmitter which uses a frequency that does not have a multiple in the FM frequency range.**

REMINDER: Transmitters equipped with the Auto Power Off Function quit transmitting 0.8 – 1.2 seconds after depressing the transmitter button (see Page 3).

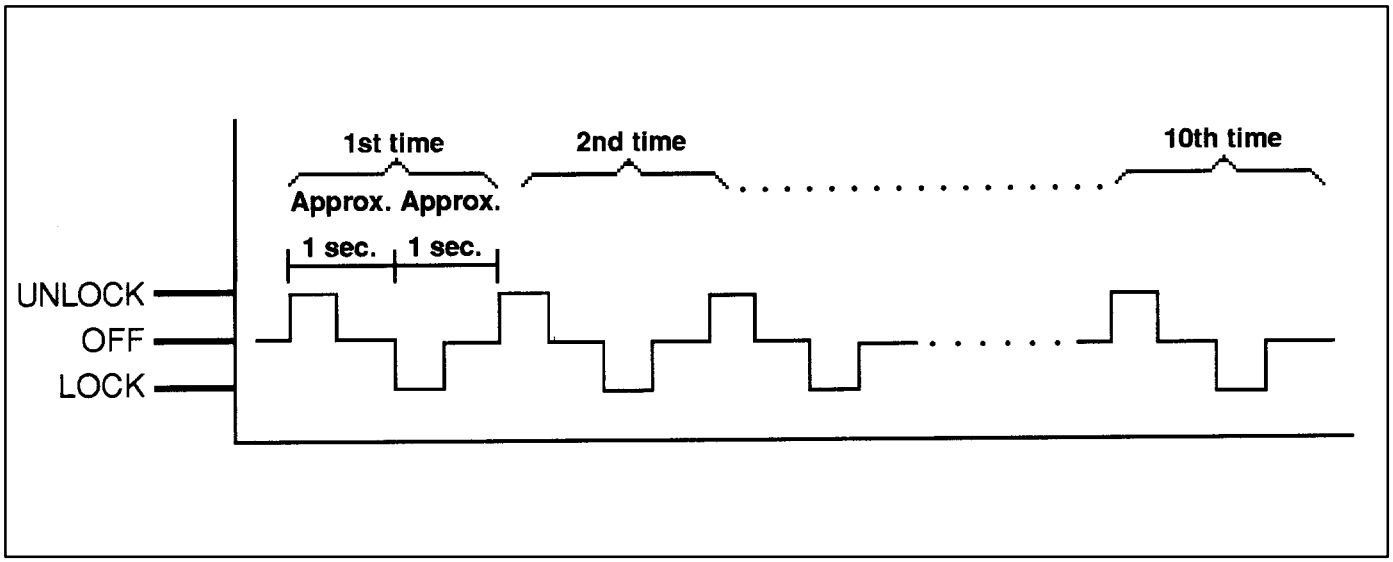
3. Enter diagnostic mode:

   a. Open driver's door.

   b. Lock all doors using the interior power door lock switch.

   c. Insert key in ignition once and remove.

   d. Cycle the door locks (unlock and lock = 1 cycle) using the interior power door lock switch 10 times as shown below (if door locks are cycled too slow or too fast, diagnostic mode will not be initiated).



4. Door locks should cycle (unlock/lock) one time automatically to confirm that diagnostic mode has been entered. If door locks do not cycle, repeat Step 3.

NOTE: If attempts to enter the diagnostic mode fail repeatedly, faulty vehicle harness wiring or a faulty receiver may be the cause. Refer to Matrix Chart of Problem Symptoms in the Wireless Door Lock Control System section of the repair manual for diagnosis.

PROCEDURE A – WIRELESS INOPERATIVE AT ALL TIMES (Cont'd):

5. Within 10 seconds of entering diagnostic mode, press the transmitter button once and count the number of door lock (unlock/lock) cycles. Refer to the applicable chart below:

Non–Programmable Type (Pre–1995):

DOOR LOCK CYCLES	DIAGNOSIS	REPAIR PROCEDURE
0	Wireless antenna, receiver or vehicle wiring harness problem	First perform antenna check (Page 12). If antenna is OK, refer to "Wireless Door Lock Control System" section of Repair Manual for diagnosis.
1	Mismatched key and ROM	Replace key and ROM.
2	Faulty transmitter	Replace transmitter.

Programmable Key Type (1995 and later):

DOOR LOCK CYCLES	DIAGNOSIS	REPAIR PROCEDURE
0	Wireless antenna, receiver or vehicle wiring harness problem	First perform antenna check (Page 12). If antenna is OK, refer to "Wireless Door Lock Control System" section of Repair Manual for diagnosis.
1	Normal	None
2	Transmitter not registered	Key Registration (see Page 11)

Programmable Fob Type (1995 and later):

DOOR LOCK CYCLES	DIAGNOSIS	REPAIR PROCEDURE
0	Faulty transmitter or receiver	Continue with procedure below
1	Transmitter not registered	Key Registration (see Page 11)

Repeat diagnostic mode initiation procedure (Steps 3 through 5) with a known good tranmitter. Do **NOT** register the transmitter first. Count the number of door lock cycles (unlock/lock) and refer to the table below:

DOOR LOCK CYCLES	DIAGNOSIS	REPAIR PROCEDURE
0	Faulty reciever	Replace
1	Original transmitter faulty	Replace original transmitter

PROCEDURE B – WIRELESS IS INTERMITTENTLY INOPERATIVE OR HAS REDUCED OPERATING DISTANCE:

1. Review the Transmitter Characteristics and Range section on Pages 1 and 2.

2. Check battery capacity (see Page 9 – Battery Capacity Check Procedure).

3. Inspect wireless antenna* (see Page 12 – Wireless Antenna Inspection Procedure).

***** This step only applies to key type transmitters (see illustration below). Fob type transmitter systems use an internal antenna in the receiver (1995 and later LS 400 and 1996 and later SC 300/400).

4. If a complaint of intermittent operation **can** be verified, the transmitter is faulty.

5. If a complaint of intermittent operation **cannot** be verified, check for intermittent sticking of the unlock warning switch using the following method:

   a. Insert key in ignition.

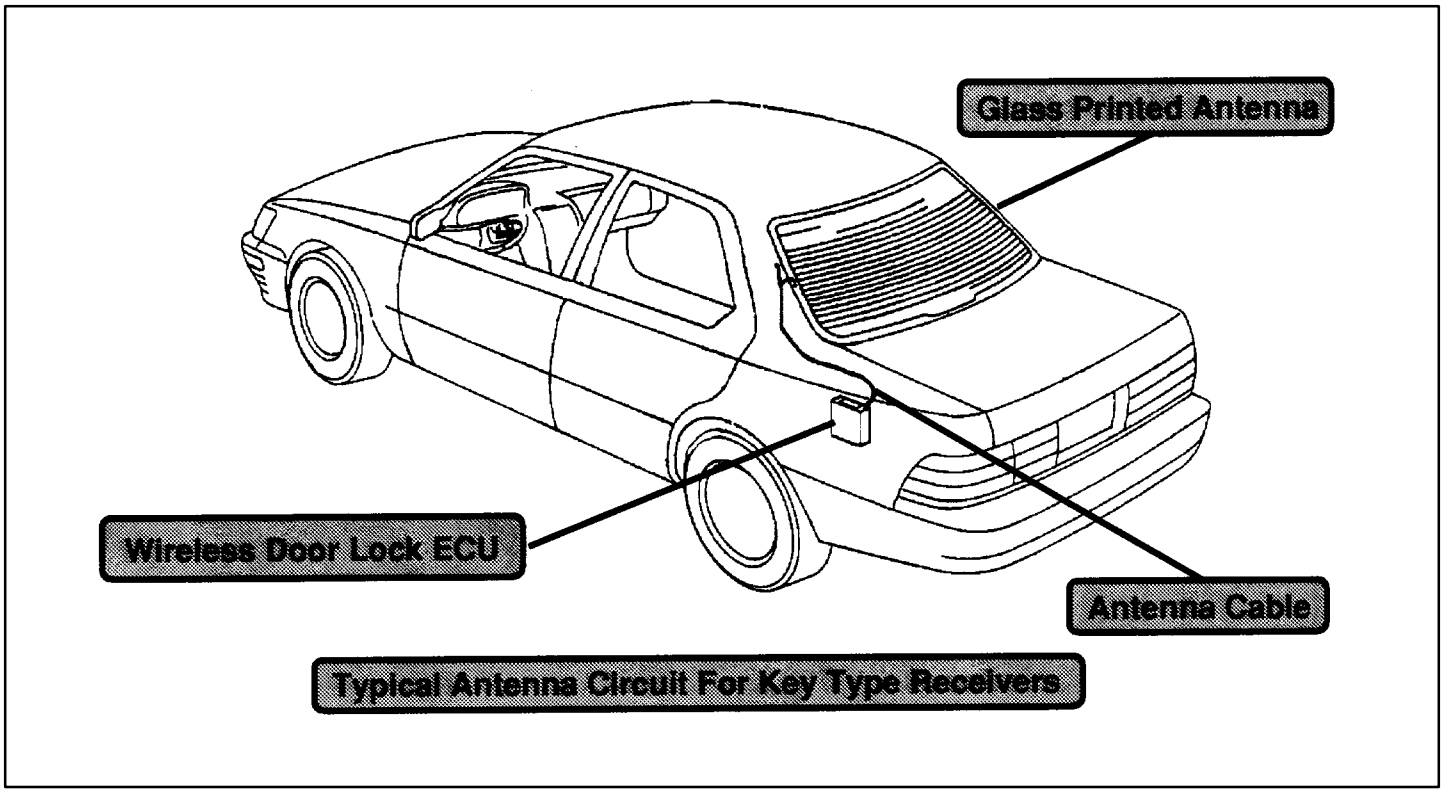
   b. Turn ignition switch from lock to accessory and back to lock.

   c. Remove key.

   d. Check remote lock/unlock operation.

   e. Repeat steps “a” – “d” at least 10 times.

   If remote becomes inoperative during step “d”, unlock detection switch or ignition key cylinder is faulty.



PROCEDURE C – WIRELESS INOPERATIVE AT SPECIFIC LOCATIONS:

This procedure is used to check for the presence of electrical interference at specific locations that may interfere with wireless transmitter/receiver operation. This test is used only to verify the presence of electrical interference at a specific location and **does not** lead to a repair.

IMPORTANT: Verify that the wireless door lock control system operation is normal in **non–compliant areas**. If the system is inoperative at all locations, do not continue with this procedure, refer to Procedure A – Wireless Inoperative At All Times.

Perform the following procedure in the area where the problem is occurring:

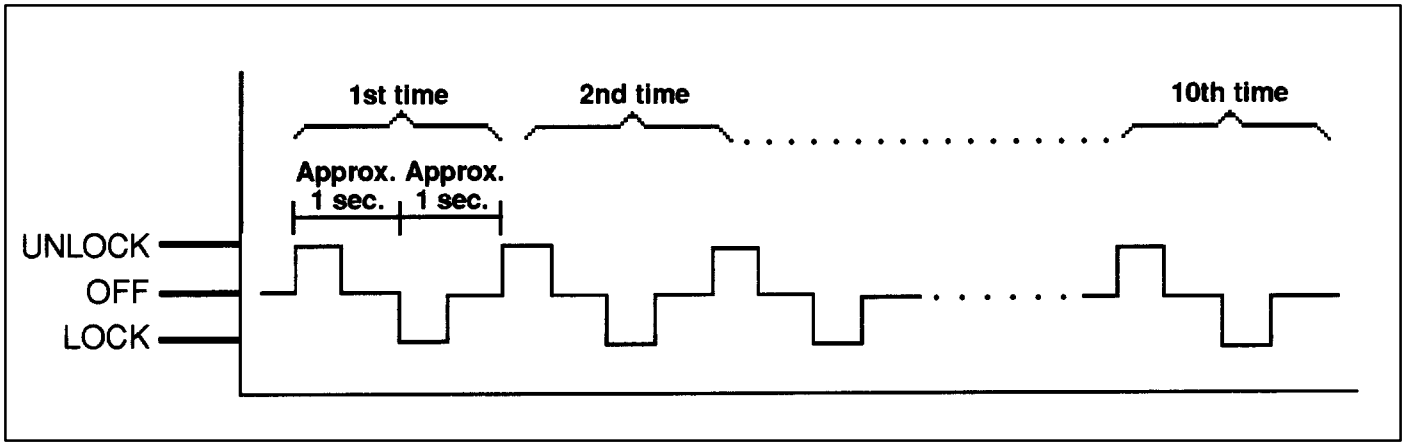
1. Enter the diagnostic mode:

   a. Open the driver's door.

   b. Lock all doors using the interior power door lock switch.

   c. Insert key in ignition once and remove.

   d. Cycle the door locks (unlock and lock = 1 cycle) using the interior power door lock switch 10 times as shown below (if door locks are cycled too slow or too fast, diagnostic mode will not be initiated).



2. Door locks should cycle (unlock/lock) one time automatically to confirm that diagnostic mode has been entered. If door locks do not cycle, repeat Step 1.

3. Within the next 10 seconds, count the number of door lock (unlock/lock) cycles and refer to the chart below:

DOOR LOCK CYCLES	DIAGNOSIS
0	No interference at this time
1 or 2	Outside electrical interference

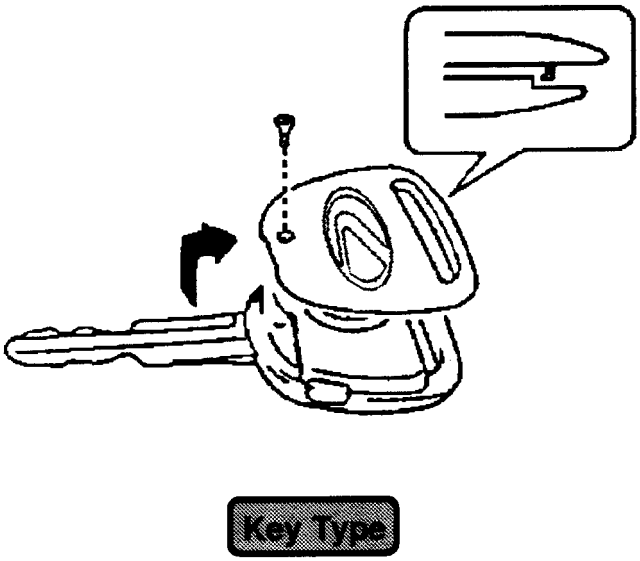
BATTERY CAPACITY CHECK PROCEDURE:

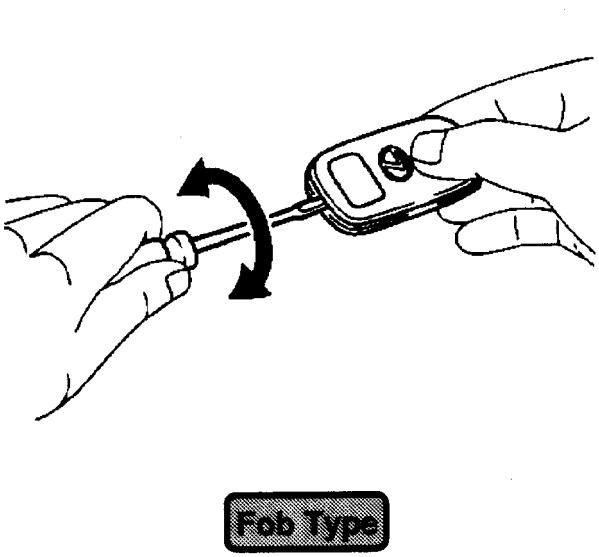
The lithium battery used in the transmitter will measure a voltage of 2.5 volts or more until the battery capacity is fully consumed. To accurately determine the remaining battery capacity, a load must be applied.

NOTE: Make all battery checks at room temperature (low temperatures may adversely affect output).

1. Key Type Transmitters:
   Remove screw, pry cover up slightly, and push cover away from portion of the key.

   Fob Type Transmitters:
   Insert a screwdriver and twist to remove cover.



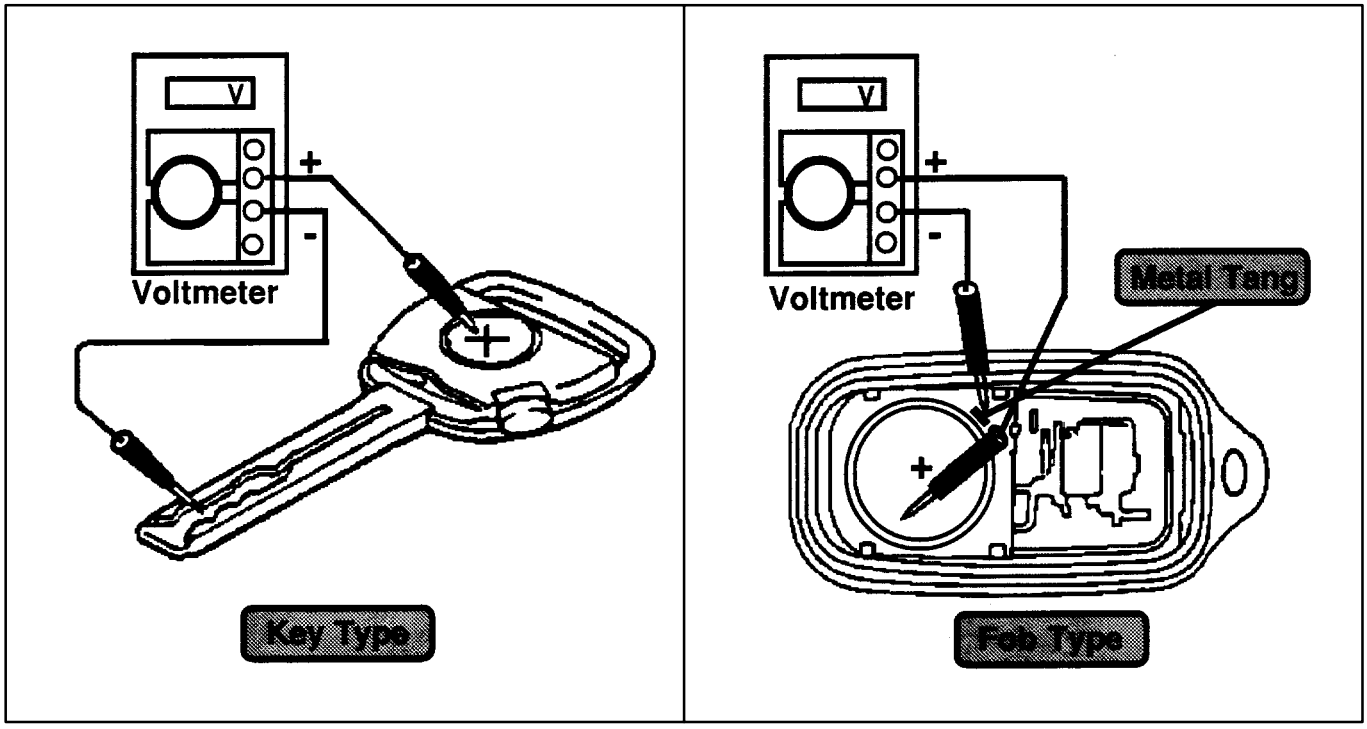


2. Inspect the battery terminals, transmitter case, and cover for corrosion or visible damage. Replace transmitter if necessary.

3. Depress the transmitter button for 1 second and then release for 1 second. Repeat this process 5 times.

BATTERY CAPACITY CHECK PROCEDURE (Cont'd):

4. Connect the positive (+) lead from the tester to the transmitter battery (+) and the negative (–) lead as shown.



5. Depress the transmitter button again and measure the voltage. Verify that the voltage drops when the transmitter button is depressed (no voltage drop may indicate a faulty transmitter). Transmitters equipped with the Auto Power Off Function (see Page 3) will only load the battery for 0.8 – 1.2 seconds after the transmitter button is depressed (voltage must be checked during this time). If loaded battery voltage is below 2.1 volts, replace the battery.

BATTERY INFORMATION:

TRANSMITTER TYPE	BATTERY PART NUMBER	BATTERY TYPE
Key	89706–50010	BR 1216
Fob	89745–50010	CR 2016

KEY REGISTRATION (1995 AND LATER MODELS):

Set initial conditions:

- Key out of ignition
- Driver's door open and unlocked
- All other doors closed and locked

Registration Procedure:

NOTE: Perform all steps with no more than a five second interval between steps.

1. Insert key into ignition for 1 second and remove.
2. Cycle (lock and unlock = 1 cycle) the driver's interior power door lock switch 5 times (1 second in each position).
3. Close and reopen driver's door.
4. Cycle the driver's interior power door lock switch 5 times (1 second in each position).
5. Insert key into ignition and cycle the ignition on and off:
   - One time to add a new code.
   - Two times to add a new code and erase all previously stored codes.
   - Three times to check how many codes are currently registered.
6. Remove key from ignition. Receiver should respond by cycling the door locks a corresponding number of times:
   - One time to add a new code.
   - Two times to add a new code and erase all previously stored codes.
   - One to four times (slowly) to indicate how many codes are registered (end).

NOTE: If no response is given, start over at the beginning of this procedure.

7. Press the transmitter button (any button on fob type transmitters) for 1 second.

NOTE: Receiver should respond by cycling door locks once. If no response is given, start over at the beginning of this procedure.

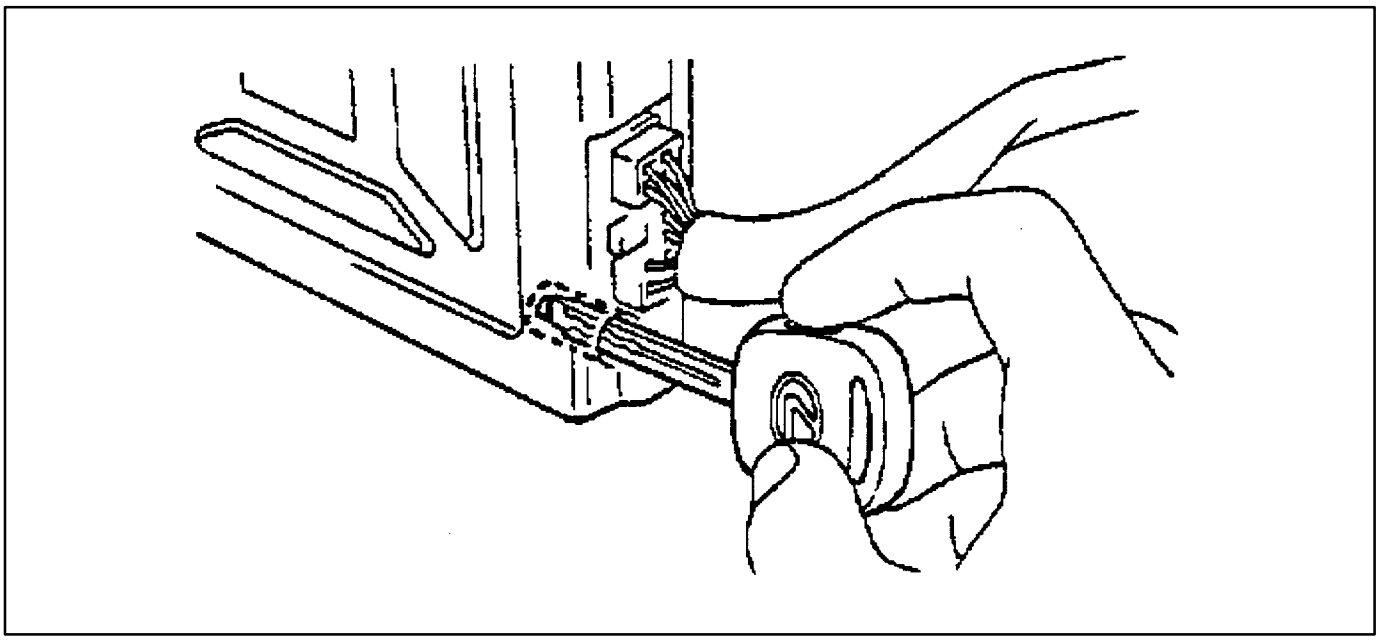
8. Close and reopen driver's door.
9. Press the transmitter button for 1 second. Receiver should respond by cycling door locks:
   - One time to confirm operation is complete.
   - Two times to signal that the code is already registered.

WIRELESS ANTENNA INSPECTION PROCEDURE:

If wireless operation is verifiably inoperative, use **Procedure A**, otherwise use **Procedure B**.

Procedure A:

Remove antenna cable from receiver. Insert key into receiver antenna port as shown below. Press transmitter button several times while monitoring door lock operation.



If door locks are still inoperative, the antenna circuit is not the primary problem.

If door lock operation is consistent:

1. Inspect rear glass for damaged or broken wires and replace glass if necessary.
2. If rear glass is OK, replace wireless antenna cable.

Procedure B:

Perform the following checks:

1. Inspect rear glass for damaged or broken wires and replace glass if necessary.
2. Inspect antenna cable connections at rear glass and at receiver.
3. Physically inspect antenna cable for pinches or breaks and replace cable if necessary.
4. Check continuity through inner coaxial cable wire and replace cable if necessary.

WARRANTY INFORMATION:

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
891101	Transmitter replacement includes key registration or installation of the ROM in the ECU where applicable and all necessary checks and tests	0.3	897XX–50XXX	95	71
EL6002	For VCV10 Transmitter replacement includes the ROM in the ECU where applicable and all necessary checks and tests	0.2	897XX–50XXX	95	71
EL6003	Receiver replacement including all necessary checks and tests	0.3	5974X–50XXX	95	71
830651	Ignition key cylinder R&R including all necessary checks and tests	*	84450–XXXXX	72	71
672101	Door key (unlock/lock) switch R&R including all necessary checks and tests	*	69052–XXXXX	95	71

NOTE: Replacement of the transmitter battery is not warrantable as per the Lexus Warranty Policy & Procedures Manual.

***** Refer to the specific model in the Lexus Flat Rate Manual for repair time.

LEXUS

Technical Service Information Bulletin

March 7, 1997

Title:

1997 PAINT AND REFINISH FORMULA CODES

Models:

All Models

TSIB

Introduction The following is a listing of 1997 Lexus paint codes and corresponding refinish formula codes for 8 (eight) refinish paint companies — BASF, DuPont, PPG, Sherwin Williams, Sikkens, Spies Hecker, ICI and Standox* (Paint and refinish formula codes are located on page 2).

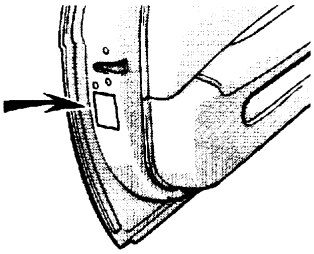
* **Standox** uses the Lexus color code number as their paint code identification number.

Example: The Standox paint code number for Lexus color code 202 (Black Onyx) is 202.

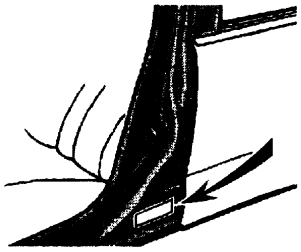
NOTE:
The body color code is indicated on the Certification Label which is located in the driver's door area as shown below.

LS 400

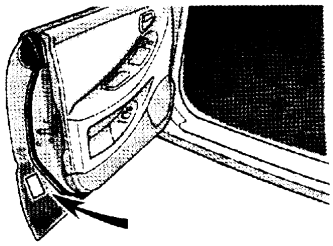
SC 400/300



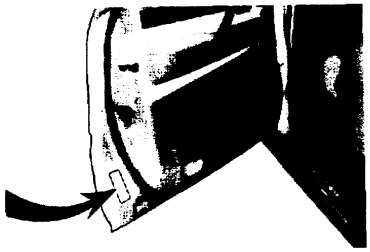
GS 300



ES 300



LX 450



Please contact your local paint representative for the actual paint mixing formulas or for additional assistance in color matching.

Please provide a copy of this information to your Lexus Collision Repair Center.

Paint Codes & Color Names

COLOR CODE	COLOR NAME	BASF	DUPONT	PPG	SHERWIN WILLIAMS	SIKKENS	SPIES-HECKER	ICI
045	Super White	TOY045	H8931	90547	38712	TOY045	16004	NP65
051	Diamond White Pearl	TOY051	L9246 L9247	90822 90826	42872 42873	TOY051	98125 16329	PF76B TD86G
1A0	Platinum Metallic	TOY1A0	N9923	4896	49700	TOY1A0	70809	6ED5B
199	Alpine Silver Metallic	TOY199	L9990	4900	48976	TOY199	70706	5TX1B
1B1	Champagne Pearl	TOY1B1	F2186	5252	53074	TOY1B1	20699	FLT9B
1B2	Antique Sage Pearl	TOY1B2	F2201	5324	54757	TOY1B2	73622	HRE5B
202	Black Onyx	TOY202	F0220	9300	1738SW 8803MS	TOY202	73935	TH21B
3K7	Shadow Rose Quartz	TOY3K7	H9650	4615	46620	TOY3K7	99745	PM71B
3L2	Renaissance Red	TOY3L2	L9992	4902	48978	TOY3L2	30491	5TX3B
3L3	Ruby Red Pearl	TOY3L3	F0294	5042	51162	TOY3L3	30914	6KD3B
3L4	Bordeaux Pearl	TOY3L4	F1803	5164	52886	TOY3L4	33135	ARD1B
4M7	Oyster Pearl	TOY4M7	K9968	27579	48841	TOY4M7	10655	5MK6B
4M9	Cashmere Beige Metallic	TOY4M9	N9924	4903	49702	TOY4M9	20261	6ED6B
4N1	Crystal Quartz Metallic	TOY4N1	F1052	5057	51185	TOY4N1	80373	7VS8B
6M1	Dark Emerald Green Prl.	TOY6M1	W9542	4595	46589	TOY6M1	99746	PM72B
6N0	Moonstone Pearl	TOY6N0	F1053	5049	51187	TOY6N0	61495	7VT1B
6N9	Ebony Teal Pearl	TOY6N9	F1054	5050	51189	TOY6N9	61496	7VT2B
6P2	Classic Green Pearl	TOY6P2	F1850	5173	52889	TOY6P2	61953	BAA7B
6P3	Deep Jewel Green Pearl	TOY6P3	F1805	5166	52887	TOY6P3	61928	ARD3B
6P7	Silver Jade Metallic	TOY6P7	F2719	5332	54755	TOY6P7	64197	HRE3B
8L1	Star Sapphire Pearl	TOY8L1	F1055	5052	51191	TOY8L1	53765	7VT3B
8L3	Blue Velvet Pearl	TOY8L3	F2239	5328	54032	TOY8L3	54676	FRC7B
8L5	Royal Sapphire Pearl	TOY8L5	F2728	5329	54485	TOY8L5	55068	HDJ4B

Paint Applications & Types

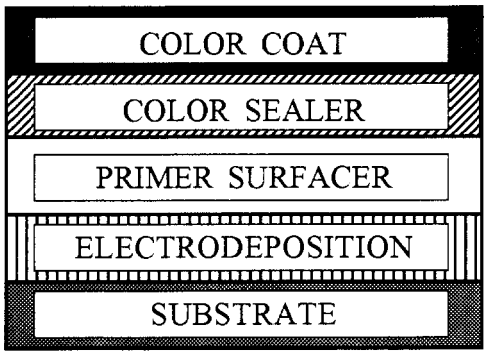
COLOR CODE	LS 400	SC 400	SC 300	GS 300	ES 300	LX 450
045						
051						
1A0						
199						
1B1						
1B2					NEW	
202						
3K7		NEW	NEW			
3L2						
3L3						
3L4						
4M7					NEW	
4M9						
4N1						
6M1						
6N0						
6N9						
6P2		NEW	NEW			
6P3						
6P7	NEW					
8L1						
8L3					NEW	
8L5		NEW	NEW			

Paint Film Cross Sections

PAINT TYPE #1

Solid Color – Non Clear Coat

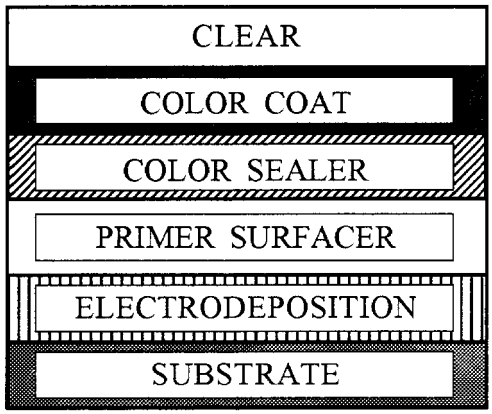
Codes: 202 (Except LX 450)



PAINT TYPE #2

Metallic or Mica Color – Clear Coat

Codes: 1A0, 199, 3K7, 3L3, 3L4 4M7, 4M9 (Except LX 450), 4N1, 6N0, 6P2, 6P3, 6P7, 8L1, 8L3, 8L5

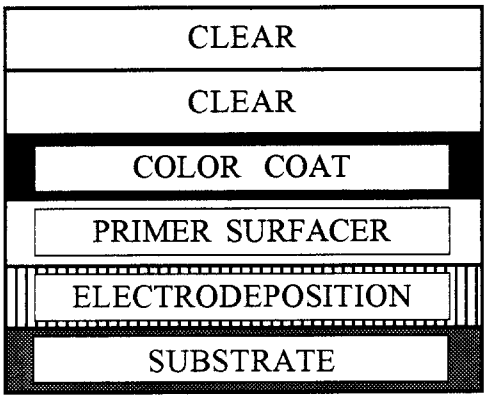


Paint Film Cross Sections (Continued)

PAINT TYPE #3

MIO Color – Two Clear Coats

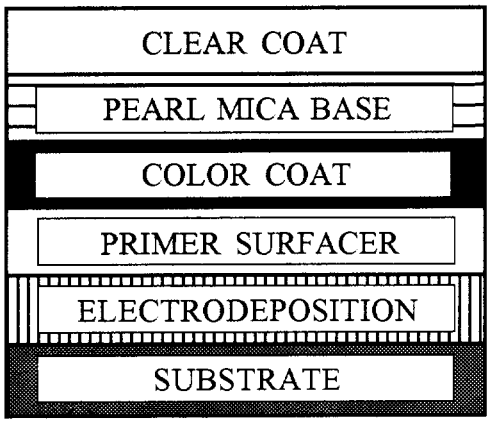
Codes: 6N9



PAINT TYPE #4

Pearl Mica Color – One Clear Coat

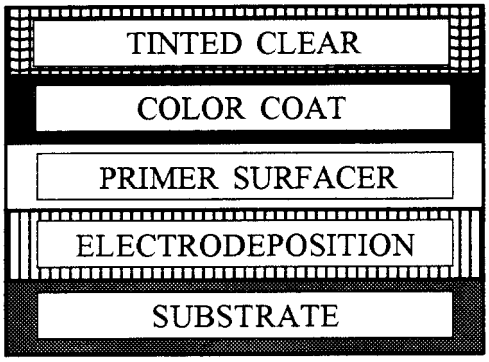
Codes: 051



PAINT TYPE #5

Solid Color – Tinted Clear Coat

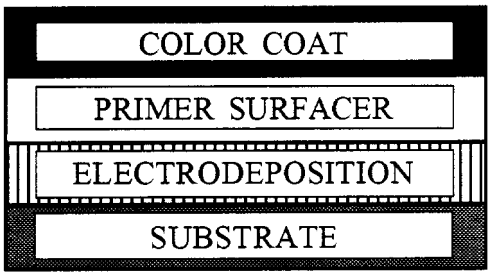
Codes: 3L2



PAINT TYPE #6

Solid Color – Non Clear Coat

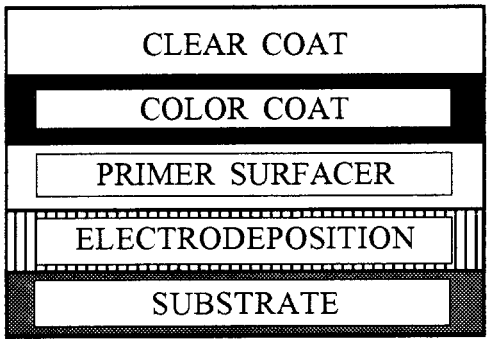
Codes: 045, 202 (LX 450 only)



PAINT TYPE #7

Metallic or Mica Color – Clear Coat

Codes: 1B1, 1B2, 4M9 (LX 450 only), 6M1



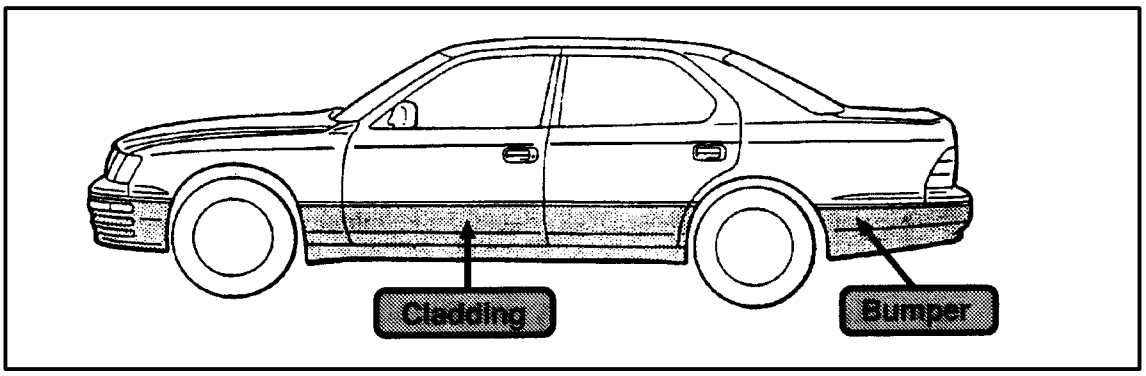
Title **1997 MODEL YEAR PAINT COLORS**

The following information outlines the single and two–tone painting schemes used on 1997 model year Lexus models.

PAINTING METHOD:

Single Color – The cladding and bumpers are painted with the same color.

Two–Tone Color – The claddings and bumpers are painted with a different color from the body color to achieve a two–tone painting scheme.



LS 400 TWO–TONE COLORS:

BODY COLOR	CLADDING COLOR	SINGLE/TWO–TONE NAME
051	UCA29	Diamond White Pearl/Warm Silver Metallic
199	UCA75	Alpine Silver Metallic/Gray Silver Metallic
202	UCA31	Black Onyx/Dark Gray Metallic
4M9	UCA77	Cashmere Beige Metallic/Beige Metallic
4N1	UCA78	Crystal Quartz Metallic/Dark Taupe Metallic
6N0	UCA76	Moonstone Pearl/Medium Gray Metallic
6N9	UCA31	Ebony Teal Pearl/Dark Gray Metallic
6P3	6N0	Deep Jewel Green Pearl/Moonstone Pearl
6P7	UCAA5	Silver Jade Pearl/Greenish Gray Pearl
8L1	UCA32	Star Sapphire Pearl/Dark Bluish Gray Metallic

GS 300 SINGLE AND TWO–TONE COLORS:

BODY COLOR	CLADDING COLOR	SINGLE/TWO–TONE NAME
051	UCA29	Diamond White Pearl/Warm Silver Metallic
199	199	Alpine Silver Metallic (One Color)
202	202	Black Onyx (One Color)
3L3	3L3	Ruby Pearl (One Color)
4M9	4M9	Cashmere Beige Metallic (One Color)
6N0	6N0	Moonstone Pearl (One Color)
6N9	UCA93	Ebony Teal Pearl/Warm Gray Mica Metallic
8L1	8L1	Star Sapphire Pearl (One Color)

ES 300 TWO–TONE COLORS:

BODY COLOR	CLADDING COLOR	TWO–TONE NAME
051	UCA46	Diamond White Pearl/Light Grayish Beige Metallic
1B2	UCAA3	Antique Sage Pearl/Medium Green Gray Metallic
202	UCA45	Black Onyx/Bluish Gray Metallic
3L3	3K2	Ruby Pearl/Dark Red
4M7	UCAA2	Oyster Pearl/Light Brown Gray Metallic
4M9	UCA46	Cashmere Beige Metallic/Light Grayish Beige Metallic
6P2	UCA45	Classic Green Pearl/Bluish Gray Metallic
8L3	UCA45	Blue Velvet Pearl/Bluish Gray Metallic

ES 300 SPECIAL EDITION COLORS:

BODY COLOR	CLADDING COLOR	TWO–TONE NAME
046	UC178	Opal White Pearl/Light Rose Silver Metallic
176	UC196	Silvermist Metallic/Pewter Pearl
202	UC138	Black Onyx/Dark Gray Metallic

LX 450 TWO–TONE COLORS:

BODY COLOR	CLADDING COLOR	TWO–TONE NAME
045	UCA46	Super White/Light Grayish Beige Metallic
1B1	UCA46	Champagne Pearl/Light Grayish Beige Metallic
202	UCA31	Black Onyx/Dark Gray Metallic
4M9	UCA46	Cashmere Beige Metallic/Light Grayish Beige Metallic
6M1	UCA31	Dark Emerald Pearl/Dark Gray Metallic

REPAIR PROCEDURE:

Since heat deformation of the cladding occurs more easily than bumpers, repair and refinishing of these parts is not recommended. If original parts are to be refinished, observe the following precautions during the refinish/drying process:

1. To prevent cladding warpage, firmly hold the cladding in place and keep drying temperature below 50°C (122°F).

2. Since the cladding and bumpers are made of a flexible plastic urethane material, use a 2–part urethane finish paint system with plasticizer for all bumper/cladding repairs.

LEXUS

Technical Service Information Bulletin

February 28, 1997

Title:

PUBLICATION CORRECTION INFORMATION

Models:

'95 - '97 LS 400, '97 GS 300, '97 ES 300, '97 LX 450

TSIB

PG001-97

PRODUCT GENERAL INFORMATION

Introduction

Corrections have been made in the repair manuals listed below. A brief Description of each correction is provided. For further details, refer to the appropriate Correction Page (attached to this TSIB for Dealer Area Office distribution). These pages should be attached in the corresponding publication.

NOTE:
When ordering a technical publication (i.e. Repair Manual, Electrical Wiring Diagram) From the MDC, any Correction Page(s) associated with that particular Publication, will be automatically included with your order.

Additional Correction Pages are available through the Dealer Support Material Network (MDC NPM System) via the corresponding part numbers from the following table:

Parts Information

PUBLICATION	NUMBER	PAGE(S)	DESCRIPTION	PART NUMBER
'95 LS 400 Repair Manual	RM405U1	AT-74	**AUTOMATIC TRANSMISSION**– *TROUBLESHOOTING.* INSPECTION PROCEDURE– Step 1 was completely revised. Step 2, **P** *1. Remove transmission.* was revised to *1. Remove the oil pan.*	00245-RM405-6012
'96 LS 400 Repair Manual	RM439U1	AT-51	**AUTOMATIC TRANSMISSION**– *TROUBLESHOOTING.* INSPECTION PROCEDURE– Step 1 was completely revised. Step 2, **P** *1. Remove transmission.* was revised to *1. Remove the oil pan.*	00245-RM439-6012
'97 LS 400 Repair Manual	RM514U1	BR-18	**BRAKE** - *FRONT BRAKE.* 5. MEASURE DISC RUNOUT - (B) Text revised to include . . . *grind it on a "on-car" brake lathe.*	00245-RM514-6041
	RM514U	BR-24	**BRAKE** - *FRONT BRAKE (Disc Brake)* 4. MEASURE DISC RUNOUT - Text revised to include . . . *grind it on a "on-car" brake lathe.*	
'97 GS 300 Repair Manual	RM512U	BR-17	**BRAKE** - *FRONT BRAKE.* 3. MEASURE DISC RUNOUT - Text revised to include . . . *grind it on a "on-car" brake lathe.*	00245-RM512-6041

Parts Information (Continued)

PUBLICATION	NUMBER	PAGE(S)	DESCRIPTION	PART NUMBER
'97 GS 300 Repair Manual	RM512U	BR-20	**BRAKE** - *REAR BRAKE (Disc Brake).* REAR BRAKE COMPONENTS INSPECTION AND REPAIR. 3. MEASURE DISC RUNOUT - Text revised to include . . . *grind it on a "on-car" brake lathe.*	00245-RM512-6041
'97 ES 300 Repair Manual	RM511U	DI-248	**BRAKE** - *ANTI-LOCK BRAKE SYSTEM.* DTC - REAR SPEED ROTOR FAULTY - Revised to 33, 34.	00245-RM511-6048
'97 LX 450 Repair Manual	RM515U	BR-10	**BRAKE** - *BRAKE BOOSTER ASSEMBLY.* BRAKE BOOSTER ASSEMBLY - Entire page has been revised from Brake Master Cylinder *Removal* and *Disassembly* to Brake Booster Assembly *Operational Test* and *Components.*	00245-RM515-6055

LEXUS

Technical Service Information Bulletin

March 21, 1997

Title:

AIR BAG INFORMATION LABEL ON GLOVE BOX DOOR

Models:

All Models

TSIB

Introduction

Based on the Federal Motor Vehicle Safety Standard (FMVSS) 208, the Air Bag Information label (1) will be hung on the glove box door for vehicles having a passenger side air bag and produced on or after 2/25/97.

NOTE:
The air bag caution label (2) affixed voluntarily on the passenger side end of the vehicle dash will be eliminated with this change.

Affected Vehicles

- **LS 400, GS 300, SC 400, SC 300, ES 300, LX 450 built after February 25, 1997.**

NOTE:
The Air Bag Information label is NOT required on vehicles built prior to 2/25/97.

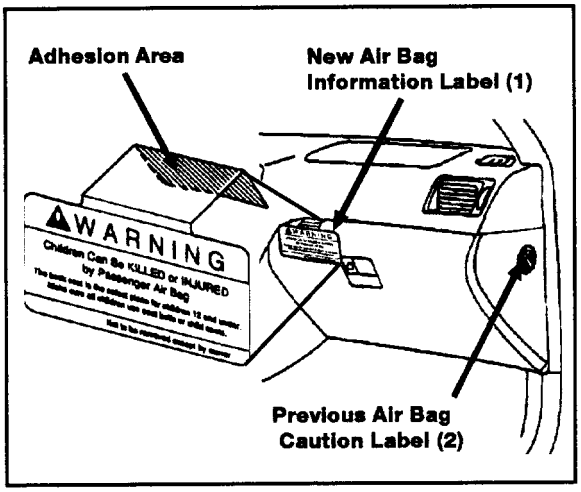
Parts Information

NEW PART NUMBER	PART NAME
74599–06010	Label, Driver and Passenger Information

Procedure

1. During PDS, check to insure that vehicles produced on or after 2/25/97 are in compliance with FMVSS 208 by having the label hung on the glove box door.

2. If the label is missing or damaged, the appropriate label can be ordered through the parts system.



LEXUS
Technical Service Information Bulletin
July 18, 1997

Title:

REPLACEMENT CERTIFICATION LABELS

Models:

All Models

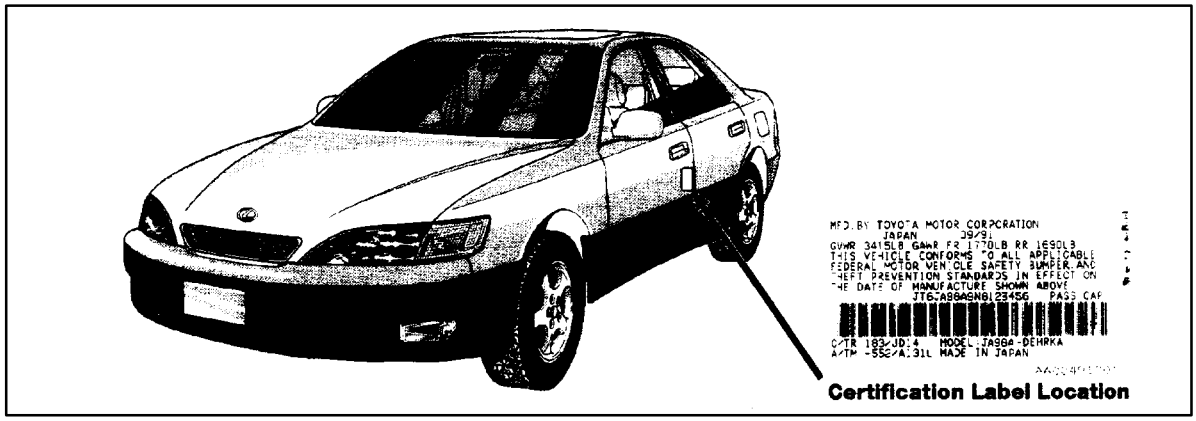
TSIB

PG003-97

PRODUCT GENERAL INFORMATION

Introduction

Replacement Certification Labels (vinyl label affixed to driver's door or door post) **may be** available from Lexus providing the request meets one of the criteria listed below.



Certification Label Location

Affected Vehicles

- All Lexus vehicles.

Certification Label Criteria

1. The vehicle is in an accident and the label is damaged or is attached to a part that will be replaced during the repair.

NOTE:
- **Processing a new label will be delayed if the old certification label is not available.**
- **A new label MAY NOT be available if the vehicle is more than five years old and the old label does not accompany this request.**

2. The label is stolen.

Procurement Procedure

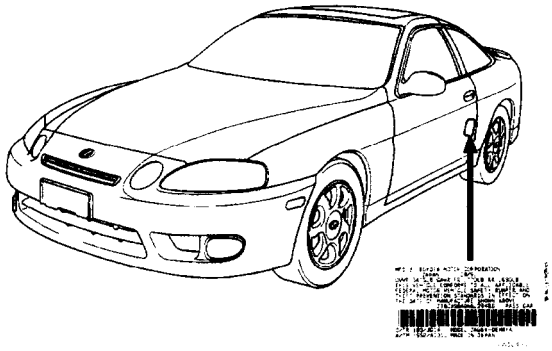
To request a replacement label, complete a copy of the form on the back of this bulletin. Your dealer parts account will be billed $10.00 for each replacement of a damaged or stolen label.

NOTE:
All replacement labels for damaged and/or stolen vehicles are subject to approval by the Technical Compliance Department. If you have any specific questions, contact (310)781-3390.

Warranty Information

- No applicable Warranty Information

APPLICATION FOR REPLACEMENT CERTIFICATION LABEL



REASON FOR REPLACEMENT:

☐ ACCIDENT DAMAGE

☐ STOLEN

☐ OTHER _____
REASON/EXPLANATION

PLEASE PROVIDE CORRECT VIN

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

ATTACH ORIGINAL LABEL HERE

NOTE:
Original label **MUST** accompany this application or order will be delayed.

DEALER INFORMATION

DEALER CODE: ☐☐☐☐☐

DEALER NAME: _____

ADDRESS: _____
STREET ADDRESS

_____
CITY, STATE, ZIP CODE

TELEPHONE: (_____) _____
AREA CODE, TELEPHONE NUMBER

CONTACT: _____
FIRST NAME, LAST NAME

MAIL *(DO NOT FAX)* THE COMPLETED REQUEST FORM WITH THE OLD LABEL TO:

TOYOTA MOTOR SALES, U.S.A. INC.
TECHNICAL COMPLIANCE DEPARTMENT, S203
19001 S. WESTERN AVENUE
TORRANCE, CA. 90509-2991

LEXUS

TECHNICAL SERVICE INFORMATION

REF: PRODUCT GENERAL INFORMATION
NO: PG004–96
DATE: SEPTEMBER 6, 1996
MODEL: ES 300

Title **1997 ES 300 SHORT PIN INSTALLATION DURING PDS**

To minimize battery discharge during transportation and storage, the Short Pin has been removed at the assembly plant.

INSTALLATION PROCEDURE:

The Short Pin is stored in the Engine Room J/B No. 2 in the engine compartment as shown in Figure A.

NOTE: Removal of the Short Pin cuts off the power source to the Dome Fuse and ECU–B fuse.

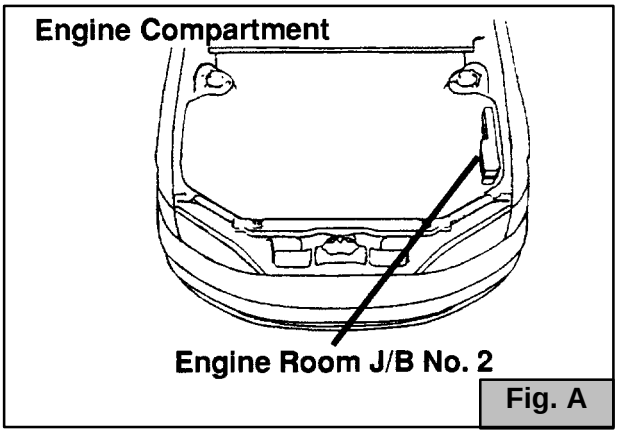


Fig. A

During PDS (Pre-Delivery Service) install the Short Pin in the correct position as shown in Figures B and C.

CAUTION: The Short Pin is not a fuse. Please install only in the position shown in Figure C.

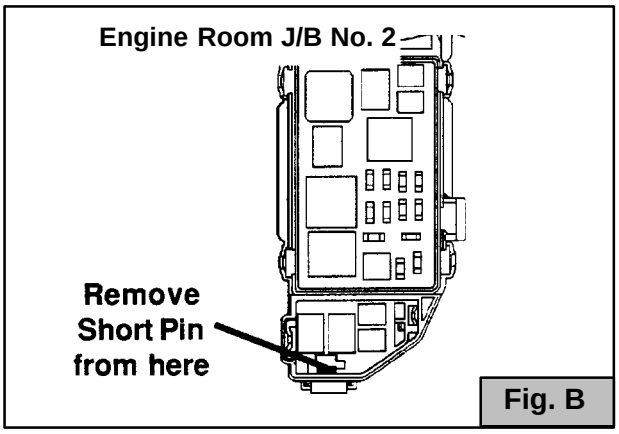


Fig. B

NOTE: If the vehicle is stored at the dealership for a long period of time after PDS, disconnect the negative battery terminal to prevent battery discharge. Refer to TSIB EL002-96 for battery maintenance information.

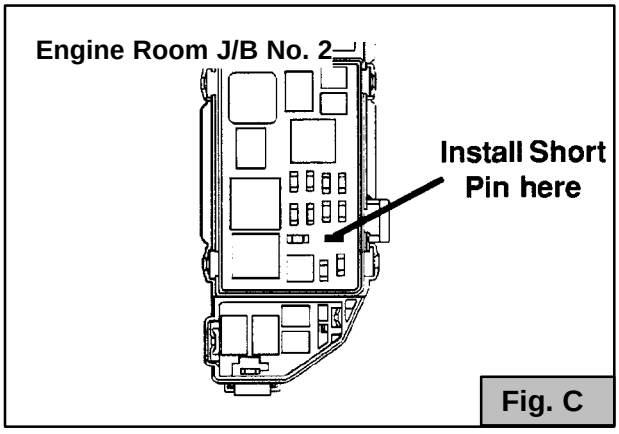


Fig. C

Lexus Supports ASE Certification

LEXUS
Technical Service Information Bulletin
July 18, 1997

Title:
REPLACEMENT VIN PLATES

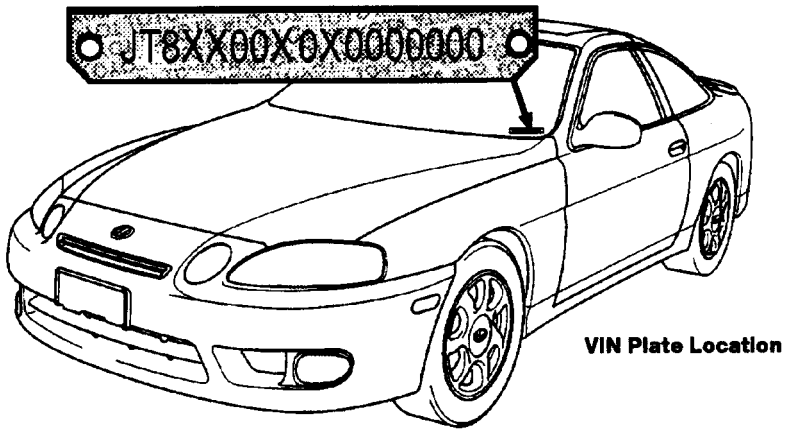
Models:
All Models

TSIB

PG004-97
PRODUCT GENERAL INFORMATION

Introduction

Replacement **VIN** plates (metal plate riveted to dashboard) **may be** available from Lexus providing the request meets one of the criteria listed below.



VIN Plate Location

Affected Vehicles

- All Lexus vehicles.

Replacement VIN Plate Criteria

- The vehicle is in an accident and the plate is damaged.

NOTE:
The plate to be replaced MUST accompany the request.

NOTE:
If a plate is stolen, be sure to contact the State Police or the Department of Motor Vehicles. In most cases the state will issue a unique number so that the original number can be included on stolen vehicle listings. If this is the case, a replacement VIN plate is NOT available from Lexus. However, the original VIN, NOT the state-issued VIN, must be used on all warranty claims.

Procurement Procedure

To request a replacement plate, complete a **copy** of the form on the back of this page. Note that damaged VIN plates must accompany the request form. Your dealer parts account will be billed $10.00 for each replacement of a damaged plate.

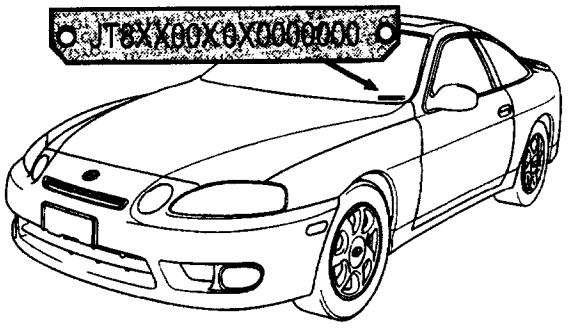
NOTE:
All replacement plates for damaged and/or stolen vehicles are subject to approval by the Technical Compliance Department. If you have any specific questions, contact (310)781-3390.

Warranty Information

- No applicable Warranty Information.

LEXUS

APPLICATION FOR REPLACEMENT VIN PLATE



REASON FOR REPLACEMENT:

☐ ACCIDENT DAMAGE

☐ OTHER _____

REASON OR EXPLANATION

PLEASE PROVIDE CORRECT VIN ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

ATTACH DAMAGED PLATE HERE

DEALER INFORMATION

DEALER CODE: ☐☐☐☐☐

DEALER NAME: _____

ADDRESS: _____
STREET ADDRESS

_____
CITY, STATE, ZIP CODE

TELEPHONE: (_____) _____
AREA CODE, TELEPHONE NUMBER

CONTACT: _____
FIRST NAME, LAST NAME

MAIL *(DO NOT FAX)* THE COMPLETED REQUEST FORM WITH THE OLD PLATE TO:

TOYOTA MOTOR SALES, U.S.A. INC.
TECHNICAL COMPLIANCE DEPARTMENT, S203
19001 S. WESTERN AVENUE
TORRANCE, CA. 90509-2991

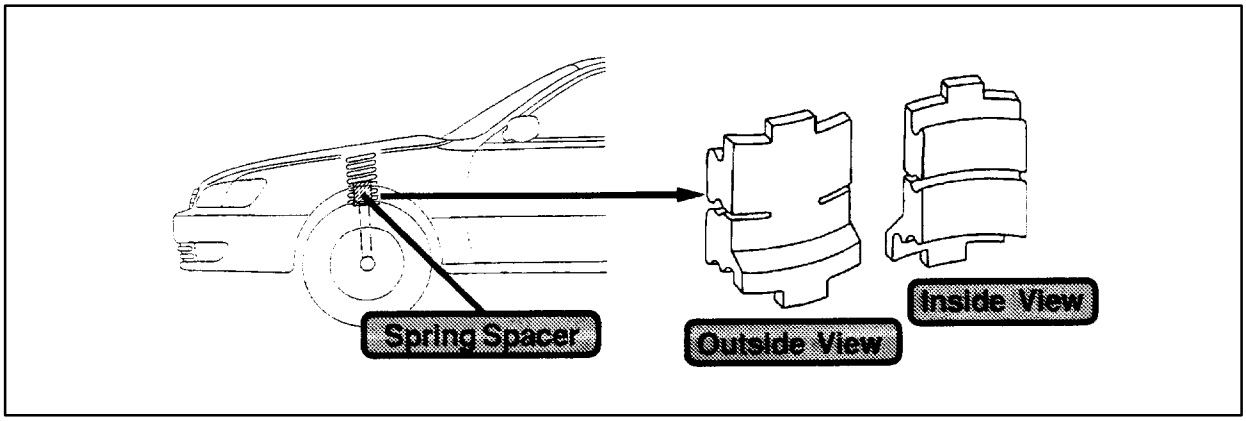
LEXUS

TECHNICAL SERVICE INFORMATION

REF: PRODUCT GENERAL INFORMATION
NO: PG005–96
DATE: SEPTEMBER 6, 1996
MODEL: ES 300

Title **'97 ES 300 FRONT SUSPENSION SPACERS REMOVAL DURING PDS**

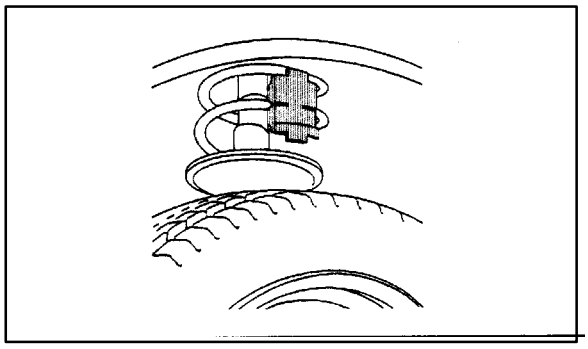
To prevent damage to the underside of the front bumper during vehicle transport, suspension spacers have been installed on the front coil springs for the 1997 ES 300.



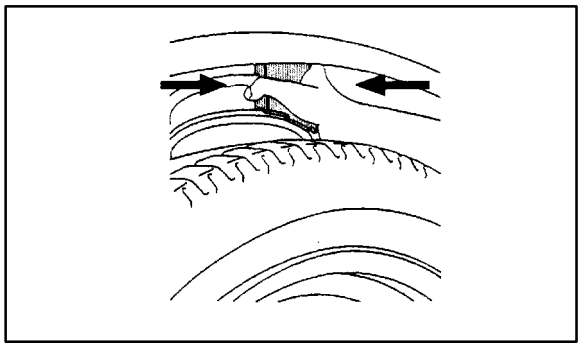
Please use the following procedures to remove the suspension spacers during PDS (Pre–Delivery Service).

SUSPENSION SPACERS REMOVAL PROCEDURE:

1. During the Under Vehicle (On Hoist) checks portion of the Pre-Delivery Service, raise the vehicle to extend the suspension.



2. Firmly grasp the lower part of the spring spacer with your hand.



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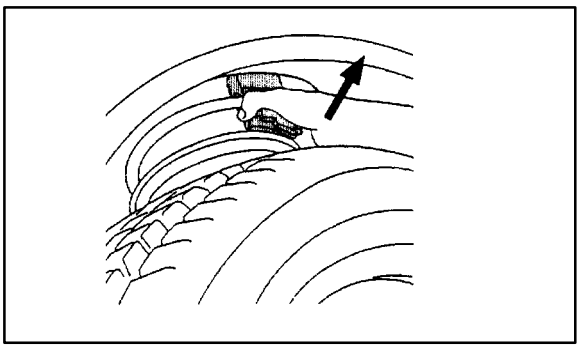
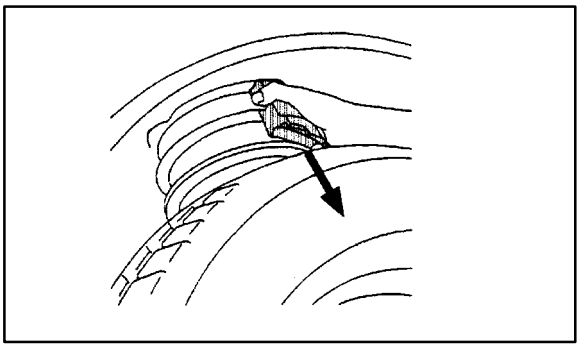
SUSPENSION SPACERS REMOVAL PROCEDURE (Cont’d):

3. Pull the spring spacer toward you and push it upward.



4. Pull the ring spacer downward to remove.



5. Repeat steps 2 through 4 above on the other side to complete removal of the spring spacers.

LEXUS

TECHNICAL SERVICE INFORMATION

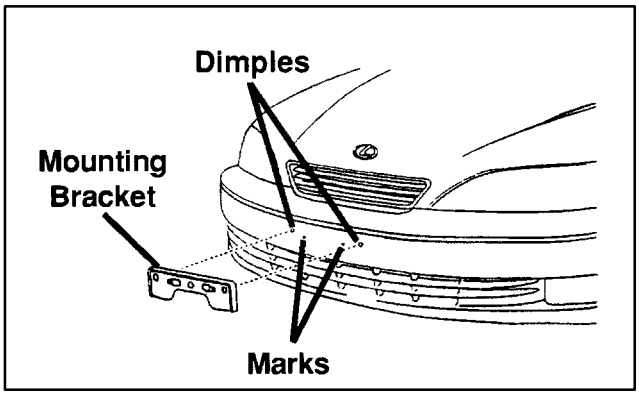
REF: PRODUCT GENERAL INFORMATION
NO: PG006–96
DATE: SEPTEMBER 6, 1996
MODEL: ES 300

Title **1997 ES 300 LICENSE PLATE INSTALLATION DURING PDS**

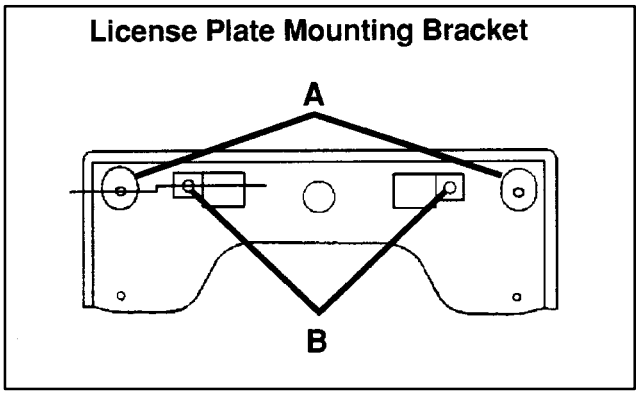
During shipment the 1997 ES 300 front license plate mounting bracket and two attaching screws are placed in a plastic bag in the luggage compartment. Install the mounting bracket cover on the front bumper during PDS (Pre-Delivery Service) according to the following procedures.

FRONT LICENSE PLATE INSTALLATION:

1. Align the holes marked “A” on the mounting bracket with the dimples on the front bumper cover. Mark the location of the holes marked “B” on the front bumper cover.

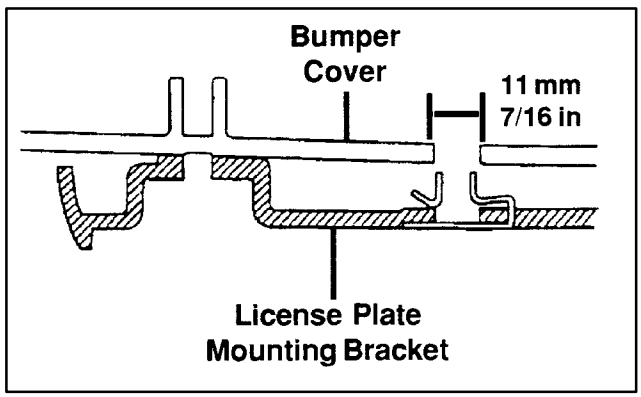


NOTE: Holes marked “A” are used for installation of the mounting bracket to the bumper cover. Holes marked “B” are used for installation of the license plate to the mounting bracket.



2. Drill 2 relief holes, 11 mm (7/16 in.) in diameter, through the bumper cover at the marks made at holes marked “B”. The relief holes provide clearance to prevent the license plate retaining screw from contacting the bumper cover.

NOTE: Do **NOT** drill at the dimples on the front bumper cover.



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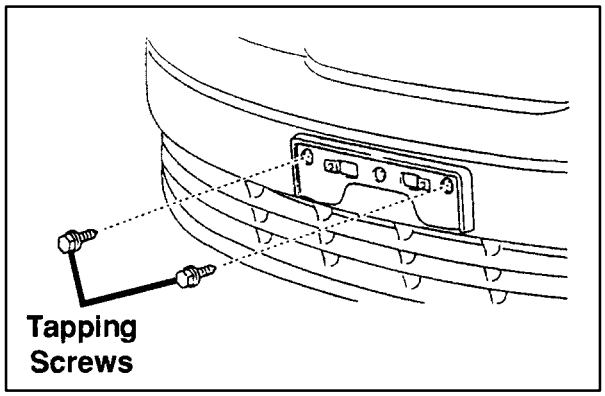
FRONT LICENSE PLATE INSTALLATION:

3. Install the mounting bracket to the front of the bumper cover (at holes marked “A”) using the 2 tapping screws supplied with the bracket.

4. Install the license plate to its bracket using 2 tapping screws with the following dimensions:

- Nominal length (L): < 25.0 mm (9.8 in.)
- Diameter: 6.0 mm (0.24 in.)
- Pitch: 1.0 mm (0.04 in.)



LEXUS

TECHNICAL SERVICE INFORMATION

REF: SPECIAL SERVICE TOOLS

NO: SS001–96

DATE: AUGUST 20, 1996

MODEL: ES 300

Title **VERSION 3.1 DIAGNOSTIC TOOL SET SOFTWARE COMMUNICATION PROBLEM WITH 1997 ES 300**

Due to a change in communication standard for the 1997 ES 300, the Version 3.1 Diagnostic Tool Set Software will display the error message below when the technician attempts to use the ALL DATA list or the ACTIVE TEST functions in ENHANCED OBD II.

NO RESPONSE FROM VEHICLE. CHECK CONNECTION TO VEHICLE. OR THIS TEST IS NOT SUPPORTED FOR THIS VEHICLE.

This problem will be corrected with the release of 1997 Model Year software in November. Until then, there are two alternatives for diagnosing the ES 300 with the current Version 3.1 software:

1. ENHANCED OBD II
   - USER DATA list (less than 50 data lines)
   - Specialized data list from SELECT DATA menu (MISFIRE, O_2 SENSOR, EGR, etc.)
2. CARB ORB II
   - All CARB OBD II function work normally.

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LEXUS

Technical Service Information Bulletin

September 26, 1997

Title:

BRAKE BOOSTER PUSH ROD GAUGE (SST)

Models:

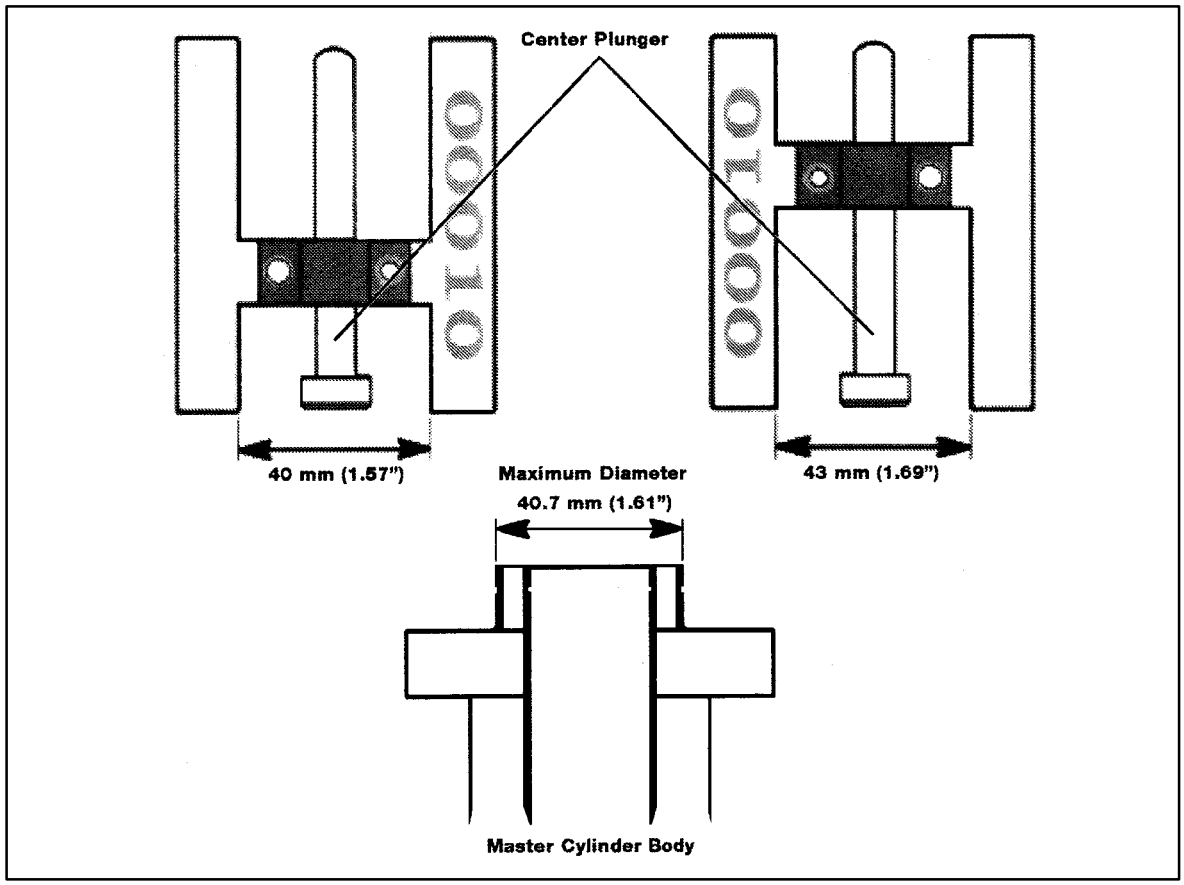
All Models

TSIB

SPECIAL SERVICE TOOLS SS001–97

Introduction

When inspecting or making brake booster push rod adjustments with SST 09737–00010, it is necessary to assure proper tool configuration prior to use. The SST has a reversible center plunger that allows it to function on a wide range of Lexus vehicles. Prior to using, verify that it is configured correctly for the application by checking the master cylinder outer diameter at the point illustrated below. The dimensions for the SST, Part Number 09737–00010, are also shown in the illustrations below.



Parts Information

PART NUMBER	PART NAME
09737–00010	Brake Booster Push Rod Gauge (SST)

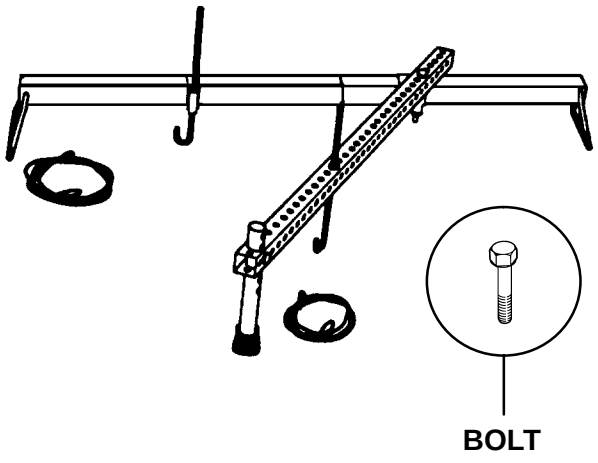
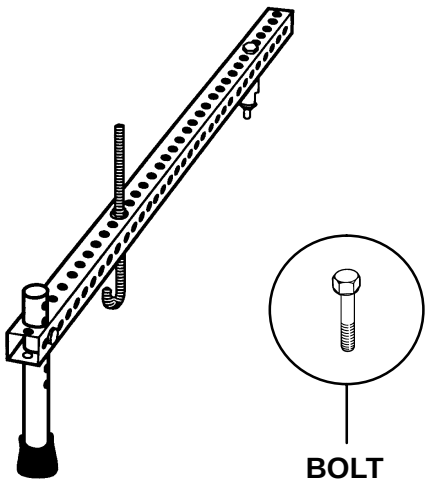
Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not applicable to warranty	–	–	–	–

Title **ENGINE SUPPORT BAR IMPROVEMENTS**

A new engine support bar, P/N 00002–01724, has been released by OTC. This new tripod design engine support bar, which is designed to support engine weight while transmission service is being performed, supersedes the current bipod engine support bar, P/N 00002–01722.

For dealers who currently own the 00002–01722 engine support bar, OTC has developed an upgrade kit, P/N 00002–01724–U which includes all necessary components and hardware to convert it to the new tripod design. **To avoid the potential for personal injury or property damage, do not use the existing engine support bar without the new upgrade kit.**

00002–01724 TRIPOD ENGINE SUPPORT BAR KIT	00002–01724–U TRIPOD UPGRADE KIT
	

DEALER PRICING IS AS FOLLOWS:

AVAILABLE SST'S		
TOOL NUMBER	**TOOL NAME**	**PRICE**
00002–01724	Tripod Engine Support Bar Kit	$165.35
00002–01724–U	Tripod Upgrade Kit	$ 77.25

For more information and to order these Special Service Tools, please call OTC at 800–933–8335.

LEXUS

TECHNICAL SERVICE INFORMATION

REF: SUSPENSION

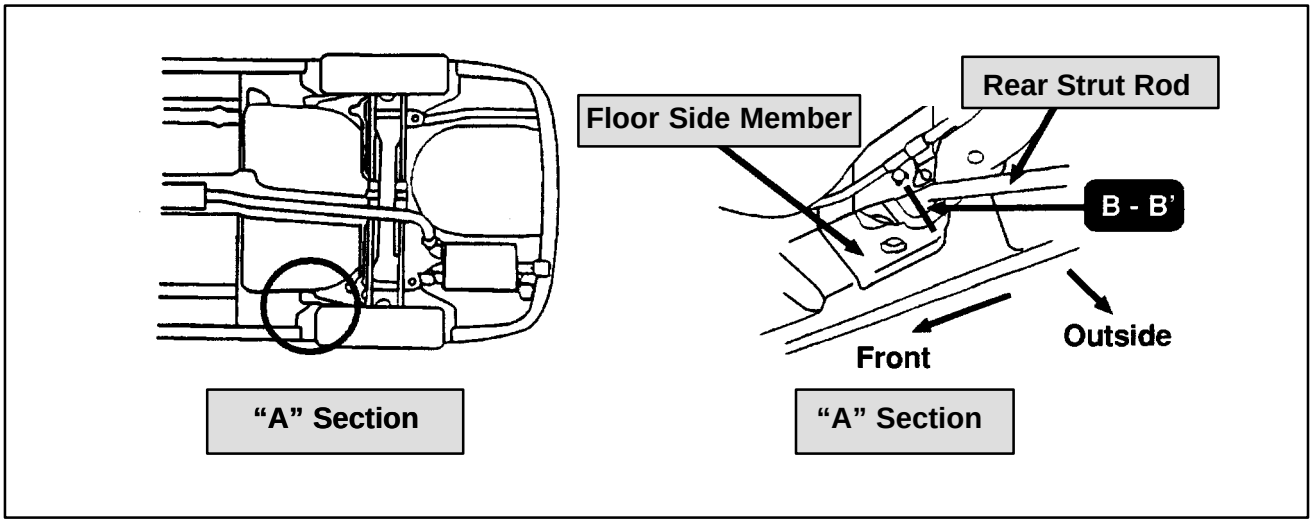
NO: SU005–96

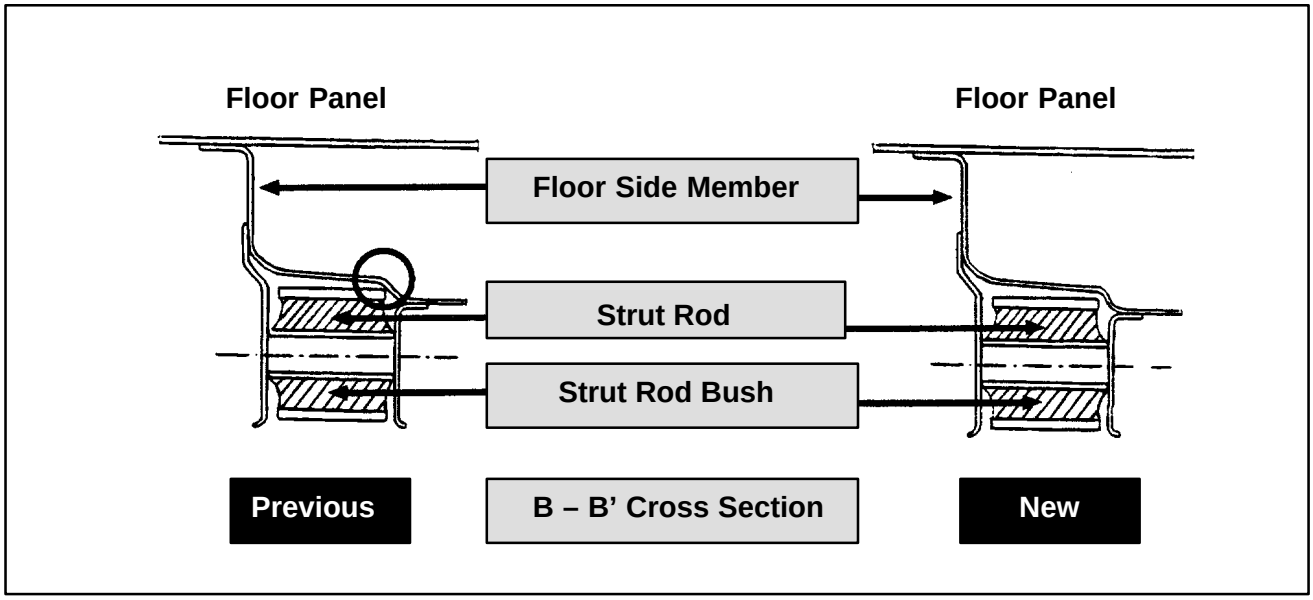
DATE: NOVEMBER 29, 1996

MODEL: ES 300

KNOCKING NOISE UNDER FLOOR IN REAR

To eliminate a knocking noise heard under the floor in the rear, caused by interference between the rear floor side member and the front end of the rear strut rod, the clearance between the side member and the rear strut rod has been increased.





PRODUCTION EFFECTIVE:

Starting VIN: JT8BF22G–V0002236

Lexus Supports ASE Certification

FIELD FIX PROCEDURE:

1. Raise vehicle on hoist.

2. Remove rear strut rod.
   a. Remove the bolt and disconnect the parking brake cable.
   b. Remove the two bolts and nuts.
   c.. Remove the strut rod.

3. Using a brass bar and a hammer, dent the cross hatched area of the rear floor side member by about 1–2 mm in order to increase the clearance between the front end of the rear strut rod and the side member. There may be a shinny area where the strut rod has made metal–to–metal contact.

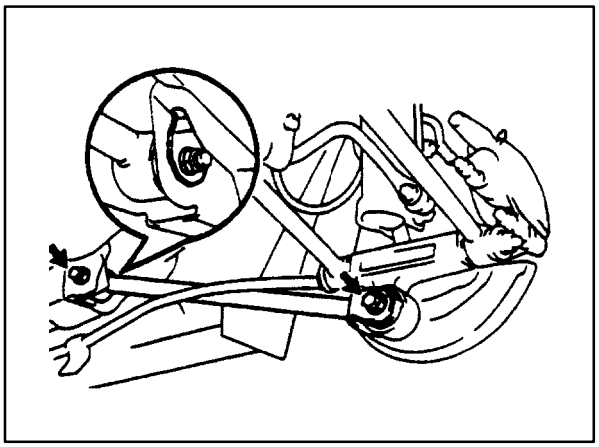
Note*:* Make sure that the end of the brass bar is smooth and rounded to prevent damage to the vehicle floor.

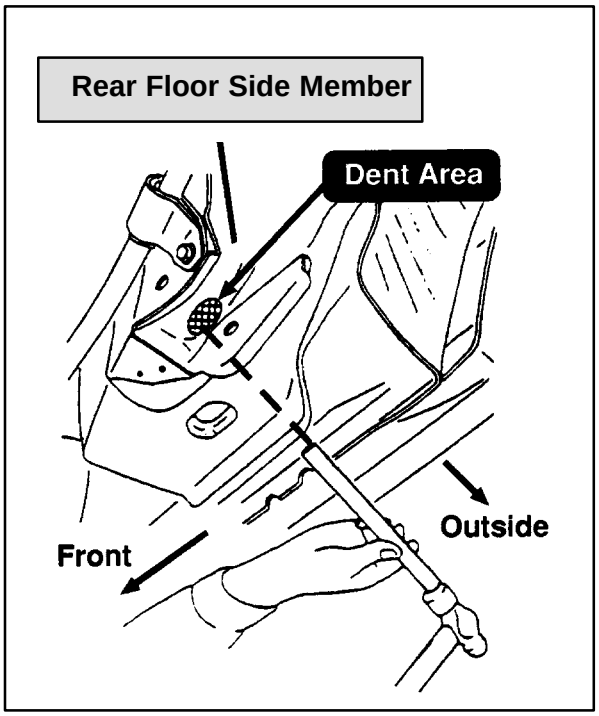
4. Apply a rust preventive sealer to the area that has been modified.
5. Reinstall the rear strut rod with the two bolts and nuts.

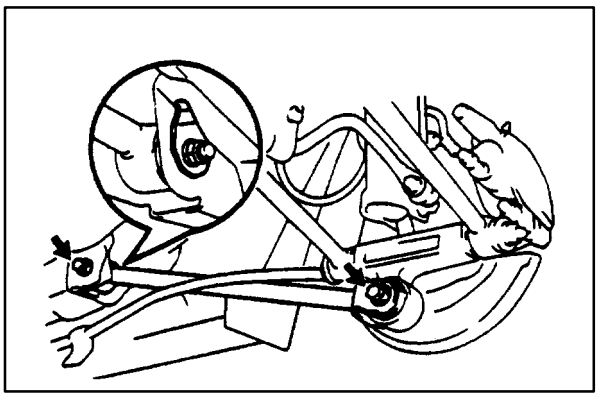
Note*:* Do not torque the bolts until the vehicle is lowered and the suspension has been stabilized.

6. Reinstall the parking cable with the bolt.
   Torque: 5.4 N•m (55 Kg•cm, 48 in•lb)

7. Lower the vehicle, stabilize the suspension at ride height, then torque the rear strut rod bolts.
   Torque: 113 N•m (1,150 Kg•cm, 83 ft•lb)







WARRANTY INFORMATION:

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
SU6010	Knocking noise under floor in rear	0.5	48780–33010	91	57

Applicable Warranty Coverage: 4 years/50,000 miles Basic Warranty Coverage.

LEXUS

Technical Service Information Bulletin

October 17, 1997

Title:

TRANSMISSION OIL COOLER INSTALLATION

Models:

'97 ES 300 WITH A541E ATM

TSIB

Introduction

To prevent overheating of the transmission when towing a weight of more than 1,000 pounds, a transmission oil cooler should be installed. The transmission oil cooler and required hardware for installation are available through normal parts supply.

Towing Capacity

- Up to 2,000 pounds (with transmission cooler installed).

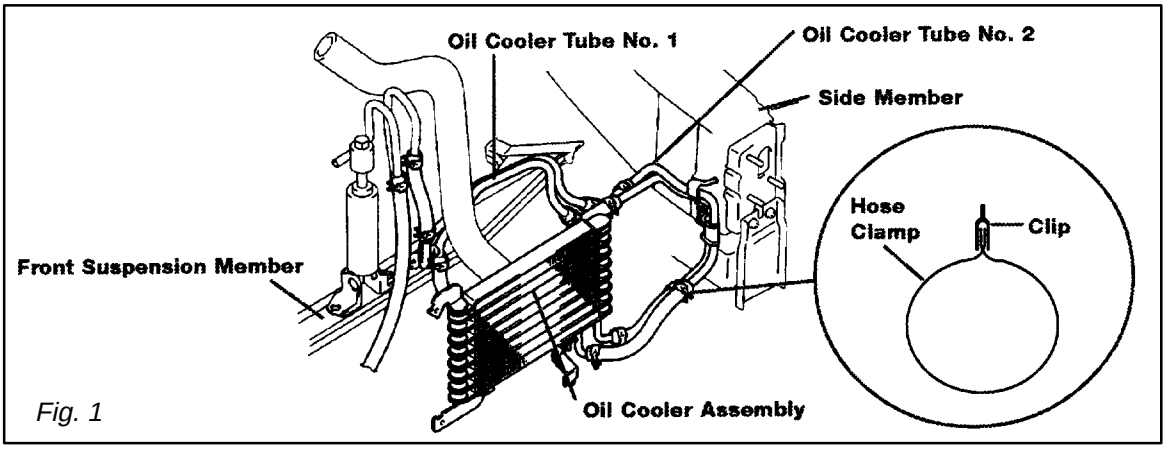


Fig. 1

Affected Vehicles

- **1997 ES 300s** with **A541E** Automatic Transmissions.

Parts Information

PART NUMBER	PART NAME	QTY
32910–33040	Oil Cooler Assembly	1
32907–33050	Oil Cooler Tube No. 2	1
32907–33090	Oil Cooler Tube No. 1	1
90445–17101	180 mm (7.09") Oil Cooler Hose	1
90445–17069	190 mm (7.48") Oil Cooler Hose	1
90445–17139	130 mm (5.12") Oil Cooler Hose	3
90445–17151	140 mm (5.51") Oil Cooler Hose	1
90119–06518	Bolt	3
91611–60816	Bolt	2
90467–16013	Hose Clamp with installation clips	12
90179–06058	Nut	1

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	No applicable warranty information	–	–	–	–

Procedure

1. Parts removal in preparation for cooler installation:

   A. Remove the **9** bolts, **2** screws and the center engine under cover.

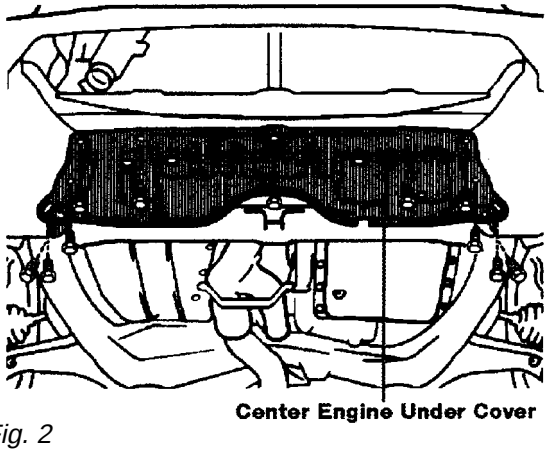


Fig. 2

   B. Remove the engine coolant temperature switch connector and the wire clamp.

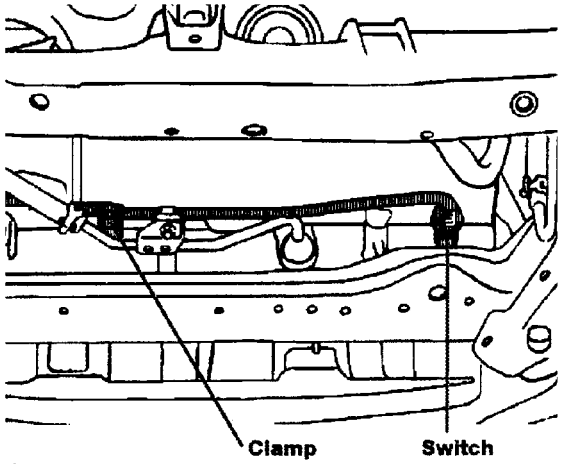


Fig. 3

   C. Remove battery and tray.

   D. Disconnect the cooling fan connector.

   E. Disconnect the No.1 engine coolant temperature switch wire connector.

   F. Remove the **2** bolts and then the cooling fan.

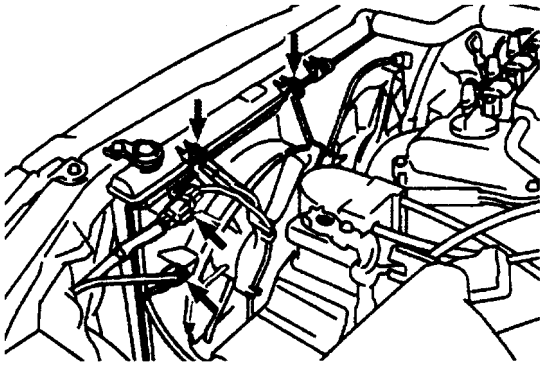


Fig. 4

Procedure (Continued)

2. Cooler Installation:

A. Install the 140 mm (5.51”) hose to the oil cooler tube No. 1 as shown.

NOTE:
Install the hose clamp with the hose clamp clip at the position shown, and use pliers to pull off the clip in the direction indicated by the arrow.

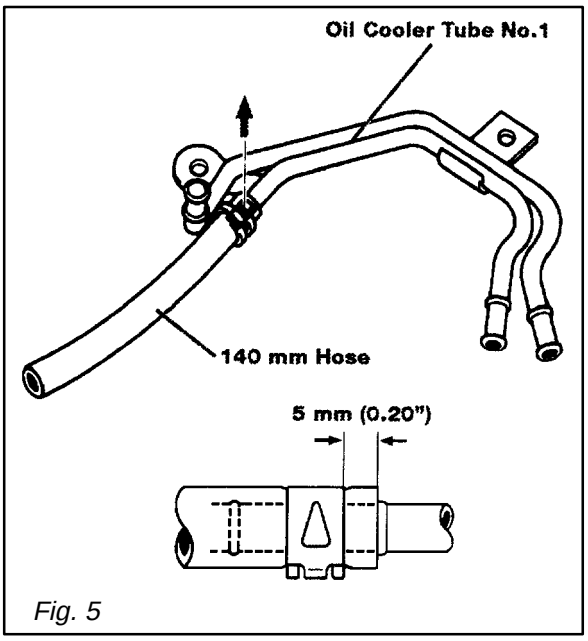


Fig. 5

B. Install the tube bracket onto the left side of the front suspension member with the **2** bolts as shown.

Torque: **62 in•lbf**
(7 N•m/71 kgf•cm)

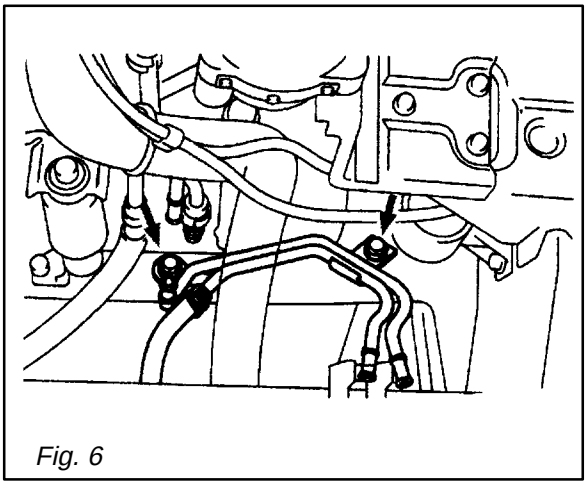


Fig. 6

C. Install the 130 mm (5.12”) hoses and the 180 mm (7.09”) hose to the oil cooler tube No. 2 as shown.

NOTE:
Install the hose clamps with the hose clamp clips at the positions shown, and use pliers to pull off the clips in the direction indicated by the arrows.

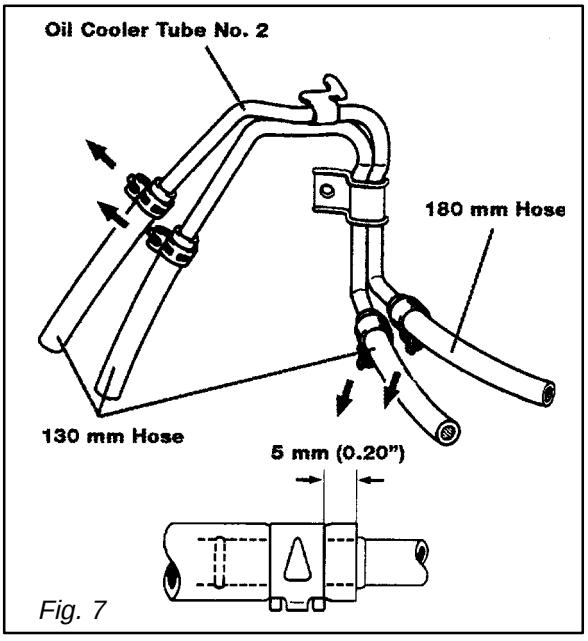


Fig. 7

Procedure (Continued)

D. Remove the lower side clip of the radiator side LH deflector.

E. Install the tube bracket with the bolt on the side member.

Torque: 62 in•lbf (7 N•m/71 kgf•cm)

F. Reinstall the lower side clip of the radiator LH deflector.

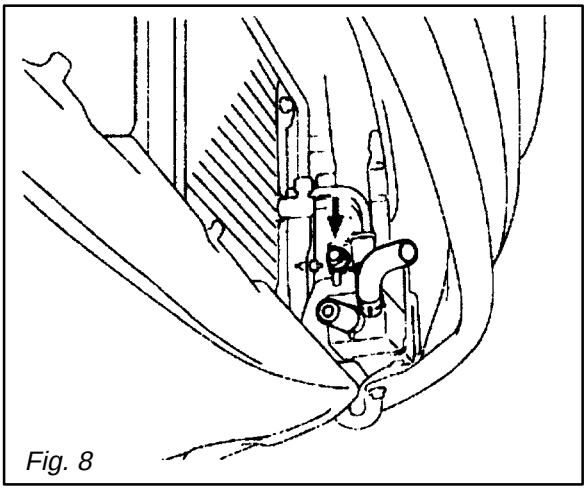


Fig. 8

G. Connect the hoses from the oil cooler tube No.2 to the oil cooler tube No.1.

NOTE:
Install the hose clamps with the hose clamp clips at the positions shown, and use pliers to pull off the clips in the direction indicated by the arrows.

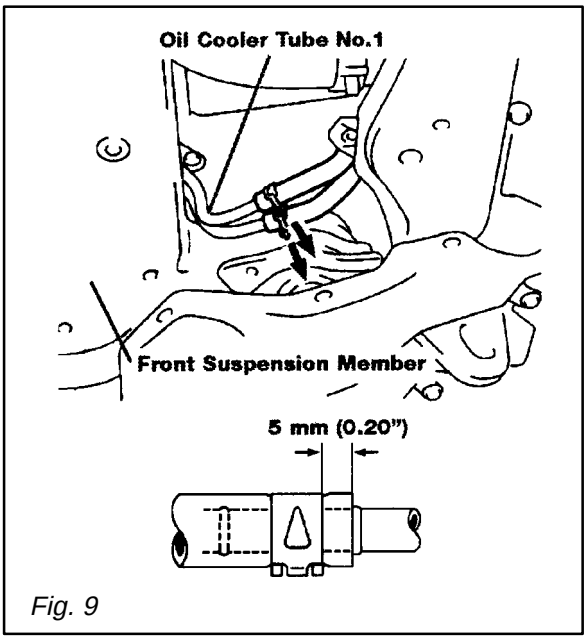


Fig. 9

H. Disconnect the hose from the oil cooler pipe of the radiator LH side.

NOTE:
Place a container below vehicle to catch any leaking ATF. Remove the other end of the hose from transaxle and discard.

I. Connect the hose from oil cooler tube No. 1 to the oil cooler pipe of the radiator LH side.

NOTE:
Install the hose clamp with the hose clamp clip at the position shown, and use pliers to pull off the clip in the direction indicated by the arrow.

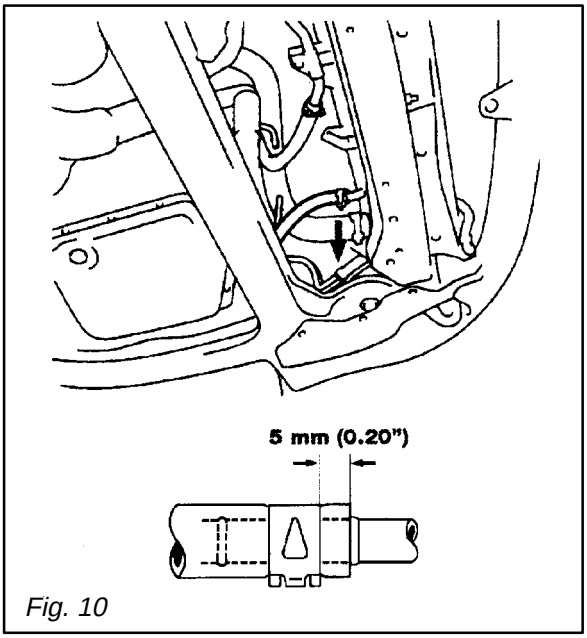
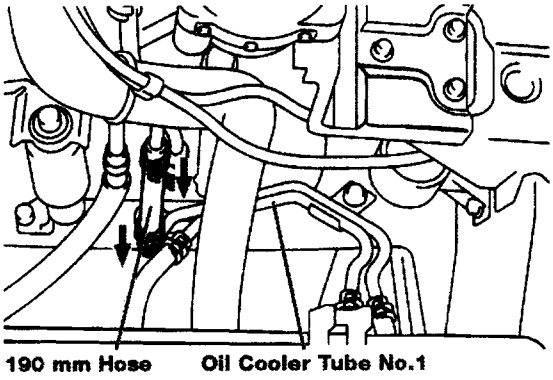


Fig. 10

Procedure
(Continued)

J. Install the 190 mm (7.48”) hose between the oil cooler tube No.1 and transaxle oil cooler tube.

NOTE:
Install the hose clamps with the hose clamp clips at the positions shown, and use pliers to pull off the clips in the direction indicated by the arrows.



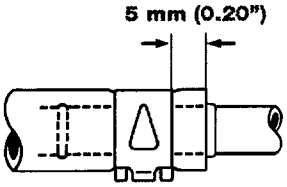


Fig. 11

K. Install the oil cooler onto the center brace and front cross member using the two bolts and nut as illustrated in figure 12.

Torque: **65.5 in•lbf**
(7.4 N•m/75.5 kgf•cm)

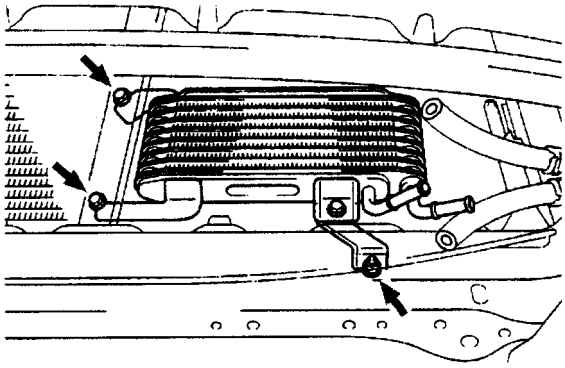


Fig. 12

L. Connect the hoses to the pipes

NOTE:
Install the hose clamps with the hose clamp clips at the positions shown, and use pliers to pull off the clips in the direction indicated by the arrows.

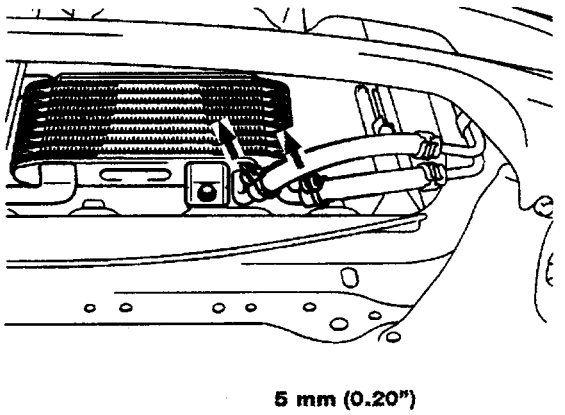


Fig. 13

Procedure (Continued)

3. Final Assembly:

   A. Reconnect the coolant temperature switch connector and wire clamp as illustrated in figure 14.

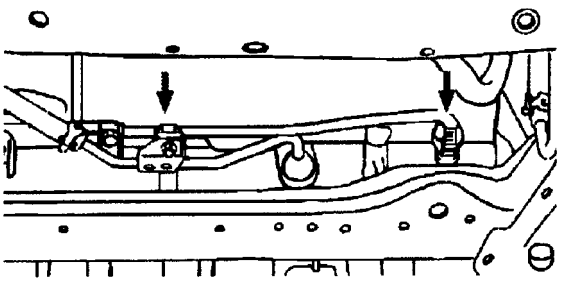


Fig. 14

   B. Install the cooling fan with **2** bolts.

   C. Reconnect the cooling fan connector and the No. 1 engine temperature switch wire connector as shown in figure 15.

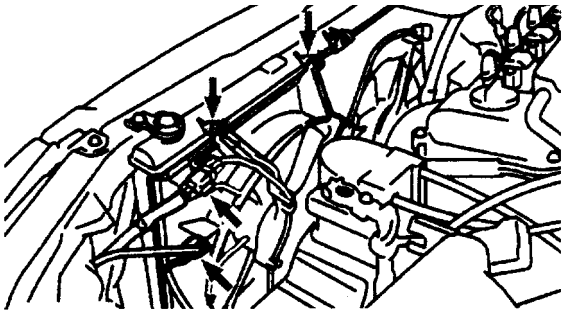


Fig. 15

   D. Reinstall the battery and tray.

   E. Start the engine.

   F. With the engine at idle and the brake pedal depressed, shift the selector into all positions from "**P**" to "**L**", and return to "**P**" position.

   G. Check for leaks from the hose joints.

   H. Add new fluid type **ATF D•II** or **DEXRON•III** **(DEXRON•II)**.

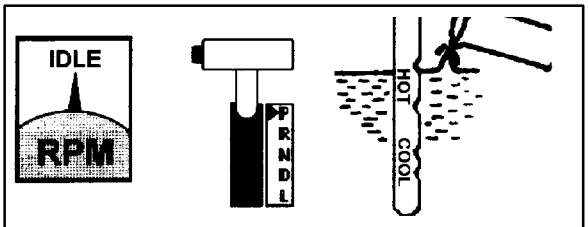


Fig. 16

NOTE:
Additional capacity with cooler will be 0.38 US quarts (0.36 liters).

   I. Shift the selector into all positions from "**P**" to "**L**", and return to "**P**".

   J. Check fluid level with engine idling at normal operating temperature of **158® to 176®F** (**70 to 80®C**) and add more fluid if required.

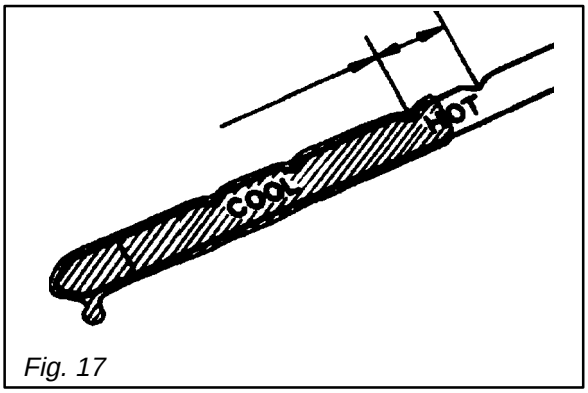


Fig. 17

CAUTION:
Do not overfill.

   K. Shut off the engine and reinstall the center engine under cover with **9** bolts and **2** screws as shown in figure 18.

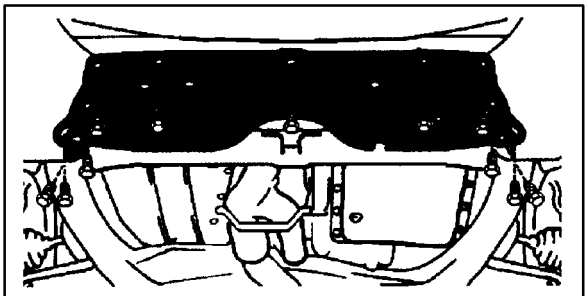


Fig. 18

LEXUS

Technical Service Information Bulletin

October 24, 1997

Title:

OIL PAN, DIP STICK & C1 CLUTCH ON A541E

Models:

'97 ES 300

TSIB

Introduction

The following production changes have occurred on the A541E transaxle:

1. The oil pan and dipstick have been redesigned for increased oil capacity.
2. The C1 clutch has been changed for improved durability.

Transmission Production Change Information

A/T MODEL	A/T SERIAL NO.
A541E	E0619902–

Parts Information

OLD PART NUMBER	NEW PART NUMBER	PART NAME	QTY
30500–33210	30500–33211	Transaxle Assembly, Automatic	1
35106–33010	35106–33020	Pan Sub–assembly, Transaxle Oil *2	1
35103–33120	35103–33160	Gauge Sub–assembly, Transaxle Oil Level *1	1
35701–33030	35701–33050	Shaft Sub–assembly, Input	1
35633–33010	35633–33100	Disc, C1 Clutch	5
35634–33010 35634–33020	35634–33060	Plate, C1 Clutch *1 *3	5
04352–33050	04352–33051	Overhaul Kit, Automatic Transmission	1

*1 Not interchangeable with previous parts.
*2 When using the new oil pan on the old transmission it is necessary to also use the new dip stick.
*3 Quantity: 35634–33010 = 4, 35634–33020 = 1 has been changed to 35634–33060 = 5

Warranty Information

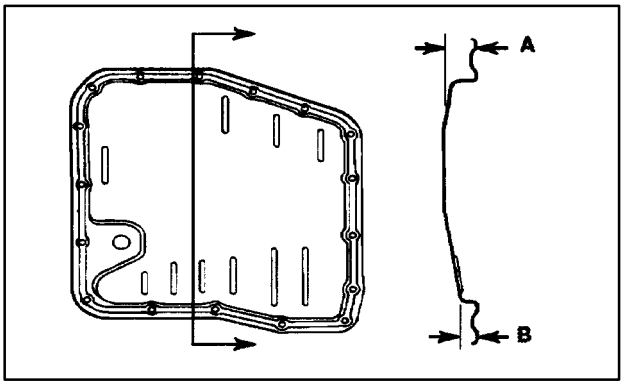
OPCODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Details of Production Change

1. Transaxle Oil Pan

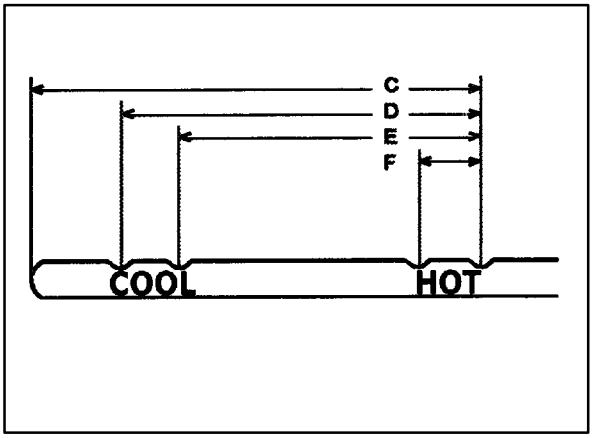
   A. The Oil Pan depth has been increased as indicated by dimensions A and B (illustration and table).

	OLD DIMENSION	NEW DIMENSION
A	31.9 mm (1.256")	34.9 mm (1.374")
B	15.0 mm (0.591")	18.0mm (0.709")



Details of Production Change (Continued)

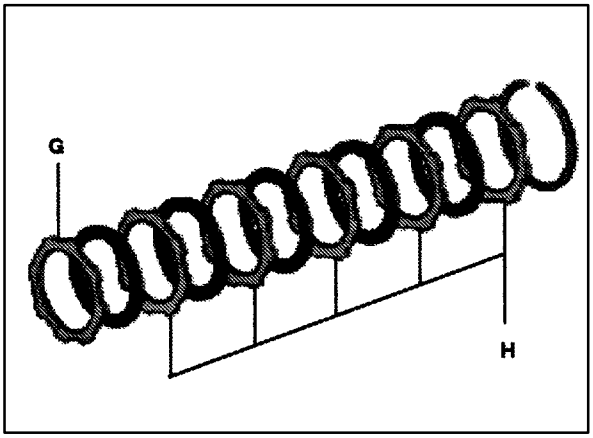
B. With the oil pan change, the oil level gauge (dip stick) has been revised.



	OLD DIMENSION	NEW DIMENSION
C	62 mm (2.44")	
D	41.5 mm (1.634")	50.0 mm (1.969")
E	34.5 mm (1.358")	42.0 mm (1.654")
F	10.0 mm (0.394")	9.0 mm (0.354")

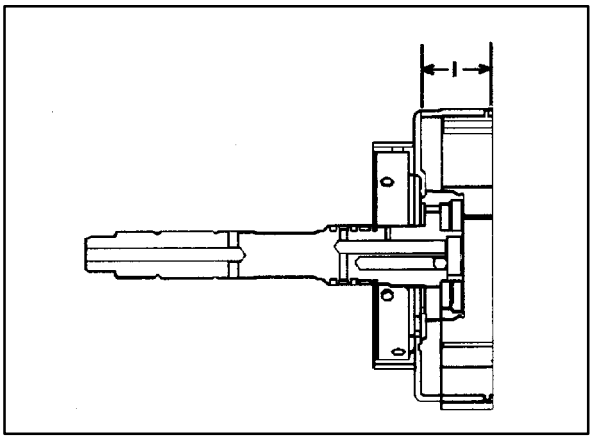
2. Forward Multiple Disc Clutch Assembly

A. C1 clutch plate thickness has been increased to 2.0 mm (0.078").



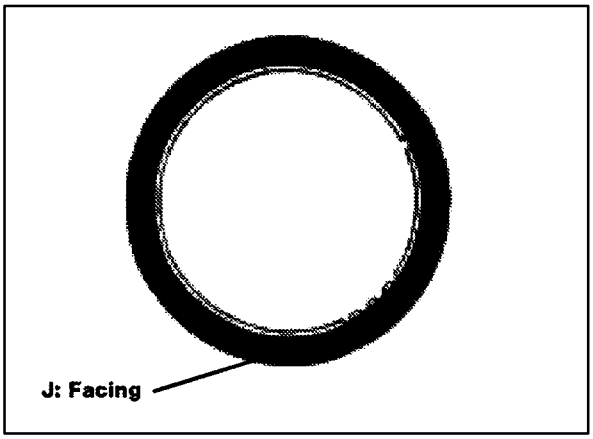
	OLD DIMENSION	NEW DIMENSION
G	1.4 mm (0.055")	2.0 mm (0.078")
H	1.6 mm (0.063")	

B. Input Shaft Sub–Assembly changed to accommodate thicker C1 clutch plates.



	OLD DIMENSION	NEW DIMENSION
I	31.7 mm (1.248")	33.9 mm (1.335")

C. C1 Clutch Disc material has been changed. Identifying marks can be found on the facing.



	PREVIOUS	CURRENT
J	AD505	AD506

LEXUS

Technical Service Information Bulletin

January 23, 1998

Title:

MOON ROOF WIND THROB NOISE

Models:

'97 & '98 ES 300

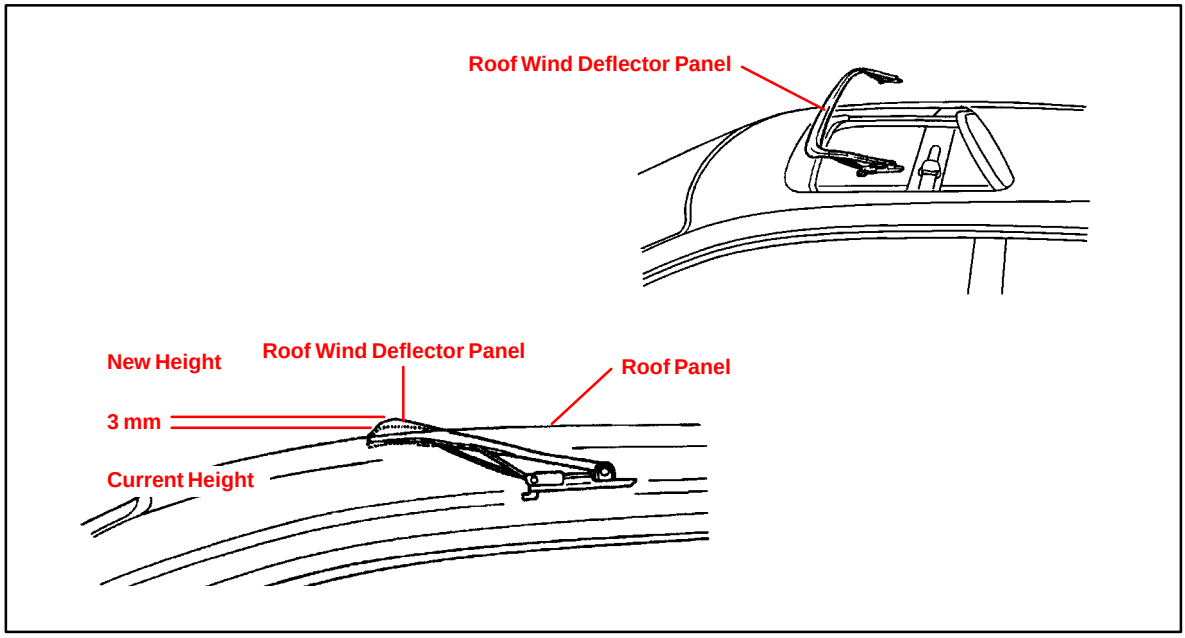
TSIB

NVH

NV001–98

Introduction

To eliminate wind throb on 1997 and 1998 ES 300 vehicles when the moon roof is fully opened, the roof wind deflector has been raised 3 mm as shown.



Production Change Information

- **1997 & 1998 ES 300s** starting with **VINs:**
  JT8BF28G3W0102176 (TMC – Plant Code "0" – 11th digit)
  JT8BF28GXW5029522 (TMK – Plant Code "5" – 11th digit)

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
63209–33030	63209–22040	Roof Wind Deflector Panel Sub–Assembly

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
614121	R&R Roof Panel Subassembly	0.2	63209–33030	59	14

Applicable Warranty:

This repair is covered under the Lexus Basic Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

Field Fix Procedure

Replace Roof Wind Deflector Panel subassembly with the new part.

Technical Service Information Bulletin
January 12, 2005

Title:

IRON PARTICLE RUST CONTAMINATION REPAIR

Models:

'94 – Current

TSIB

Introduction

The purpose of this bulletin is to provide information regarding the proper procedures to clean vehicles that may have been subjected to contamination by airborne iron particles such as rail dust.

Applicable Vehicles

- **1994 – Current** model year **Lexus** vehicles.

Required Tools & Materials

TOOLS & MATERIALS	QUANTITY
Auto Magic® Special Cleaner Concentrate™ #713*	1
Rubber Gloves, Aprons, Boots	As Needed
Eye Protection	
Sponges or Wash Mitts	
Pail or Bucket	

* Contact the main office of Auto Wax Company Inc. (1–800–826–0828 or www.automagic.biz) to find a local source for Auto Magic® Special Cleaner Concentrate.™

Condition

During rail transportation or extended storage near industrial areas, vehicles may occasionally be subjected to contamination by airborne iron particles shed from railroad tracks, train wheels, exposure to heavy machinery facilities, grinding, welding, etc.

Inspection

This type of contamination can be identified by the presence of small red or brown particles on the paint surface. These particles are often difficult to see on dark color paints, but can be easily felt when brushing a hand across horizontal body surfaces such as hood, roof, or deck lid.

CAUTION:

Because of the abrasiveness of these small iron particles, polishing or buffing procedures should not be attempted to repair the paint surface of an affected vehicle. This will result in further paint damage and detract from vehicle appearance.

Repair

Washing the affected paint surfaces with Auto Magic® Special Cleaner Concentrate™ is the recommended method to dislodge embedded iron particles and remove the surrounding rust stains. The correct usage of Auto Magic® Special Cleaner Concentrate™ is described in this bulletin.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

General Precautions

WARNING:

Auto Magic® Special Cleaner Concentrate™ is a corrosive material. Appropriate personal protection equipment must be worn to protect persons performing the contamination removal procedure. Please refer to the precautions on the product prior to use.

CAUTION:

Consult local or state regulations regarding the handling, use, and disposal of Auto Magic® Special Cleaner Concentrate™ prior to use.

Under no circumstances should contamination removal be performed in direct sunlight or contamination removal solution be allowed to dry on vehicle surfaces, as staining of plastic, rubber, or painted parts may result.

Repair Procedure

1. Move vehicle out of direct sunlight. Initially rinse with cool water then wash with liquid car wash detergent. Rinse again thoroughly with fresh water.

2. Dilute the mixture to a 1:8 ratio for painted surfaces. Use the recommended dilution ratio when applying to any other surface. Apply the diluted cleaner concentrate so that it evenly covers the affected area. Use an appropriate mitt or sponge to agitate the surface.

3. Thoroughly rinse vehicle with fresh water.

4. Inspect vehicle carefully both visually and by feel to determine if all iron particles have been removed. Repeat the wash several times if necessary to achieve complete removal.

5. Dry vehicle with a soft terry cloth towel and apply a non–abrasive, non–silicone glaze to obtain a high–gloss finish.

LEXUS

Technical Service Information Bulletin

April 7, 2000

Title:

CA/50 STATE CERTIFIED EMISSION CONTROL UNDERHOOD LABEL ORDERING

Models:

All Models

TSIB

PG001–00

PRODUCT GENERAL INFORMATION

Introduction

It is no longer necessary to fax the CA/50 State Emission Control Label Order Form to TMS. California (CA) and 50 State Certified underhood emission control labels (emission labels) may now be obtained through your dealership Parts Department utilizing standard replacement parts ordering procedures via the TDN. Follow the guidelines outlined in this TSB to ensure proper label application.

Applicable Vehicles

- **All** model year **Lexus Vehicles.**
  We have included a table showing 1995 – 2000 U.S. model numbers and their exhaust emissions certifications. Please continue to consult the Electronic Parts Catalog (EPC) or the parts microfiche for emission label parts numbers.

NOTE:

Although the California Smog Impact Fee has been discontinued, dealers are still required by regulation to verify the correct emission label is installed on the correct vehicle.

REGULATIONS:

The United States Clean Air Act, Title II, Sections 202, 203, 205, and 207 mandates that the emission control label must correctly match the emissions equipment on the vehicle. Any person violating this requirement is subject to applicable State penalties and a Federal civil penalty of no more than $25,000 for each instance.

Personnel at franchised dealerships are authorized to affix such labels to vehicles and are, therefore, subject to this regulation and the attendant penalties.

- **Do not sell the labels over the counter. Always install the label on the vehicle.**
- **Never install a California and/or 50 State Label on a vehicle that is not a California/50 State Emission Certified Vehicle.**
- **Do not install Federal Emission labels on vehicles that are not Federal Emissions Certified.**

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

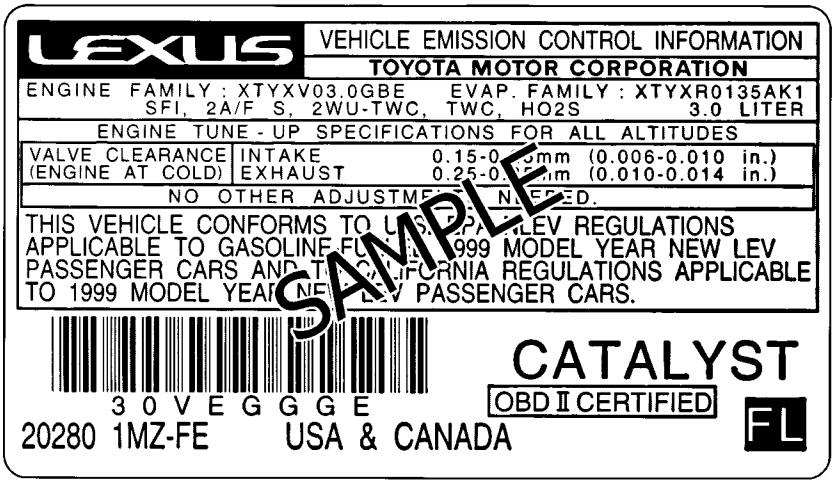
Label Ordering Procedure

To ensure that the emission control labels are affixed to the correct vehicle, it is necessary to follow these procedures:

1. Record the Vehicle Identification Number (VIN) from the vehicle requiring a replacement label.

2. Refer to the Vehicle Detail screen in the Lexus Service Inquiry system to determine the correct 4–digit U.S. model number for the VIN in question.

3. Determine the vehicle's emission certification using the U.S. model number and the attached tables.



4. Once the emissions equipment information is verified, obtain the part number information by consulting the EPC/microfiche.

5. Order the label through your Parts Department, using normal parts ordering procedures via the TDN.

6. When the part arrives, verify that the emission label matches the emissions equipment on the vehicle. This will ensure the correct label is affixed to the vehicle.

1995 MY Emission Control Labels

Year	Model	CA Emission Model No.	50 States Emission Model No.	Federal Emission Model No.
1995	ES 300	9010	N/A	9000
	SC 300	9210, 9211		9200, 9201
	SC 400	9230		9220
	GS 300	9310		9300
	LS 400	9110		9100

1996 MY Emission Control Labels

Year	Model	CA Emission Model No.	50 States Emission Model No.	Federal Emission Model No.
1996	ES 300	9010	N/A	9000
	SC 300	9210, 9211		9200, 9201
	SC 400	9230		9220
	GS 300	9310		9300
	LS 400	9110		9100
	LX 450	9610		9600

1997 MY Emission Control Labels

Year	Model	CA Emission Model No.	50 States Emission Model No.	Federal Emission Model No.
1997	ES 300	9010	N/A	9000
	SC 300	9210, 9211		9200, 9201
	SC 400	9230		9220
	GS 300	9310		9300
	LS 400	9110		9100
	LX 450	9610		9600

1998 MY Emission Control Labels

Year	Model	CA Emission Model No.	50 States Emission Model No.	Federal Emission Model No.
1998	ES 300	9010	N/A	9000
	SC 300	9210		9200
	SC 400	9230		9220
	GS 300	9310		9300
	GS 400	9330		9320
	LS 400	9110		9100
	LX 470	9630		9620

1999 MY Emission Control Labels

Year	Model	CA Emission Model No.	50 States Emission Model No.	Federal Emission Model No.
1999	ES 300	N/A	9000, 9010	N/A
	SC 300		9200, 9210	
	SC 400		9220, 9230	
	GS 300		9300, 9310	
	GS 400		9320, 9330	
	LS 400		9100, 9110	
	RX 300	9410, 9414	9420, 9424	9400, 9404
	LX 470	N/A	9620, 9630	N/A

2000 MY Emission Control Labels

Year	Model	CA Emission Model No.	50 States Emission Model No.	Federal Emission Model No.
2000	ES 300	N/A	9000	N/A
	SC 300		9200	
	SC 400		9220	
	GS 300		9300	
	GS 400		9320	
	LS 400		9100	
	RX 300		9420, 9424	
	LX 470		9620	

LEXUS

Technical Service Information Bulletin

January 1, 1999

Title:

VOLUME 4 INFORMATION

Models:

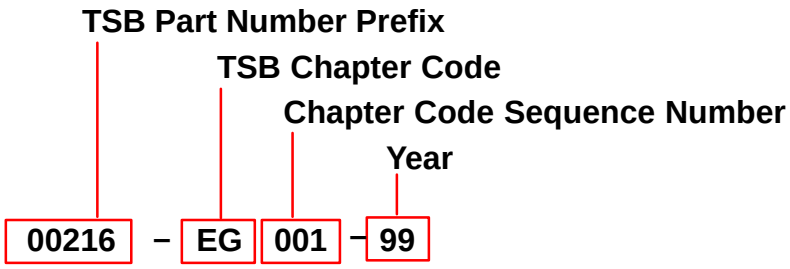
All Models

TSIB

Introduction

Lexus Technical Service Information Bulletins (TSIBs) continue to be one of the most current sources of technical information available. To ensure complete access to this reference source, use the following steps:

- Volume Four will begin with 1999 Technical Service Information Bulletins.
- Place this bulletin along with all 1999 TSIBs into the new binders received with this bulletin.
- Label this new binder “Volume Four“ using the labels provided with the binder.
- Additional copies of 1994 through 1999 TSIBs are available to all Lexus Dealerships through the Non–Parts System (MDC NPM System) by using the following Part Number designation:



Related TSIB Part Numbers

MATERIAL DESCRIPTION	PART NUMBER
1999 TSIB Binder complete with all bulletins issued to date	VOL4
New TSIB Binder and tabs only	00216–00001

LEXUS

Technical Service Information Bulletin

December 24, 1999

Title:

REPAIR MANUAL CORRECTIONS INDEX

Models:

All Models

TSIB

REVISED

PG002–99

PRODUCT GENERAL INFORMATION

Introduction

Corrections have been made in the repair manuals listed below. Corrections available in the last quarter are marked in **red**, and have already been mailed to all dealers.

Parts Information

Correction Pages are available through the Dealer Support Material Network (MDC NPM System) via the corresponding part numbers from the following table:

NOTE:

When ordering a technical publication (i.e. Repair Manual, Electrical Wiring Diagram) from the MDC, any Correction Page(s) associated with that particular Publication will automatically be included with your order.

	Publication	Number	Page(s)	Part Number
ES 300	1997 ES 300	RM511–U	DI–198	00245–RM511–9064
	1998 ES 300	RM577–U	DI–232	00245–RM577–9064
			DI–251	↓
	1999 ES 300	RM667–U1	DI–87	00245–RM667–8122
			DI–92	↓
			DI–94	↓
			DI–107	↓
			DI–234	00245–RM667–9009
			DI–234	00245–RM667–9064
			DI–235	00245–RM667–9009
			DI–243	↓
			DI–244	↓
			DI–245	↓
			DI–253	00245–RM667–9064
			DI–255	00245–RM667–9009
			DI–258	↓
			DI–260	↓
			DI–262	↓
			DI–333	00245–RM667–8101
			IN–19	↓
			IN–20	↓
GS 400/300	1998 GS 400/300	RM583–U1	DI–77	00245–RM583–8122
			DI–81	
			DI–83	
			DI–95	
			DI–283	
			DI–242	
			DI–244	
			DI–256	
		RM583–U2	BE–161	00245–RM583–8118
			BR–4	00245–RM583–8032

	Publication	Number	Page(s)	Part Number
GS 400/300 (Continued)	1998 GS 400/300	RM583–U2	SA–29	00245–RM583–9064
			SA–31	↓
			SA–53	↓
	1999 GS 400/300	RM665–U2	SA–29	00245–RM665–9064
			SF–31	↓
LS 400	1998 LS 400	RM578–U2	BE–170	00245–RM578–8118
			SA–14	00245–RM578–8059
			SA–19	↓
			SA–21	↓
	1998 LS 400	RM578–U2	SA–24	00245–RM578–8059
			SA–53	↓
			SA–56	↓
			SA–75	↓
			SA–78	↓
			SA–79	↓
			SA–80	↓
			SA–110	↓
			SA–114	↓
			SA–124	↓
			SA–125	00245–RM578–9064
LX 470	1998 LX 470	RM620–U	PP–34	00245–RM620–8060
			PP–35	↓
			PP–36	↓
			PP–37	↓
			SS–26	↓
			TR–07	↓
			TR–11	↓
			TR–12	↓
			TR–26	↓
			TR–29	↓
			TR–30	↓
			TR–31	↓
			TR–32	↓
			TR–33	↓
			TR–39	↓
			TR–41	↓
			TR–44	↓
			TR–45	↓
			TR–46	↓
	1998 LX 470	RM620–U1	IN–8	00245–RM620–8039
			DI–221	00245–RM620–8041
			DI–223	00245–RM620–8086
			DI–246	↓
			DI–247	↓
			DI–250	↓
			DI–262	↓

	Publication	Number	Page(s)	Part Number
LX 470 (Continued)	1998 LX 470	RM620–U1	DI–267	↓
			DI–383	00245–RM620–8045
			DI–389	↓
			DI–578	00245–RM620–8118
			SS–29	00245–RM620–9018
	1998 LX 470	RM620–U2	BE–103	00245–RM620–9020
			BR–4	00245–RM620–8039A
			EM–59	00245–RM620–9044
			SA–14	00245–RM620–9018A
			SA–15	↓
			SA–183	00245–RM620–8058
	1998 LX 470	RM620–U2	SR–11	00245–RM620–9029
			SR–15	↓
			SR–16	↓
			SR–17	↓
			SR–20	↓
			SR–21	↓
	1999 LX 470	RM662–U1	SS–30	00245–RM662–9018
			DI–594	00245–RM662–8118
	1999 LX 470	RM662–U2	BE–103	00245–RM662–9020
			EM–59	00245–RM662–9044
			SA–14	00245–RM662–9018A
			SA–15	↓
			SR–11	00245–RM662–9029
			SR–15	↓
			SR–16	↓
			SR–17	↓
			SR–20	↓
			SR–21	↓
RX 300	1999 RX 300	RM662–U1	DI–76	00245–RM626–8122
			DI–80	↓
			DI–82	↓
			DI–93	↓
			IN–21	00245–RM626–8100
			IN–22	↓
			IN–23	↓
		RM626–U2	BE–131	00245–RM626–8118
SC 300/400	1997 SC 400/300	RM513–U	SA–18	00245–RM513–9006
			SA–23	
			SA–25	
			SA–26	
			SA–27	
			SA–28	
	1998 SC 400/300	RM590–U1	DI–466	00245–RM590–8096
			DI–467	↓

	Publication	Number	Page(s)	Part Number
SC 400/300 (Continued)			DI–468	↓
			DI–762	00245–RM590–8118
			PP–72	00245–RM590–9006A
		RM590–U2	SA–27	00245–RM590–9006B
			SA–30	↓
	1999 SC 400/300	RM666–U1	DI–480	00245–RM666–8096
			DI–481	↓
			DI–482	↓
			DI–738	00245–RM666–8118
			PP–72	00245–RM666–9006A
		RM666–U2	SA–27	00245–RM666–9006B
			SA–30	↓

LEXUS

Technical Service Information Bulletin

September 26, 2003

Title:

WARRANTY PARTS MARKING PROCEDURE

Models:

All Models

TSIB

Introduction

Effective September 1, 2003, all warranty parts (as indicated on the next page) must be marked in the area or location of the failure. The technician should complete this procedure after the failed part has been removed from the vehicle and before the part is placed in the 10–bin storage. (Exchanged parts and remanufactured parts are not included in this procedure.)

Failed parts marking will be beneficial in detecting and resolving product and parts quality issues. This will also offer additional opportunities to make future enhancements to our parts and products.

Parts are subject to random inspection in the dealership by field representatives to ensure compliance with this new policy.

Failure to comply with this policy may result in a debit of the corresponding warranty claim(s).

Applicable Vehicles

- All models.

Parts Marking Procedure

All technicians must follow these procedures to ensure proper parts marking:

- Wipe the part clean (no excess fluid should be present).
- Indicate area of defect or failure by marking the specific part(s) with a water resistant permanent marker. Use a color that can be easily seen against the background of the part being marked. For dark surfaces the color yellow is highly recommended as well as the color black for light surfaces.
- Mark the area of failure or defect by drawing a circle, a square, pointing an arrow or adhering tape with an indication of the failed or defect location.
- Attach a completed Warranty Parts Tag (M/N 00404–PRETN–TAGS) to the marked part.

All other parts recovery/shipping policies and procedures apply.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Parts Marking Requirement

Dealers are requested to mark the location of the failure of all warranty parts that are listed below. ***This list is not inclusive.*** There may be other components that can be marked in the area of failure. All other parts that can be marked should be marked.

Parts Marking List

- assist grip assy
- audio (blemish)
- back door garnish
- bumper covers
- cargo cover (retractable)
- carpet
- clutch disc
- clutch flywheel
- combination meter glass
- console and components
- cowl assy
- cowl side trim sub–assy
- cupholders
- cylinder head cover sub–assy
- dash panel insulator assy
- dashboard and trim
- disc wheel
- display panels
- door handle assy
- door moulding
- door trim panel & molding
- emblems
- engine oil pan
- exhaust manifold
- floor and cargo mats
- gear shift knob
- grills
- headlamps
- headliner
- hoses
- instrument panel safety pad sub–assy
- Interior light assemblies and covers
- knobs, levers, handles
- l/pulley pump assy
- mirrors (side and rearview)
- navigation or VES screens
- pillar garnish
- rack and pinion/power steering gear assy
- radiator
- room partition board
- rotors (mark where min. runout is exceeded or warped)
- seat covers/cushions
- seat tracks
- soft trim
- spare tire cover
- steering column cover
- steering wheel
- tail lamps and covers
- transmission oil pan
- visor
- washer jar
- wheel cap
- wheels

Parts Marking List (Continued)

NOTE:

The following parts do not have to be marked unless the technician can determine failure and location.

air induction/ejection systems
all computers
alternators
audio (internal)
batteries
bearings
belts
catalytic converter
crankshaft
cruise control
distributors
EGR systems
engine control systems
exchange parts
exhaust systems
fuel injection systems
fuel injectors
fuel pump
ignition system
internal engine components
internal transmission components
oil cooler
power door lock switches
remanufactured parts
starters
suspension components
valve covers
window regulators
wiper motors

Technical Service Information Bulletin
October 11, 2002

Title:
SUSPENSION BALL JOINT INSPECTION
Models:
Applicable Models

TSIB

Introduction

This Service Bulletin is to inform you of the inspection method, and free play specification figures for suspension ball joints. The on–vehicle inspection methods have been standardized.

Applicable Vehicles

- **1990 – 2000** model year **LS 400** vehicles.
- **2001 – 2003** model year **LS 430** vehicles.
- **1993 – 2003** model year **GS 300** vehicles.
- **1998 – 2000** model year **GS 400** vehicles.
- **2001 – 2003** model year **GS 430** vehicles.
- **1992 – 2000** model year **SC 300 & SC 400** vehicles.
- **2002 – 2003** model year **SC 430** vehicles.
- **2001 – 2003** model year **IS 300** vehicles.
- **1999 – 2003** model year **RX 300** vehicles.
- **1990 – 2003** model year **ES 250 & ES 300** vehicles.
- **1998 – 2003** model year **LX 470** vehicles.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Inspection Information Table

MODEL	LOCATION	LOWER BALL JOINT OR SUSPENSION BALL JOINT			UPPER BALL JOINT		
		INSP. METHOD	MAX. PLAY	TURNING TORQUE	INSP. METHOD	MAX. PLAY	TURNING TORQUE
LS 400 (UCF10) 1990–1994	Front	1–(A)	0.016 in. (0.4) mm	4 in.•lbf (0.5 N•m) or Less	2	No Play Felt	31 in.•lbf (3.5 N•m) or Less
	Rear	3	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
LS 400 (UCF20) 1995–2000	Front	1–(A)	0.016 in. (0.4) mm	22 in.•lbf (2.5 N•m) or Less			
	Rear	3	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
LS 430 (UCF30) 2001–2003	Front	1–(A)	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
	Rear	3	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
GS 300 (JZS147) 1993–1997	Front	1–(A)	0.016 in. (0.4) mm	27 in.•lbf (3.0 N•m) or Less			
	Rear	1–(A)	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
GS 300, 400, 430 (JZS16#, UZS16#) 1998–2003	Front	1–(A)	0.016 in. (0.4) mm	27 in.•lbf (3.0 N•m) or Less			
	Rear	3	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
SC 300, 400 (JZZ31, UZZ30) 1992–2000	Front	1–(A)	0.016 in. (0.4) mm	27 in.•lbf (3.0 N•m) or Less			
	Rear	1–(A)	No Play Felt	31 in.•lbf (3.5 N•m) or Less			
SC 430 (UZZ40) 2002–2003	Front	1–(A)	0.016 in. (0.4) mm	27 in.•lbf (3.0 N•m) or Less			
	Rear	3	No Play Felt	31 in.•lbf (3.5 N•m) or Less			

Inspection Information Table (Continued)

MODEL	LOCATION	LOWER BALL JOINT OR SUSPENSION BALL JOINT			UPPER BALL JOINT		
		INSP. METHOD	MAX. PLAY	TURNING TORQUE	INSP. METHOD	MAX. PLAY	TURNING TORQUE
IS 300 (JCE10) 2001–2003	Front	1–(A)	0.016 in. (0.4) mm	27 in.•lbf (3.0 N•m) or Less	2	No Play Felt	31 in.•lbf (3.5 N•m) or Less
	Rear	3	No Play Felt	31 in.•lbf (3.5 N•m) or Less			27 in.•lbf (3.0 N•m) or Less
RX 300 (MCU10, 15) 1999–2003	Front	1–(B)	No Play Felt	31 in.•lbf (3.5 N•m) or Less	N/A	N/A	N/A
	Rear	N/A	N/A	N/A	N/A	N/A	N/A
ES 250 & 300 (VZV21, MCV20, 30) 1990–2003	Front	1–(B)	No Play Felt	31 in.•lbf (3.5 N•m) or Less	N/A	N/A	N/A
	Rear	N/A	N/A	N/A	N/A	N/A	N/A
LX 470 (UZJ100) 1998–2003	Front	1–(A)	No Play Felt	27 in.•lbf (3.0 N•m) or Less	2	No Play Felt	40 in.•lbf (4.5 N•m) or Less
	Rear	N/A	N/A	N/A	N/A	N/A	N/A

Free Play Inspection

NOTE:
- **Be sure to check the table for the applicable inspection type based on the vehicle model.**
- **Refer to the table for the standard free play values.**

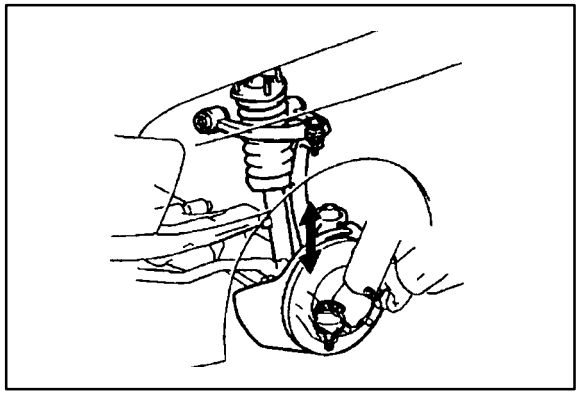
1. Inspect Lower Ball Joint Free Play

A. Move the hub up and down by hand (Most models with wish–bone suspension):

a. Remove the tire.

b. Install the 2 lug nuts.

c. Inspect the free play while moving the lug nuts up and down at a force of 67 lbf (294 N, 30 kgf).

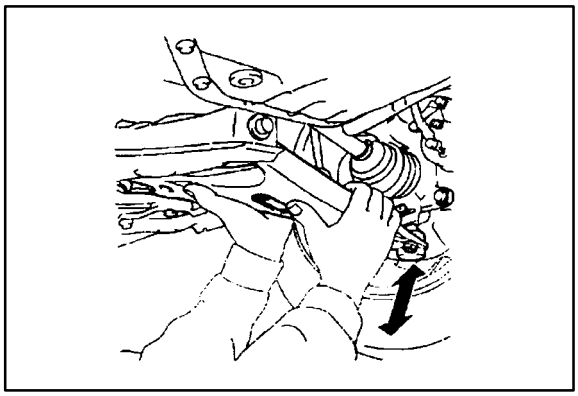


Free Play Inspection (Continued)

B. Move the lower arm by hand (All models with strut type suspension and some models with wish–bone type suspension):

a. Lift up the vehicle.

b. Inspect the free play while moving the lower arm up and down at a force of 67 lbf (294 N, 30 kgf).

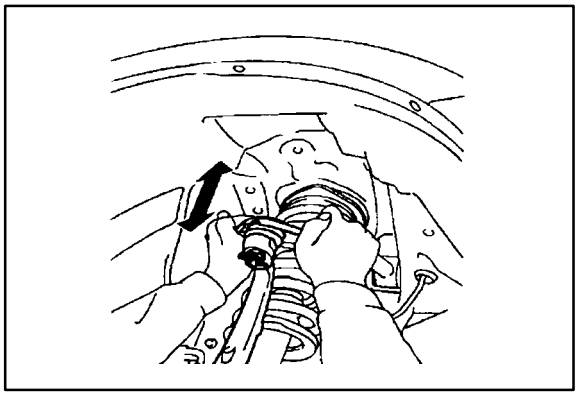


2. Inspect Upper Ball Joint Play

Move the upper arm by hand (Models where the **LOWER** control arm are linked by a torsion bar, and all models using a coil spring.

A. Remove the front tire.

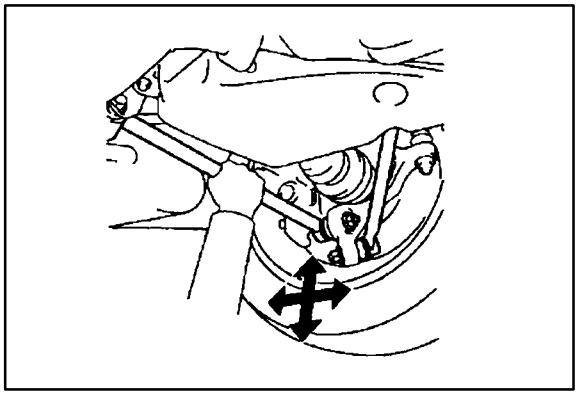
B. Inspect the free play while moving the upper arm up and down at a force of 67 lbf (294 N, 30 kgf).



3. Inspect the Suspension Arm Ball Joint Free Play

A. Lift up the vehicle.

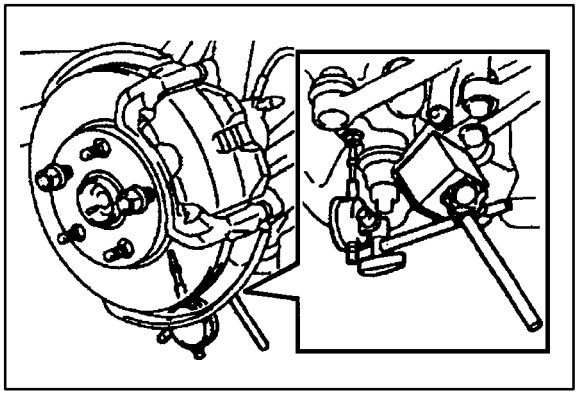
B. Inspect the free play while moving the control arm by hand.



(Reference)

Free Play Inspection Method (Gauge Installation)

- Position the dial gauge between the arm (upper or lower) and the knuckle, and measure free play.
  (This illustration shows how to measure free play for vehicles with double wishbone type suspension with coil spring).



Inspect Ball Joint Dust Cover

Check for cracks and grease leaks on the dust cover (boots).

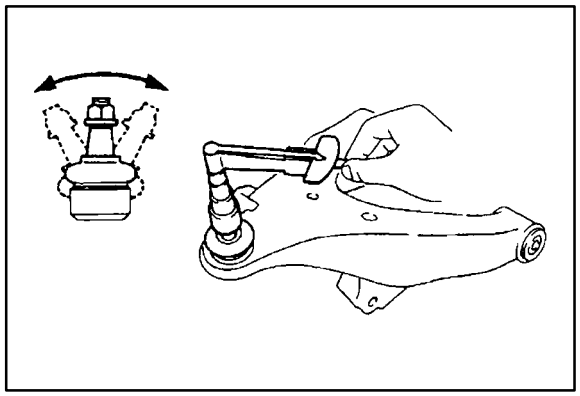
Turning Torque Inspection

Inspect Ball Joint Turning Torque

Move the stud back and forth 5 times, then turn the stud continuously at 3–5 seconds per turn, and measure the turning torque at the 5th turn.

HINT:

Refer to the table for standard values for the turning torque.



LEXUS

Technical Service Information Bulletin

May 4, 2001

Title:

REPLACEMENT CERTIFICATION LABELS

Models:

All Models

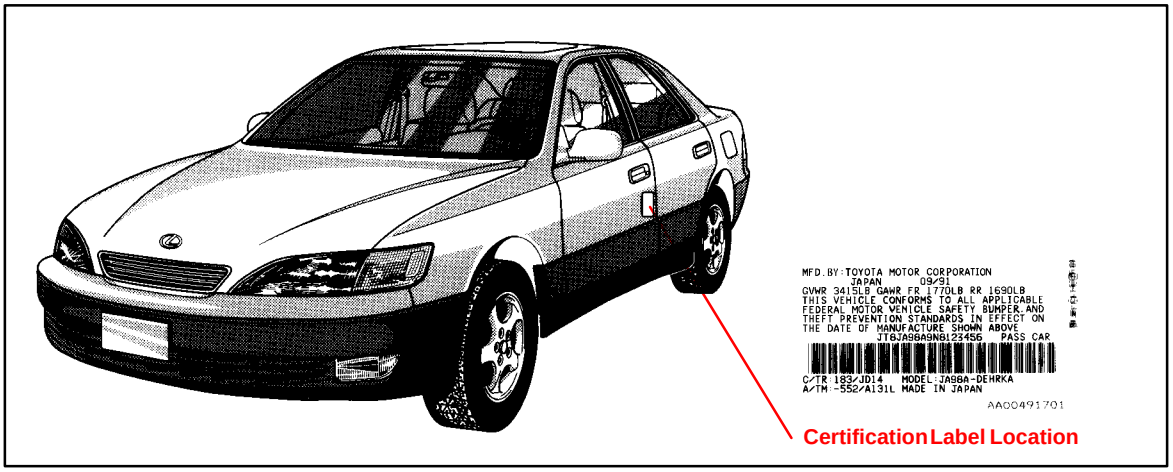
TSIB

PG015-01

PRODUCT GENERAL INFORMATION

Introduction

Replacement Certification Labels (vinyl label affixed to driver's door or door post) **may be** available from Toyota providing the request meets one of the criteria listed below.



Applicable Vehicles

- All Lexus vehicles.

Certification Label Criteria

1. The vehicle is in an accident and the label is damaged or is attached to a part that will be replaced during the repair.

NOTE:

- **Processing a new label *will be delayed significantly if the old certification label is not available.***
- **A replacement label MAY NOT be available if the vehicle is more than 5 years old and the old label does not accompany this request.**

2. The label is stolen.

Procurement Procedure

To request a replacement label, complete a copy of the form on the back of this bulletin. Your dealer parts account will be billed $10.00 for each replacement of a damaged or stolen label.

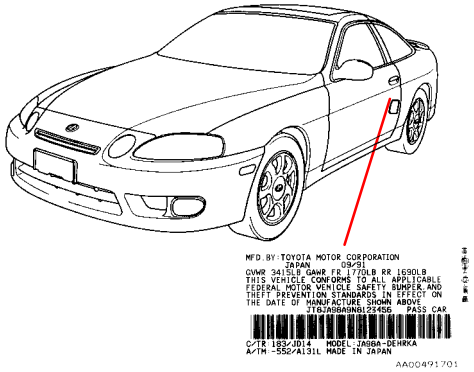
NOTE:

All replacement labels for damaged and/or stolen vehicles are subject to approval by the Technical Compliance Department. If you have any specific questions, contact (310) 468–3390.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

APPLICATION FOR REPLACEMENT CERTIFICATION LABEL



REASON FOR REPLACEMENT

- ☐ ACCIDENT DAMAGE
- ☐ STOLEN
- ☐ OTHER _____

REASON/EXPLANATION

PLEASE PROVIDE CORRECT VIN _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

ATTACH ORIGINAL LABEL HERE

NOTE:
Original label MUST accompany this application or order will be significantly delayed.

DEALER INFORMATION

DEALER CODE: ☐☐☐☐☐

DEALER NAME: _____

ADDRESS: _____
STREET ADDRESS

_____
CITY, STATE, ZIP CODE

TELEPHONE: ( ) _____
AREA CODE, TELEPHONE NUMBER

CONTACT: _____
FIRST NAME, LAST NAME

MAIL (*DO NOT FAX*) THE COMPLETED REQUEST FORM WITH THE OLD LABEL TO:

TOYOTA MOTOR SALES, U.S.A. INC.
TECHNICAL COMPLIANCE DEPARTMENT, S207
19001 S. WESTERN AVENUE
TORRANCE, CA 90509–2991

Technical Service Information Bulletin
May 4, 2001

Title:
REPLACEMENT VIN PLATES
Models:
All Models

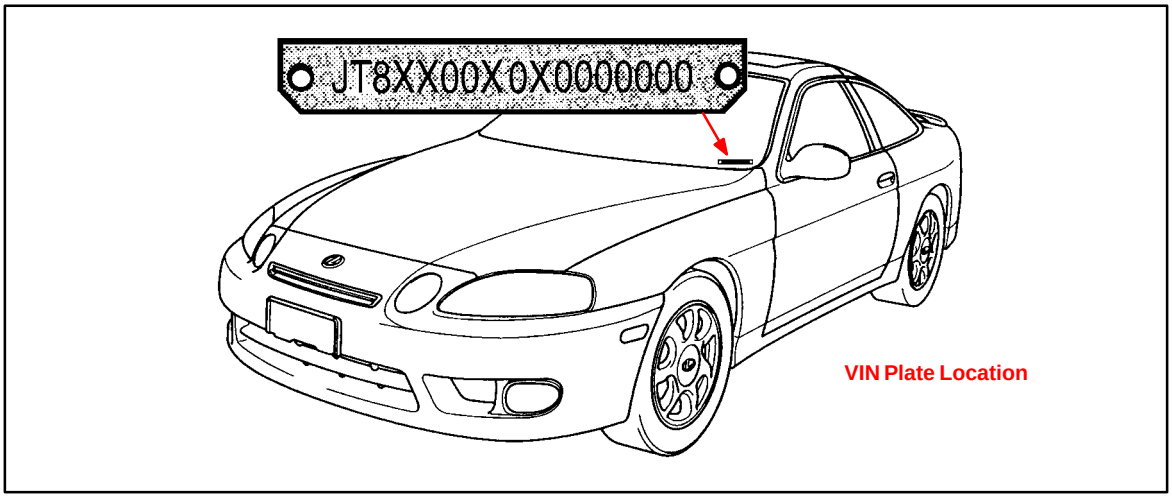
TSIB

PG016-01

PRODUCT GENERAL INFORMATION

Introduction

Replacement **VIN** plates (metal plates riveted to dashboard) **may be** available from Lexus providing the request meets the criteria listed below.



Applicable Vehicles

- All Lexus vehicles.

Replacement VIN Plate Criteria

- The vehicle is in an accident and the plate is damaged.

NOTE:
The original plate to be replaced MUST accompany the request.

NOTE:
If a plate is stolen, be sure to contact the State Police or your State's Department of Motor Vehicles (DMV). In most cases the State DMV will issue a unique number so that the original number can be included on stolen vehicle listings. If this is the case, a replacement plate is NOT available from Lexus. However, the original VIN, NOT the state issued VIN, must be used on all warranty claims.

Procurement Procedure

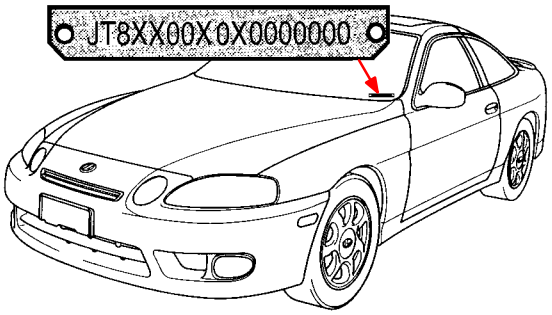
To request a replacement plate, complete a copy of the form on the back of this page. Note that the damaged VIN plate **MUST** accompany the request form. Your dealer parts account will be billed $10.00 for each replacement of a damaged plate.

NOTE:
All replacement plates for damaged and/or stolen vehicles are subject to approval by the Technical Compliance Department. If you have any specific questions, contact (310) 468–3390.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

APPLICATION FOR REPLACEMENT VIN PLATE



REASON FOR REPLACEMENT

☐ ACCIDENT DAMAGE

☐ OTHER _____

REASON/EXPLANATION

PLEASE PROVIDE CORRECT VIN _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

DEALER INFORMATION

DEALER CODE: ☐☐☐☐☐

DEALER NAME: _____

ADDRESS: _____

STREET ADDRESS

_____

CITY, STATE, ZIP CODE

TELEPHONE: ( ) _____

AREA CODE, TELEPHONE NUMBER

CONTACT: _____

FIRST NAME, LAST NAME

MAIL (*DO NOT FAX*) THE COMPLETED REQUEST FORM WITH THE OLD PLATE TO:

TOYOTA MOTOR SALES, U.S.A. INC.
TECHNICAL COMPLIANCE DEPARTMENT, S207
19001 S. WESTERN AVENUE
TORRANCE, CA. 90509–2991

LEXUS

Technical Service Information Bulletin

December 24, 1999

Title:

YEAR 200 READINESS DISCLOSURE

Models:

All Models

TSIB

Introduction

Based upon information we have obtained from our suppliers,[1] all factory–installed systems in Lexus cars and sports utility vehicles distributed and/or sold by Lexus ("Vehicles") will not be affected by the change of date from 1999 to the year 2000.

Lexus anticipates no problems with past, current or future Lexus brand vehicles or Genuine Lexus parts and accessories regarding year 2000 readiness. We hope the following information is helpful to you.

Please contact our Customer Service Department at 1–800–255–3987 should you have any other questions.

Applicable Vehicles

- **All Models**

Warranty

WARRANTY STATEMENT WITH RESPECT TO LEXUS BRAND VEHICLES

Lexus is pleased to confirm that the manufacturer's limited express warranty and Lexus' powertrain warranty warrant that all factory–installed systems in new Vehicles and Lexus Certified Pre–Owned Vehicles shall be free of any defect arising solely due to a change in date from the year 1999 to the year 2000.[2]

With respect to Vehicles no longer covered under such Lexus limited express warranty, Lexus is not aware of any operational safety or functional impact the year 2000 date change would have upon any factory–installed system in Lexus Vehicles. Should Lexus become aware of any material impact to the operational safety or functionality of such systems, Lexus shall publish such information promptly.

WARRANTY STATEMENT WITH RESPECT TO GENUINE LEXUS PARTS AND ACCESSORIES

Lexus is pleased to confirm that the manufacturer's limited express warranty warrants that all new Lexus Genuine Parts and Accessories shall be free of any defect arising solely due to a change in date from the year 1999 to the year 2000.[2]

With respect to products no longer covered under a Lexus limited express warranty, Lexus is not aware of any operational safety or functional impact the year 2000 date change would have upon such products. Should Lexus become aware of any material impact to the operational safety or functionality of such a product, Lexus shall publish such information promptly.

1 Lexus relies on the statements made by its suppliers and has not independently verified such information.

2 Please refer to terms of limited express warranty for disclaimers, limitations and restrictions.

Parts & Accessories

GENUINE LEXUS PARTS AND ACCESSORIES

Based upon information we have obtained from our suppliers,[1] all new Genuine Lexus Parts and Accessories will not be affected by the change of date from 1999 to the year 2000.

DEALER–INSTALLED AND OTHER THIRD PARTY–INSTALLED SYSTEMS/PRODUCTS

Our dealers and distributors may sell and/or install products that are not Genuine Lexus Parts and Accessories. Lexus can only determine the Year 2000 status of Genuine Lexus Parts and Accessories. Therefore, the above statements do not apply to products that are not Genuine Lexus Parts and Accessories or were not installed by the factory. We encourage you to contact your dealer or other relevant third party regarding products installed on your Lexus vehicle(s) that are not Genuine Lexus Parts and Accessories and/or were not installed by the factory to determine any Year 2000 issues associated with those products.

[1] Lexus relies on the statements made by its suppliers and has not independently verified such information.

LEXUS

Technical Service Information Bulletin

September 8, 2003

Title:

DIAGNOSTIC TESTER CONTROLLER AREA NETWORK (CAN) INTERFACE MODULE

Models:

All Models

TSIB

SS001-03

SPECIAL SERVICE TOOLS

Introduction

Over the next three model years, all Lexus vehicles will begin using an all–new diagnostic communication protocol, Controller Area Network (CAN). CAN will be introduced on the 2004 LS 430 this fall. A CAN Interface Module has been distributed to all dealers as an essential Special Service Tool (SST) and will allow the Diagnostic Tester to communicate with CAN–equipped vehicles. Please use the following instructions to install the new CAN Interface Module as soon as it arrives at your dealership.

NOTE:

- **Version 10.2a or later Diagnostic Tester Software must be used to enable communication with CAN–equipped vehicles. Version 10.2a will be distributed to dealers via TIS before CAN–equipped vehicles arrive at dealers.**
- **There is no need to remove the CAN Interface Module when working with non–CAN systems or older software versions (Version 10.1a or earlier). The Diagnostic Tester will communicate with all DLC3/J1962 based systems with the CAN Interface Module installed.**

Applicable Vehicles

- **All Models**.

Required SSTs

SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QUANTITY
Lexus Diagnostic Tester Kit*	01001270	1
CAN Interface Module Kit*	01002744	1
12 Megabyte Diagnostic Tester Program Card with version 10.2a Software (or later)*	01002593-005	1

* Essential SSTs.

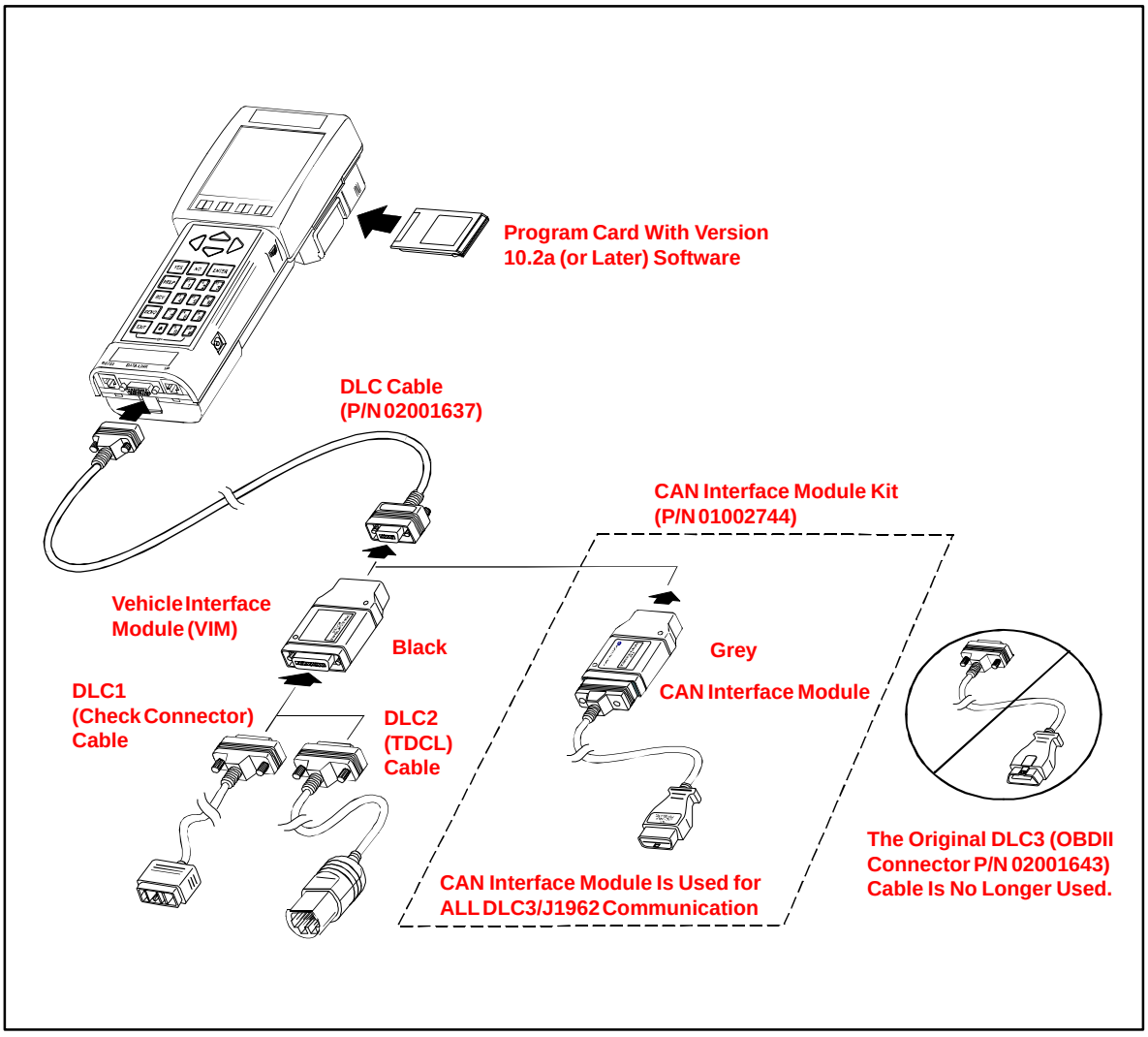
NOTE:

Additional Diagnostic Tester Kits, CAN Interface Modules, Program Cards or SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

Warranty Information

OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Installation Procedure



1. Remove the original DLC3 Cable and store it in the Diagnostic Tester storage case.
2. Connect the CAN Interface Module to the DLC Cable.
3. Use the Diagnostic Tester with the CAN Module installed for all DLC3/J1962 based vehicle communication.
4. If you experience problems with the Diagnostic Tester or CAN Interface Module, please contact Lexus Special Service Tool Customer Support at 1–800–933–8335.

NOTE:

- **There is no need to remove the CAN Interface Module when working with non–CAN systems or older software versions (Version 10.1a or earlier). The Diagnostic Tester will communicate with all DLC3/J1962 based systems with the CAN Interface Module installed.**
- **For DLC1 and DLC2 communication you must continue to use the Vehicle Interface Module (VIM).**

LEXUS

Technical Service Information Bulletin

June 26, 1998

Title:

1998 SPECIAL SERVICE TOOLS

Models:

All 1997 and 1998 Models

TSIB

Introduction

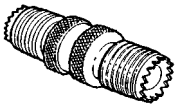
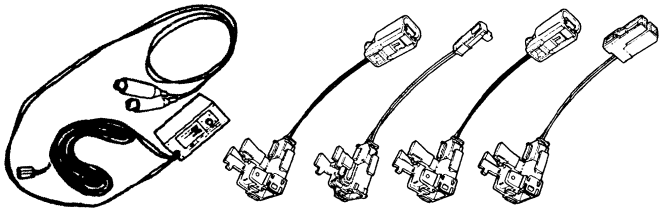
The following bulletin contains information regarding 1997 and 1998 Special Service Tools (SSTs). All new SSTs are listed by tool number, name and model application. All 1998 Essential SSTs are automatically shipped to dealers.

- **Special Service Tools may also be ordered by contacting OTC at 1–800–933–8335.**

Affected Vehicles

- All **1997** and **1998** model year Lexus vehicles.

1998 Essential Special Service Tools

1998 ESSENTIAL SPECIAL SERVICE TOOLS		
TOOL NUMBER	**TOOL NAME**	**APPLICATION**
01001895–U05	Scan Tool Software Update > Support for 98MY vehicles: OBD,Enhanced OBD II, NVH, V–BOB & 5 Gas Analyzer > Multiplex On–Board Diagnostic capability for: 1. Wireless Registration 2. Immobilizer Key Programming 3. ABS Air Bleed > Expanded Help Functions 	All models
02002456	Customize Program Card (for Diagnostic Tester)	LS400, RX300, GS300/400, LX470
09843–18040	Diagnosis Check Wire No. 2	LS400, GS300/400
09843–18050	Navigation Wire Harness No. 2	LS400, GS300/400
09990–00450	ABS Actuator Checker Sub–Harness “P”	ES300, SC300/400
LEX280103	Cellular Phone Antenna Connector 	LS400
09870–00005–02	A/C Quick Joint Disconnect Set 1. 09870–00010 Storage Case 2. 09870–00015 High Side Tool 3. 09870–00025 Low Side Tool	RX300, LX470
09082–00705–02	Airbag Deployment Tool Kit: Includes: 09082–00700 Deployment Tool 09082–00730 Airbag deployment sub–harness #1 09082–00740 Airbag deployment sub–harness #2 for seat belt pretensioner (NEW) 09082–00750 Airbag deployment sub–harness #3 for side airbag (NEW) 09082–00760 Airbag deployment sub–harness #4 for driver/passenger airbag (NEW) TOY28015 Storage Case (NEW) 	All models

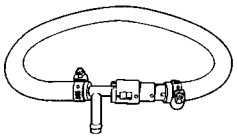
1998 Essential Special Service Tools Continued

1998 ESSENTIAL SPECIAL SERVICE TOOLS		
TOOL NUMBER	**TOOL NAME**	**APPLICATION**
09268–41300	Clamp for EFI Set (add to kit 09268–41047–02)	LS400, ES300, GS300, GS400, SC300, SC400

1998 Available Special Service Tools

1998 AVAILABLE SPECIAL SERVICE TOOLS		
TOOL NUMBER	**TOOL NAME**	**APPLICATION**
02002455	V–BOB ECU Interface Box #6 for ABS and Engine Systems	LS400, GS300/400, ES300, SC300/400
02002454	ECU Connector Exchange Wire #10 for Cruise Control	97–98 ES300

1997 Essential Special Service Tools

1997 ESSENTIAL SPECIAL SERVICE TOOLS		
TOOL NUMBER	**TOOL NAME**	**APPLICATION**
00002–MP815–L	Battery Tester	All models
09950–60010	Bearing & Seal Driver Set 1	multiple
09950–60020	Bearing & Seal Driver Set 2	multiple
00950–70010	Handle Set	multiple
09990–00410	ABS Actuator Checker Sheet “N”	LS400, SC400
09990–00420	ABS Actuator Checker Sheet “O”	LS400, SC300/400
09990–00430	ABS Actuator Checker Sheet “P”	ES300
09990–00450	ABS Actuator Checker Sub–harness “P”	ES300, LS400, SC400
09082–00730	Airbag Deployment Wire Sub–harness 1	LS400
09817–33190–01	Sensor Socket Wrench (for shocks)	ES300
09992–00350–01	ABS & TRAC Actuator Air Bleed Tool	LS400, SC400
09268–41250–01	EFI Fuel Pressure Gauge T–Joint (Add to 09268–45015–02 Gauge Set) 	All models

1997 Available Special Service Tools

1997 AVAILABLE SPECIAL SERVICE TOOLS		
TOOL NUMBER	**TOOL NAME**	**APPLICATION**
09710–04081	Base, front lower suspension arm bushing	ES300

LEXUS

Technical Service BULLETIN

December 17, 2003

Title:

O2S TEST RESULTS (MODE 05)

Models:

All '96 – '03 & '04 RX 330

TSIB

SS002-03

SPECIAL SERVICE TOOLS

Introduction

This Service Bulletin contains Oxygen Sensor (O2S) Monitor threshold values for all models from 1996 to 2003 and some 2004 models. Starting in 2004, the O2S Monitor threshold values can be found in the repair manual. These values are used when analyzing the O2S test results to determine the O2S condition.

Applicable Vehicles

- **All 1996 – 2003** model year **Lexus** vehicles.
- **2004** model year **RX 330** vehicles.

Function Description

Checking O2S Test Results

To view O2S test results, the O2S Monitor must be completed and the test results must be checked within the same key cycle. If the ignition key is cycled OFF, the O2S test results will be set to the minimum or maximum limits, and all test results will be erased. The O2S test results are stored in the ECU (SAE term: Powertrain Control Module/PCM) when the monitor is complete. The test results are static and will not change once the monitor is complete.

The process for checking O2S test results is described in the following three basic steps:

1. Completing the O2S Readiness Monitor (page 2).
2. Accessing O2S Test Results (page 3).
3. Comparing O2S Test Results to Failure Thresholds (page 4).

Required SSTs

SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QUANTITY
Lexus Diagnostic Tester Kit* (or any OBDII Scantool)	01001270	1
12 Megabyte Diagnostic Tester Program Card with version 10.1a Software (or later)*	01002593-005	1

* Essential SSTs.

NOTE:
Additional Diagnostic Tester Kits, Program Cards or other SSTs may be ordered by calling SPX/OTC at 1-800-933-8335.

Warranty Information

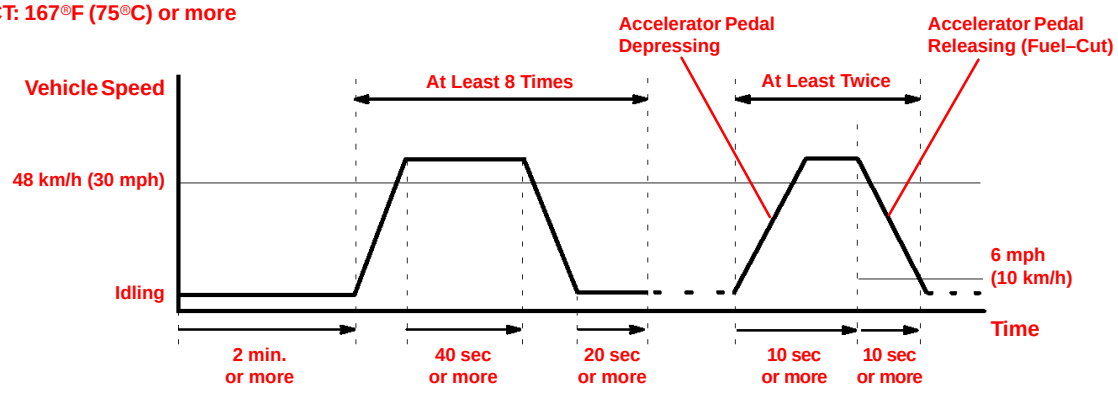
OP CODE	DESCRIPTION	TIME	OFP	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Completing O2S Readiness Monitor

1. Clear any stored Diagnostic Trouble Codes (DTCs) using the Lexus Diagnostic Tester.
2. Start the engine.
3. Perform the drive pattern below to run and complete the Oxygen Sensor (O2S) Monitor.

O2S Monitor Drive Pattern

ECT: 167°F (75°C) or more



HINT:

The O2S Monitor is completed when the following conditions are met:

- **Two (2) minutes or more passed after the engine start.**
- **The Engine Coolant Temperature (ECT) is 167°F (75°C) or more.**
- **Cumulative running time at 30 mph (48 km/h) or more exceeds 6 minutes.**
- **Vehicle is in closed loop.**
- **The fuel–cut is operated for 8 seconds or more (for Rear O2S Monitor).**

A. Allow the engine to idle for two minutes.

B. Warm up the engine until the Engine Coolant Temperature (ECT) reaches 167°F (75°C).

C. Drive the vehicle over 30 mph (48 km/h) for more than 40 seconds.

D. Stop the vehicle and allow the engine to idle for more than 20 seconds.

E. Repeat steps C and D at least 8 times in one driving cycle. (Do not cycle the ignition key.)

In addition, perform the following steps for the Rear O2S Readiness Monitor:

A. Select second gear.

B. Allow the vehicle to run at 30 mph (48 km/h) or more.

C. Keep the accelerator pedal “off–idle” for more than 10 seconds.

D. Immediately after step C, release the accelerator pedal for at least 10 seconds without depressing the brake pedal (to execute the fuel–cut).

E. Decelerate the vehicle until the vehicle speed reaches less than 6 mph (10 km/h).

F. Repeat steps B – E at least twice in one driving cycle.

Accessing O2S Test Results

1. On the Diagnostic Tester* screen, select the following menus:
   - DIAGNOSTICS
   - CARB OBD II
   - O2S TEST RESULTS

   A list of the available oxygen sensors will be displayed.

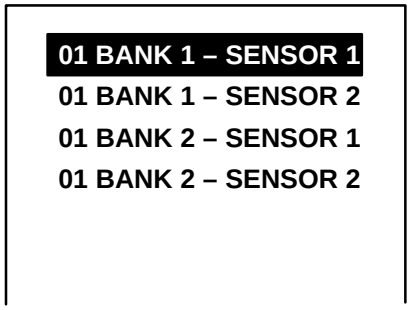
2. Select the desired oxygen sensor and press Enter.

NOTE:

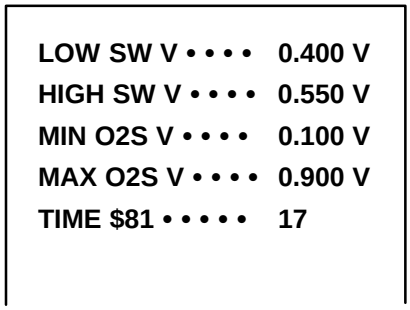
The monitor result of the A/F sensor will not be displayed. If you select "Bank 1–Sensor 1" or Bank 2–Sensor 1" for a vehicle equipped with an A/F sensor, the Diagnostic Tester will display "No parameter to display."

3. Compare the test results with the values listed in the Failure Threshold Chart.

O2S TEST RESULT Screen



TEST DATA Screen



* Although this procedure references the Lexus Diagnostic Tester, the O2S test results can be checked using a generic OBDII scantool. Refer to your OBDII scantool operator's manual for specific procedures.

Comparing O2S Test Results to Failure Thresholds

1. Determine the correct O2S Failure Threshold Chart for your vehicle by looking in the "O2S Application Table," pages 5 – 6 in this bulletin.
2. Select appropriate year, model, and engine for specified O2S Failure Threshold Chart.
3. Compare O2S test results with the specified O2S Failure Threshold Chart. It may be necessary to convert O2S test results to a specific measurement unit using the conversion factor that is supplied in the specified table. See example below:

Example:

A. The Diagnostic Tester displays "17" as a value of the "Time $81" (see illustration).

B. Find the Conversion Factor value of "Time $81" in the O2S Failure Threshold chart below. 0.3906 is specified for Time $81 in this chart.

C. Multiply "17" in step "A" by 0.3906 (Conversion Factor) in step "B." **17 x 0.3906 = 6.6 %**

D. If the answer is within the Standard Value of TEST LIMIT, the "Time $81" can be confirmed to be normal.

Example

LOW SW V	**0.400 V**
HIGH SW V	**0.550 V**
MIN O2S V	**0.035 V**
MAX O2S V	**0.835 V**
Time $81	**17**
Time $84	**84**
Time $85	**79**

NOTE:

- **"LOW SW V" indicates the O2S voltage when the O2S status changes from rich to lean.**
- **"HIGH SW V" indicates the O2S voltage when the O2S status changes from lean to rich.**
- **If the O2S voltage is lower than "LOW SW V," the O2S status is lean.**
- **If the O2S voltage is higher than "HIGH SW V," the O2S status is rich.**

Example of O2S Failure Threshold Chart:

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05V	Multiply 0.3906	%	Within 60%

NOTE:

Before the O2S Monitor completes or after the ignition switch is turned OFF, the Diagnostic Tester displays the viewable upper limit or a lower limit of the test value (example: 0 V, 1.275 V, 0 s [seconds], 10.2 s, 0 and 255).

O2S Application Table

MODEL YEAR	MODEL	ENGINE	CERTIFICATION	SEE CHART NO. (TSB PAGE)
1996	ALL		50–State	1 (p. 7)
1997	ALL		50–State	1 (p. 7)
1998	ES 300	1MZ–FE	California	3 (p. 9)
			Federal	1 (p. 7)
	GS 300	2JZ–GE	50–State	2 (p. 8)
	GS 400	1UZ–FE	50–State	
	LS 400	1UZ–FE	50–State	
	LX 470	2UZ–FE	50–State	
	SC 300	2JZ–GE	50–State	
	SC 400	1UZ–FE	50–State	
1999	ES 300	1MZ–FE	50–State	3 (p. 9)
	GS 300	2JZ–GE	50–State	2 (p. 8)
	GS 400	1UZ–FE	50–State	
	LS 400	1UZ–FE	50–State	
	LX 470	2UZ–FE	50–State	
	RX 300	1MZ–FE	50–State	3 (p. 9)
	SC 300	2JZ–GE	50–State	2 (p. 8)
	SC 400	1UZ–FE	50–State	
2000	ES 300	1MZ–FE	50–State	3 (p. 9)
	GS 300	2JZ–GE	50–State	2 (p. 8)
	GS 400	1UZ–FE	50–State	
	LS 400	1UZ–FE	50–State	
	LX 470	2UZ–FE	50–State	
	RX 300	1MZ–FE	50–State	3 (p. 9)
	SC 300	2JZ–GE	50–State	2 (p. 8)
	SC 400	1UZ–FE	50–State	
2001	ES 300	1MZ–FE	50–State	3 (p. 9)
	GS 300	2JZ–GE	50–State	1 (p. 7)
	GS 430	3UZ–FE	50–State	
	IS 300	2JZ–GE	50–State	
	LS 430	3UZ–FE	50–State	
	LX 470	2UZ–FE	50–State	
	RX 300	1MZ–FE	50–State	4 (p. 9)

O2S Application Table (Continued)

MODEL YEAR	MODEL	ENGINE	CERTIFICATION	SEE CHART NO. (TSB PAGE)
2002	ES 300	1MZ–FE	50–State	8 (p. 13)
	GS 300	2JZ–GE	50–State	5 (p. 10)
	GS 430	3UZ–FE	50–State	6 (p. 11)
	IS 300	2JZ–GE	50–State	5 (p. 10)
	LS 430	3UZ–FE	50–State	6 (p. 11)
	LX 470	2UZ–FE	50–State	7 (p. 12)
	RX 300	1MZ–FE	50–State	13 (p. 22)
	SC 430	3UZ–FE	50–State	6 (p. 11)
2003	ES 300	1MZ–FE	50–State	8 (p. 13)
	GS 300	2JZ–GE	50–State	9 (p. 14–15)
	GS 430	3UZ–FE	50–State	10 (p. 16–17)
	GX 470	2UZ–FE	50–State	11 (p. 18–19)
	IS 300	2JZ–GE	50–State	9 (p. 14–15)
	LS 430	3UZ–FE	50–State	10 (p. 16–17)
	LX 470	2UZ–FE	50–State	12 (p. 20–21)
	RX 300	1MZ–FE	50–State	13 (p. 22)
	SC 430	3UZ–FE	50–State	10 (p. 16–17)
2004	RX 330	3MZ–FE	50–State	14 (p. 23)

O2S Failure Threshold Charts

CHART 1:

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $31	Time to change from Lean (≤0.4 V) to Rich (≥0.55 V)	N/A	Second	Between 0 and 1 second
Time $32	Time to change from Rich (≥0.55 V) to Lean (≥0.4 V)	N/A	Second	Between 0 and 1 second

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 2:

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.35 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $31	Time to change from Lean (≤0.35 V) to Rich (≥0.55 V)	N/A	Second	Between 0 and 1.1 seconds
Time $32	Time to change from Rich (≥0.55 V) to Lean (≥0.35 V)	N/A	Second	Between 0 and 1.1 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 3:

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor
Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.45 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

CHART 4:

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor
Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.5 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 5:

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $31	Time to change from Lean (≤0.4 V) to Rich (≥0.55 V)	N/A	Second	Between 0 and 0.9 seconds
Time $32	Time to change from Rich (≥0.55 V) to Lean (≤0.4 V)	N/A	Second	Between 0 and 0.9 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 80% (A/T) Between 0 and 90% (M/T)
Time $84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time $85	Maximum Rich (≤0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time $81, Time $84 and Time $85) are out of the standard values, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 6:

Rear O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $31	Time to change from Lean (≤0.4 V) to Rich (≥0.55 V)	N/A	Second	Between 0 and 0.9 seconds
Time $32	Time to change from Rich (≥0.55 V) to Lean (≤0.4 V)	N/A	Second	Between 0 and 0.9 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 60%
Time $84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time $85	Maximum Rich (≤0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time $81, Time $84 and Time $85) are out of the standard values, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 7:

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $31	Time to change from Lean (≤0.4 V) to Rich (≥0.55 V)	N/A	Second	Between 0 and 0.9 seconds
Time $32	Time to change from Rich (≥0.55 V) to Lean (≤0.4 V)	N/A	Second	Between 0 and 0.9 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 90%
Time $84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time $85	Maximum Rich (≤0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time $81, Time $84 and Time $85) are out of the standard values, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 8:

Front O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.5 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 95%
Time $84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time $85	Maximum Rich (≤0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time $81, Time $84 and Time $85) are out of the standard values, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 9:

Rear O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $31	Time to change from Lean (≤0.4 V) to Rich (≥0.55 V)	N/A	Second	Between 0 and 1 second
Time $32	Time to change from Rich (≥0.55 V) to Lean (≤0.4 V)	N/A	Second	Between 0 and 1 second

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Engine Idling

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $33	Average Lean (≤0.4 V) time of one waveform cycle	N/A	Second	**Bank 1:** Between 0 and 3.45 seconds **Bank 2:** Between 0 and 3.7 seconds
Time $34	Average Rich (≥0.55 V) time of one waveform cycle	N/A	Second	**Bank 1:** Between 0 and 3.45 seconds **Bank 2:** Between 0 and 3.7 seconds

If the sum of Time $33 and Time $34 is out of the standard value, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 9 (Continued):

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Vehicle Running

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $35	Average Lean (≤0.4 V) time of one waveform cycle	N/A	Second	**Bank 1:** Between 0 and 0.73 seconds **Bank 2:** Between 0 and 0.75 seconds (varies depending on feedback compensation factor)
Time $36	Average Rich (≥0.55 V) time of one waveform cycle	N/A	Second	**Bank 1:** Between 0 and 0.73 seconds **Bank 2:** Between 0 and 0.75 seconds (varies depending on feedback compensation factor)

If the sum of Time $35 and Time $36 is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 90%
Time $84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time $85	Maximum Rich (≤0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time $81, Time $84 and Time $85) are out of the standard values, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 10:

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $31	Time to change from Lean (≤0.4 V) to Rich (≥0.55 V)	N/A	Second	Between 0 and 0.9 seconds
Time $32	Time to change from Rich (≥0.55 V) to Lean (≤0.4 V)	N/A	Second	Between 0 and 0.9 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Engine Idling

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $33	Average Lean (≤0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 3 seconds
Time $34	Average Rich (≥0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 3 seconds

If the sum of Time $33 and Time $34 is out of the standard value, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 10 (Continued):

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Engine Idling

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $35	Average Lean (≤0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 0.75 seconds (varies depending on feedback compensation factor)
Time $36	Average Rich (≥0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 0.75 seconds (varies depending on feedback compensation factor)

If the sum of Time $35 and Time $36 is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 60%
Time $84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time $85	Maximum Rich (≤0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time $81, Time $84 and Time $85) are out of the standard values, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 11:

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $31	Time to change from Lean (≤0.4 V) to Rich (≥0.55 V)	N/A	Second	Between 0 and 0.9 seconds
Time $32	Time to change from Rich (≥0.55 V) to Lean (≤0.4 V)	N/A	Second	Between 0 and 0.9 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Engine Idling

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $33	Average Lean (≤0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 2.8 seconds
Time $34	Average Rich (≥0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 2.8 seconds

If the sum of Time $33 and Time $34 is out of the standard value, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 11 (Continued):

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Vehicle Running

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $35	Average Lean (≤0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 0.75 seconds (varies depending on feedback compensation factor)
Time $36	Average Rich (≥0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 0.75 seconds (varies depending on feedback compensation factor)

If the sum of Time $35 and Time $36 is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.05 V	Multiply 0.3906	%	Between 0 and 60%
Time $84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time $85	Maximum Rich (≤0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time $81, Time $84 and Time $85) are out of the standard values, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 12:

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Voltage Monitor

Related DTCs: P0130, P0150, P2195, P2196, P2197 and P2198

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.55 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Response Monitor

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $31	Time to change from Lean (≤0.4 V) to Rich (≥0.55 V)	N/A	Second	Between 0 and 0.9 seconds
Time $32	Time to change from Rich (≥0.55 V) to Lean (≤0.4 V)	N/A	Second	Between 0 and 0.9 seconds

If the time required to change is out of the standard value, the ECM interprets this as a malfunction.

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Engine Idling

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $33	Average Lean (≤0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 2.8 seconds
Time $34	Average Rich (≥0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 2.8 seconds

If the sum of Time $33 and Time $34 is out of the standard value, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 12 (Continued):

Front O2S (Bank 1 Sensor 1 and Bank 2 Sensor 1) Frequency Monitor During Vehicle Running

Related DTCs: P0133 and P0153

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $35	Average Lean (≤0.4 V) time of one waveform cycle	N/A	Second	Between 0 and 0.75 seconds (varies depending on feedback compensation factor)
Time $36	Average Rich (≥0.55 V) time of one waveform cycle	N/A	Second	Between 0 and 0.75 seconds (varies depending on feedback compensation factor)

If the sum of Time $35 and Time $36 is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.5 V	Multiply 0.3906	%	Between 0 and 90%
Time $84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time $85	Maximum Rich (≥0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time $81, Time $84 and Time $85) are out of the standard values, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 13:

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.4 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.6 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.5 V	Multiply 0.3906	%	Between 0 and 60%
Time $84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time $85	Maximum Rich (≥0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time $81, Time $84 and Time $85) are out of the standard values, the ECM interprets this as a malfunction.

O2S Failure Threshold Charts (Continued)

CHART 14:

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Voltage Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $07	The minimum voltage during O2S monitoring	N/A	V	Between 0 and 0.45 V
Time $08	The maximum voltage during O2S monitoring	N/A	V	Between 0.5 and 1.275 V

If the sensor voltage is out of the standard value, the ECM interprets this as a malfunction.

Rear O2S (Bank 1 Sensor 2 and Bank 2 Sensor 2) Element Monitor

Related DTCs: P0136 and P0156

TEST ID	DESCRIPTION OF TEST DATA	CONVERSION FACTOR	UNIT	STANDARD VALUE OF TEST LIMIT
Time $81	Percentage of monitoring time where Oxygen Sensor voltage is less than 0.5 V	Multiply 0.3906	%	Between 0 and 80%
Time $84	Percentage of monitoring time where Oxygen Sensor voltage is 0.70 V or more	Multiply 0.3906	%	Between 20 and 100%
Time $85	Maximum Rich (≥0.45 V) time	Multiply 0.2621	Second	Between 20 and 66.8 seconds

If all the values (Time $81, Time $84 and Time $85) are out of the standard values, the ECM interprets this as a malfunction.

LEXUS

Technical Service Information Bulletin

June 7, 2002

Title:

MIDTRONICS BATTERY TESTER SOFTWARE UPDATE

Models:

All Models & Model Years Through Current

TSIB

SS002-02

SPECIAL SERVICE TOOLS

Introduction

The internal software of the Midtronics Battery Tester can now be periodically updated to support future models. New updates will include new battery warranty codes and testing information.

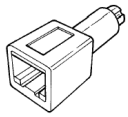
The Technical Information System (TIS) will be the primary distribution method for battery tester software updates. Utilizing the new Midtronics Update Wizard (MUW) and the new essential SST (Midtronics Battery Tester Adapter), you will be able to quickly and easily update your Midtronics Battery Tester.

This bulletin will show you how to use and install the Midtronics Update Wizard to update the Midtronics tester software.

Applicable Vehicles

- **All models and model years through current.**

Required Tools & Material

SPECIAL SERVICE TOOLS (SSTs)	PART NUMBER	QUANTITY
Midtronics Battery Tester*	00002–MP815–L	1
Midtronics Battery Tester Adapter* 	00002–DMPUC	1

* Essential SSTs.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

Process Overview

The Midtronics Battery Tester Software Update is a 2-step process:

1. **Installing the Midtronics Update Wizard (MUW).**
   The Midtronics Update Wizard (MUW) is an application that only needs to be installed on the PC one time. This bulletin will provide the steps to install the MUW.
2. **Using the Midtronics Update Wizard (MUW).**
   The Midtronics Update Wizard (MUW) will be used with each battery tester software update. The Update Wizard will walk you through each step to connect the PC to the tester and perform the update.

Operation Procedure: Preparation

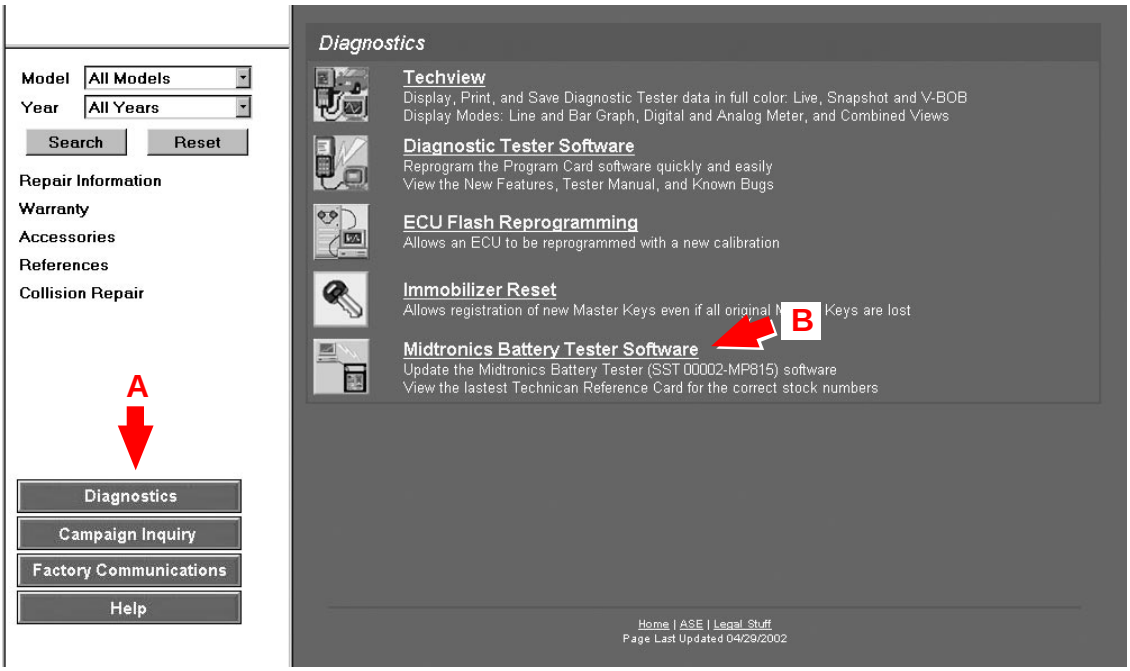
Before Installation or Use of the Midtronics Update Wizard (MUW):

Steps A and B are required to begin the update process. (Refer to Figure 1.)

A. Open TIS (Technical Information System) and go to the “Diagnostics” section.

B. Click on the text “Midtronics Battery Tester Software.”

FIGURE 1.



Operation Procedure

1. Installing the Midtronics Update Wizard (MUW).

NOTE:

The Midtronics Update Wizard only needs to be installed once and must be installed before the rest of the update process can take place. If this step is already complete, continue on to step 2.

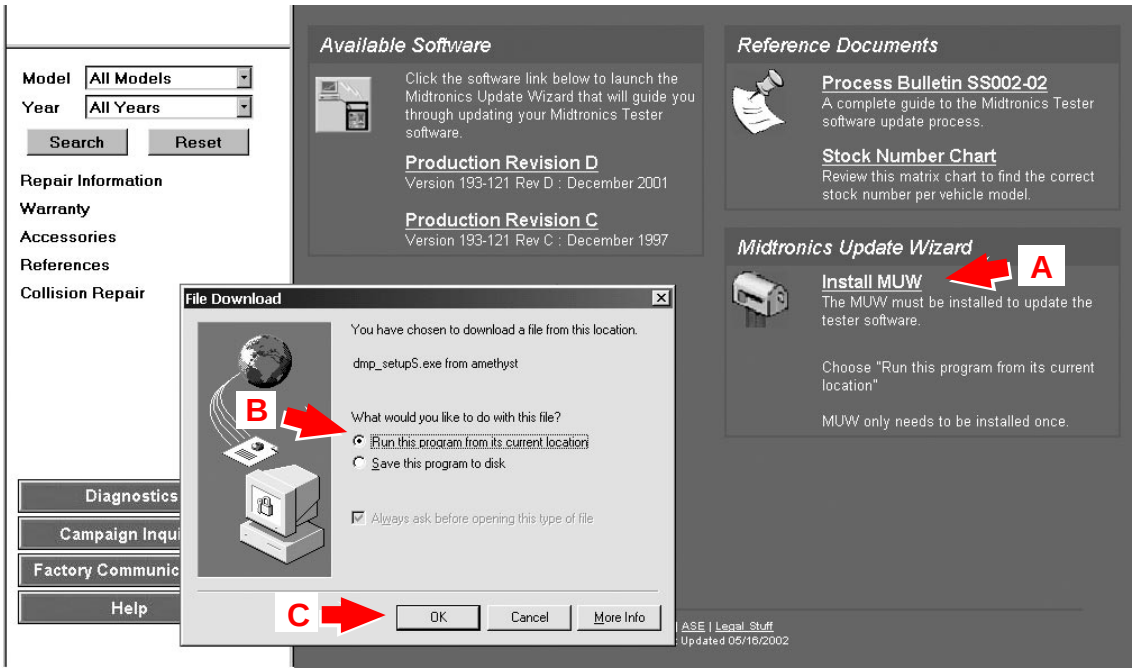
A. Click on the text “Install MUW.” (Figure 2.)

B. The file download window will appear. Click on “Run this program from it’s current location.”

C. Click the “OK” button.

D. Allow the Update Wizard to perform its self–installation. This will take only a few minutes.

FIGURE 2.



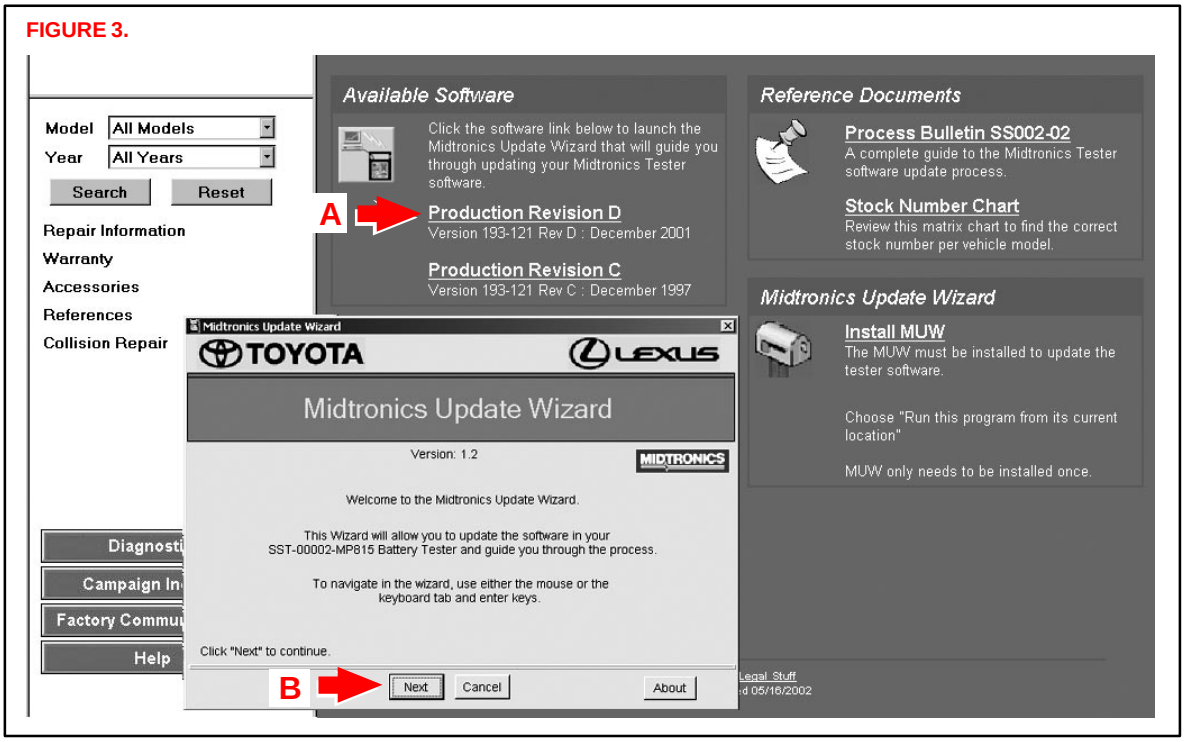
Operation Procedure (Continued)

2. Using the Midtronics Update Wizard (MUW).

A. Click on the latest version of production software. (Figure 3.) This will begin the software update process.

B. The next screen to appear will be the first screen of the software update. Click "Next" to continue.

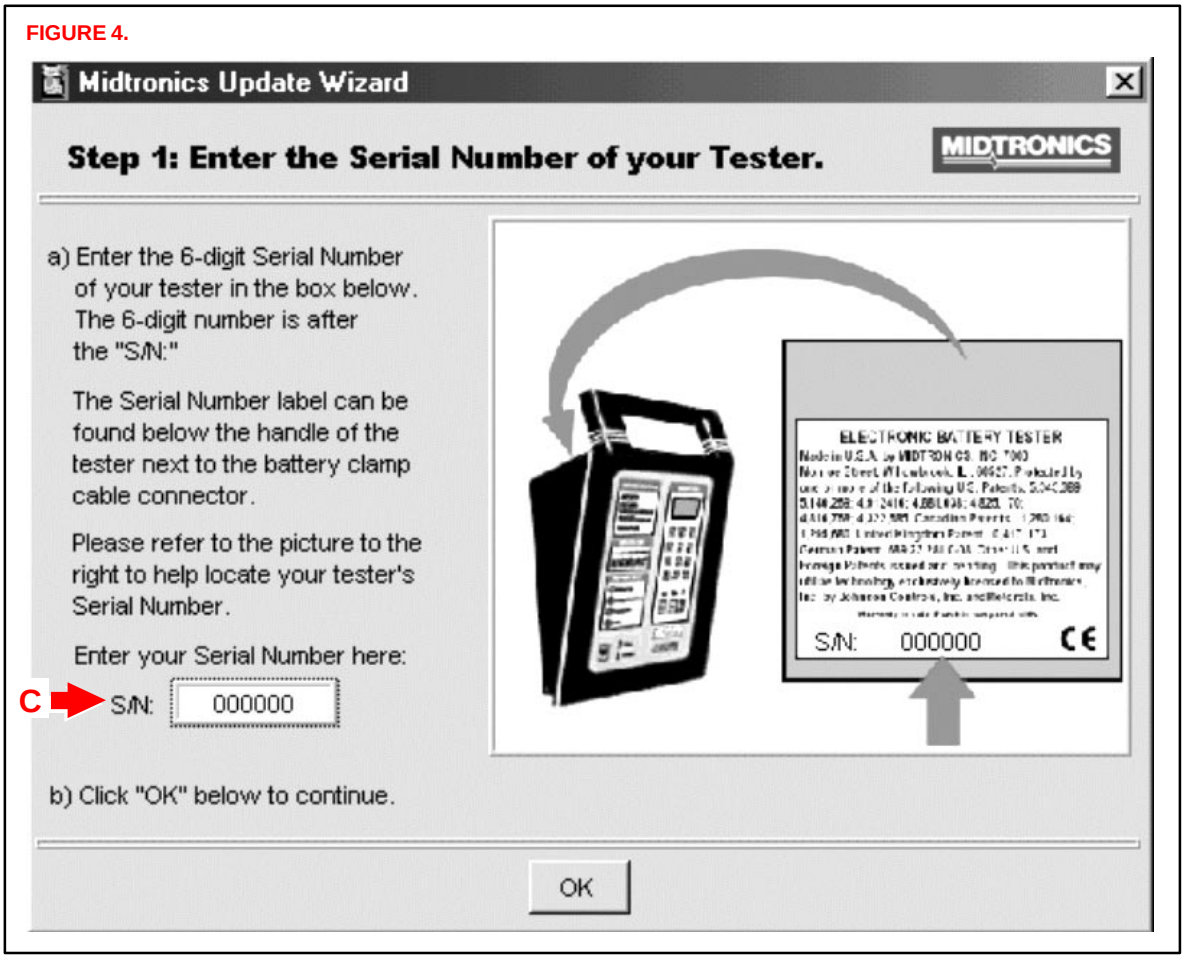
FIGURE 3.



Operation Procedure (Continued)

C. Enter the serial number of the battery tester then click “OK.” (Figure 4.)

FIGURE 4.



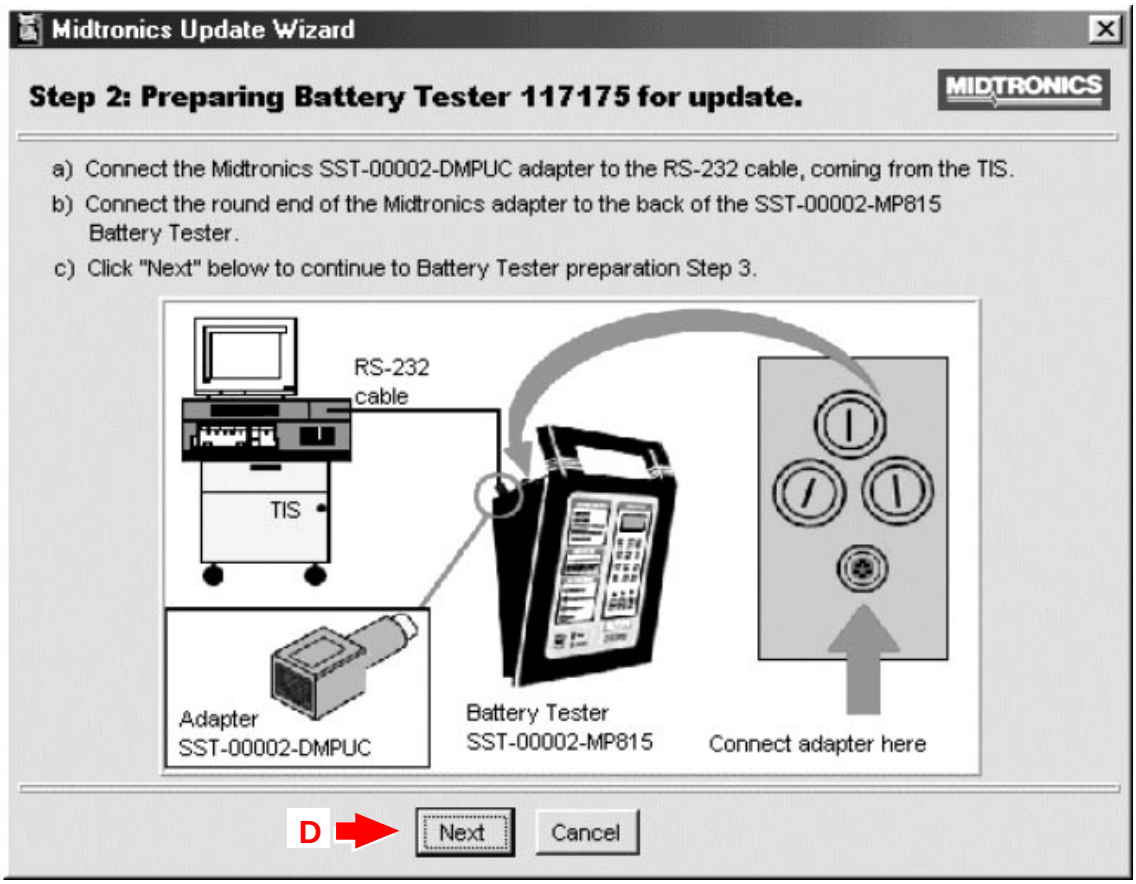
Operation Procedure (Continued)

D. Connect the Midtronics Battery Tester to TIS as instructed (Figure 5), then click "Next."

NOTE:

Connecting the Midtronics Battery Tester to the TIS station will require the use of SST 00002–DMPUC. This is an adapter that allows the TIS RS–232 cable to plug into the Battery Tester. (Figure 5.)

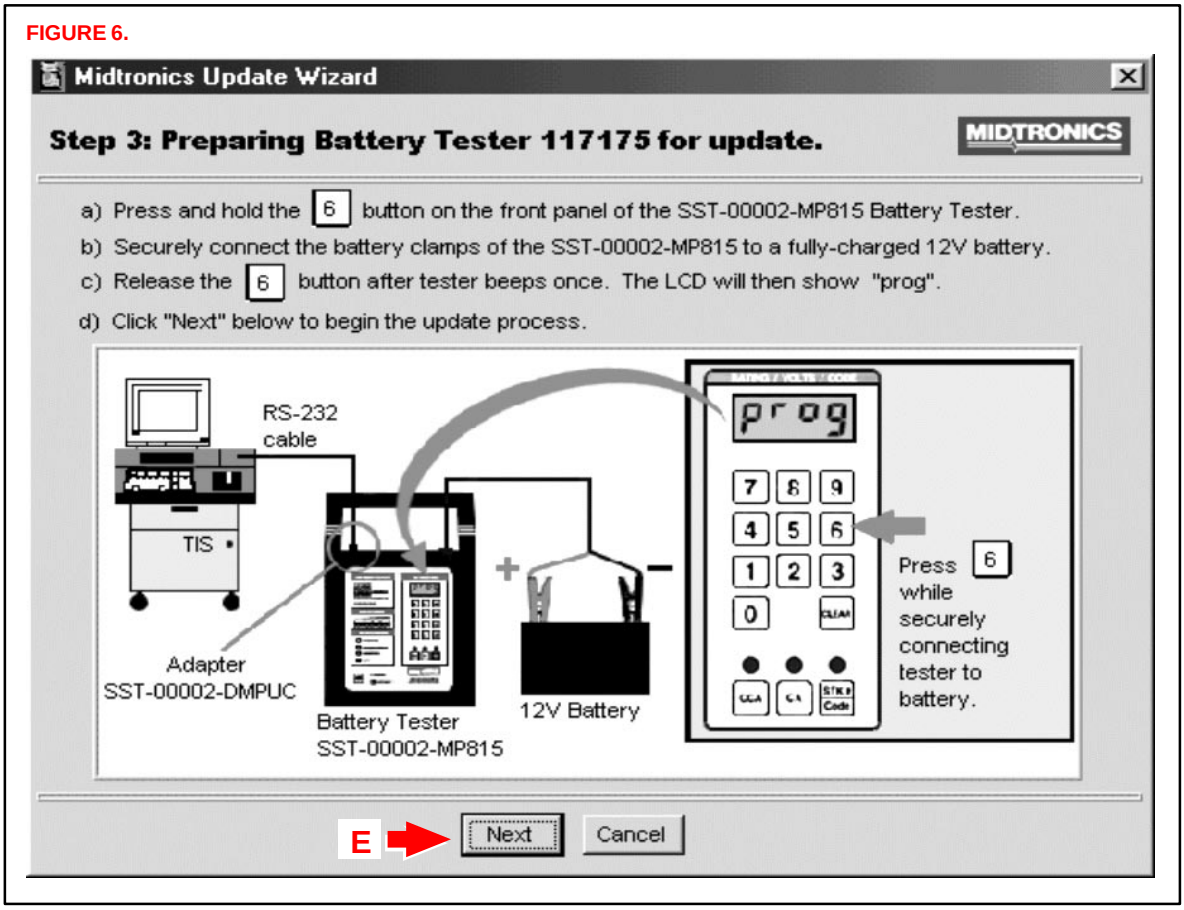
FIGURE 5.



Operation Procedure (Continued)

E. Follow the instructions to put the Midtronics Battery Tester into the correct mode (Figure 6), then click “Next.”

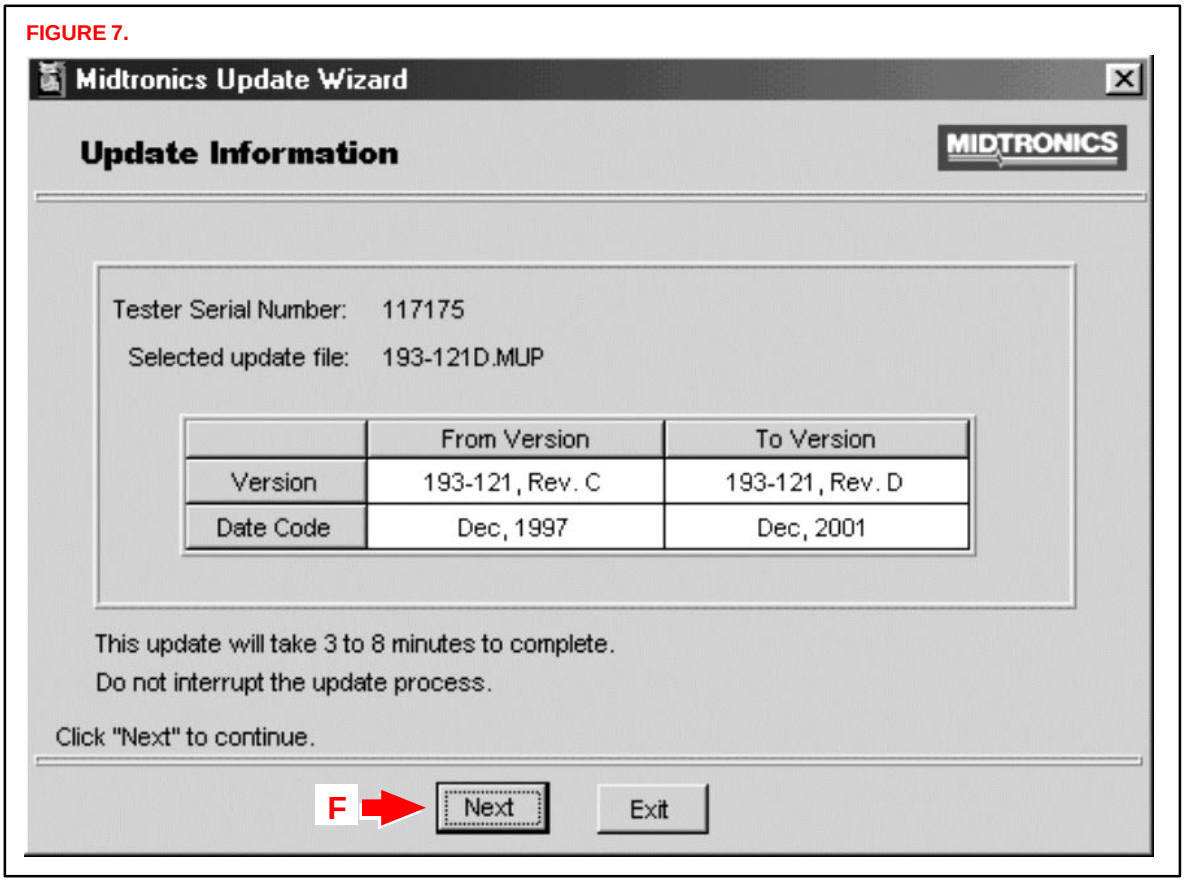
FIGURE 6.



Operation Procedure (Continued)

F. Confirm the software version and click “Next.” (Figure 7.)

FIGURE 7.



Figures 7–1 and 7–2 are confirmation dialogs that will pop up over the Update Information window (Figure 7) when:

- The update file is an older revision level than that found in the battery tester (Figure 7–1) or
- The update file is the same revision level as that found in the tester (Figure 7–2).

Click the “Yes” button to clear the pop–up dialog and continue with the update.

FIGURE 7–1.

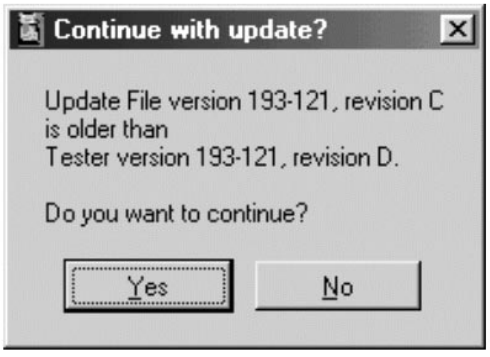
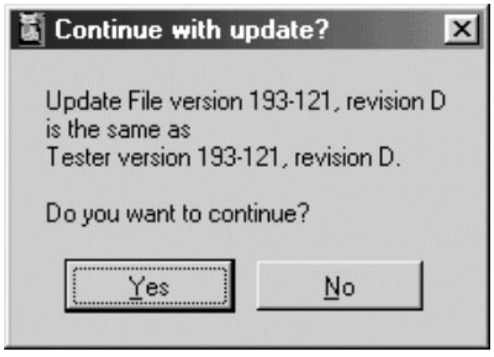


FIGURE 7–2.

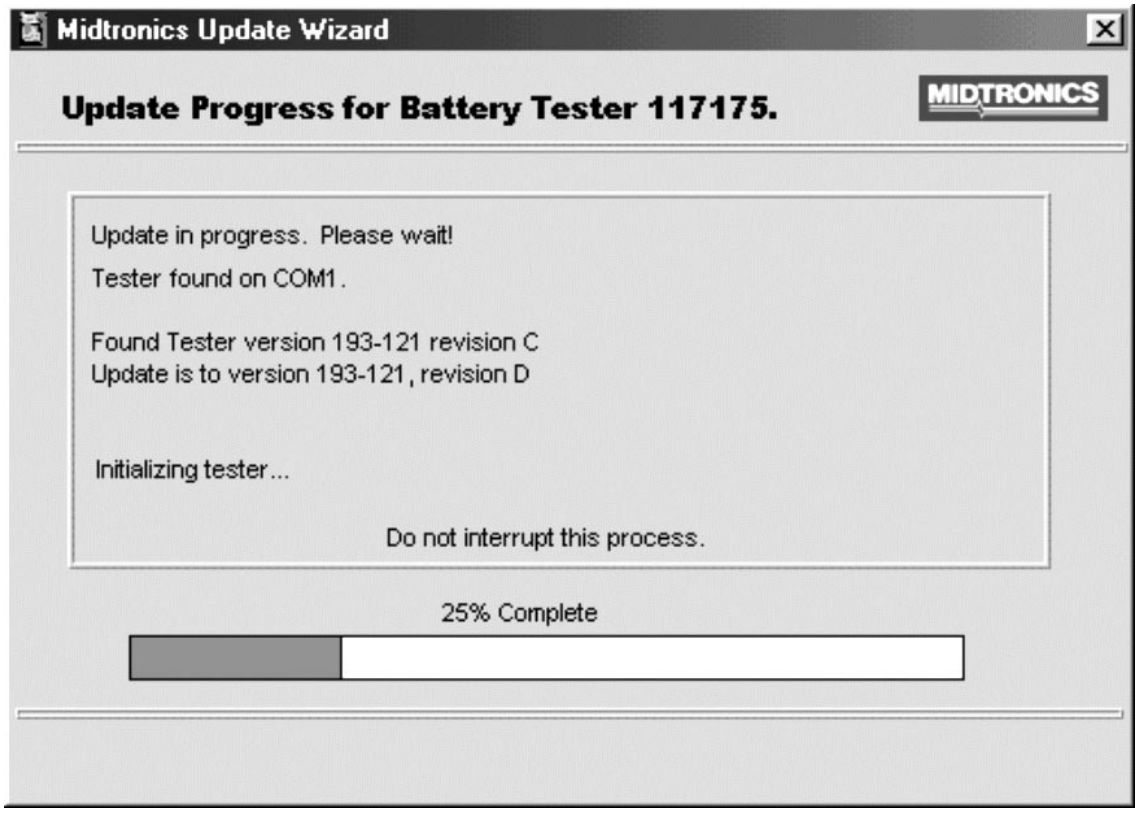


Operation Procedure (Continued)

G. The Midtronics Update Wizard (MUW) will now update the Midtronics Battery Tester software. (Figure 8.)

NOTE:
Do not interrupt this process (it will take approximately 5 minutes).

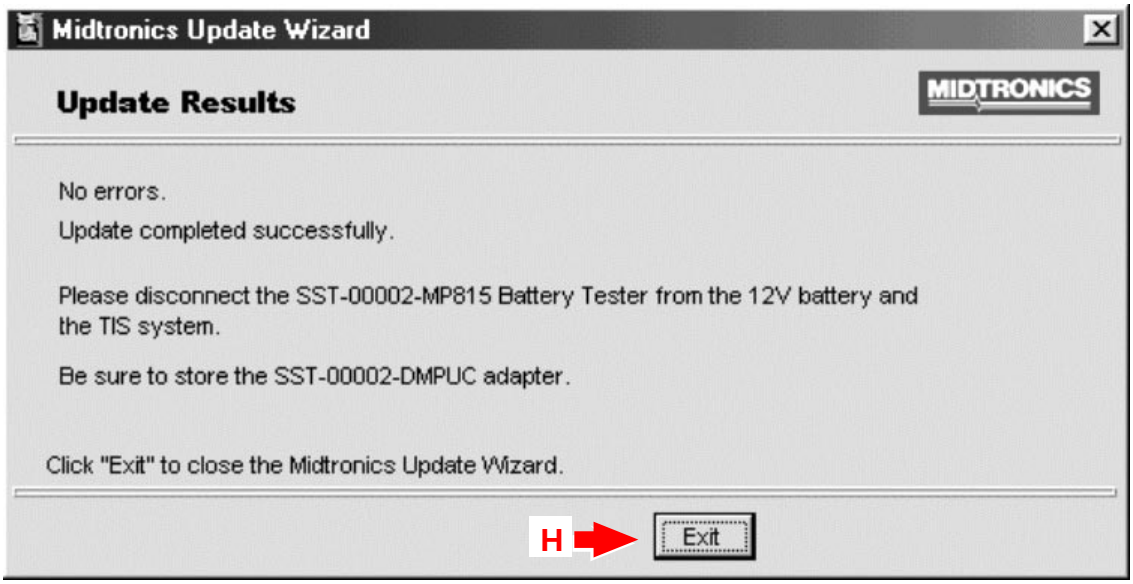
FIGURE 8.



Operation Procedure (Continued)

H. Upon successful completion, the Update Results screen will display “No errors” and the update is now complete. Click on the “Exit” button. (Figure 9.)

FIGURE 9.



Your Midtronics Battery Tester is now updated and ready for use.

NOTE:

BE SURE TO REGULARLY CHECK TIS FOR FUTURE UPDATES:

- **The Midtronics Battery Tester OE Stock Number Card will no longer be printed and shipped. It will be distributed through TIS from now on.**
- **Latest versions of Tester update software will be available on TIS.**

LEXUS

Technical Service Information Bulletin

December 8, 2000

Title:

DIAGNOSTIC TESTER COMMUNICATION ERROR WITH T.I.S.

Models:

All Models

TSIB

SS003-00

SPECIAL SERVICE TOOLS

Introduction

Certain Diagnostic Testers (SST P/N 02002019) may experience a communication error with the Technical Information System (T.I.S.). To correct this condition, the tester manufacturer, Vetronix Corporation, will recall and update affected units. The following explains how to determine which Diagnostic Testers may exhibit this problem and outlines the procedure to return the tester for repair.

Applicable Diagnostic Testers

Diagnostic Testers within the serial number range below are known to experience these communication errors.

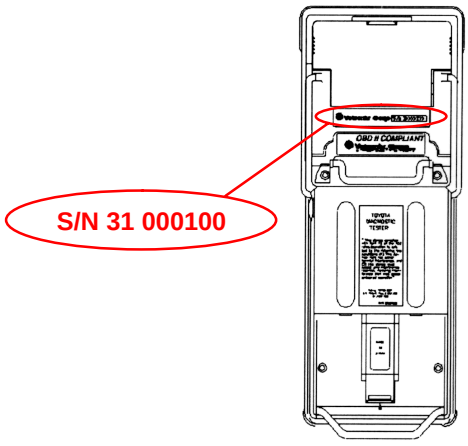
STARTING SERIAL NUMBER	ENDING SERIAL NUMBER
31 000000	31 000100

Repair Procedure

1. Determine the Diagnostic Tester serial number located on the back of the tester (see Figure 1).
2. If the serial number is within the range listed above, call Vetronix Toyota Customer Service at 1-800-321-4889, ext. 3123, to obtain a pre-paid shipping package for the Diagnostic Tester.
3. The shipping package will arrive within 2 business days. Secure the tester in the provided package following the enclosed shipping instructions.

   Diagnostic Testers are guaranteed to be returned within 3 business days from receipt at Vetronix (except over holidays).

Figure 1
Back View of Diagnostic Tester



NOTE:
This update will be performed free of charge.

Diagnostic Testers outside of the serial number range above are not affected and do not need this repair. If a Diagnostic Tester outside this range experiences a similar problem, please call Dealer Daily Support at 1-877-DL-DAILY or Vetronix Toyota Customer Service at 1-800-321-4889, ext. 3123.

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

February 16, 2001

Title:

STEERING WHEEL NUT SERVICE SPECIFICATION

Models:

All Applicable Models

TSIB

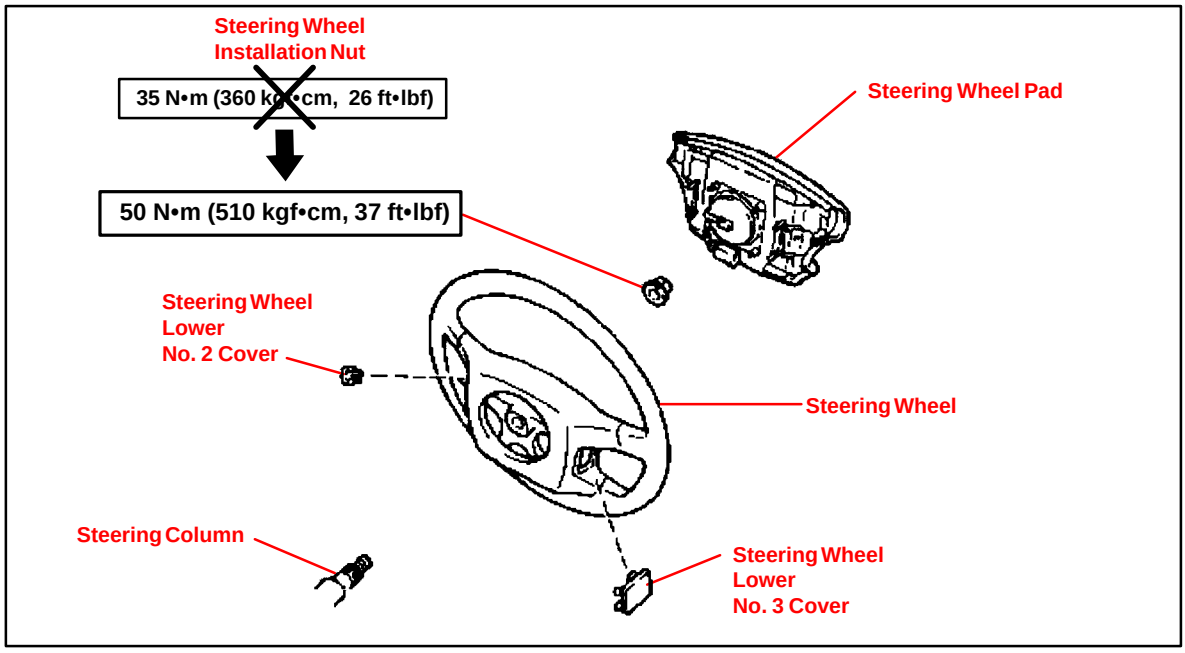
Introduction

To make the steering wheel installation procedure similar for all models, the steering wheel nut tightening torque has been standardized.

Applicable Vehicles

MODEL		MODEL YEARS
LS 400	UCF10, 20	1990 – 2000
SC 400/300	JZZ31, UZZ30	1992 – 2000
GS 400/300	JZS147, 160, UZS160	1993 – 2000
ES 300	MCV10, 20	1994 – 2000
LX 450	FZJ80	1996 – 1997
LX 470	UZJ100	1998 – 2000
RX 300	MCU10, 15	1999 – 2000
IS 300	JCE10	2001

Service Information



Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

STEERING GEAR/STEERING WHEEL REMOVAL AND INSTALLATION

Anytime the steering gear is removed on a vehicle equipped with an SRS airbag, the steering wheel must also be removed. Use of the following steps for reinstallation and re–centering of the steering wheel will prevent possible damage to the spiral cable.

REQUIRED STEPS FOR STEERING GEAR REMOVAL AND INSTALLATION:

Removal:

- Place front wheels facing straight ahead.
- Remove the steering wheel pad.
- Remove the steering wheel.

Installation:

- Place front wheels facing straight ahead.
- Center the spiral cable.
- Install the steering wheel.
- Install the steering wheel pad.

STEERING GEAR/STEERING WHEEL REMOVAL PROCEDURES:

Follow the steps below to remove the steering wheel, before removing the steering gear, from the vehicle.

1. Place front wheels in the straight ahead position.
2. With ignition switch in lock position, disconnect the negative terminal of the battery.
3. Remove Steering wheel pad.

NOTICE: If the airbag connector is disconnected with the ignition switch at “ON” or “ACC,” a “Diagnostic Trouble Code” will be recorded.

Never use airbag parts from another vehicle. When replacing parts, replace with new parts.

a. Remove the steering wheel lower cover.

STEERING GEAR/STEERING WHEEL REMOVAL PROCEDURES (CONT'D):

b. Using a torx socket wrench, loosen the torx screws until the groove along the screw circumference catches on the screw case. SST 09042–00010. (See Fig. 1)

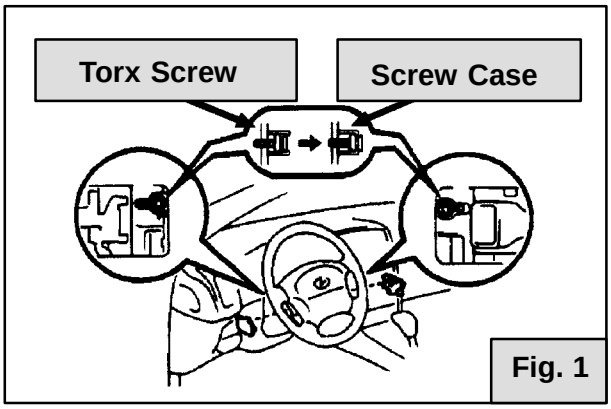


Fig. 1

c. Pull the wheel pad away from the steering wheel and disconnect the airbag connector. (See Fig. 2)

CAUTION: When storing the wheel pad, keep the upper surface of the pad facing up.

Never disassemble the wheel pad.

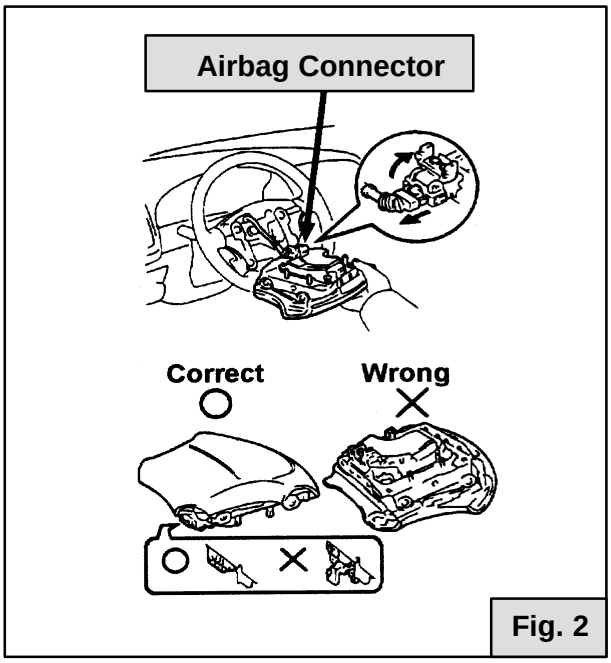


Fig. 2

NOTICE: When removing the wheel pad, take care not to pull the airbag wiring harness.

4. Remove the steering wheel.

a. Disconnect the spiral cable connector.

b. Remove the wheel set nut.

c. Place matchmarks on the wheel and steering main shaft. (See Fig. 3)

d. Using the appropriate SST, remove the wheel. SST 09950–50010 (set includes 09951–05010, 09952–05010, 09953–05020, 09954–05020)

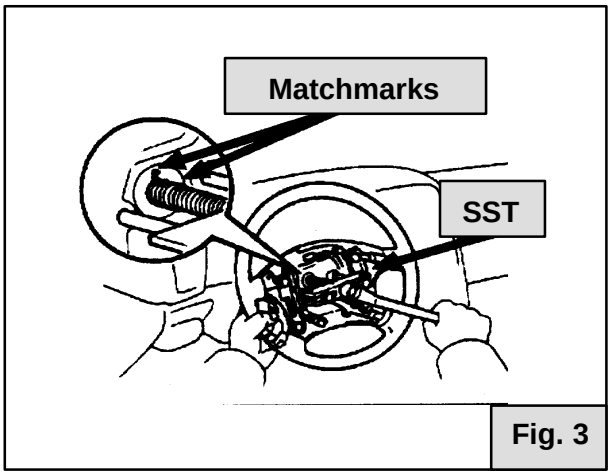


Fig. 3

For further disassembly of the steering column, refer to the Steering (SR) section of the Repair Manual.

STEERING GEAR/STEERING WHEEL INSTALLATION PROCEDURES:

Follow the steps below to install the steering wheel, after installing the steering gear.

1. Place front wheels in the straight ahead position.

STEERING GEAR/STEERING WHEEL INSTALLATION PROCEDURES (Cont'd):

2. Center spiral cable.
   a. Turn the cable counterclockwise by hand until it becomes harder to turn.
   b. Then rotate the cable clockwise about 2.5 or 3 turns to align the marks. (See Fig. 4)

NOTE: The number of turns clockwise varies by model. See the "SR" section of the vehicle's repair manual for the information.

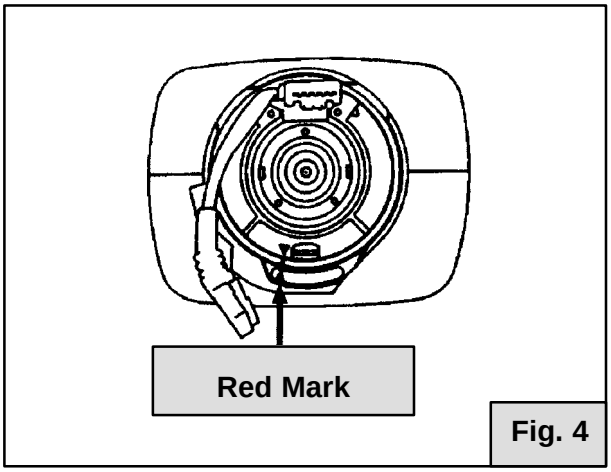


Fig. 4

3. Install the steering wheel.
   a. Align the matchmarks on the wheel and steering main shaft.
   b. Temporarily tighten the wheel set nut.
   c. Connect the spiral cable connector.

4. Bleed Power Steering System (when applicable).
5. Check steering wheel center point.
6. Torque steering wheel set nut. See the applicable vehicle's repair manual for the torque specification.
7. Install steering wheel pad.

NOTICE: Make Sure the pad is centered and installed to the specified torque.

If the pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.

When installing the pad, take care that the wiring does not interfere with other parts and is not pinched between other parts.

   a. Connect the airbag wiring connector.
   b. Install the pad after confirming that torx screws are in the screw case.
   c. Using a torx socket, torque the screws to the specification in the vehicle's repair manual.
      SST 09042–00010.
      (See Fig. 5)
   d. Install the steering wheel lower cover.

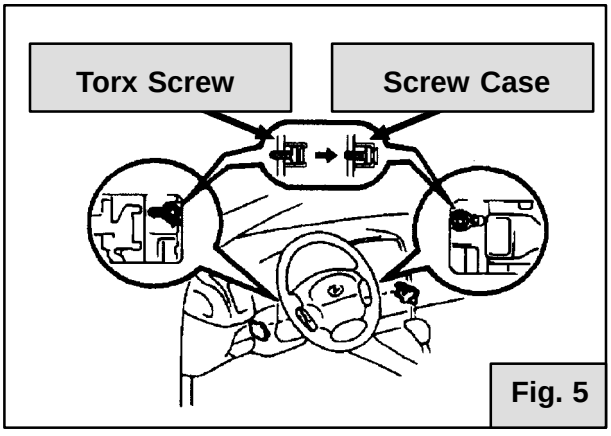
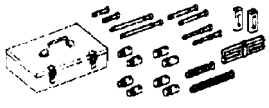
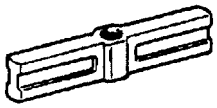
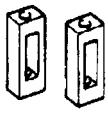
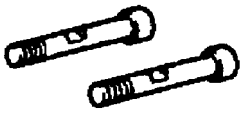


Fig. 5

SST (SPECIAL SERVICE TOOLS):

SSTs	TOOL NUMBER	TOOL NAME	APPLICATION
	09950–50010	Puller C Set	Power tilt/power telescoping steering column
	09951–05010	Hanger 150	
	09952–05010	Slide Arm	
	09953–05020	Center Bolt 150	
	09954–05020	Claw No. 2	

RECOMMENDED TOOLS AND NECESSARY EQUIPMENT:

TOOL	TOOL NUMBER	TOOL NAME	APPLICATION
	09042–00010	Torx Socket T 30	Steering wheel pad

EQUIPMENT: Torque Wrench

LUBRICANT: ATF DEXRON II or III

LEXUS

Technical Service Information Bulletin

May 26, 2000

Title:

STEERING WHEEL NUT

Models:

'94 – '00 ES 300

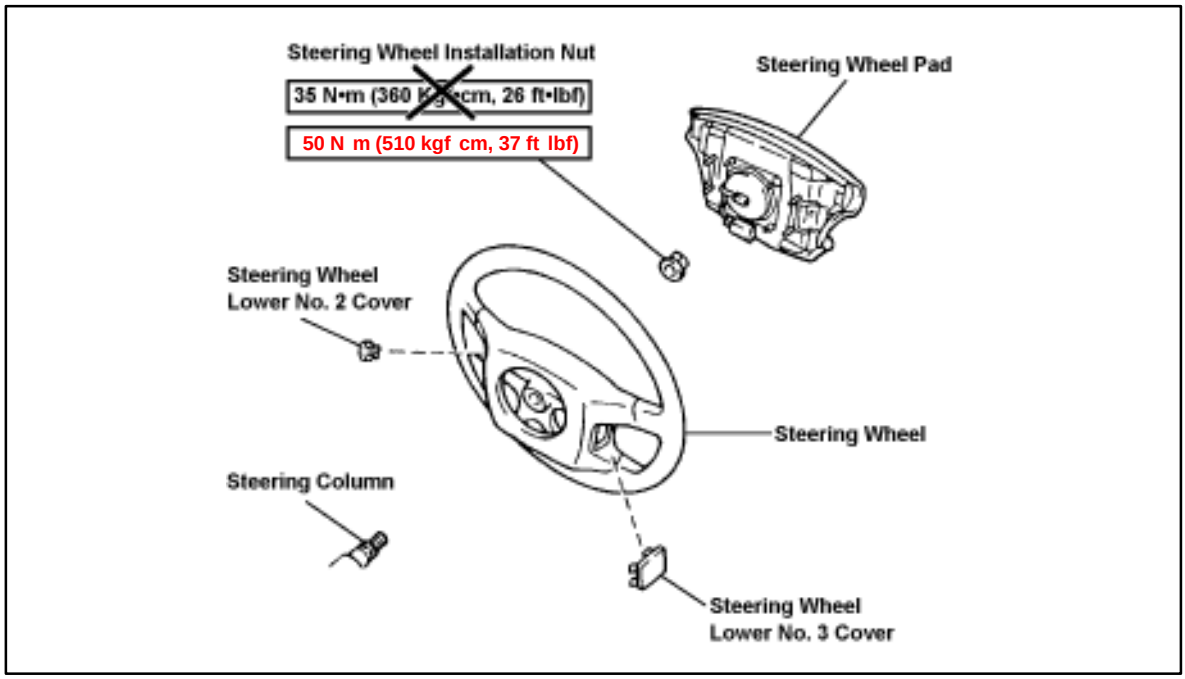
TSIB

Introduction

The steering wheel installation nut torque specification has been changed. Please update the repair manuals for the applicable vehicles.

Applicable Vehicles

- **1994 – 2000** model year **ES 300**



Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

August 14, 1998

Title:

STEERING RACK HOUSING BUSHING NOISE

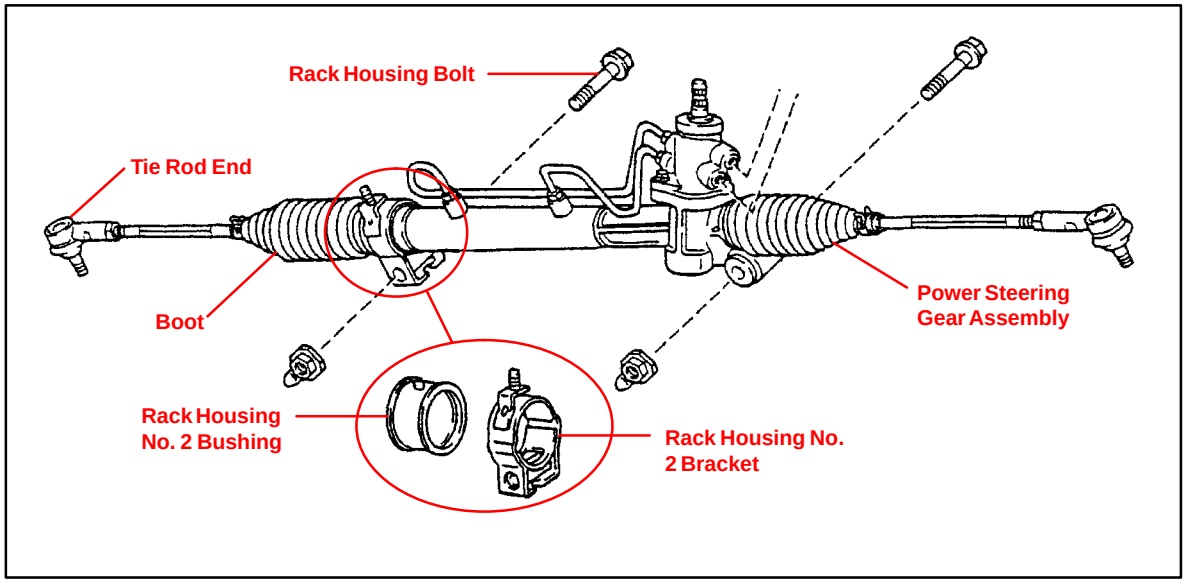
Models:

'97 ES 300

TSIB

Introduction

The Steering Rack Bushing on 1997 ES 300 vehicles has been changed to reduce noise from the Rack Housing Bracket No. 2.



Production Change Information

- **1997 ES 300s** starting with **VIN: JT8BF22G * V0001068**

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME
45517–33010	45517–33021	Steering Rack Housing Bushing No. 2

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
ST8002	Replace Steering Rack No. 2 Bushing	1.0	45517–33010	91	99

Applicable Warranty*:

This repair is covered under the Lexus Basic Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

* Warranty application is limited to correction of a problem based upon a customer's complaint.

Repair Procedure

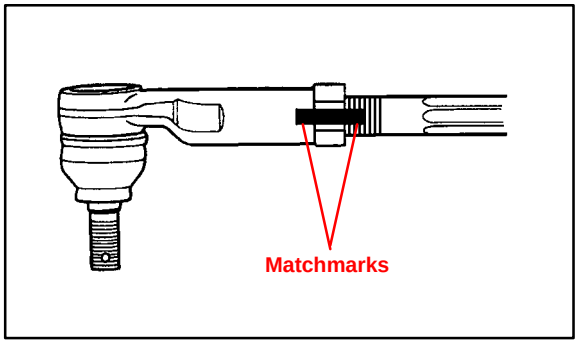
If the customer encounters noise in cold weather, when turning, at very low speed (2–3 mph), replace the Rack Housing Bushing with the updated part.

> **NOTE:**
> **It is not necessary to remove the Steering Rack to replace the bushing.**

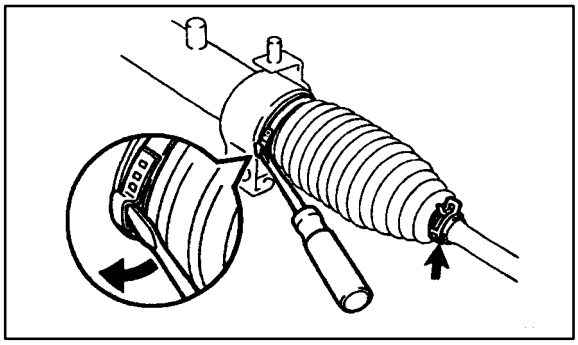
To remove the Rack Housing Bushing:

1. Remove the No. 2 Rack Housing Bolt.
2. Place matchmarks on the tie rod and rack end so that the toe will not be changed.

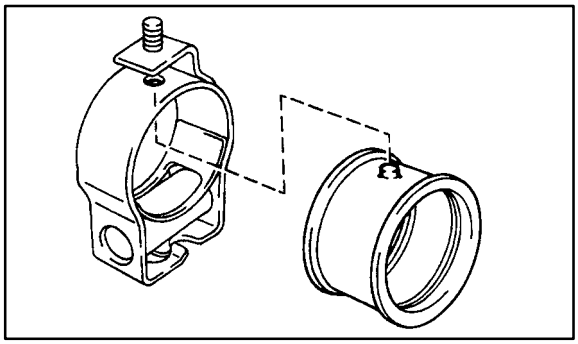
   Remove the Tie Rod End.



3. Remove the Rack Boot, using a screwdriver to loosen the clamp. Be careful not to damage the boot.



4. Remove and replace the Bushing. Be sure to align the projection on the bushing with the hole in the bracket.



5. Reassemble the Rack Boot using a new clamp (P/N 90461–08688).
6. Road test the vehicle to make sure steering wheel is on center.

LEXUS

Technical Service Information Bulletin

May 5, 2000

Title:

REAR ABS SPEED SENSOR REMOVAL

Models:

'97 – '00 ES 300

TSIB

Introduction

This bulletin provides service information regarding the removal of the ABS speed sensor prior to removal of the rear axle and rear suspension.

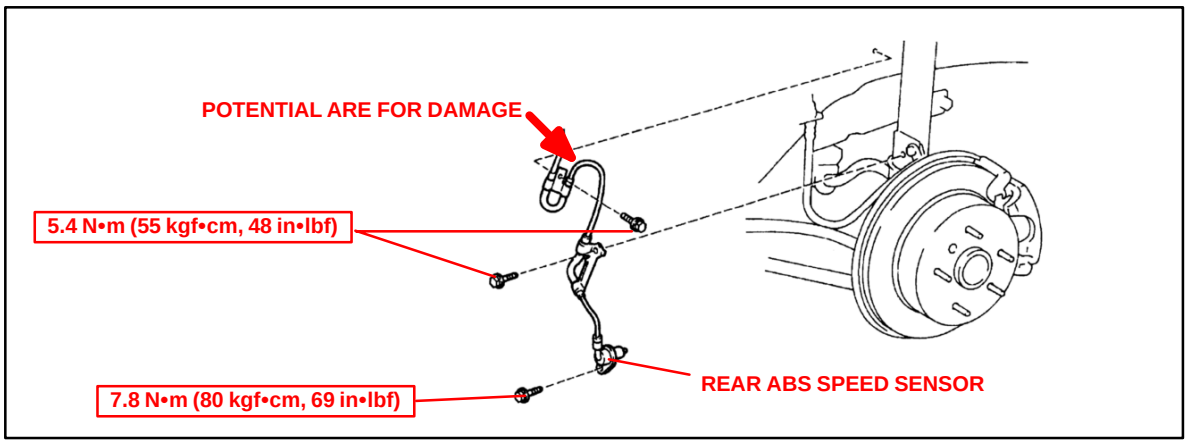
REMINDER:

Failure to remove the ABS speed sensor prior to removal of the rear axle or suspension may cause the ABS warning light to illuminate or damage the ABS speed sensor wire harness.

Applicable Vehicles

- **1997 – 2000** model year **ES 300**

Repair Procedure



NOTE:

Prior to removal/replacement of the rear axle, rear coil spring and rear shock absorber, be sure to remove the rear ABS speed sensor from the rear axle by removing the 3 bolts shown above. Check the speed sensor signal after installation.

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable	–	–	–	–

LEXUS

Technical Service Information Bulletin

December 10, 1999

Title:

FRONT SUSPENSION SUPPORT NOISE

Models:

'97–'00 ES 300 & '99–'00 RX 300

TSIB

Introduction

To eliminate a noise occurrence from the front suspension on washboard type road surfaces, the suspension support has been changed.

Applicable Vehicles

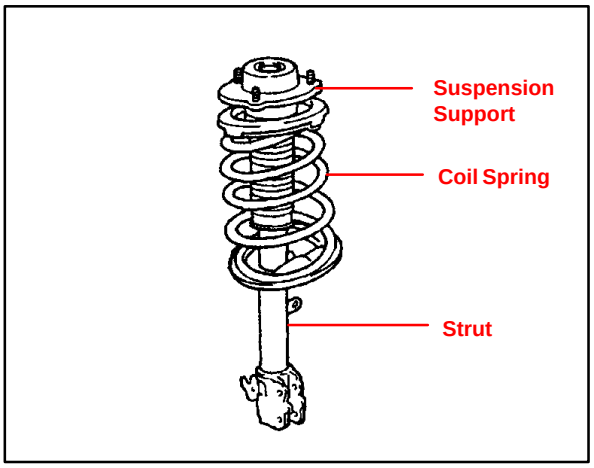
- **1997 – 2000 Model Year ES 300 and 1999 – 2000 Model Year RX 300.**

Production Change Information

The rubber bushing shape of the suspension support has been changed.

NOTE:

This change is not applicable to "Adaptive Variable Suspension" equipped ES 300 vehicles.



MODEL	STARTING VIN
ES 300	JT8BF28G*Y0237725 JT8BF28G*Y5075984
RX 300	JT6GF10U*Y0045378 JT6HF10U*Y0097408

Parts Information

PREVIOUS PART NUMBER	CURRENT PART NUMBER	PART NAME	QTY
48603–33020	48603–33021	Support Sub–Assembly, Front Suspension RH	1
48609–33120	48609–33121	Support Sub–Assembly, Front Suspension LH	1

Warranty Information

ES 300

OP CODE	COMBO	DESCRIPTION	TIME	OPN	T1	T2
431451	A	R & R Front Suspension Support Assembly (RH and LH)	1.6	48603–33020	91	99
	B	Adjust Toe–in				

RX 300

OP CODE	COMBO	DESCRIPTION	TIME	OPN	T1	T2
431451	A	R & R Front Suspension Support Assembly (RH and LH)	2.0	48603–33020	91	99
	B	Adjust Toe–in				

Applicable Warranty*:

This repair is covered under the Lexus Basic Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle's in–service date.

* Warranty application is limited to correction of a problem based upon a customer's specific complaint.

LEXUS

Technical Service Information Bulletin

April 9, 1999

Title:

REVISED DRIVE SHAFT GREASE

Models:

LS 400, GS 300/400, SC 300/400, ES 250/300 & RX 300

TSIB

Introduction

The greases supplied in replacement Inboard and Outboard Drive Shaft Boot Kits for the following models, has been revised.

With this revision, the grease compositions have been changed and are now both the **same color**. To correctly lubricate each joint, consult the Service Repair Manual as to which **size** packet of grease is designated for each Drive Shaft Joint Assembly.

NOTE:

Although Inboard and Outboard greases are now the same color, their compositions are different.

Affected Vehicles

- **All LS 400, GS 300/400, SC 300/400, ES 250/300 & RX 300 Models.**

Required Tools and Material

As outlined in the Service Repair Manual.

Repair Procedure

Refer to the appropriate Repair Manual for installation and lubrication information for Drive Shaft Joint Assemblies.

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

June 19, 1998

Title:

AUTOMATIC TRANSMISSION FLUID TYPE T-IV

Models:

All Models

TSIB

Introduction

The introduction of Automatic Transmission Fluid type T–IV makes type T–II obsolete. Use type T–IV for all applications that specify ATF type T–II.

Affected Vehicles

- All vehicles with Automatic Transmissions specified to use **ATF Types T–II or T–IV.**

	TYPE OF ATF			
SPECIFIED ATF	**Dextron®–III**	**TYPE T**	**TYPE T–II**	**TYPE T–IV**
Dextron®–II or III	**OK**	**X**	**X**	**X**
TYPE T	**X**	**OK**	**X**	**X**
TYPE T–II	**X**	**X**	**OK**	**OK**
TYPE T–IV	**X**	**X**	**X**	**OK**
X = NOT USABLE				

Parts Information

SIZE	NEW PART NUMBER	PART NAME
4 Liter	08886–01705	ATF type T–IV

Warranty Information

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

LEXUS

Technical Service Information Bulletin

September 10, 1999

Title:

AUTOMATIC TRANSMISSION FLUIDS

Models:

All Models

TSIB

REVISION NOTICE:

The information contained in this TSIB updates TC003–98 dated June 19, 1998.

Introduction

Automatic Transmission Fluid Type T–IV now replaces Type T–II fluid. Use Type T–IV for all applications that specify ATF Type T–II.

Please refer to the following table for the interchangeability between each ATF.

Applicable Vehicles

- **All vehicles produced after 1990 with Automatic Transmissions specified to use ATF Type T, T–II and T–IV.**

SPECIFIED ATF	TYPE OF ATF			
	DEXRON® II OR III	TYPE T	TYPE T–II	TYPE T–IV
DEXRON® II OR III	OK	X	X	X
TYPE T	X	OK	X	OK
TYPE T–II	X	X	OK	OK
TYPE T–IV	X	X	X	OK
X = NOT USABLE				

NOTICE:

With the exception of mixing ATF Type T with Type T–IV fluids, different types of fluids must not be mixed.

Parts Information

SIZE	NEW PART NUMBER	PART NAME
4 Liter	08886–01705	ATF Type T–IV

Warranty Information

OPCODE	DESCRIPTION	TIME	OPN	T1	T2
N/A	Not Applicable to Warranty	–	–	–	–

A INTRODUCTION

This manual consists of the following 11 sections:

No.	Section	Description
A	INDEX	Index of the contents of this manual.
	INTRODUCTION	Brief explanation of each section.
B	HOW TO USE THIS MANUAL	Instructions on how to use this manual.
C	TROUBLE–SHOOTING	Describes the basic inspection procedures for electrical circuits.
D	ABBREVIATIONS	Defines the abbreviations used in this manual.
E	GLOSSARY OF TERMS AND SYMBOLS	Defines the symbols and functions of major parts.
F	RELAY LOCATIONS	Shows position of the Electronic Control Unit, Relays, Relay Block, etc. This section is closely related to the system circuit.
G	ELECTRICAL WIRING ROUTING	Describes position of Parts Connectors, Splice points, Ground points, etc. This section is closely related to the system circuit.
H	POWER SOURCE (Current Flow Chart)	Describes power distribution from the power supply to various electrical loads.
I	INDEX	Index of the system circuits.
	SYSTEM CIRCUITS	Electrical circuits of each system are shown from the power supply through ground points. Wiring connections and their positions are shown and classified by code according to the connection method. (Refer to the section, “How to sue this manual”). The “System Outline” and “Service Hints” useful for troubleshooting are also contained in this section.
J	GROUND POINTS	Shows ground positions of all the parts decribed in this manual.
K	OVERALL ELECTRICAL WIRING DIAGRAM	Provides circuit diagrams showing the circuit connections.

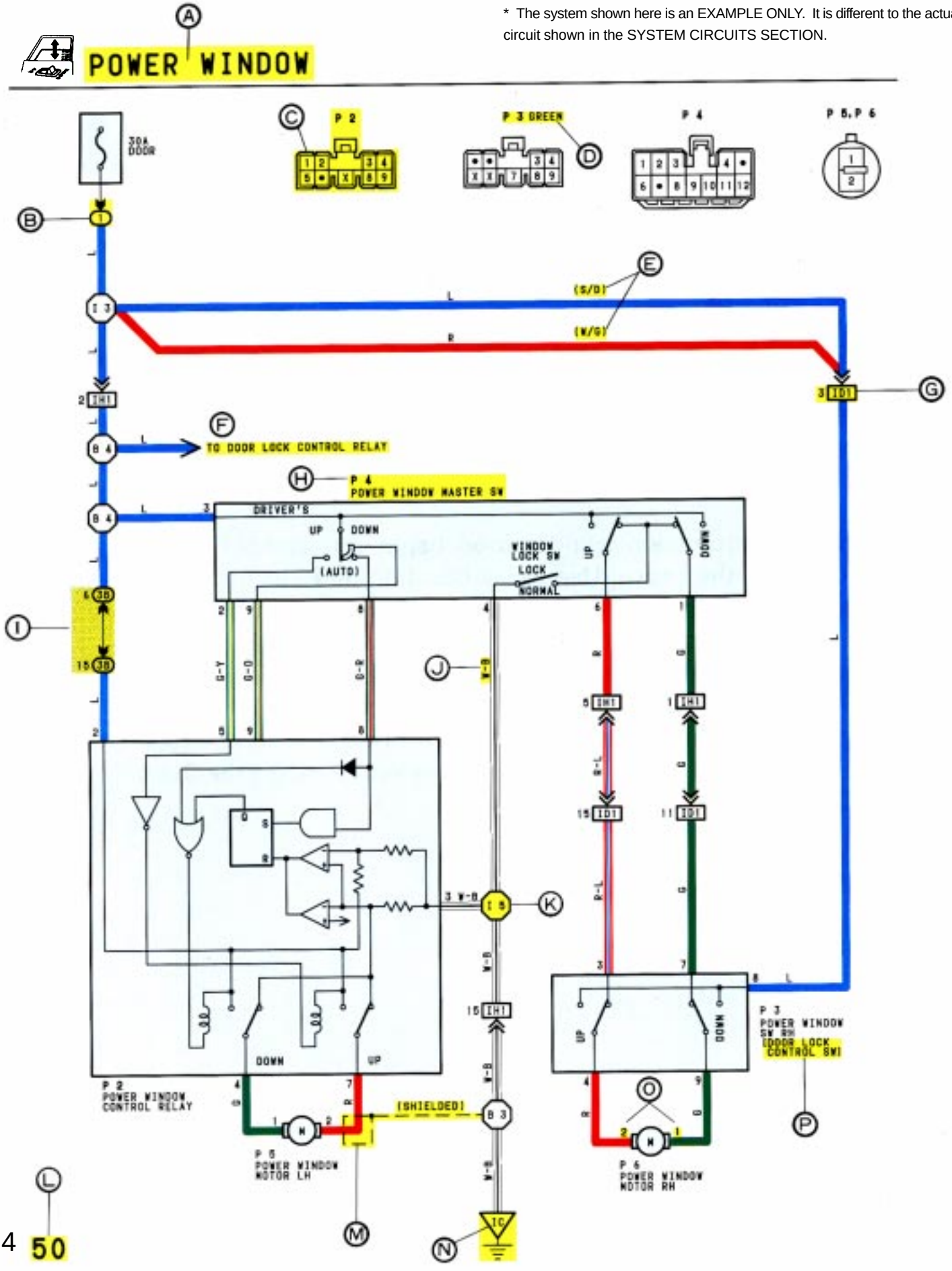
This manual provides information on the electrical circuits installed on vehicles by dividing them into a circuit for each system.

The actual wiring of each system circuit is shown from the point where the power source is received from the battery as far as each ground point. (All circuit diagrams are shown with the switches in the OFF position.)

When troubleshooting any problem, first understand the operation of the circuit where the problem was detected (see System Circuit section), the power source supplying power to that circuit (see Power Source section), and the ground points (see Ground Points section). See the System Outline to understand the circuit operation.

When the circuit operation is understood, begin troubleshooting of the problem circuit to isolate the cause. Use Relay Location and Electrical Wiring Routing sections to find each part, junction block and wiring harness connectors, wiring harness and wiring harness connectors, splice points, and ground points of each system circuit. Internal wiring for each junction block is also provided for better understanding of connection within a junction block.
Wiring related to each system is indicated in each system circuit by arrows (from__,to__). When overall connections are required, see the Overall Electrical Wiring Diagram at the end of this manual.

* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.

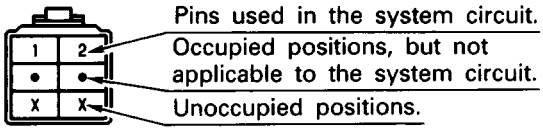


A : System Title

B : Indicates a Relay Block. No shading is used and only the Relay Block No. is shown to distinguish it from the J/B.

Example: (1) Indicates Relay Block No. 1.

C : Indicates the connector to be connected to a part (the numeral indicates the pin No.)
Explanation of pin use.



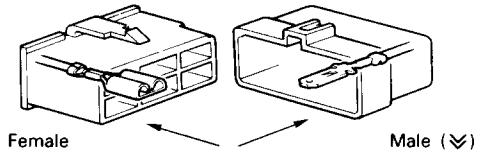
The pins shown are only for the highest grade, or only include those in the specification.

D : Connector Color Connectors not indicated are milky white in color:

E : ( ) is used to indicate different wiring and connector, etc. when the vehicle model, engine type, or specification is different.

F : Indicates related system.

G : Indicates the wiring harness and wiring harness connector. The wiring harness with male terminal is shown with arrows (⩛).



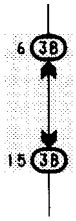
The first letter of the code for each wiring harness and wiring harness connector(s) indicates thecomponent's location, e.g, "E" for the Engine Compartment, "I" for the Instrument Panel and Surrounding area, and "B" for the Body and Surrounding area.

When more than one code has the first and second letters in common, followed by numbers (e.g, IH1, IH2), this indicates the same type of wiring harness and wiring harness connector.

H : Represents a part (all parts are shown in sky blue). The code is the same as the code used in parts position.

I : Junction Block (The number in the circle is the J/B No. and the connector code is shown beside it). Junction Blocks are shaded to clearly separate them from other parts (different junction blocks are shaded differently for further clarification).

Example:



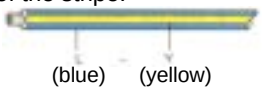
3B indicates that it is inside Junction Block No. 3.

J : Indicates the wiring color.
Wire colors are indicated by an alphabetical code.

B = Black	L = Black	R = Red
BR = Brown	LG = Light Green	V = Violet
G = Green	O = Orange	W = White
GR = Gray	P = Pink	Y = Yellow

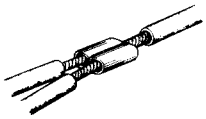
The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

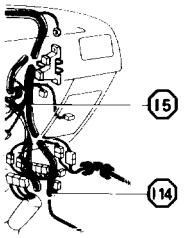
Example: L – Y



K : Indicates a wiring Splice Point (Codes are "E" for the Engine Room, "I" for the Instrument Panel, and "B" for the Body).

Example:





The Location of Splice Point I 5 is indicated by the shaded section.

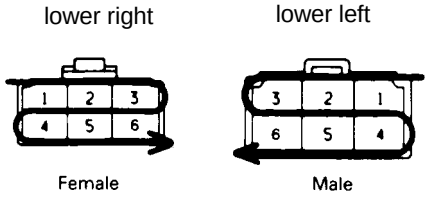
L : Page No.

M : Indicates a shielded cable.

N : Indicates a ground point.

The first letter of the code for each ground point(s) indicates the component's location, e.g. "E" for the Engine Compartment, "I" for the Instrument Panel and Surrounding area, and "B" for the Body and Surrounding area.

O : Indicates the pin number of the connector.
The numbering system is different for female and male connectors.



P : When 2 parts both use one connector in common, the parts connector name used in the wire routing section is shown in square brackets [ ].

B HOW TO USE THIS MANUAL

Q

SYSTEM OUTLINE

WITH THE IGNITION SW TURNED ON, THE CURRENT FLOWS TO **TERMINAL 3** OF THE POWER WINDOW MASTER SW, **TERMINAL 2** OF THE POWER WINDOW CONTROL RELAY AND **TERMINAL 8** OF THE POWER WINDOW SW THROUGH THE **DOOR** FUSE.

1. DRIVER'S WINDOW "MANUAL UP" OPERATION BY MASTER SW

HOLDING MANUAL SW (DRIVER'S) ON "UP" POSITION LOCATED IN POWER WINDOW MASTER SW, THE CURRENT FLOWS TO **TERMINAL 5** OF THE POWER WINDOW CONTROL RELAY THROUGH **TERMINAL 3** OF THE MASTER SW ➔ **TERMINAL 2** TO OPERATE A POWER WINDOW CONTROL RELAY. THUS THE CURRENT INSIDE THE RELAY FLOWS FROM **TERMINAL 2** OF THE RELAY ➔ **TERMINAL 1** ➔ **TERMINAL 2** OF THE POWER WINDOW MOTOR ➔ **TERMINAL 1** ➔ **TERMINAL 4** OF THE RELAY ➔ **TERMINAL 3** ➔ TO **GROUND**. THE MOTOR TURNS TO ASCENT THE WINDOW. RELEASING THIS SW, THE ROTATION OF MOTOR IS STOPPED AND THE WINDOWS CAN STOP AT WILL POINT.

(FOR THE "MANUAL DOWN" OPERATION, CURRENT FLOWS IN THE REVERSE DIRECTION BECAUSE THE TERMINALS WHERE IT FLOW ARE CHANGED).

2. DRIVER'S WINDOW "AUTO DOWN" OPERATION BY MASTER SW

ONCE THE "AUTO DOWN" BUTTON OF THE MASTER SW IS PUSHED, THE CURRENT FLOW **TERMINAL 9** OF THE POWER WINDOW CONTROL RELAY THROUGH **TERMINAL 3** OF THE MASTER SW➔ **TERMINALS 8** AND **9** TO OPERATE THE RELAY. THUS THE CURRENT INSIDE THE POWER WINDOW CONTROL RELAY FLOWS FROM **TERMINAL 2** OF THE RELAY ➔ **TERMINAL 4** ➔ **TERMINAL 1** OF THE POWER WINDOW MOTOR ➔ **TERMINAL 2** ➔ **TERMINAL 1** OF THE RELAY ➔ **TERMINAL 3** ➔ TO **GROUND**. THE MOTOR CONTINUES THE ROTATION ENABLING TO DESCENT THE WINDOW.

THE WINDOW DESCENDS TO THE END POSITION. THE CURRENT WILL BE CUT OFF TO RELEASE THE AUTO DOWN FUNCTION BASED ON THE INCREASING CURRENT BETWEEN **TERMINAL 2** OF THE RELAY AND **TERMINAL 1** IN RELAY.

3. DRIVER'S WINDOW AUTO DOWN RELEASE OPERATION BY MASTER SW

HOLDING THE MANUAL SW (DRIVER'S) ON "UP" POSITION IN OPERATING AUTO DOWN. THE CURRENT FROM **TERMINAL 3** OF THE MASTER SW PASSING **TERMINAL 2** FLOWS **TERMINAL 5** OF THE RELAY AND RELEASES THE AUTO DOWN FUNCTION IN THE POWER WINDOW CONTROL RELAY. RELEASING THE HAND FROM SW, WINDOW STOPS AND CONTINUING ON TOUCHING SW. THE FUNCTION SWITCHES TO MANUAL UP OPERATION.

4. PASSENGER'S WINDOW UP OPERATION (MASTER SW) AND WINDOW LOCK SW OPERATION

HOLDING PASSENGER'S WINDOW SW (MASTER SW) ON "UP", THE CURRENT FLOWS FROM **TERMINAL 3** OF THE MASTER SW PASSING **TERMINAL 6** TO **TERMINAL 3** OF THE POWER WINDOW SW (PASSENGER'S) ➔ **TERMINAL 4 TERMINAL** ➔ **2** OF THE MOTOR ➔ **TERMINAL 1** ➔ **TERMINAL 9** OF THE POWER WINDOW SW ➔ **TERMINAL 7** ➔ **TERMINAL 1** OF THE MASTER SW ➔ **TERMINAL 4** TO **GROUND**. THE MOTOR RUNS TO ASCENT THE WINDOW. RELEASING THIS SW, THE ROTATION OF MOTOR IS STOPPED AND WINDOW CAN STOP AT WILL PLACE. SWITCHING THE WINDOW LOCK SW IN "LOCK" POSITION, THE CIRCUIT IS OPENED AND STOPPED THE MOTOR ROTATION.

R (FOR THE DOWN OPERATION, CURRENT FLOWS IN THE REVERSE DIRECTION BECAUSE THE TERMINALS WHERE IT FLOWS ARE CHANGED).

SERVICE HINTS

P 2 POWER WINDOW CONTROL RELAY

3–GROUND: ALWAYS CONTINUITY

2–GROUND: APPROX. 12 VOLTS WITH THE IGNITION SW AT **ON** POSITION

5–GROUND: APPROX. 12 VOLTS WITH THE IGNITION SW AT **ON** POSITION AND THE MASTER SW AT **UP** POSITION

8–GROUND: APPROX. 12 VOLTS WITH THE IGNITION SW AT **ON** POSITION AND THE MASTER SW AT **AUTO DOWN** POSITION

9–GROUND: APPROX. 12 VOLTS WITH THE IGNITION SW AT **ON** POSITION AND THE MASTER SW AT **DOWN** OR **AUTO DOWN** POSITION

P 4 POWER WINDOW MASTER SW

4–GROUND: ALWAYS CONTINUITY

3–GROUND: APPROX. 12 VOLTS WITH THE IGNITION SW AT **ON** POSITION

WINDOW LOCK SW

OPEN WITH THE WINDOW LOCK SW AT **LOCK** POSITION

S ○ : **PARTS LOCATION**

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
P2	21	**P4**	21	**P6**	21
P3	21	**P5**	21		

T ⬭ : **RELAY BLOCKS**

CODE	SEE PAGE	RELAY BLOCK (RELAY BLOCK LOCATION)
1	16	R/B NO. 1 (INSTRUMENT PANEL LEFT)

U ⬭ : **JUNCTION BLOCK AND WIRE HARNESS CONNECTOR**

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
38	14	J/B NO. 3 AND COWL WIRE (INSTRUMENT PANEL LEFT SIDE)

V □ : **CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS**

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
ID1	26	FRONT DOOR RH WIRE AND COWL WIRE (RIGHT KICK PANEL)
IH1	26	FRONT DOOR LH WIRE AND COWL WIRE (LEFT KICK PANEL)

W ▽ : **GROUND POINTS**

CODE	SEE PAGE	GROUND POINT LOCATION
IC	24	COWL LEFT

X ⯃ : **SPLICE POINTS**

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 5	24	COWL WIRE			

Ⓠ: Explains the system outline.

Ⓡ: Indicates values or explain the function for reference during troubleshooting.

Ⓢ: Indicates the reference page showing the position on the vehicle of the parts in the system circuit.

Example: Part “P 4” (Power Window Master SW) is on page 21 of the manual.

* The letter in the code is from the first letter of the part, and the number indicates its order in parts starting with the letter.

Example: P 4

- 4 → Part is 4th in order
- P → Power Window Master SW

Ⓣ: Indicates the reference page showing the position on the vehicle of Relay Block Connectors in the system circuit.

Example: Connector “1” is described on page 16 on this manual and is installed on the left side of the instrument panel.

Ⓤ: Indicates the reference page showing the position on the vehicle of J/B and Wire Harness in the system circuit.

Example: Connector “3B”connects the Cowl Wire and J/B No. 3. It is described on page 14 of this manual, and is installed on the instrument panel left side.

Ⓥ: Indicates the reference page describing the wiring harness and wiring harness connector (the female wiring harness is shown first, followed by the male wiring harness).

Example: Connector “ID1”connects the front door RH wire (female) and cowl wire (male). It is described on page 26 of this manual, and is installed on the right side kick panel.

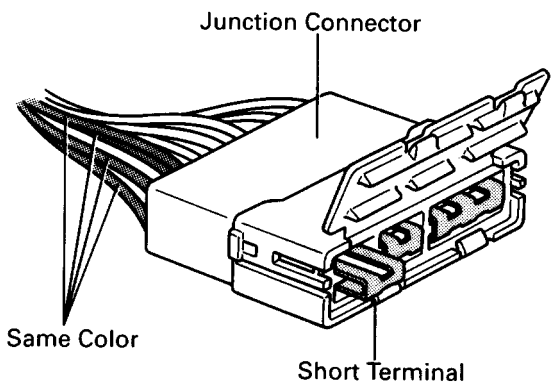
Ⓦ: Indicates the reference page showing the position of the ground points on the vehicle.

Example: Ground point “IC” is described on page 24 of this manual and is installed on the cowl left side.

Ⓧ: Indicates the reference page showing the position of the splice points on the vehicle.

Example: Splice point “I 5” is on the Cowl Wire Harness and is described on page 24 of this manual.

HINTS:



Junction connector (code: J1 to J19) in this manual include a short terminal which is connected to a number of wire harnesses. Always perform inspection with the short terminal installed. (When installing the wire harnesses, the harnesses can be connected to any position within the short terminal grouping. Accordingly, in other vehicles, the same position in the short terminal may be connected to a wire harness from a different part.)
Wire harness sharing the same short terminal grouping have the same color.

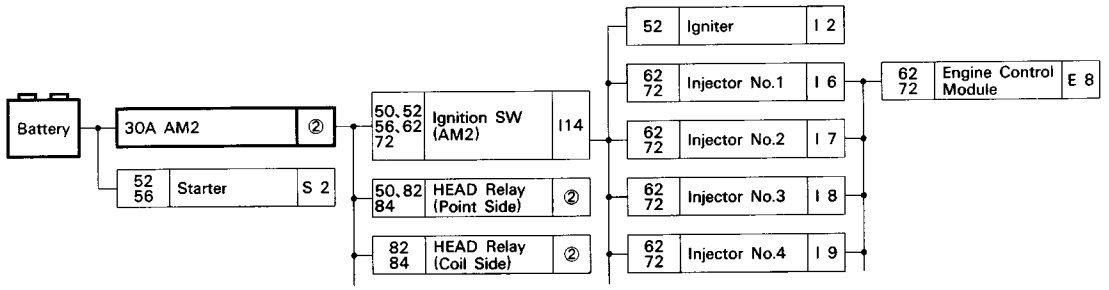
B HOW TO USE THIS MANUAL

The “Current Flow Chart” section, describes which parts each power source (fuses, fusible links, and circuit breakers) transmits current to. In the Power Source circuit diagram, the conditions when battery power is supplied to each system are explained. Since all System Circuit diagrams start from the power source, the power source system must be fully understood.

H POWER SOURCE (CURRENT FLOW CHART)

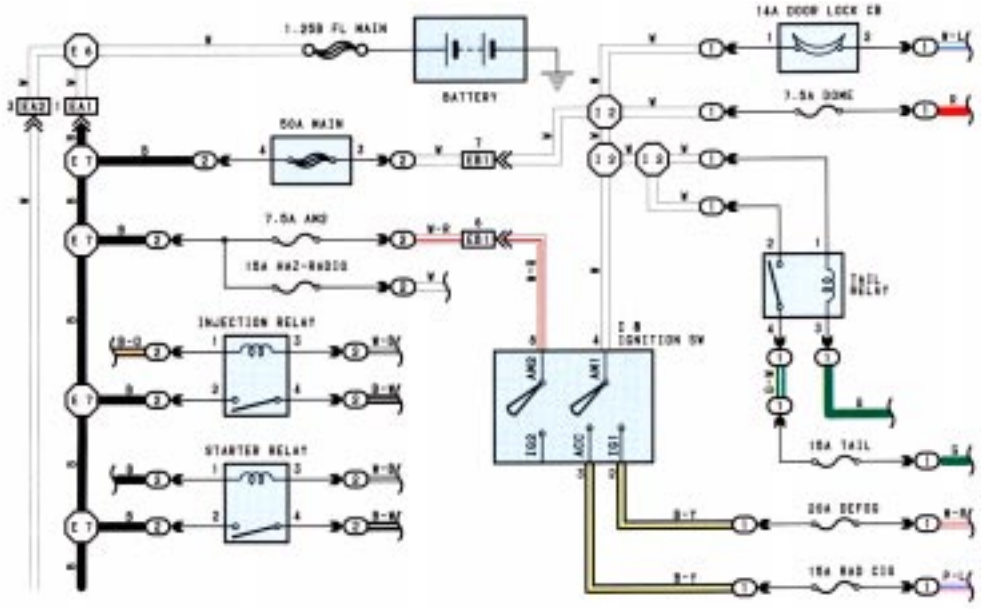
The chart below shows the route by which current flows from the battery to each electrical source (Fusible Link, Circuit Breaker, Fuse, etc.) and other parts.

The next page and following pages shown the parts to which each electrical source outputs current.



Location	CB or Fuse		Page Nos. of Related Systems	120		132 138	166	120	120 132 138	120	174	90 174	138	127	90	166 168	98	170	98	164	90	62 72	164
			Parts	ABS Actuator	ABS Relay	ADD Indicator SW	Auto Antenna Motor	ABS Deceleration Sensor	ABS ECU		A/C Amplifier	A/C Dual Pressure SW	A/C SW	ADD Control Relay	Airbag Sencor Assembly	Ashtray Illumination	Auto Antenna Control Relay	Back-Up Light SW	Brake Fluid Level Warning SW	Back-Up Light Relay	Cigarette Lighter	Cigarette Lighter Illumination	Circuit Opening Relay	Clock
			Code or Location	A 2	A 3	A 4	A 6	A 8	A 9	A10	A11	A12	A13	A14	A16	A17	A19	A20	B 1	B 2	B 3	C 4	C 5	C 6	C 7
	15A	ECU-B								●						●								
	10A	GAUGE		●		●	●			●	●							●	●	●	●			
	10A	TURN																						
①	15A	ECU-IG							●	●														

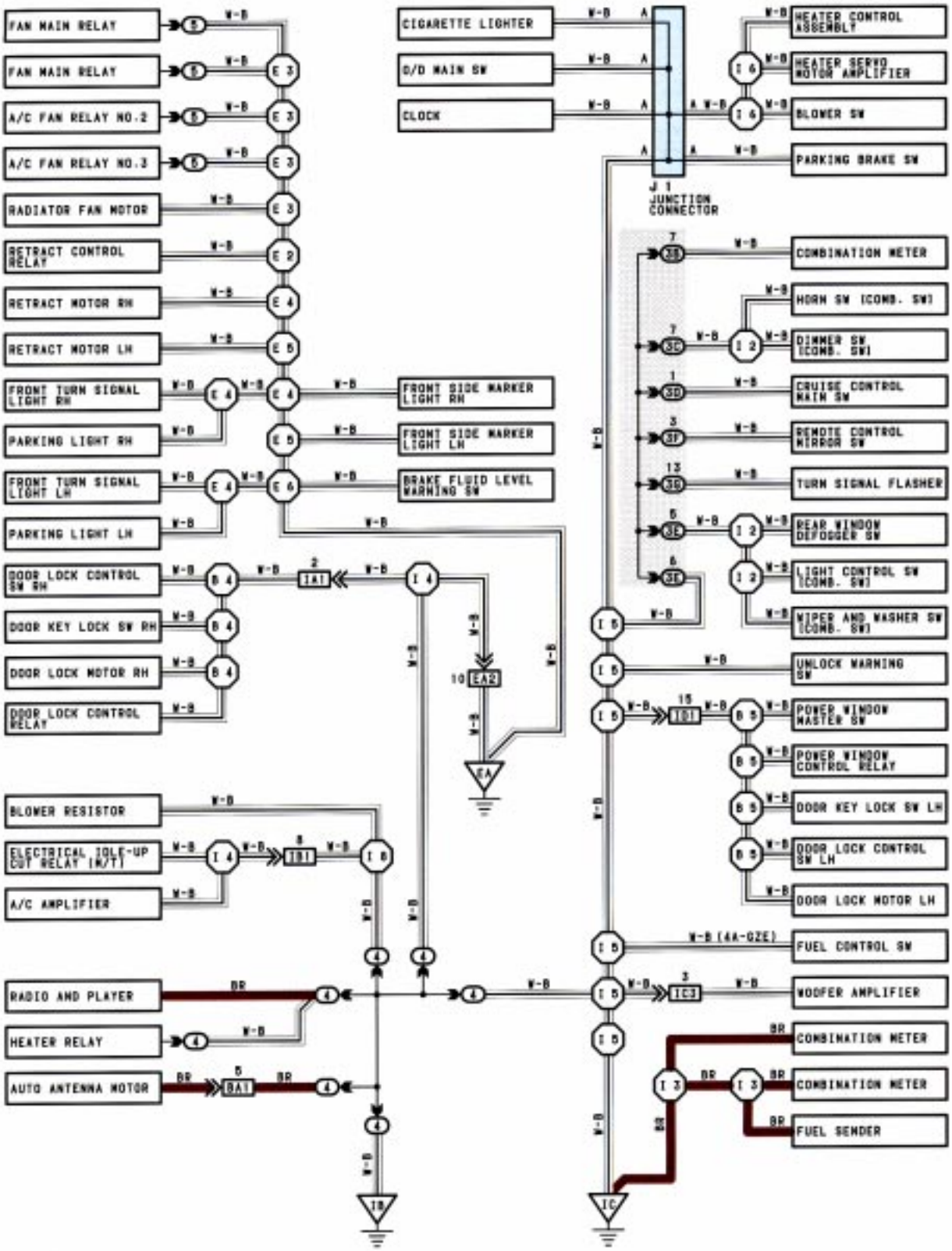
POWER SOURCE



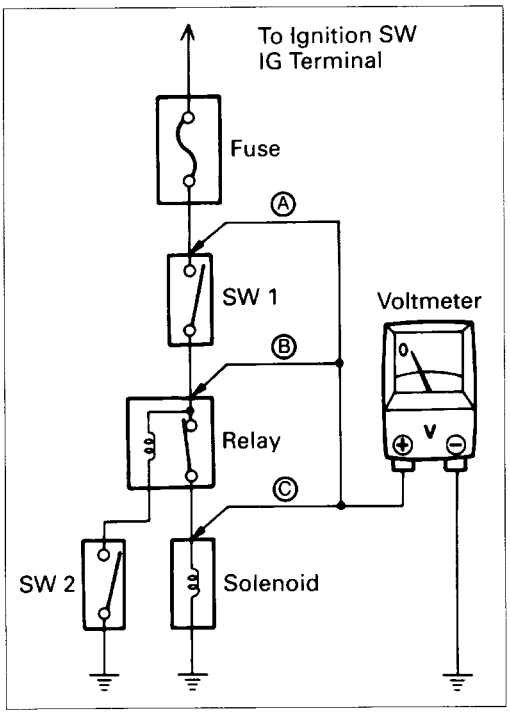
* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.

The ground points circuit diagram shows the connections from all major parts to the respective ground points. When troubleshooting a faulty ground point, checking the system circuits which use a common ground may help you identify the problem ground quickly. The relationship between ground points (EA, IB and IC shown below) can also be checked this way.

J GROUND POINT



* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.



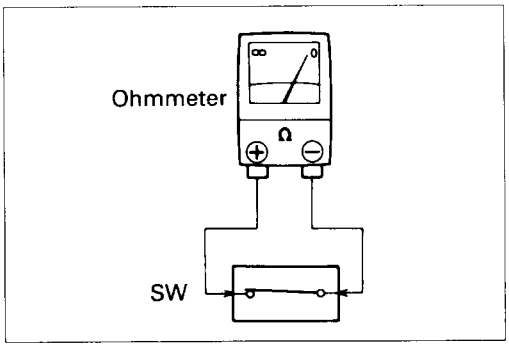
VOLTAGE CHECK

(a) Establish conditions in which voltage is check point.

Example:

Ⓐ– Ignition SW on
Ⓑ– Ignition SW and SW 1 on
Ⓒ– Ignition SW, SW 1 and Relay on (SW2 off)

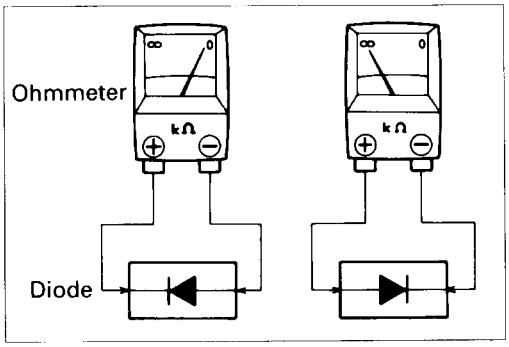
(b) Using a voltmeter, connect the negative lead to a ground point or negative battery terminal, and a positive lead to the connector or component terminal. This check can be done with a test light instead of a voltmeter.



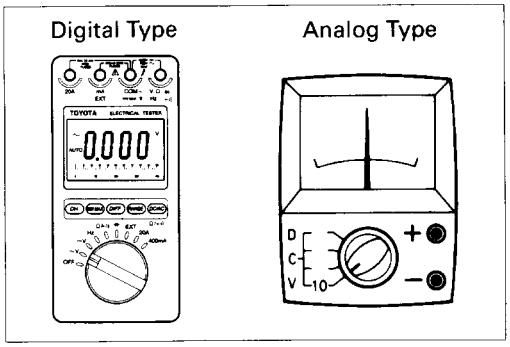
CONTINUITY AND RESISTANCE CHECK

(a) Disconnect the battery terminal or wire so there is no voltage between the check points.

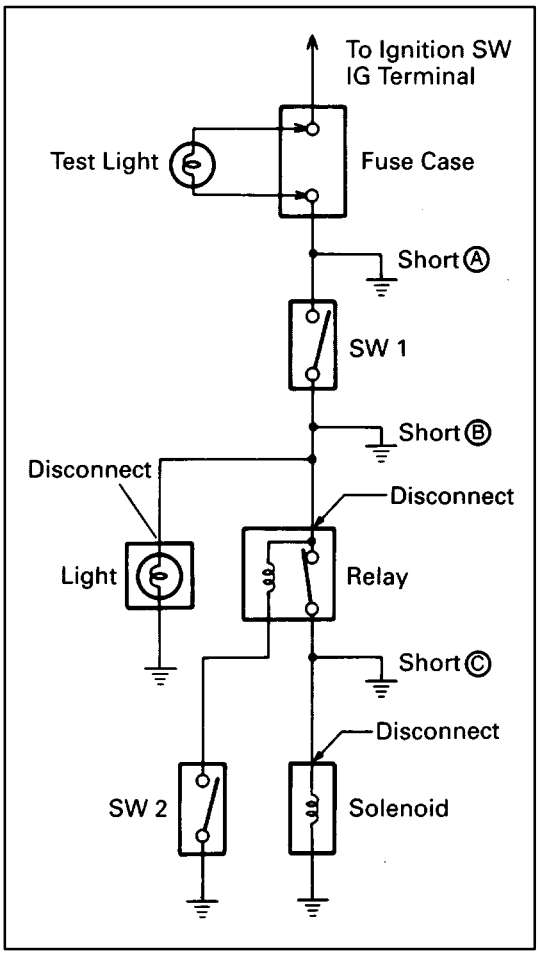
(b) Contact the two leads of an ohmmeter to each of the check point.



If the circuit has diodes, reverse the two leads and check again.
When contacting the negative lead to the diode positive side and the positive lead to the negative side, there should be continuity.
When contacting the two leads in reverse, there should be no continuity.



(c) Use the volt/ohmmeter with high impedance (10kΩ/V minimum) for troubleshooting of the electrical circuit.



FINDING A SHORT CIRCUIT

(a) Remove the blown fuse and disconnect all loads of the fuse.
(b) Connect a test light in place of the fuse.
(c) Establish conditions in which the test light comes on.

Example:

Ⓐ – Ignition SW on
Ⓑ – Ignition SW and SW 1 on
Ⓒ – Ignition SW, SW 1 and Relay on (Connect the Relay) and SW 2 off (or Disconnect SW 2)

(d) Disconnect and reconnect the connectors while watching the test light.
The short lies between the connector where the test light stays lit and the connector where the light goes out.

(e) Find the exact location of the short by lightly shaking the problem wire along the body.

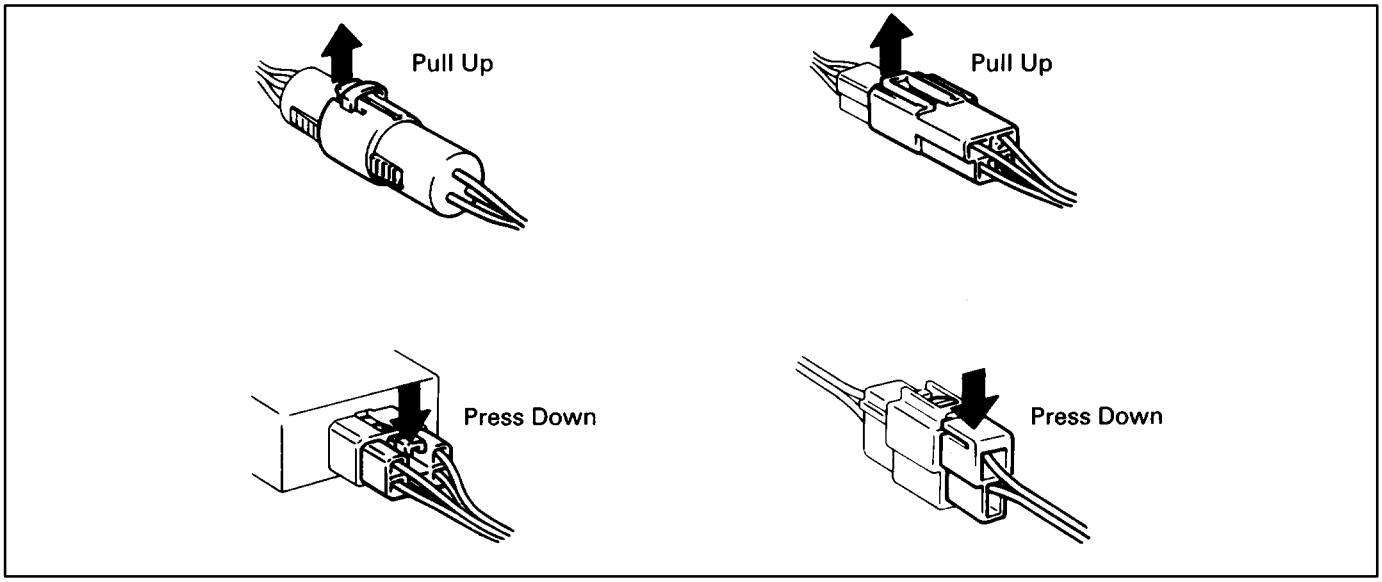
CAUTION:

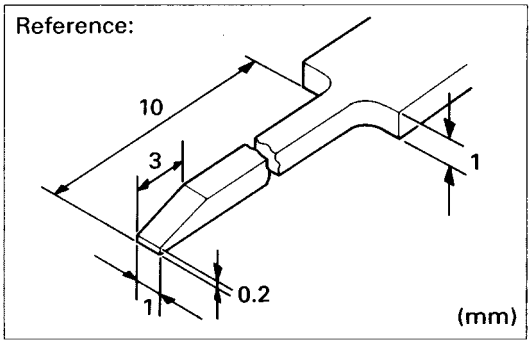
(a) Do not open the cover or the case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)
(b) When replacing the internal mechanism (ECU part) of the digital meter, be careful that no part of your body or clothing comes in contact with the terminals of leads from the IC, etc. of the replacement part (spare part).

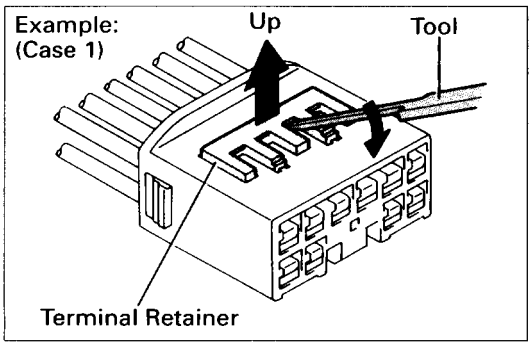
DISCONNECTION OF MALE AND FEMALE CONNECTORS

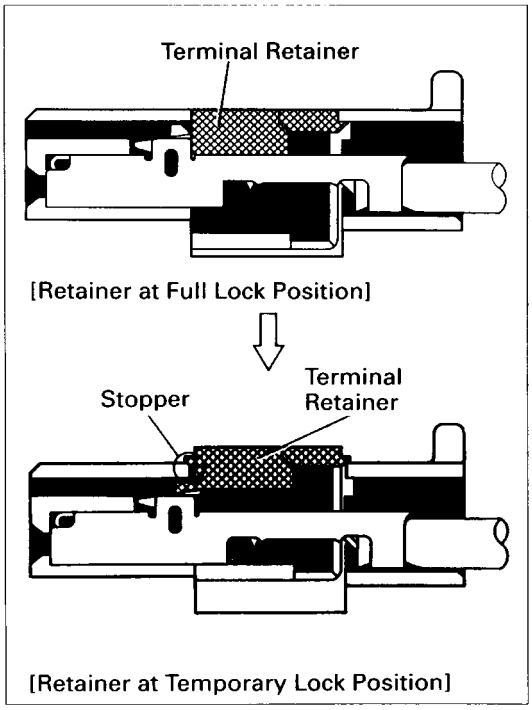
To pull apart the connectors, pull on the connector itself, not the wire harness.

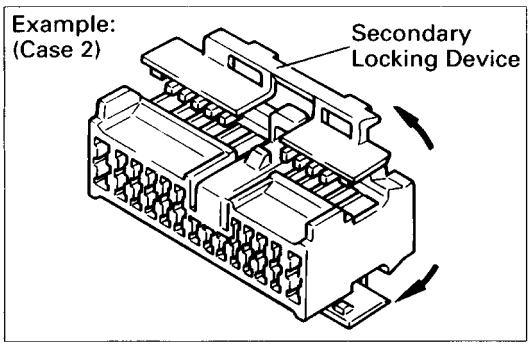
HINT: Check to see what kind of connector you are disconnecting before pulling apart.











HOW TO REPLACE TERMINAL (with terminal retainer or secondary locking device)

1. PREPARE THE SPECIAL TOOL
   HINT: To remove the terminal from the connector, please construct and use the special tool or like object shown on the left.

2. DISCONNECT CONNECTOR

3. DISENGAGE THE SECONDARY LOCKING DEVICE OR TERMINAL RETAINER
   (a) Locking device must be disengaged before the terminal locking clip can be released and the terminal removed from the connector.

   (b) Use a special tool or the terminal pick to unlock the secondary locking device or terminal retainer.

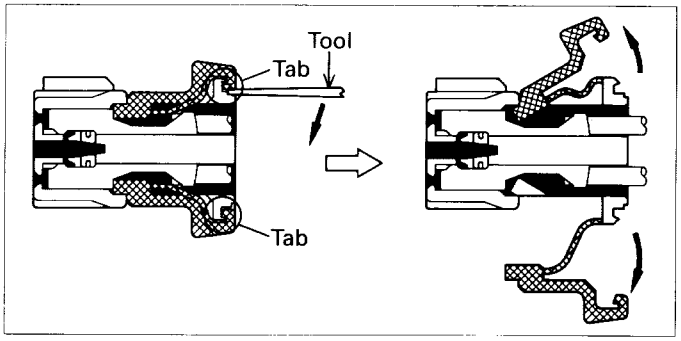
NOTICE:
Do not remove the terminal retainer from connector body.

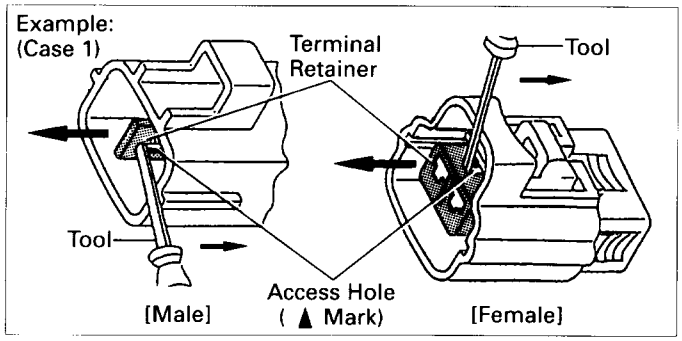
Ⓐ For Non–Waterproof Type Connector

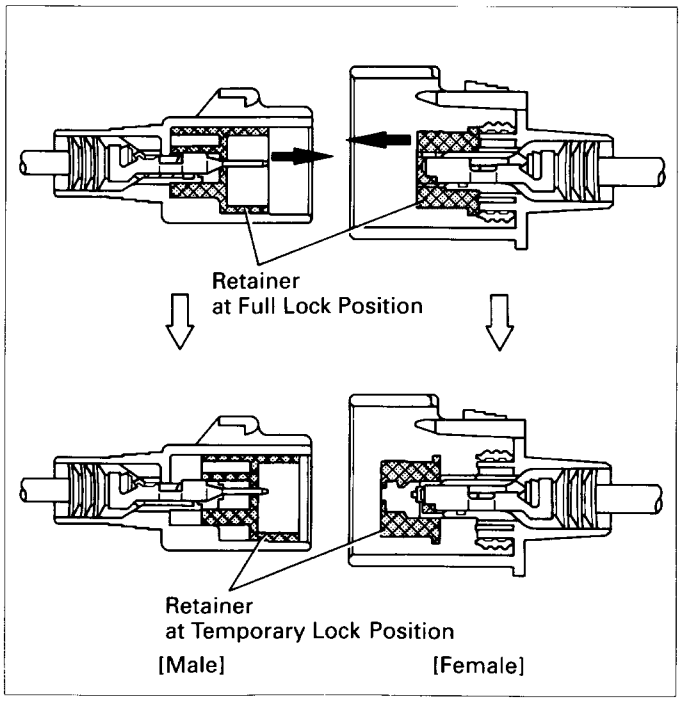
HINT: The needle insertion position varies according to the connector's shape (number of terminals etc.), so check the position before inserting it.

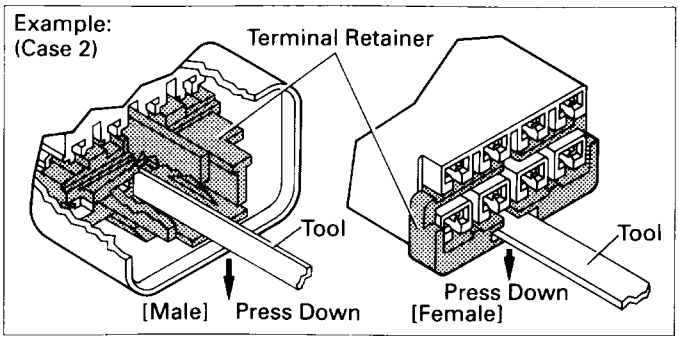
"Case 1"
Raise the terminal retainer up to the temporary lock position.

"Case 2"
Open the secondary locking device.









Ⓑ For Waterproof Type Connector

HINT: Terminal retainer color is different according to connector body.

Example:

Terminal Retainer	:Connector Body:
Black or White	:Gray
Black or White	:Dark Gray
Gray or White	:Black

"Case 1"

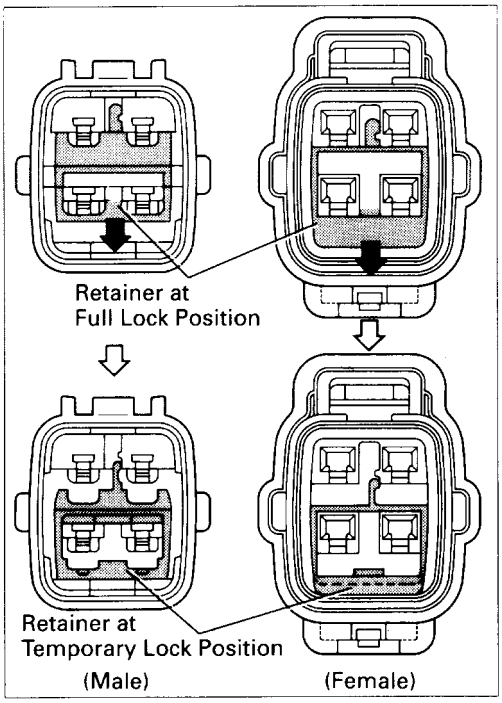
Type where terminal retainer is pulled up to the temporary lock position (Pull Type).

Insert the special tool into the terminal retainer access hole (▲Mark) and pull the terminal retainer up to the temporary lock position.

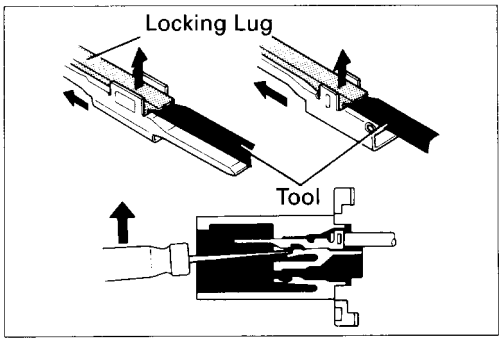
HINT: The needle insertion position varies according to the connector's shape (number of terminals etc.), so check the position before inserting it.

"Case 2"

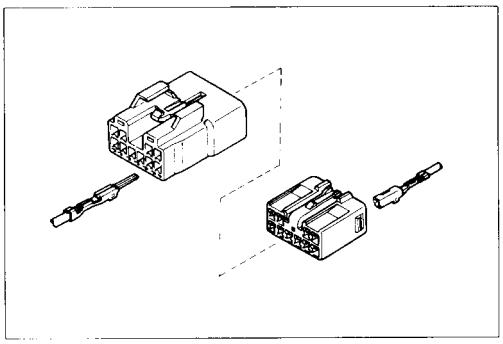
Type which cannot be pulled as far as Power Lock insert the tool straight into the access hole of terminal retainer as shown.



Push the terminal retainer down to the temporary lock position.



(c) Release the locking lug from terminal and pull the terminal out from rear.

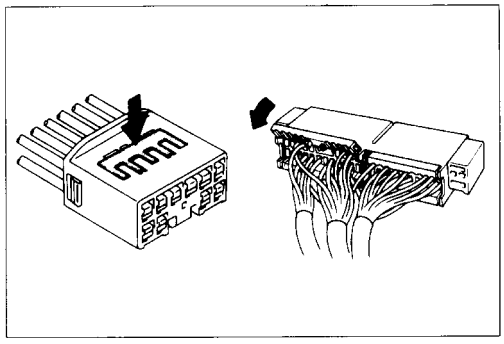


4. INSTALL TERMINAL TO CONNECTOR

(a) Insert the terminal.

HINT:

1. Make sure the terminal is positioned correctly.
2. Insert the terminal until the locking lug locks firmly.
3. Insert the terminal with terminal retainer in the temporary lock position.



(b) Push the secondary locking device or terminal retainer into the full lock position.

5. CONNECT CONNECTOR

ABBREVIATIONS

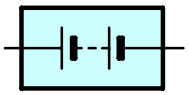
The following abbreviations are used in this manual.

ABS	=	Anti–Lock Brake System
A/C	=	Air Conditioning
ACIS	=	Acoustic Control Induction System
A/T	=	Automatic Transaxle
CD	=	Compact Disc
COMB.	=	Combination
ECU	=	Electronic Control Unit
EGR	=	Exhaust Gas Recirculation
ESA	=	Electronic Spark Advance
EVAP	=	Evaporative Emission
FL	=	Fusible Link
J/B	=	Junction Block
LH	=	Left–Hand
O/D	=	Overdrive
R/B	=	Relay Block
RH	=	Right–Hand
SFI	=	Sequential Multiport Fuel Injection
SRS	=	Supplemental Restraint System
SW	=	Switch
TEMP.	=	Temperature
TRAC	=	Traction Control
VSV	=	Vacuum Switching Valve
w/	=	With
w/o	=	Without

* The titles given inside the components are the names of the terminals (terminal codes) and are not treated as being abbreviations.

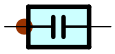
E GLOSSARY OF TERMS AND SYMBOLS

BATTERY



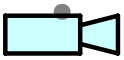
Stores chemical energy and converts it into electrical energy. Provides DC current for the auto's various electrical circuits.

CAPACITOR (Condenser)



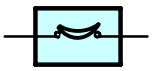
A small holding unit for temporary storage of electrical voltage.

CIGARETTE LIGHTER



An electric resistance heating element.

CIRCUIT BREAKER



Basically a reusable fuse, a circuit breaker will heat and open if too much current flows through it. Some units automatically reset when cool, others must be manually reset.

DIODE

A semiconductor which allows current flow in only one direction.

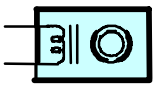
DIODE, ZENER

A diode which allows current flow in one direction but blocks reverse flow only up to a specific voltage. Above that potential, it passes the excess voltage. This acts as a simple voltage regulator.

PHOTODIODE

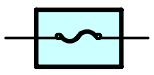
The photodiode is a semiconductor which controls the current flow according to the amount of light.

DISTRIBUTOR, IIA

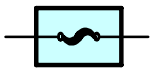


Channels high–voltage current from the ignition coil to the individual spark plugs.

FUSE

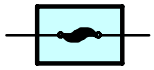


A thin metal strip which burns through when too much current flows through it, thereby stop–ping current flow and protecting a circuit from damage.



(for Medium Current Fuse)

FUSIBLE LINK



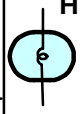
(for High Current Fuse or Fusible Link.)

A heavy–gauge wire placed in high amperage circuits which burns through on overloads, thereby protecting the circuit. The numbers indicate the cross–section surface area of the wires.

GROUND

The point at which wiring attaches to the Body, thereby providing a return path for an electrical circuit; without a ground, current cannot flow.

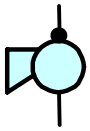
HEADLIGHTS



1. **SINGLE FILAMENT**
2. **DOUBLE FILAMENT**

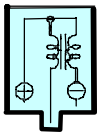
Current flow causes a headlight filament to heat up and emit light. A headlight may have either a single (1) filament or a double (2) filament.

HORN



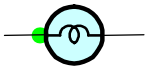
An electric device which sounds a loud audible signal.

IGNITION COIL



Convert low–voltage DC current into high–voltage ingition current for firing the spark plugs.

LIGHT



Current flow through a filament causes the filament to heat up and emit light.

LED (LIGHT EMITTING DIODE)

Upon current flow, these diodes emit light without producing the heat of a comparable light.

METER, ANALOG

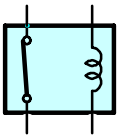
Current flow activates a magnetic coil which causes a needle to move, thereby providing a relative display against a background calibration.

METER, DIGITAL

Current flow activates one or many LED's, LCD's, or fluoresent displays, which provide a relative or digital display.

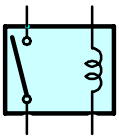
MOTOR

A power unit which converts electrical energy into mechanical energy, especially rotary motion.



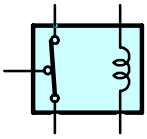
RELAY

1. **NORMALLY CLOSED**



2. **NORMALLY OPEN**

Basically, an electrically operated switch which may be normally closed (1) or open (2). Current flow through a small coil creates a magnetic field which either opens or closes an attached switch.

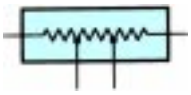


RELAY, DOUBLE THROW

A relay which passes current through one set of contacts or the other.

RESISTOR

An electrical component with a fixed resistance, placed in a circuit to reduce voltage to a specific value.

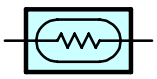


RESISTOR, TAPPED

A resistor which supplies two or more different non adjustable resistance values.

RESISTOR, VARIABLE or RHEOSTAT

A controllable resistor with a variable rate of resistance. Also called a potentiometer or rheostat.



SENSOR (Thermistor)

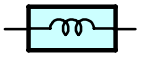
A resistor which varies its resistance with temperature.

SENSOR, SPEED

Uses magnetic impulses to open and close a switch to create a signal for activation of other components.

SHORT PIN

Used to provide an unbroken connection within a juction block.



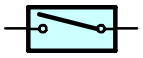
SOLENOID

An electromagnetic coil which forms a magnetic field when current flows, to move a plunger, etc.

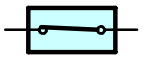
SPEAKER

An electromechanical device which creates sound waves from current flow.

SWITCH, MANUAL

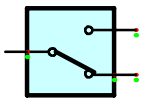


1. **NORMALLY OPEN**



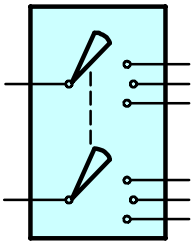
2. **NORMALLY CLOSED**

Open and closes circuits, thereby stopping (1) or allowing (2) current flow.



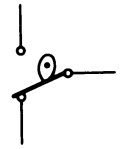
SWITCH, DOUBLE THROW

A switch which continuously passes cureent through one set of contacts or the other.



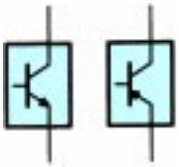
SWITCH, IGNITION

A key operated switch with several positions which allows various circuits, particularly the primary ignition circuit, to become operational.



SWITCH, WIPER PARK

Automatically returns wipers to the stop position when the wiper switch is turned off.

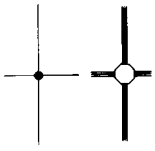


TRANSISTOR

A solid state device typically used as an electronic relay; stops or passes current depending on the voltage applied at “base.”

WIRES

(1) **NOT CONNECTED**

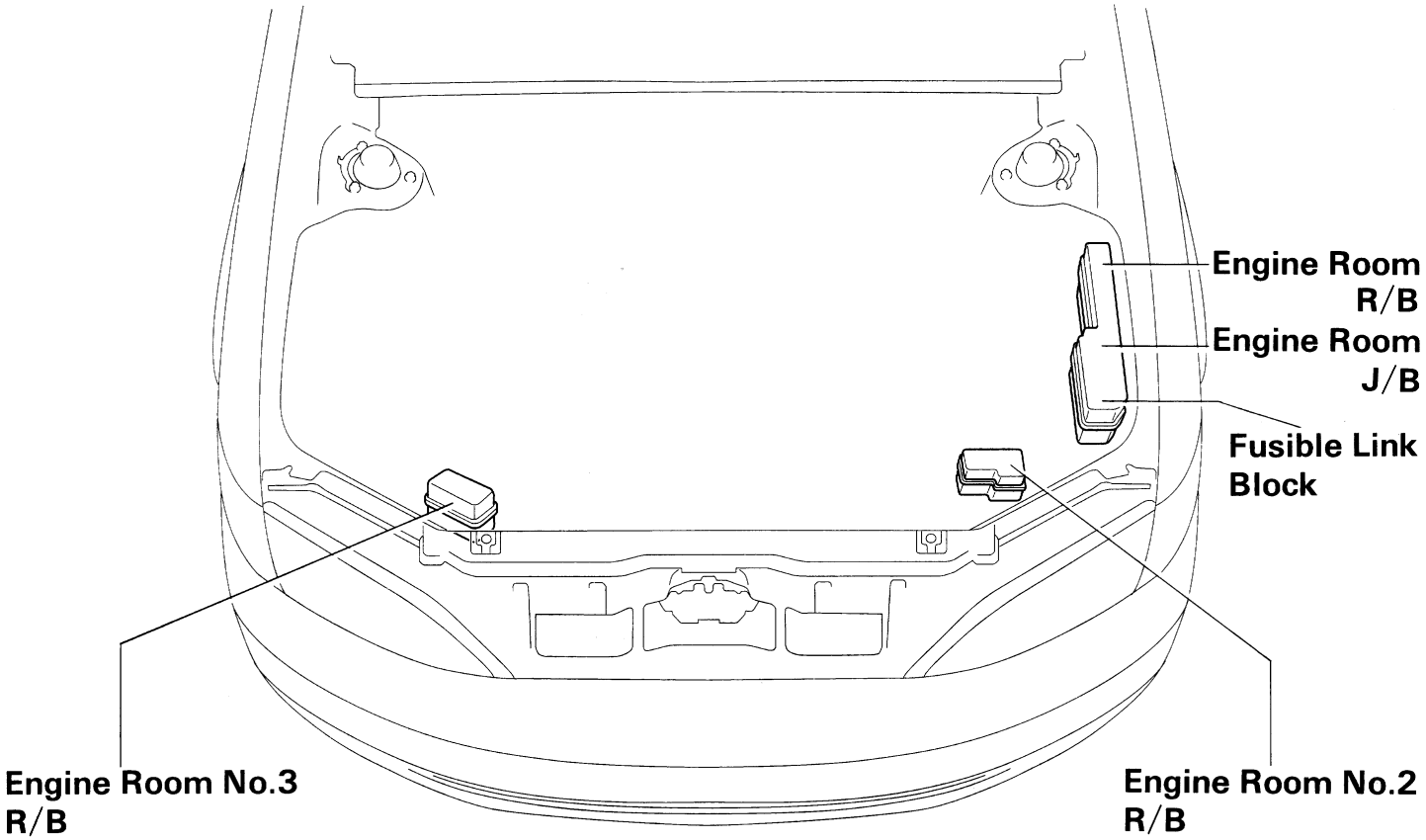


(2) **SPLICED**

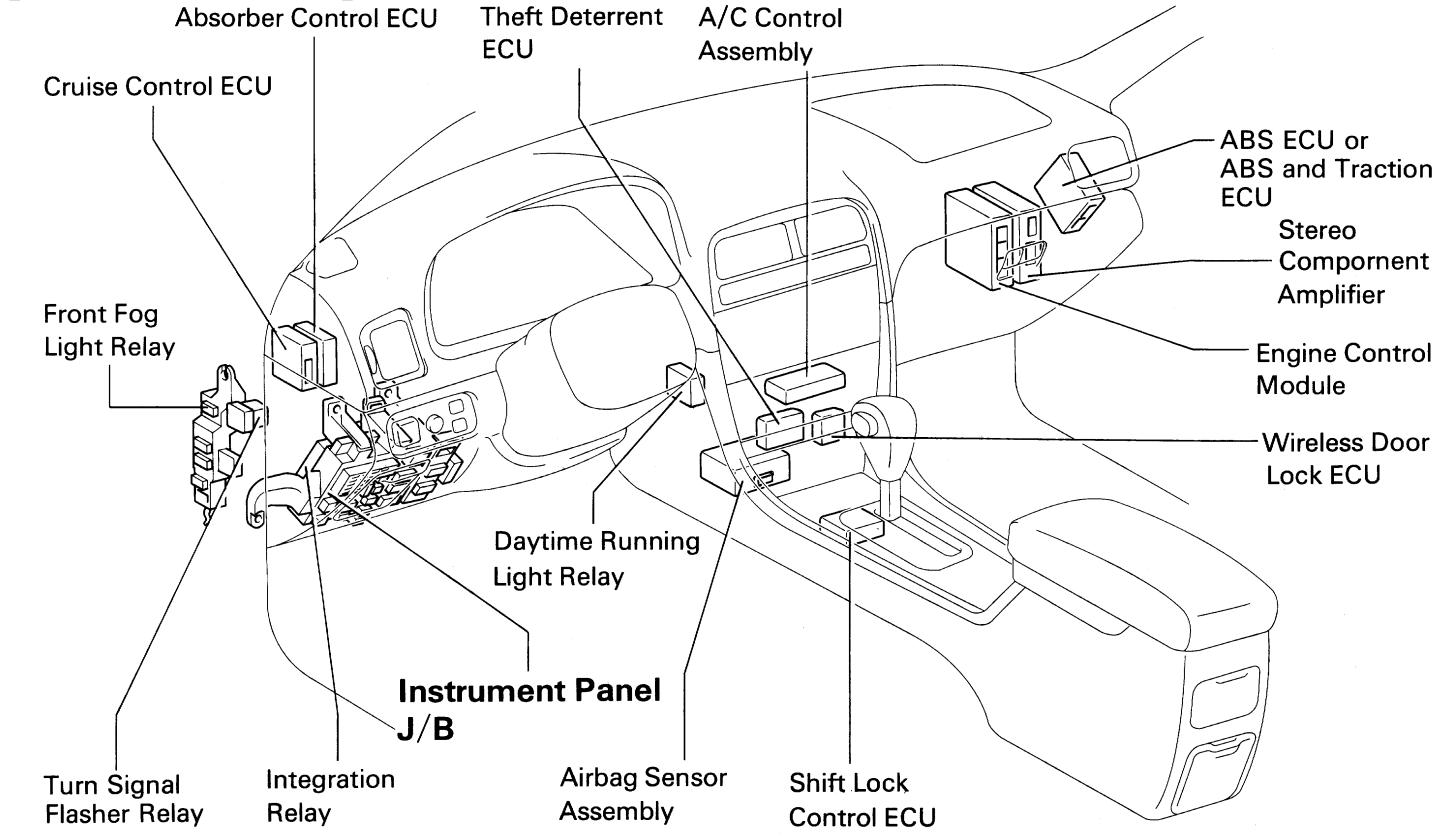
Wires are always drawn as straight lines on wiring diagrams. Crossed wires (1) without a black dot at the junction are not joined; crossed wires (2) and a black dot or octagonal (⬡) mark at the juction as spliced (joined) connections.

F RELAY LOCATIONS

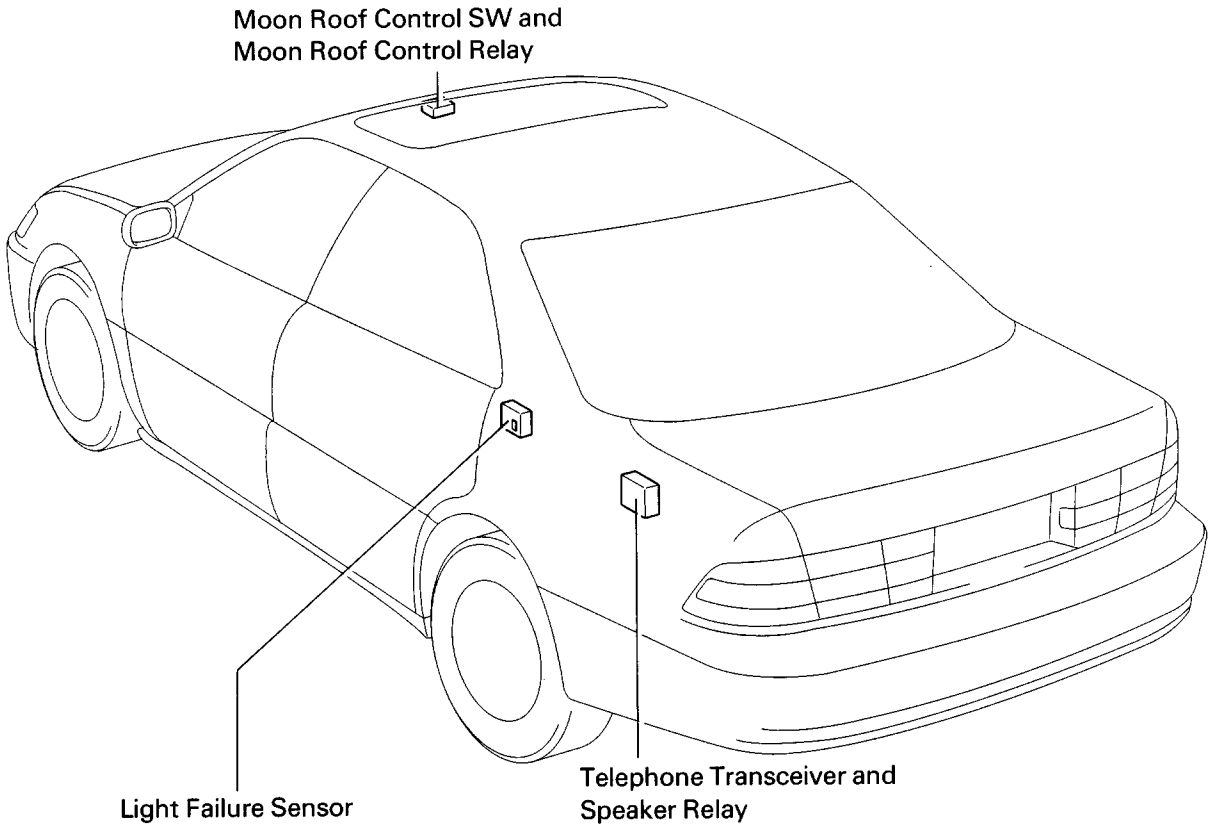
[Engine Compartment]



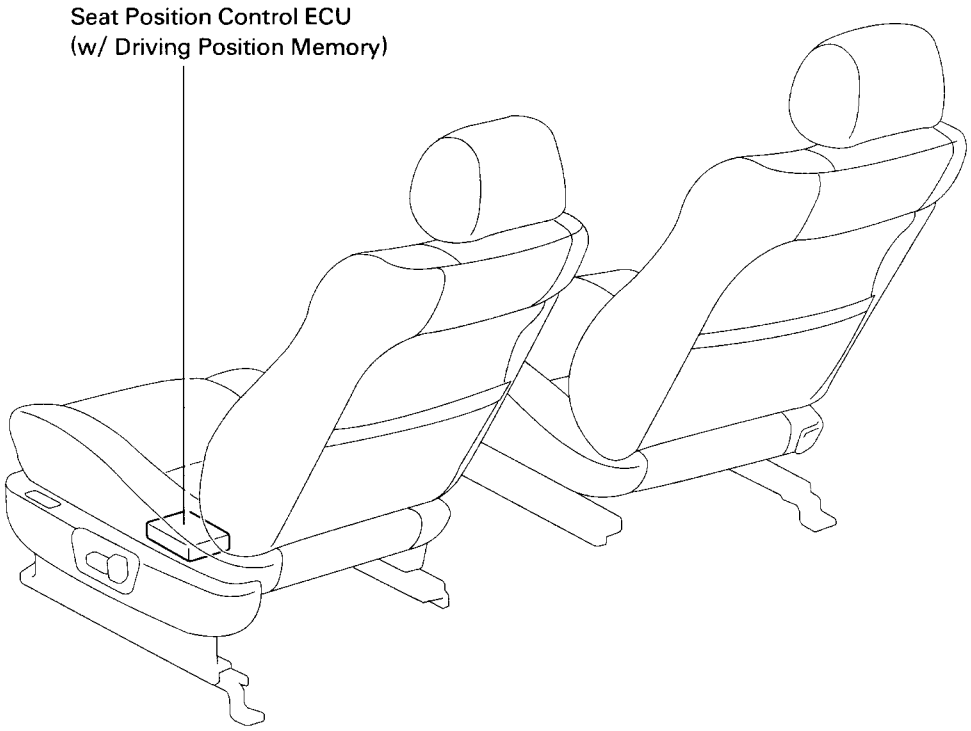
[Instrument Panel]



(Body)

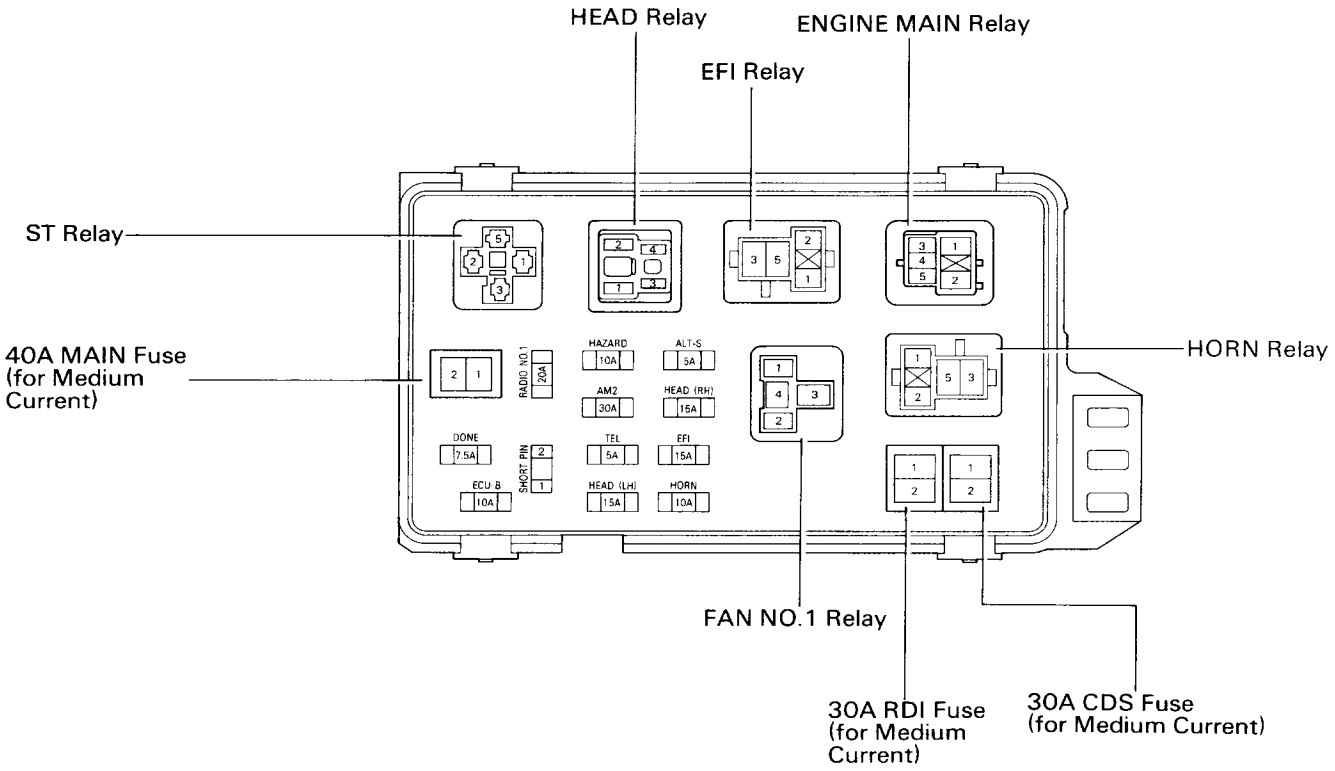

Moon Roof Control SW and
Moon Roof Control Relay
Light Failure Sensor
Telephone Transceiver and
Speaker Relay

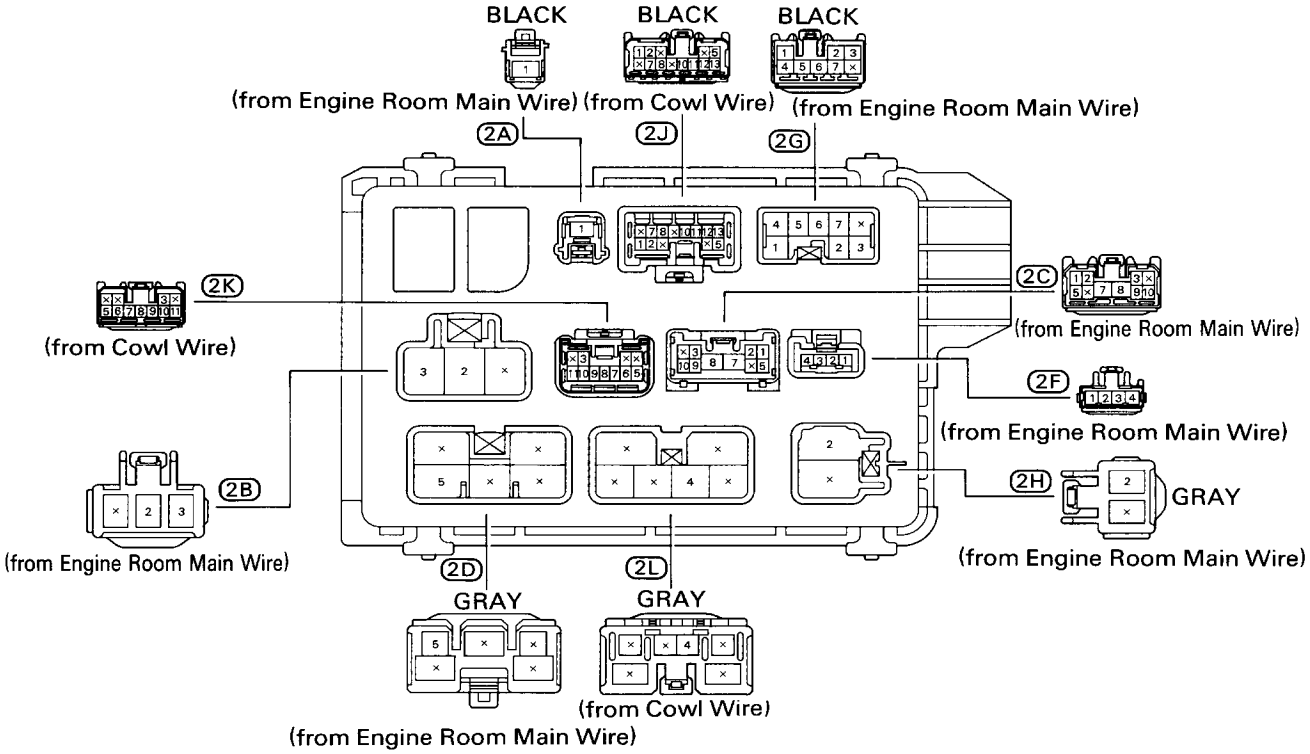
[Seat]


Seat Position Control ECU
(w/ Driving Position Memory)

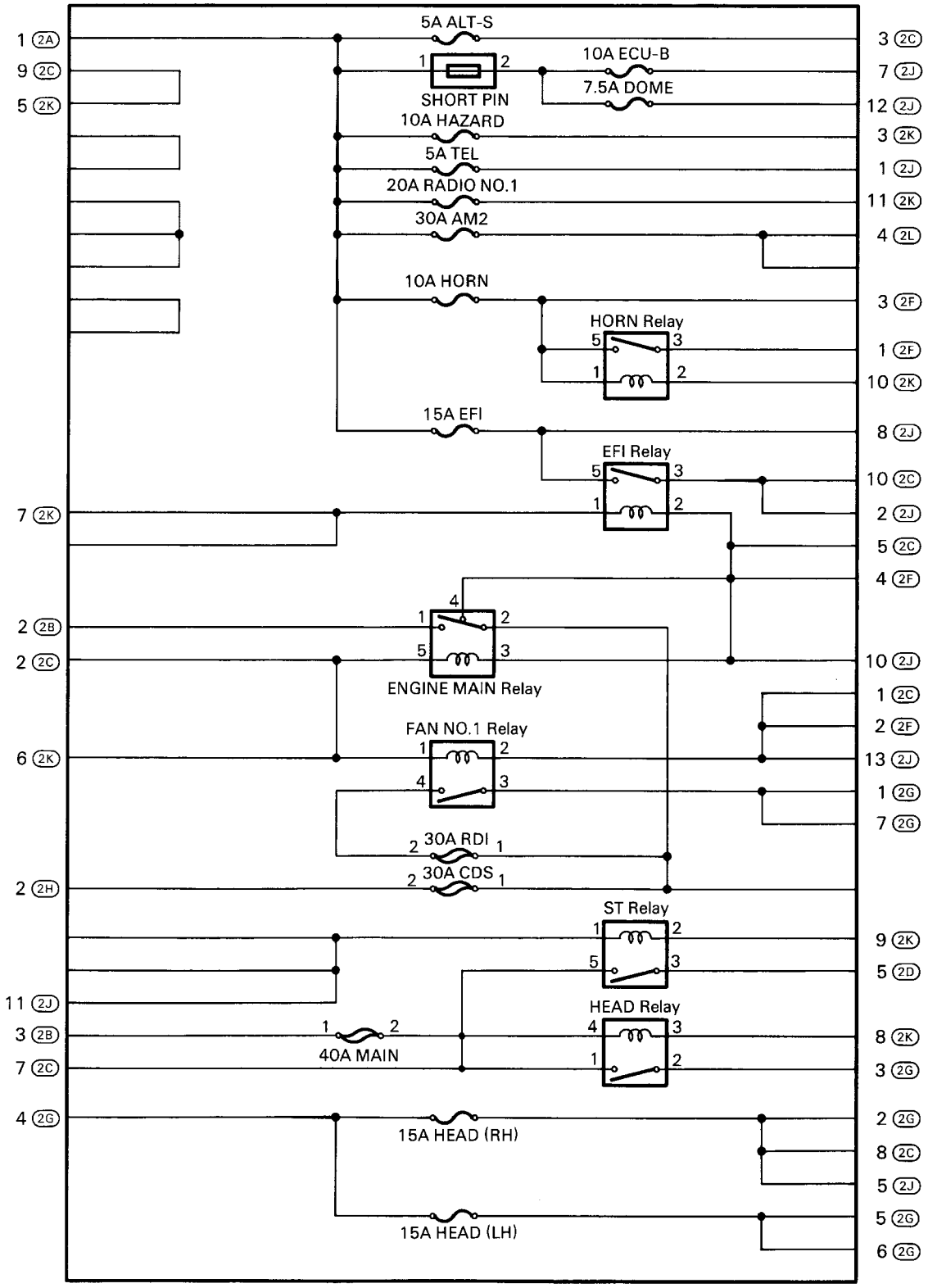
F RELAY LOCATIONS

: Engine Room J/B	Engine Compartment Left (See Page 18)



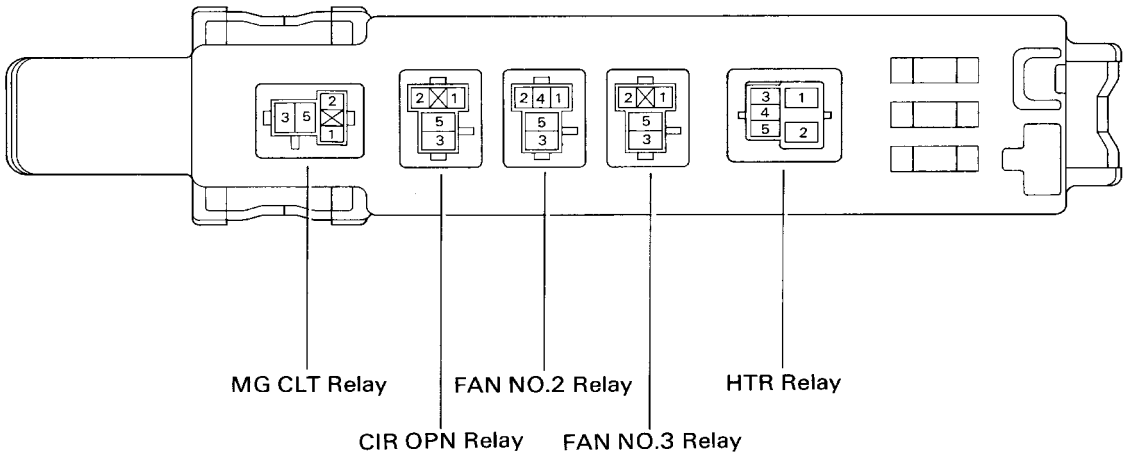


(Engine Room J/B Inner Circuit)

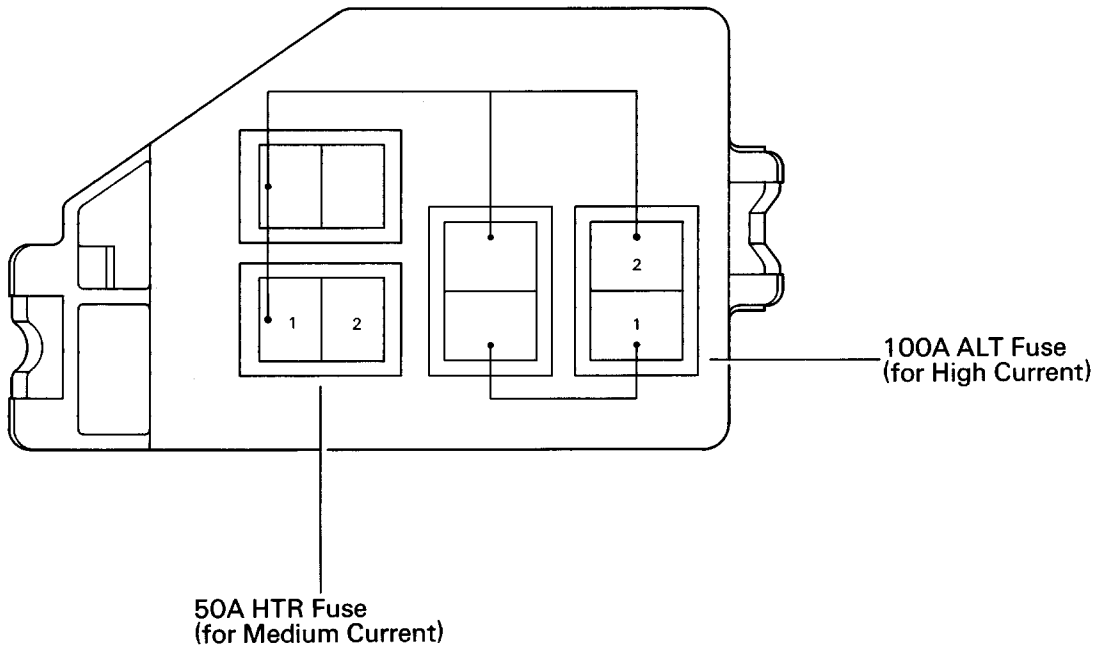


F RELAY LOCATIONS

① : Engine Room R/B	Engine Compartment Left (See Page 18) (Inside Engine Room J/B)

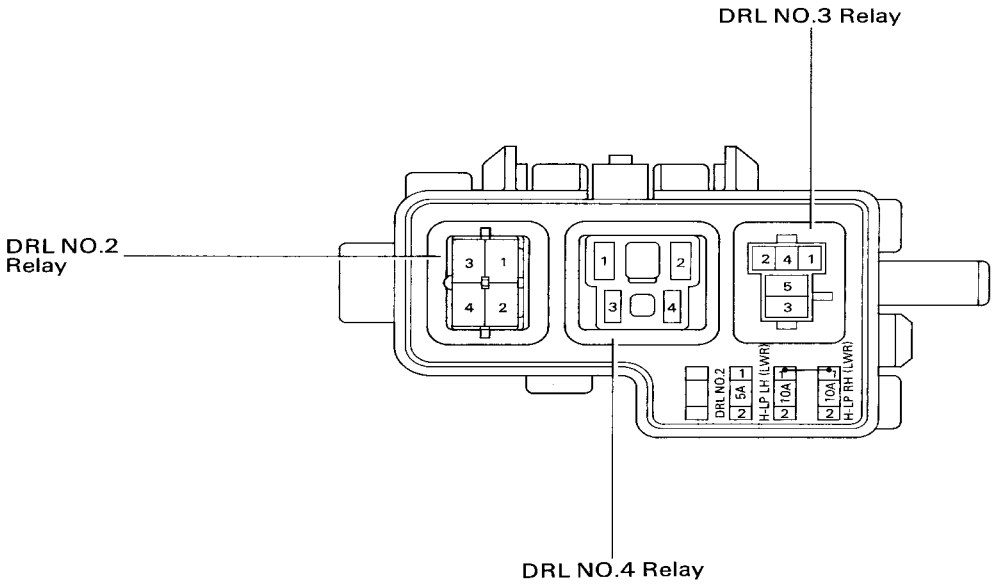


Fusible Link Block	Engine Compartment Left (See Page 18) (Inside Engine Room J/B)

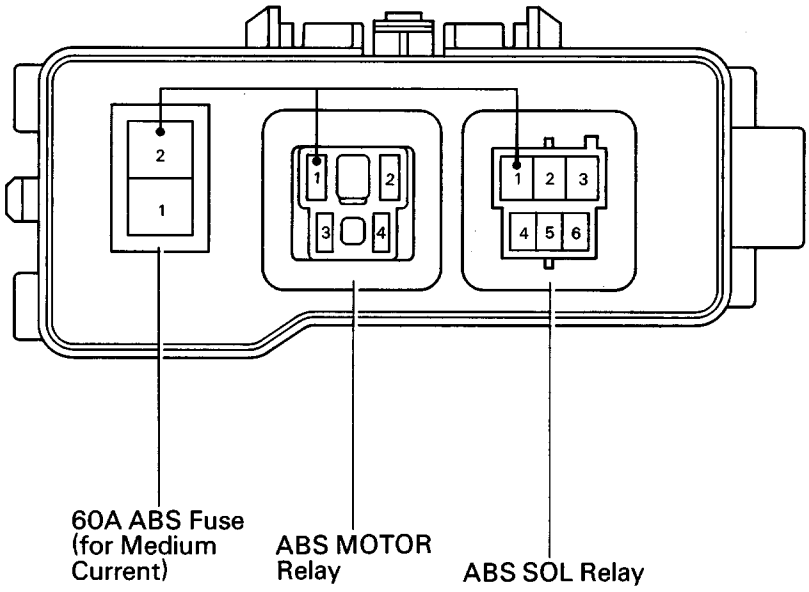


② : Engine Room No. 2 R/B	Engine Compartment Left (See Page 18)

(Canada)

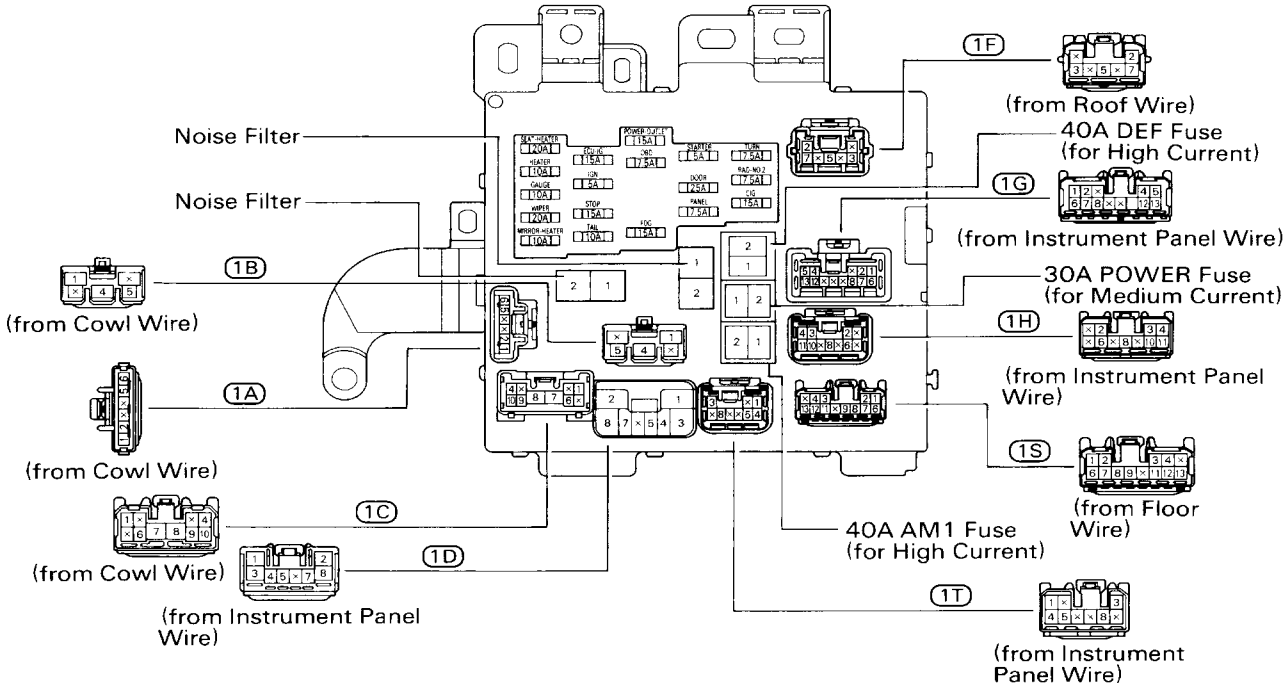


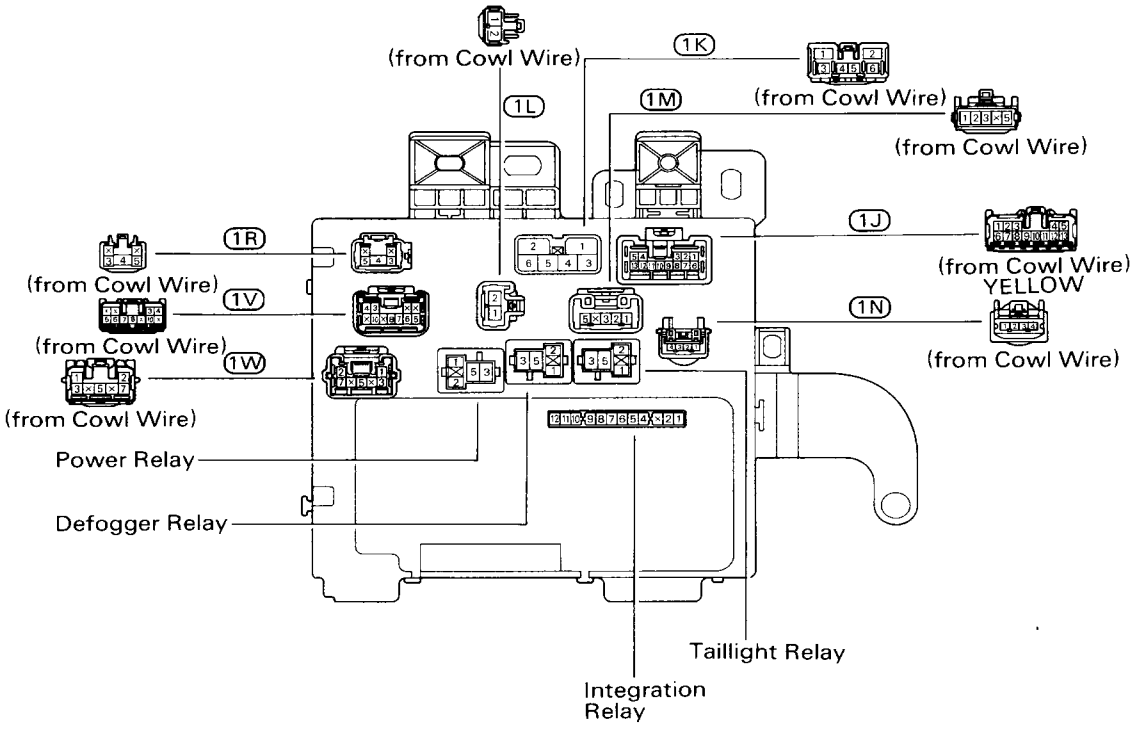
③ : Engine Room No.3 R/B	Radiator Upper Support RH (See Page 18)



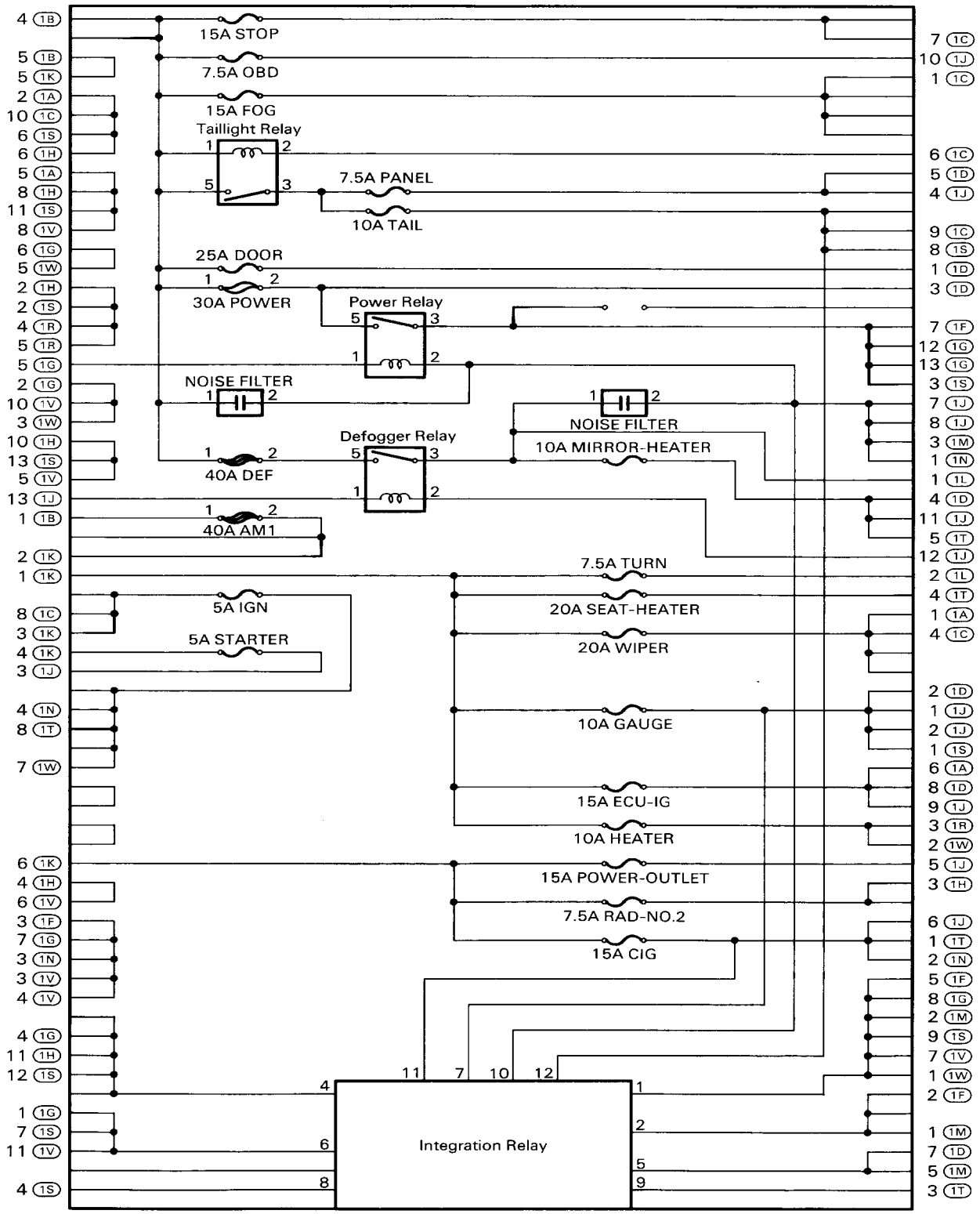
F RELAY LOCATIONS

: Instrument Panel J/B	Lower Finish Panel (See Page 18)

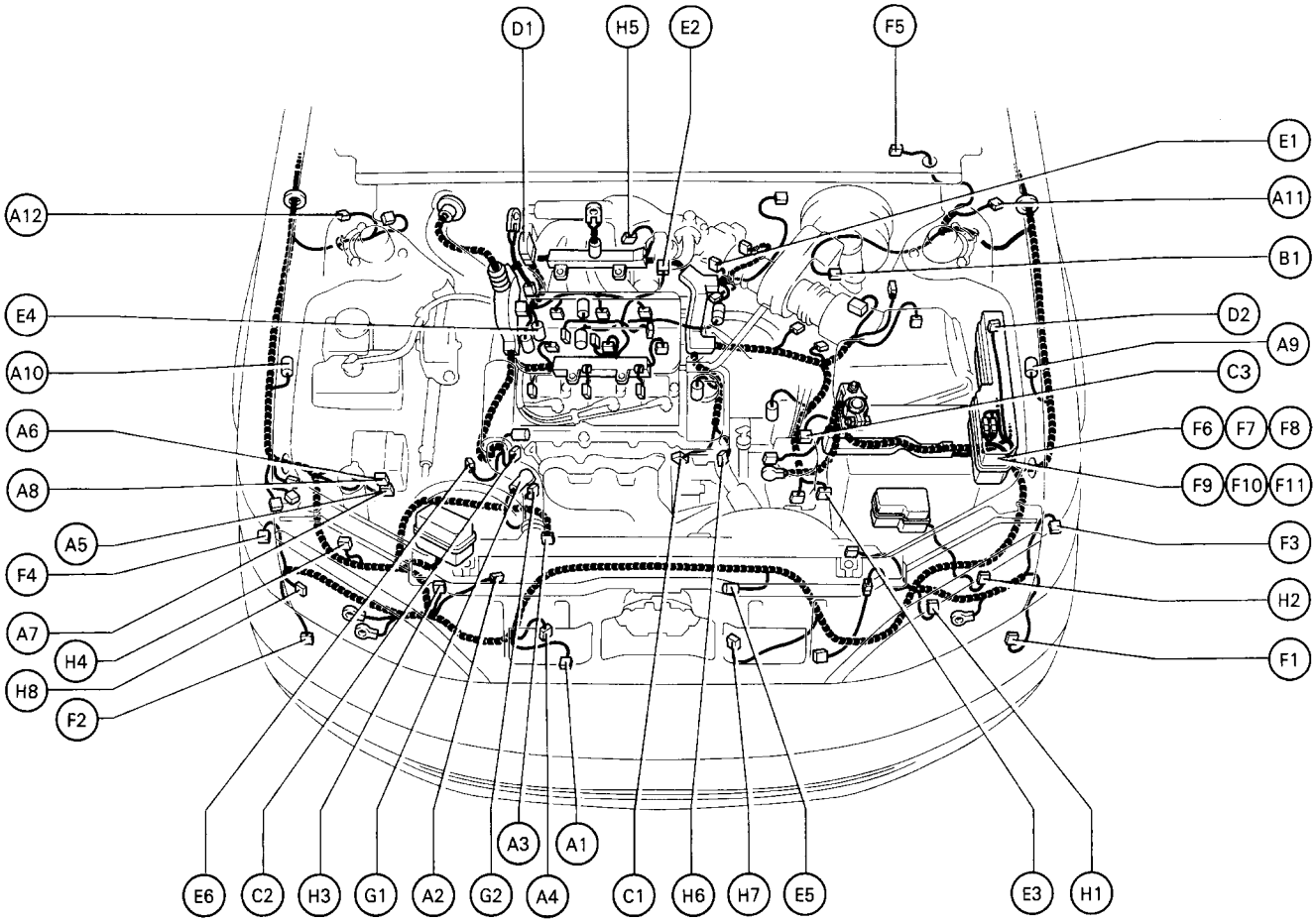




(Instrument Panel J/B Inner Circuit)



Position of Parts in Engine Compartment



A 1 Ambient Temp. Sensor
A 2 A/C Condenser Fan Motor
A 3 A/C Magnetic Clutch and Lock Sensor
A 4 A/C Triple Pressure SW (A/C Dual and Single Pressure SW)
A 5 ABS Actuator
A 6 ABS Actuator
A 7 ABS and Traction Actuator
A 8 ABS and Traction Actuator
A 9 ABS Speed Sensor Front LH
A 10 ABS Speed Sensor Front RH
A 11 Absorber Control Acuator Front LH
A 12 Absorber Control Acuator Front RH

B 1 Brake Fluid Level Warning SW

C 1 Camshaft Position Sensor
C 2 Crankshaft Position Sensor
C 3 Cruise Control Actuator

D 1 Data Link Connector 1
D 2 Diode (A/C)

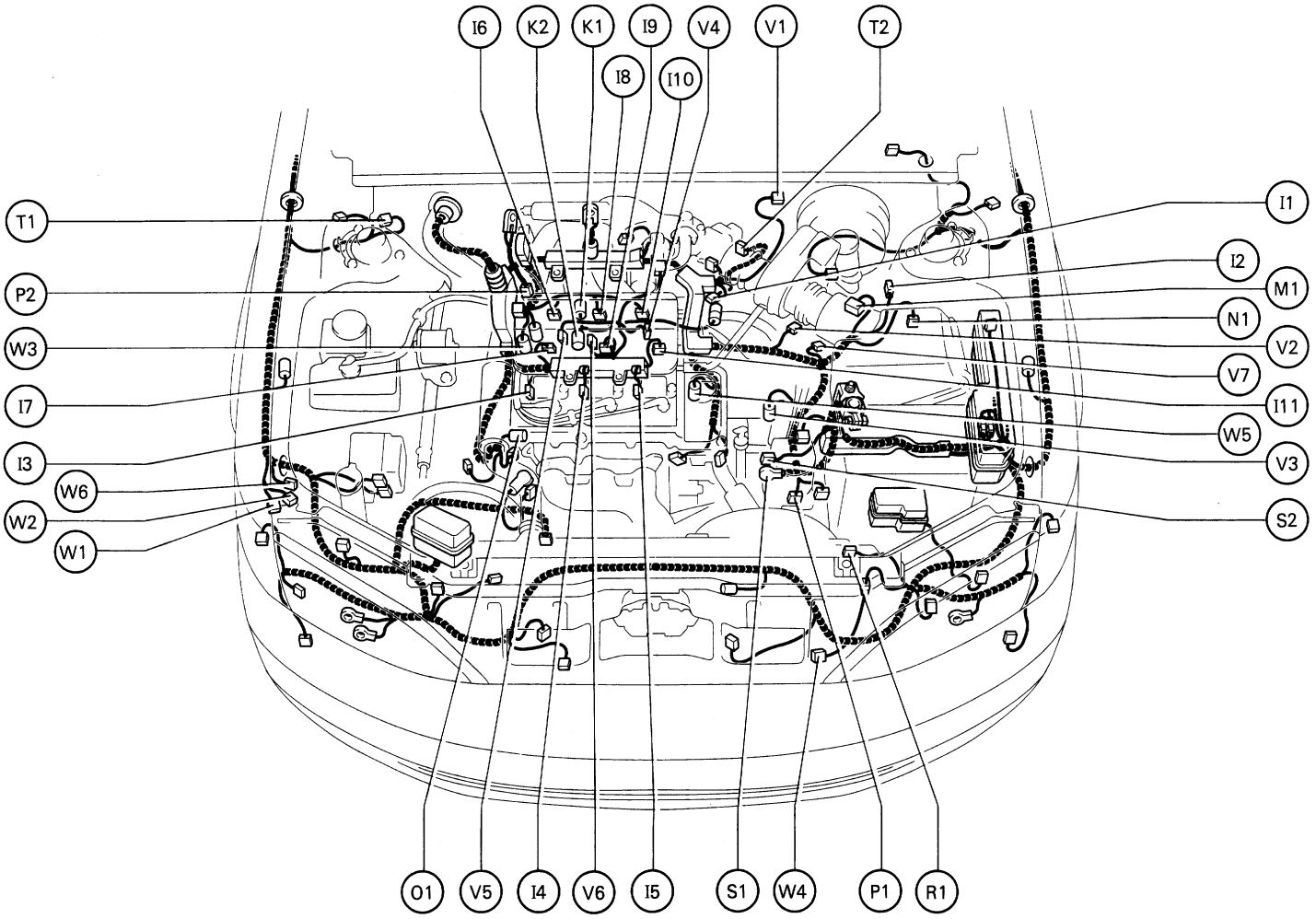
E 1 EGR Gas Temp. Sensor
E 2 EGR Valve Position Sensor
E 3 Electronically Controlled Transmission Solenoid
E 4 Engine Coolant Temp. Sensor
E 5 Engine Hood Courtesy SW
E 6 Engine Oil Level Warning SW

F 1 Front Fog Light LH
F 2 Front Fog Light RH
F 3 Front Turn Signal and Front Parking Light LH
F 4 Front Turn Signal and Front Parking Light RH
F 5 Front Wiper Motor
F 6 Fusible Link Block
F 7 Fusible Link Block
F 8 Fusible Link Block
F 9 Fusible Link Block
F 10 Fusible Link Block
F 11 Fusible Link Block

G 1 Generator
G 2 Generator

H 1 Headlight LH (HI)
H 2 Headlight LH (LO)
H 3 Headlight RH (HI)
H 4 Headlight RH (LO)
H 5 Heated Oxygen Sensor (Bank 1 Sensor 1)
H 6 Heated Oxygen Sensor (Bank 2 Sensor 1)
H 7 Horn LH
H 8 Horn RH

Position of Parts in Engine Compartment



I 1 Idle Air Control Valve
I 2 Igniter
I 3 Ignition Coil No. 1
I 4 Ignition Coil No. 2
I 5 Ignition Coil No. 3
I 6 Injector No. 1
I 7 Injector No. 2
I 8 Injector No. 3
I 9 Injector No. 4
I 10 Injector No. 5
I 11 Injector No. 6

K 1 Knock Sensor 1
K 2 Knock Sensor 2

M 1 Mass Air Flow Meter

N 1 Noise Filter (Ignition)

O 1 Oil Pressure SW

P 1 Park/Neutral Position SW,A/T Indicator Light SW and Back–Up Light SW
P 2 Power Steering Oil Pressure SW

R 1 Radiator Fan Motor

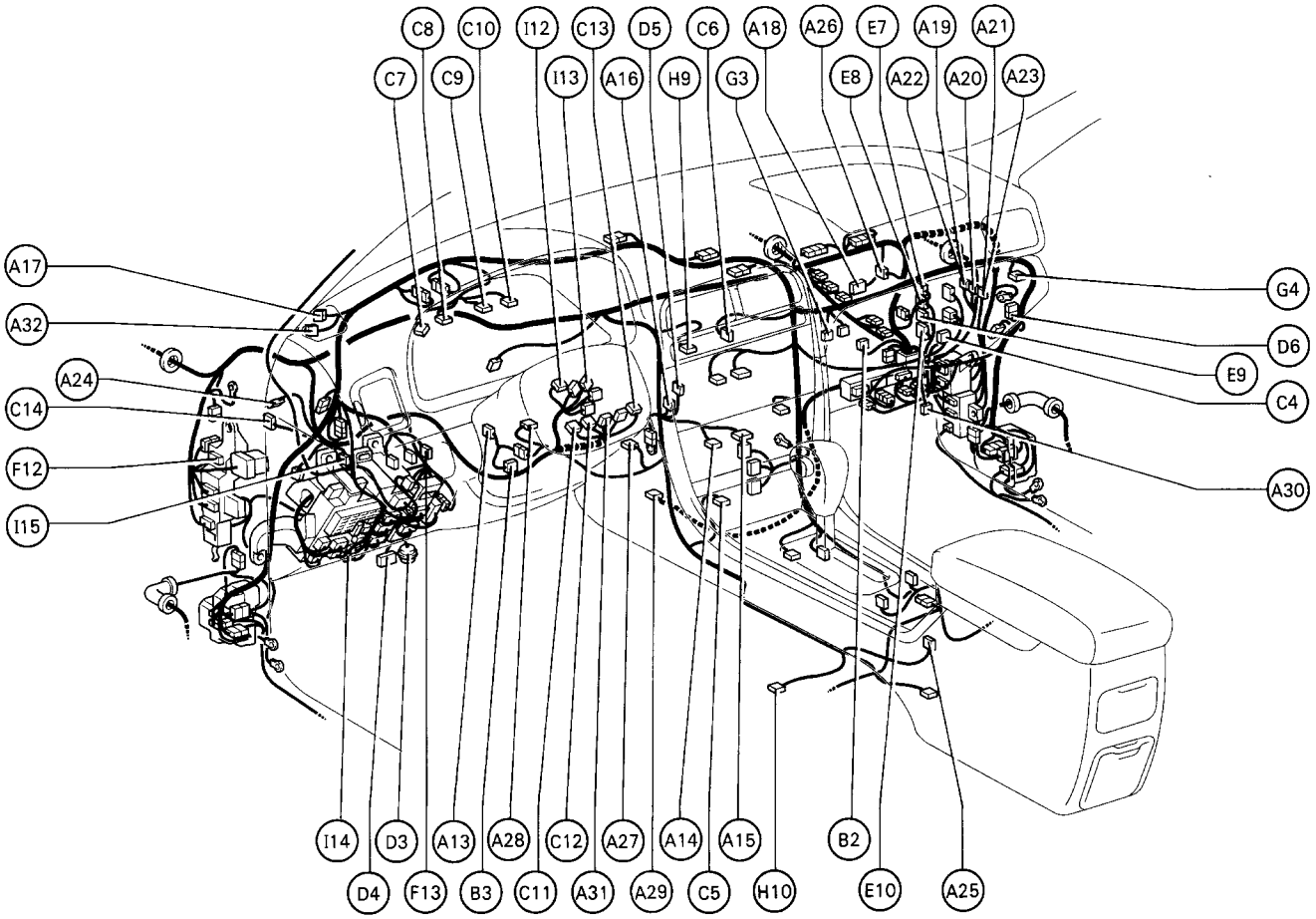
S 1 Starter
S 2 Starter

T 1 Theft Deterrent Horn
T 2 Throttle Position Sensor

V 1 Vapor Pressure Sensor
V 2 Vehicle Speed Sensor (Combination Meter)
V 3 Vehicle Speed Sensor (Electronically Controlled Transmission)
V 4 VSV (EGR)
V 5 VSV (EVAP)
V 6 VSV (Intake Air Control)
V 7 VSV (Vapor Pressure Sensor)

W 1 Water Level Warning SW
W 2 Washer Motor
W 3 Water Temp. Sender
W 4 Water Temp. SW No.1
W 5 Water Temp. SW No.2
W 6 Wireless Door Lock Buzzer

Position of Parts in Instrument Panel



A 13 A/C Blower Motor Linear Controller
A 14 A/C Control Assembly
A 15 A/C Control Assembly
A 16 A/C Room Temp. Sensor
A 17 A/C Solar Sensor
A 18 A/C Thermistor
A 19 ABS and Traction ECU
A 20 ABS and Traction ECU
A 21 ABS and Traction ECU
A 22 ABS ECU
A 23 ABS ECU
A 24 Absorber Control ECU
A 25 Absorber Control SW
A 26 Air Inlet Control Servo Motor
A 27 Air Mix Control Servo Motor
A 28 Air Vent Mode Control Servo Motor
A 29 Airbag Sensor Assembly
A 30 Airbag Squib (Front Passenger Airbag Assembly)
A 31 Airbag Squib (Steering Wheel Pad)
A 32 Automatic Light Control Sensor

B 2 Blower Motor
B 3 Blower Resistor

C 4 CD Automatic Changer
C 5 Cigarette Lighter
C 6 Clock
C 7 Combination Meter
C 8 Combination Meter
C 9 Combination Meter
C 10 Combination Meter
C 11 Combination SW
C 12 Combination SW
C 13 Combination SW
C 14 Cruise Control ECU

D 3 Data Link Connector 2
D 4 Data Link Connector 3
D 5 Daytime Running Light Relay (Main)
D 6 Diode (Courtesy)

E 7 Engine Control Module
E 8 Engine Control Module
E 9 Engine Control Module
E 10 Engine Control Module

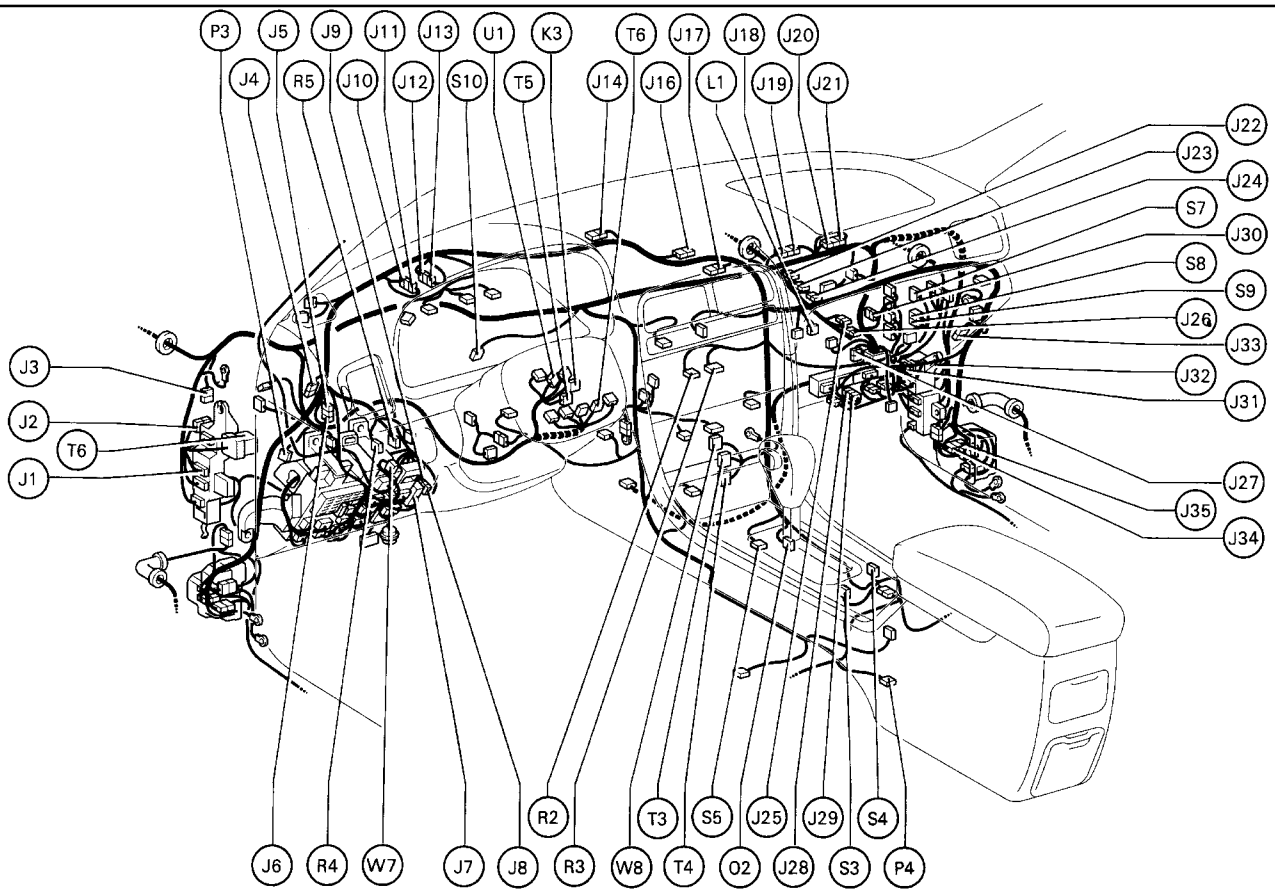
F 12 Front Fog Light Relay
F 13 Fuel Lid and Luggage Compartment Door Opener SW

G 3 Generator Box Light
G 4 Generator Box Light SW

H 9 Hazard SW
H 10 Heated Oxygen Sensor (Bank 1 Sensor 2)

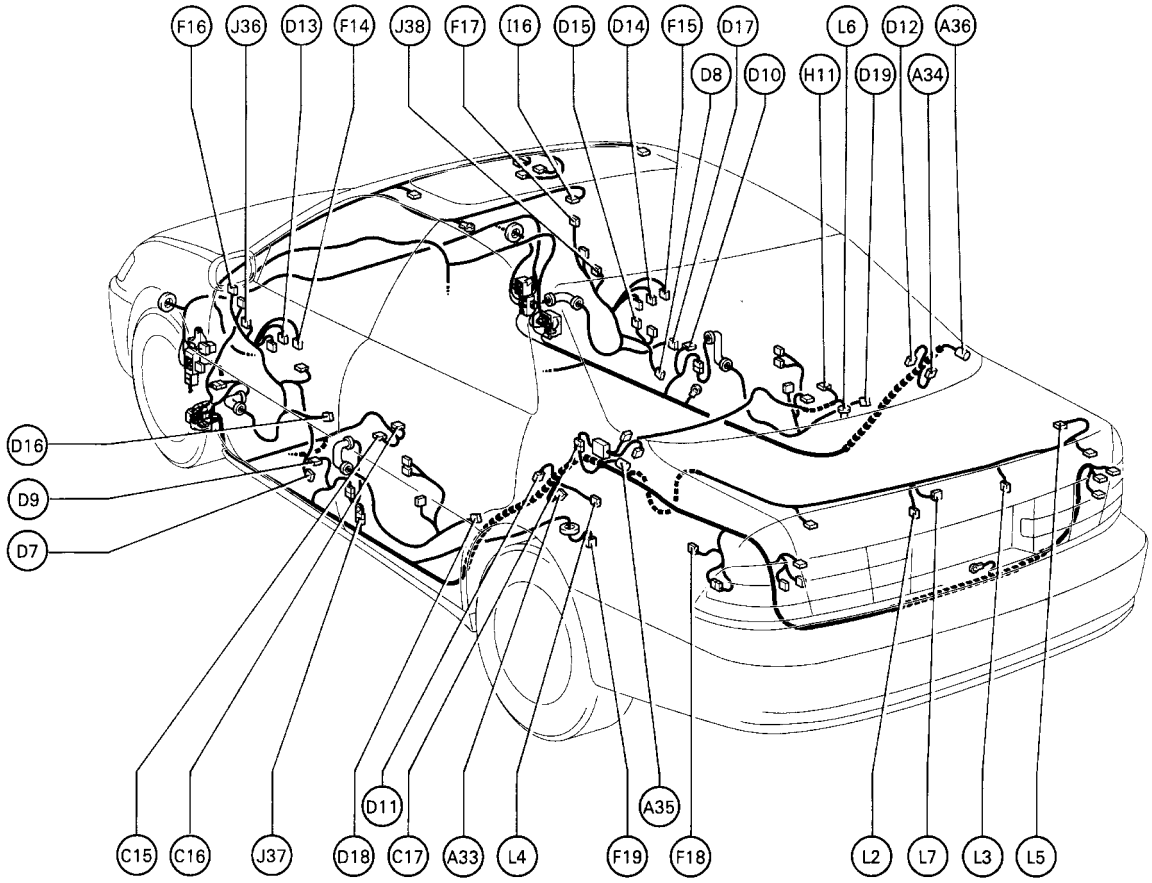
I 12 Ignition Key Cylinder Light
I 13 Ignition SW
I 14 Integration Relay
I 15 Integration Relay

Position of Parts in Instrument Panel



J	1	Junction Connector
J	2	Junction Connector
J	3	Junction Connector
J	4	Junction Connector
J	5	Junction Connector
J	6	Junction Connector
J	7	Junction Connector
J	8	Junction Connector
J	9	Junction Connector
J	10	Junction Connector
J	11	Junction Connector
J	12	Junction Connector
J	13	Junction Connector
J	14	Junction Connector
J	15	Junction Connector
J	16	Junction Connector
J	17	Junction Connector
J	18	Junction Connector
J	19	Junction Connector
J	20	Junction Connector
J	21	Junction Connector
J	22	Junction Connector
J	23	Junction Connector
J	24	Junction Connector
J	25	Junction Connector
J	26	Junction Connector
J	27	Junction Connector
J	28	Junction Connector
J	29	Junction Connector
J	30	Junction Connector
J	31	Junction Connector
J	32	Junction Connector
J	33	Junction Connector
J	34	Junction Connector
J	35	Junction Connector
K	3	Key Interlock Solenoid
L	1	Luggage Compartment Door Opener Main SW
O	2	O/D Main SW and A/T Shift Lever Illumination
P	3	Parking Brake SW
P	4	Power Outlet
R	2	Radio and Player
R	3	Radio and Player
R	4	Remote Control Morror SW
R	5	Rheostat
S	3	Seat Heater SW (Driver's Seat)
S	4	Seat Heater SW (Front Passenger's Seat)
S	5	Shift Lock Control ECU
S	6	Steering Sensor
S	7	Stereo Component Amplifier
S	8	Stereo Component Amplifier
S	9	Stereo Component Amplifier
S	10	Stop Light SW
T	3	Theft Deterrent ECU
T	4	Theft Deterrent ECU
T	5	TRAC OFF SW
T	6	Turn Signal Flasher Relay
U	1	Unlock Warning SW (Ignition Key)
W	7	Wireless Door Lock Buzzer Volume SW
W	8	Wireless Door Lock ECU

Position of Parts in Body



A 33 ABS Speed Sensor Rear LH
A 34 ABS Speed Sensor Rear RH
A 35 Absorber Control Actuator Rear LH
A 36 Absorber Control Actuator Rear RH

C 15 Cellular Phone (Hand Set)
C 16 Cellular Phone (Hand Set)
C 17 Choke Coil

D 7 Door Courtesy Light Front LH
D 8 Door Courtesy Light Front RH
D 9 Door Courtesy SW Front LH
D 10 Door Courtesy SW Front RH
D 11 Door Courtesy SW Rear LH
D 12 Door Courtesy SW Rear RH
D 13 Door Key Lock and Unlock SW Front LH
D 14 Door Key Lock and Unlock SW Front RH
D 15 Door Lock Control SW Front RH
D 16 Door Lock Motor and Door Unlock Detection SW Front LH
D 17 Door Lock Motor and Door Unlock Detection SW Front RH
D 18 Door Lock Motor and Door Unlock Detection SW Rear LH
D 19 Door Lock Motor and Door Unlock Detection SW Rear RH

F 14 Front Door Speaker LH
F 15 Front Door Speaker RH
F 16 Front Tweeter Speaker LH
F 17 Front Tweeter Speaker RH
F 18 Fuel Lid Opener Motor
F 19 Fuel Pump and Fuel Sender

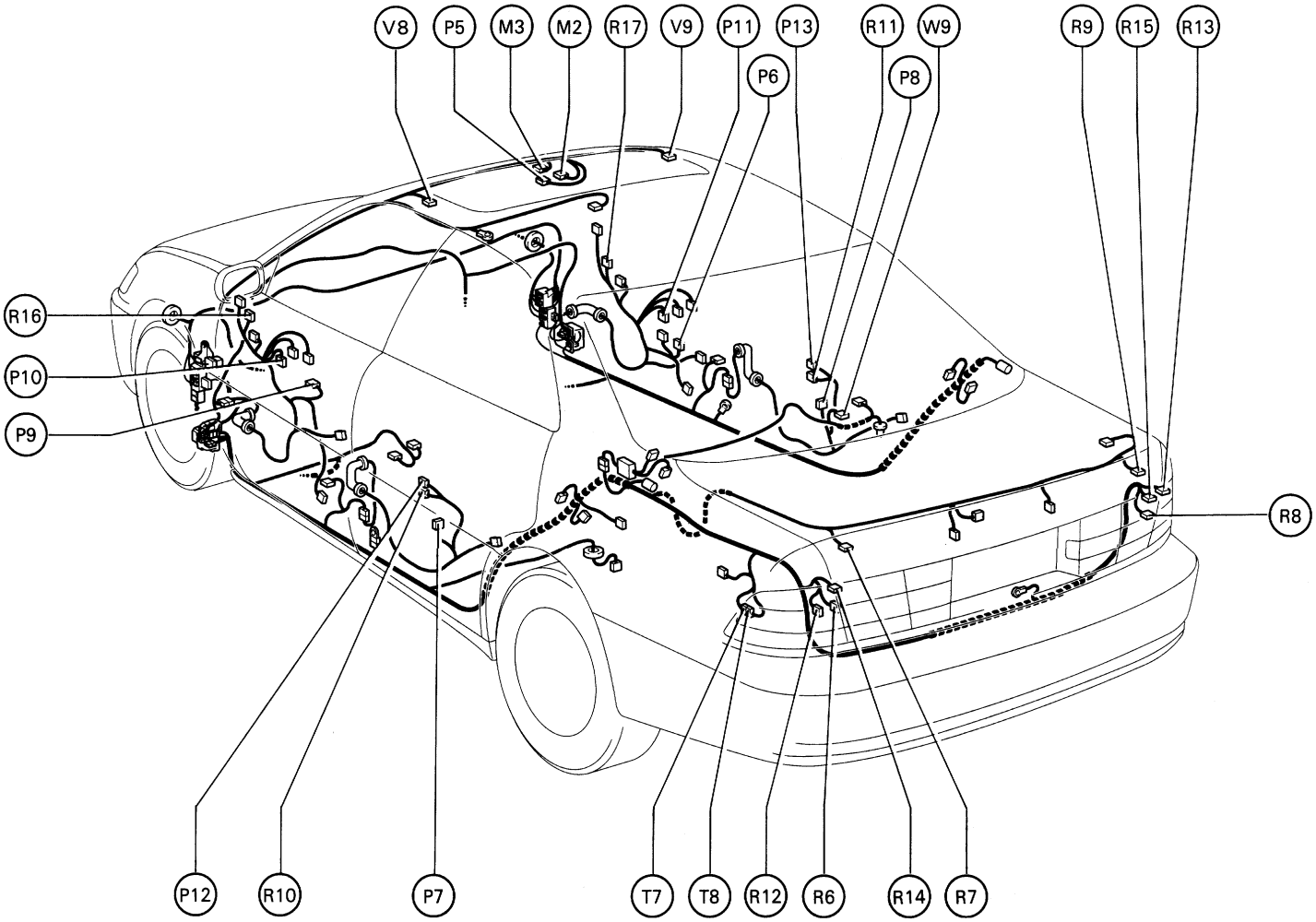
H 11 High Mounted Stop Light

I 16 Interior Light

J 36 Junction Connector
J 37 Junction Connector
J 38 Junction Connector

L 2 License Plate Light LH
L 3 License Plate Light RH
L 4 Light Failure Sensor
L 5 Luggage Compartment Key Unlock SW
L 6 Luggage Compartment Light
L 7 Luggage Compartment Light SW and Luggage Compartment Door Opener Motor

Position of Parts in Body



M 2 Moon Roof Control SW and Moon Roof Control Relay
M 3 Moon Roof Moon and Limit SW

P 5 Personal Light
P 5 Personal Light
P 6 Power Window Control SW Front RH
P 7 Power Window Control SW Rear LH
P 8 Power Window Control SW Rear RH
P 9 Power Window Master SW and Door Lock Control SW Front LH
P 10 Power Window Motor Front LH
P 11 Power Window Motor Front RH
P 12 Power Window Motor Rear LH
P 13 Power Window Motor Rear RH

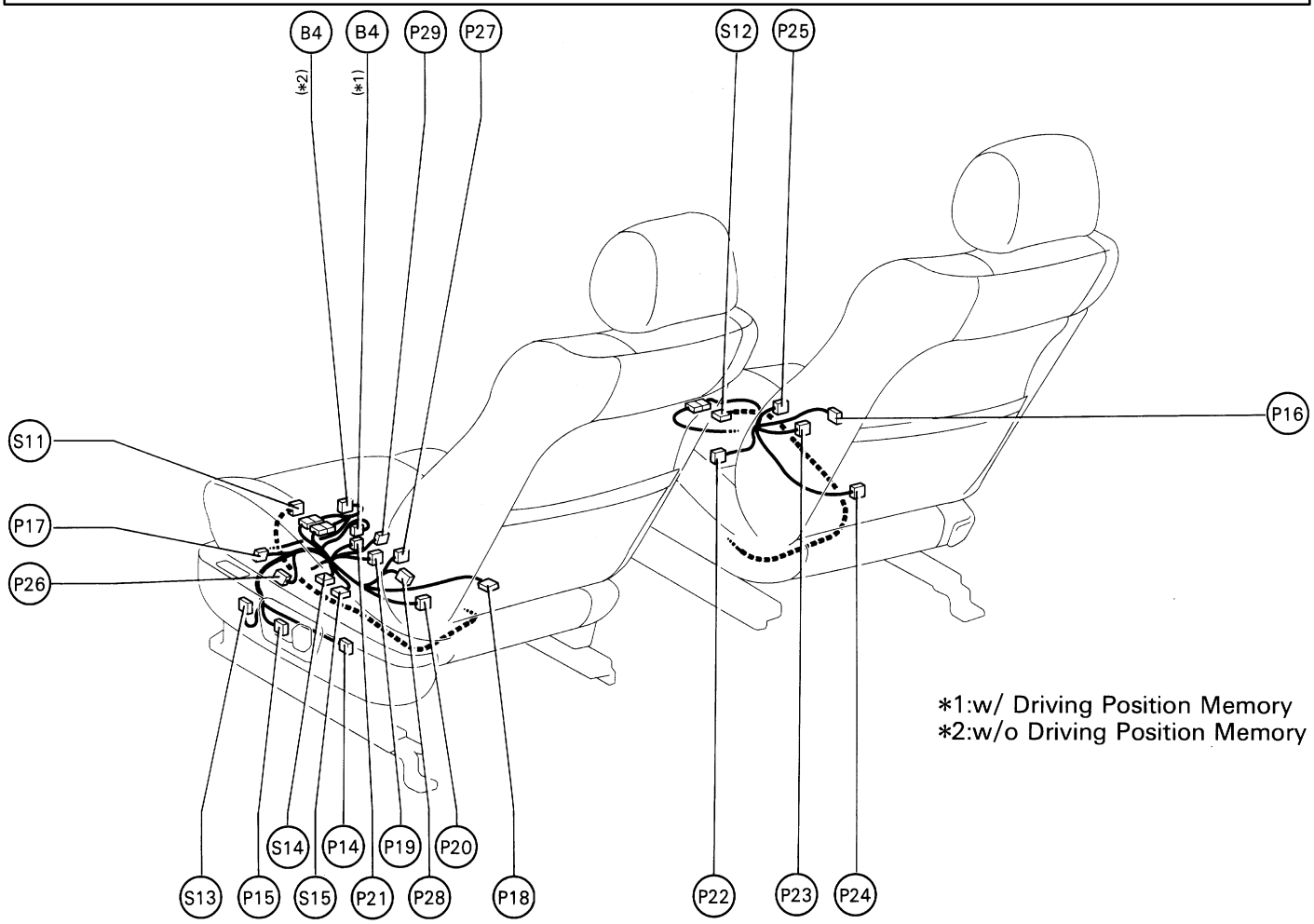
R 6 Rear Combination Light LH
R 7 Rear Combination Light LH
R 8 Rear Combination Light RH
R 9 Rear Combination Light RH
R 10 Rear Door Speaker LH
R 11 Rear Door Speaker RH
R 12 Rear Side Marker Light LH
R 13 Rear Side Marker Light RH
R 14 Rear Turn Signal Light LH
R 15 Rear Turn Signal Light RH
R 16 Remote Control Mirror and Mirror Heater LH
R 17 Remote Control Mirror and Mirror Heater RH

T 7 Telephone Transceiver and Speaker Relay
T 8 Telephone Transceiver and Speaker Relay

V 8 Vanity Light LH
V 9 Vanity Light RH

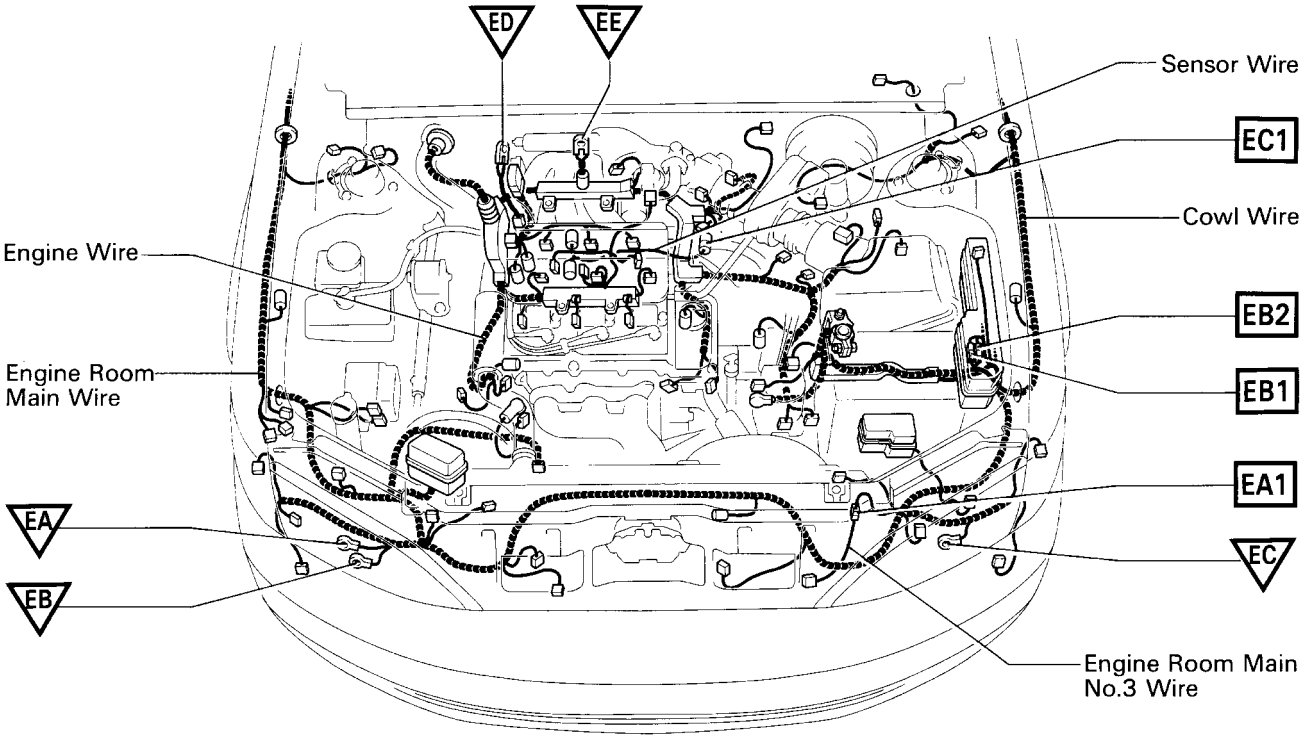
W 9 Woofer Speaker

Position of Parts in Seat

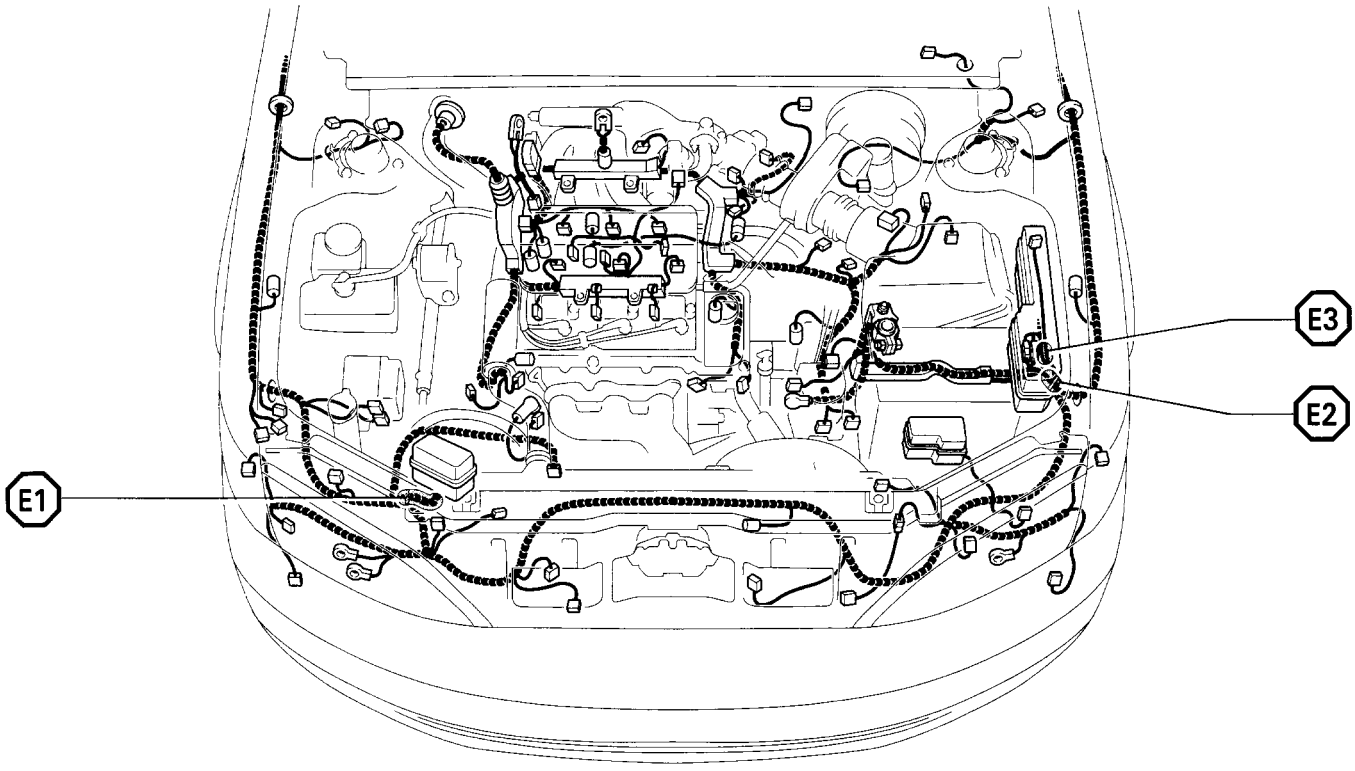


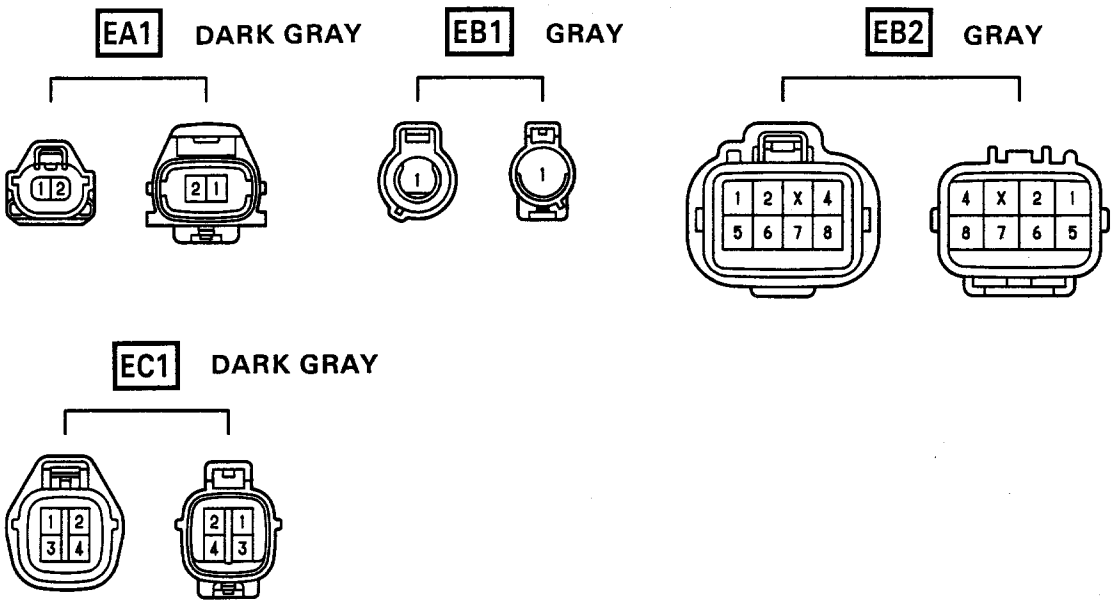
B 4	Buckle SW	P 26	Power Seat Position Sensor (Driver's Seat Front Vertical Control)
P 14	Power Seat Control SW (Driver's Seat Lumber Support Control)	P 27	Power Seat Position Sensor (Driver's Seat Rear Vertical Control)
P 15	Power Seat Control SW (Driver's Seat)	P 28	Power Seat Position Sensor (Driver's Seat Reclining Control)
P 16	Power Seat Control SW (Front Passenger's Seat))	P 29	Power Seat Position Sensor (Driver's Seat Slide Control)
P 17	Power Seat Motor (Driver's Seat Front Vertical Control)	S 11	Seat Heater (Driver's Seat)
P 18	Power Seat Motor (Driver's Seat Lumber Support Control)	S 12	Seat Heater (Front Passenger's Seat)
P 19	Power Seat Motor (Driver's Seat Rear Vertical Control)	S 13	Seat Memory SW
P 20	Power Seat Motor (Driver's Seat Reclining Control)	S 14	Seat Position Control ECU
P 21	Power Seat Motor (Driver's Seat Slide Control)	S 15	Seat Position Control ECU
P 22	Power Seat Motor (Front Passenger's Seat Front Vertical Control)		
P 23	Power Seat Motor (Front Passenger's Seat Rear Vertical Control)		
P 24	Power Seat Motor (Front Passenger's Seat Reclining Control)		
P 25	Power Seat Motor (Front Passenger's Seat Slide Control)		

: Location of Connector Joining Wire Harness and Wire Harness
: Location of Ground Points



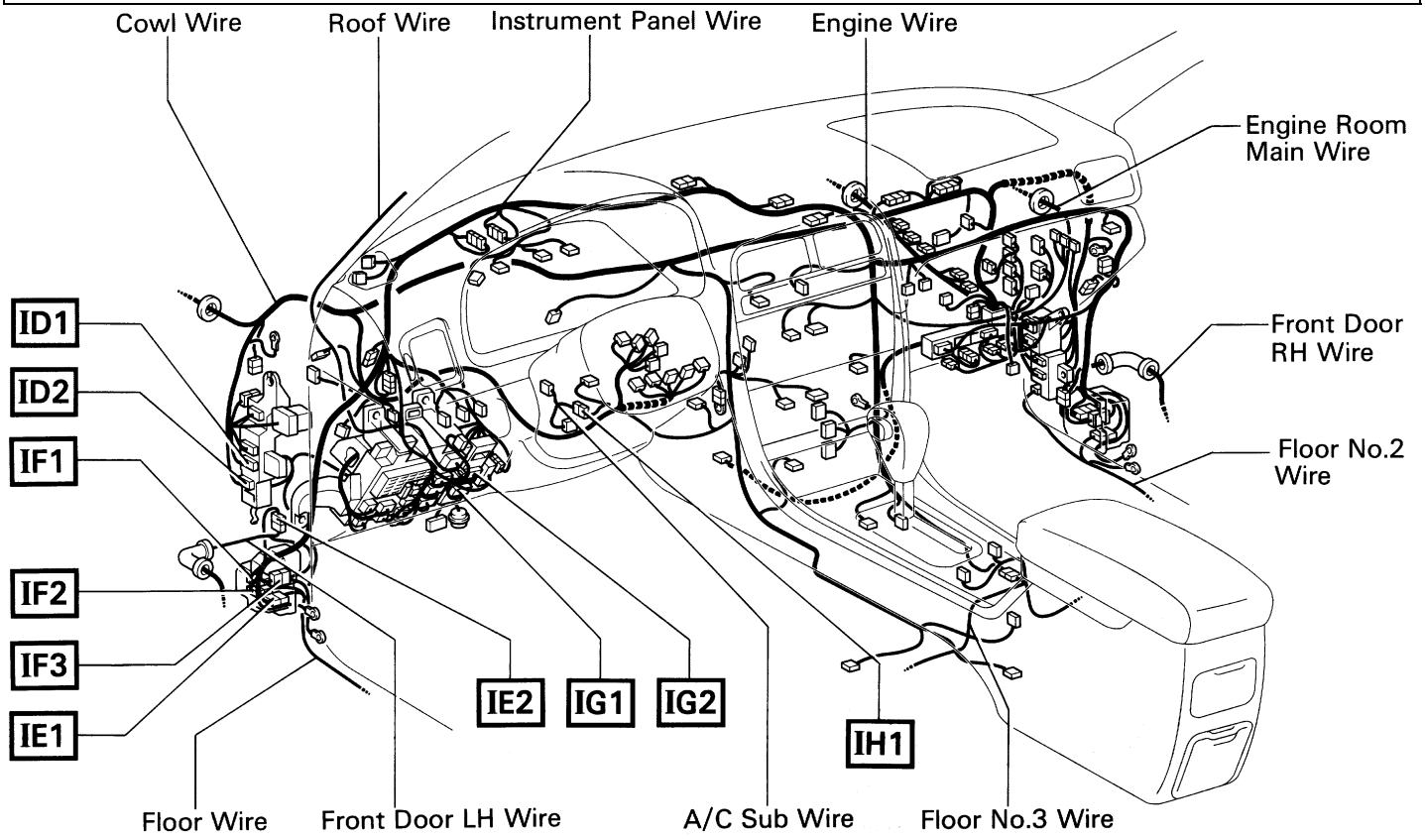
: Location of Splice Points



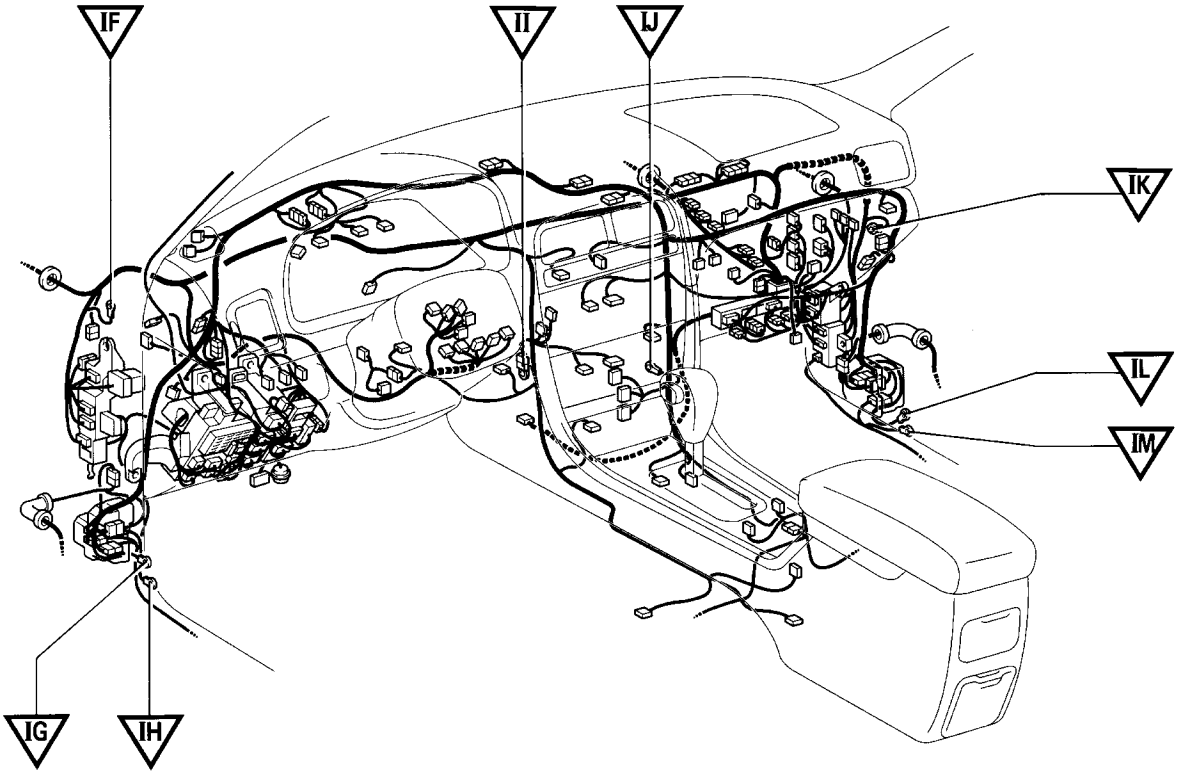


CODE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EA1	ENGINE ROOM MAIN WIRE AND ENGINE ROOM MAIN NO. 3 WIRE (BEHIND HEADLIGHT LH)
EB1	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE ENGINE ROOM J/B)
EB2	
EC1	ENGINE WIRE AND SENSOR WIRE (LEFT BANK OF THE CYLINDER HEAD)

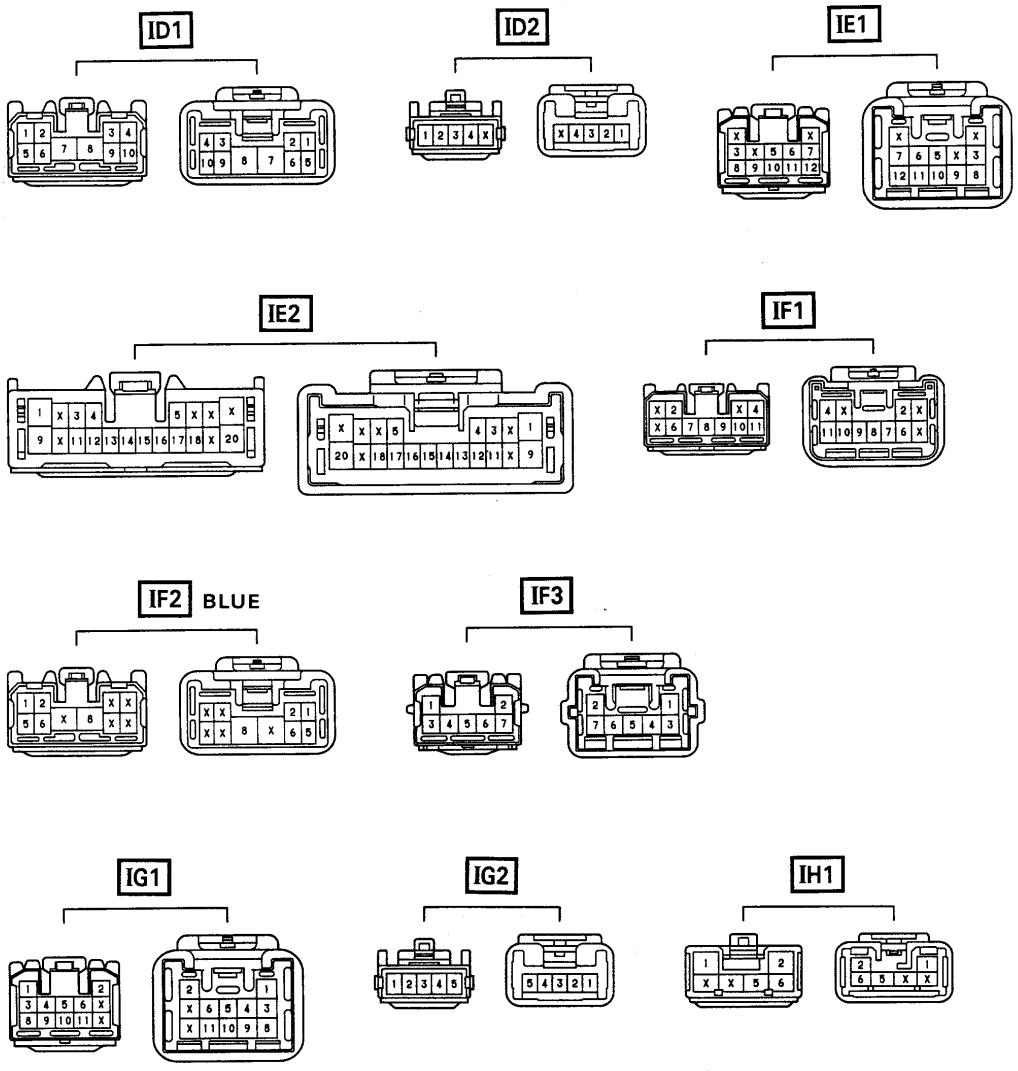
: Location of Connector Joining Wire Harness and Wire Harness



: Location of Ground Points

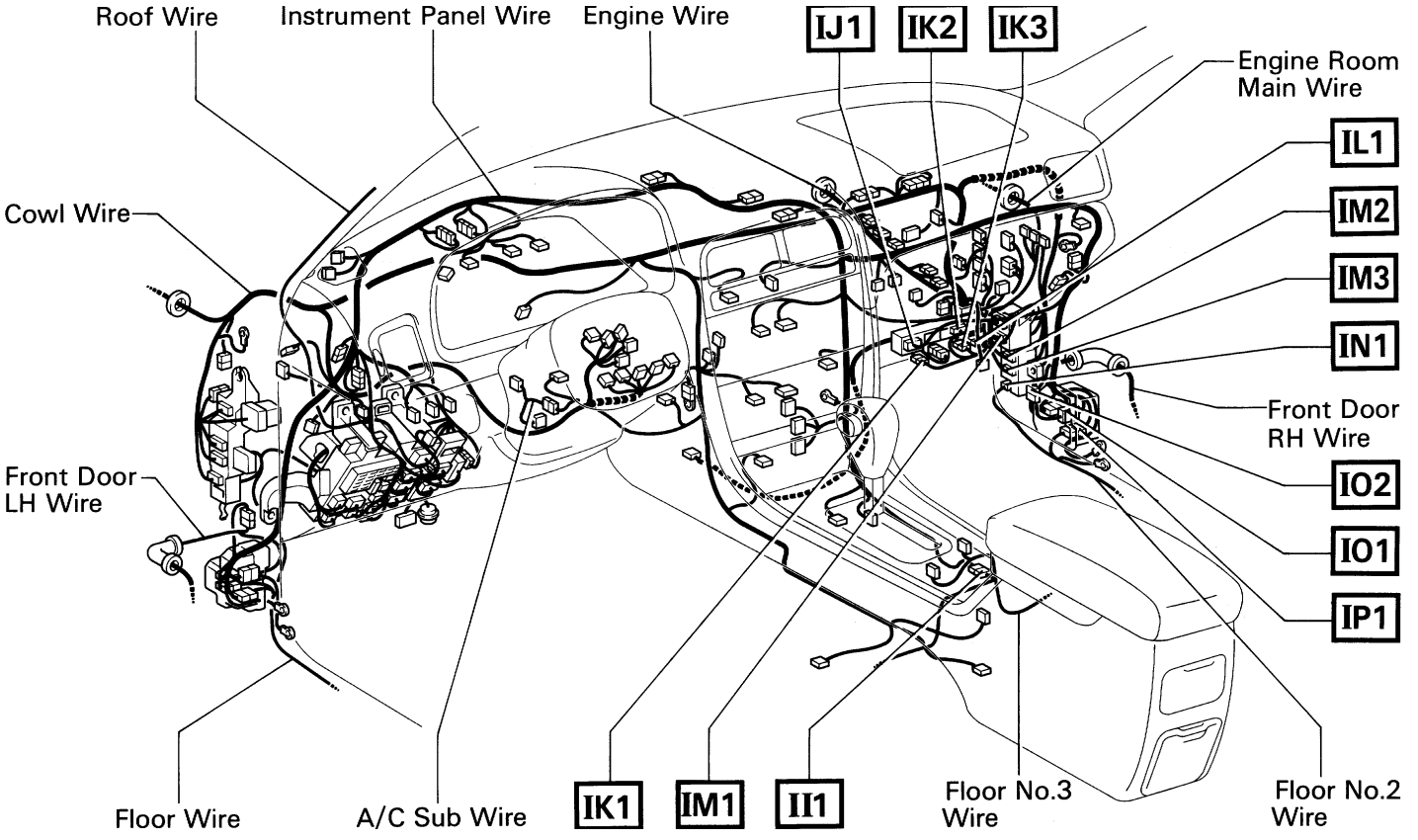


Connector Joining Wire Harness and Wire Harness

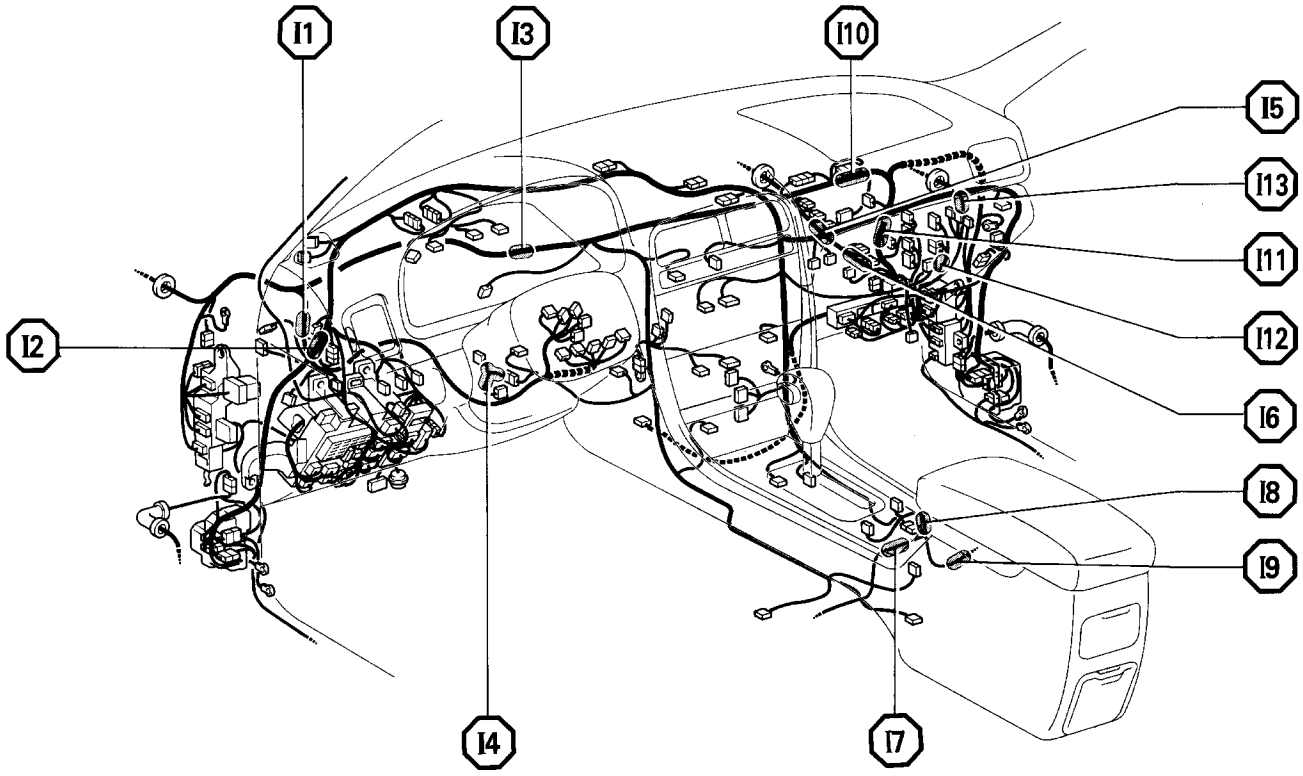


CODE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
ID1	FLOOR WIRE AND COWL WIRE (LEFT KICK PANEL)
ID2	
IE1	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IE2	
IF1	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IF2	
IF3	
IG1	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)
IG2	
IH1	COWL WIRE AND A/C SUB WIRE (BEHIND RADIO AND PLAYER)

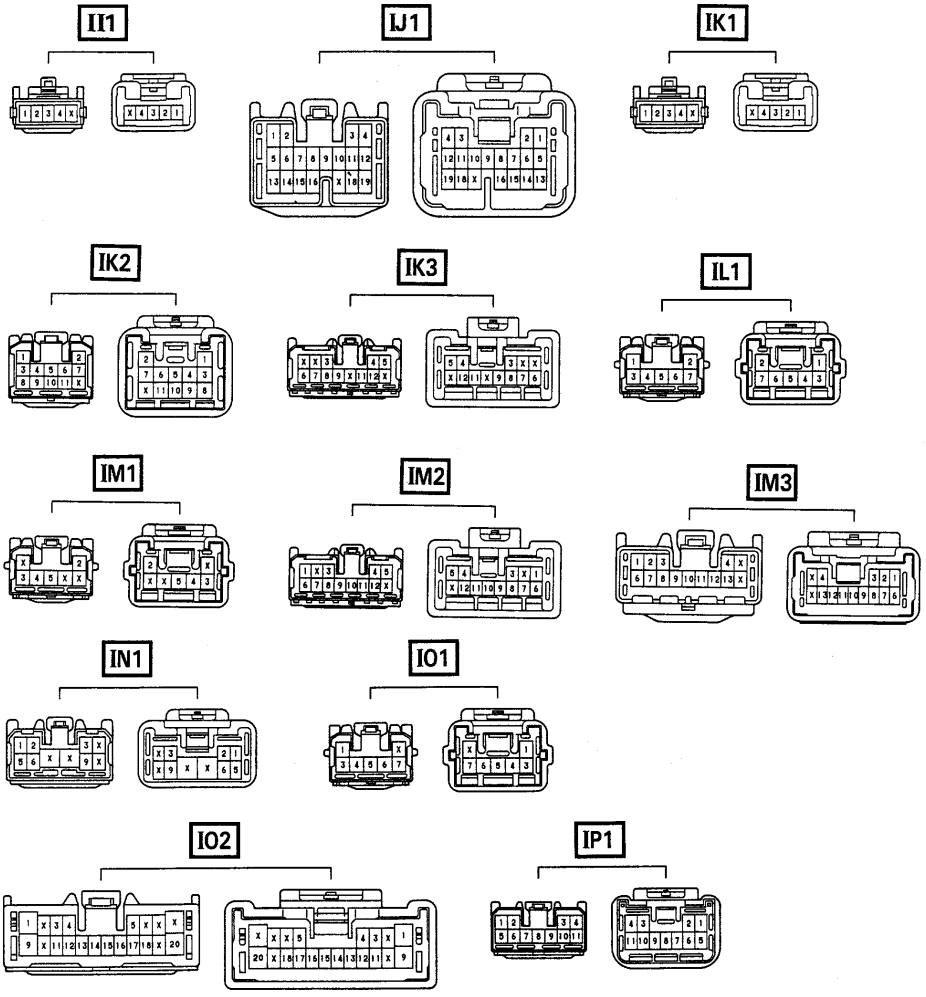
□ : Location of Connector Joining Wire Harness and Wire Harness



○ : Location of Splice Points

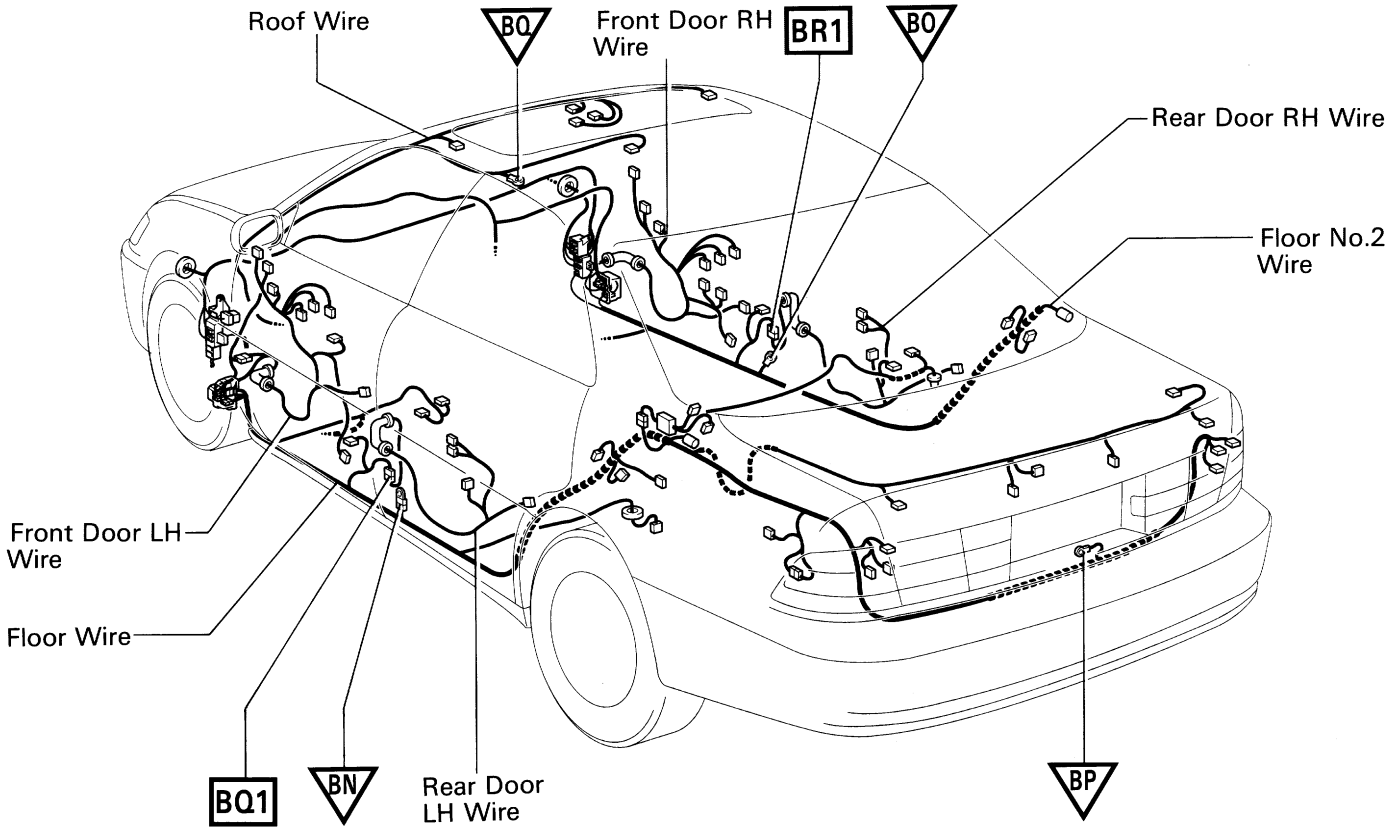


Connector Joining Wire Harness and Wire Harness

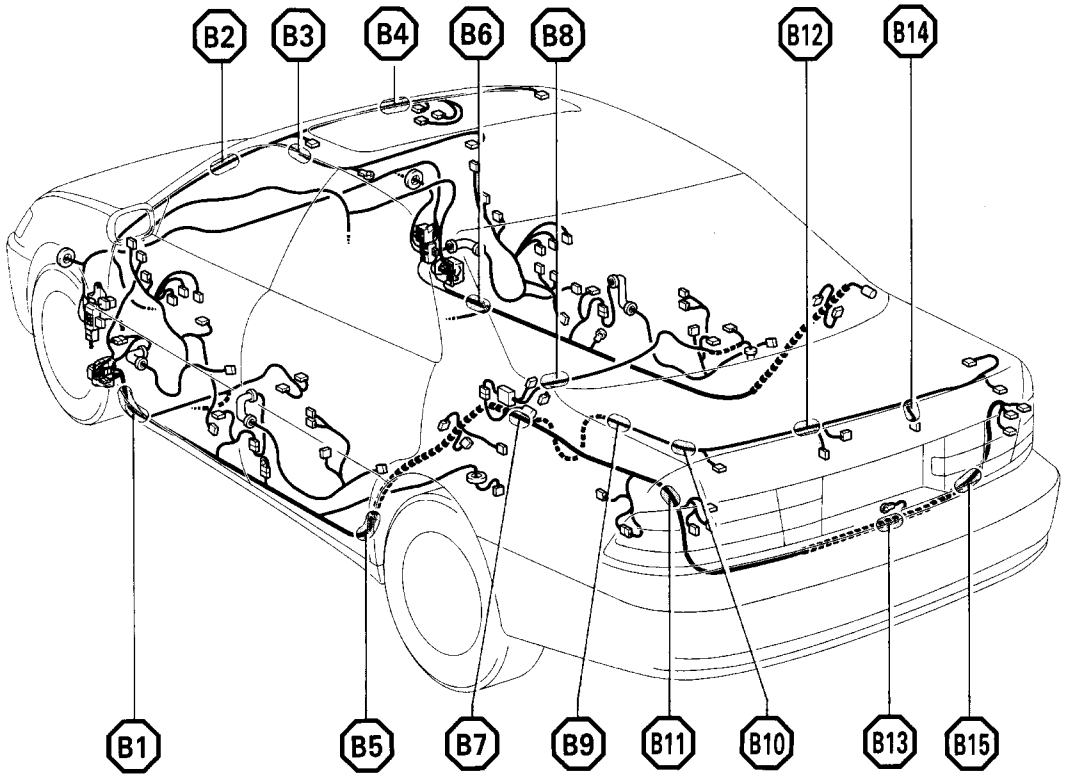


CODE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
II1	FLOOR NO.3 WIRE AND INSTRUMENT PANEL WIRE (UNDER THE CONSOLE BOX)
IJ1	INSTRUMENT PANEL WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK1	EWNGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK2	
IK3	
IL1	ENGINE WIRE AND INSTRUMENT PANEL WIRE (UNDER THE GLOVE BOX)
IM1	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IM2	
IM3	
IN1	FLOOR NO. 2 WIRE AND COWL WIRE (RIGHT KICK PANEL)
IO1	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IO2	
IP1	FRONT NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)

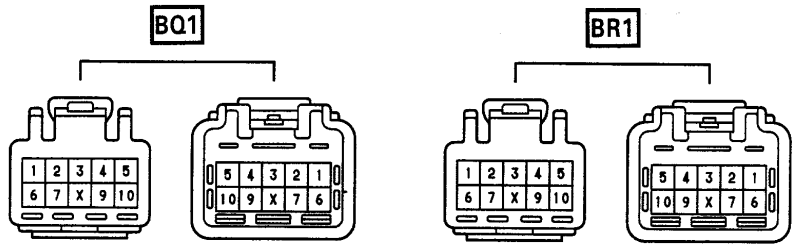
: Location of Connector Joining Wire Harness and Wire Harness
: Location of Ground Points



: Location of Splice Points

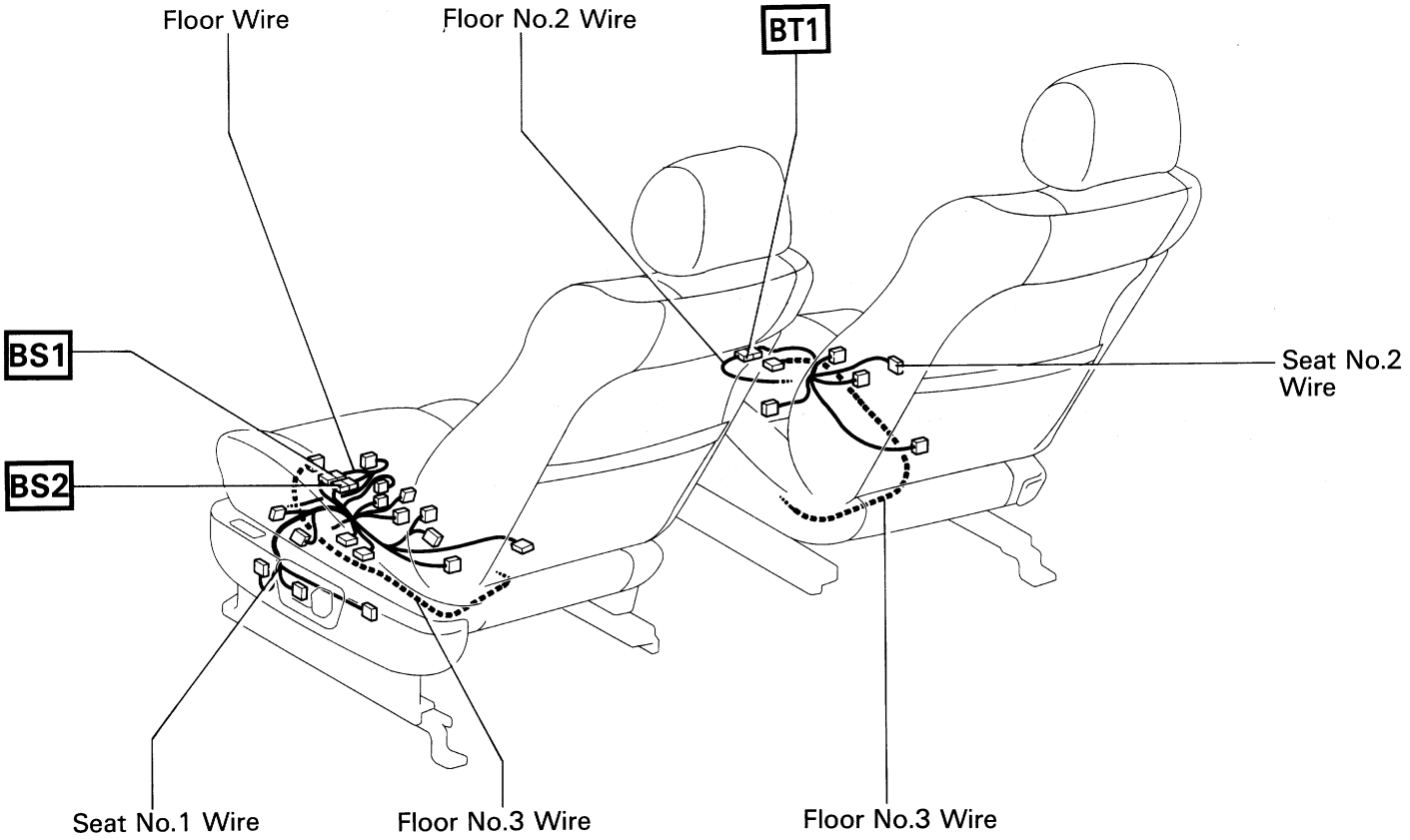


Connector Joining Wire Harness and Wire Harness

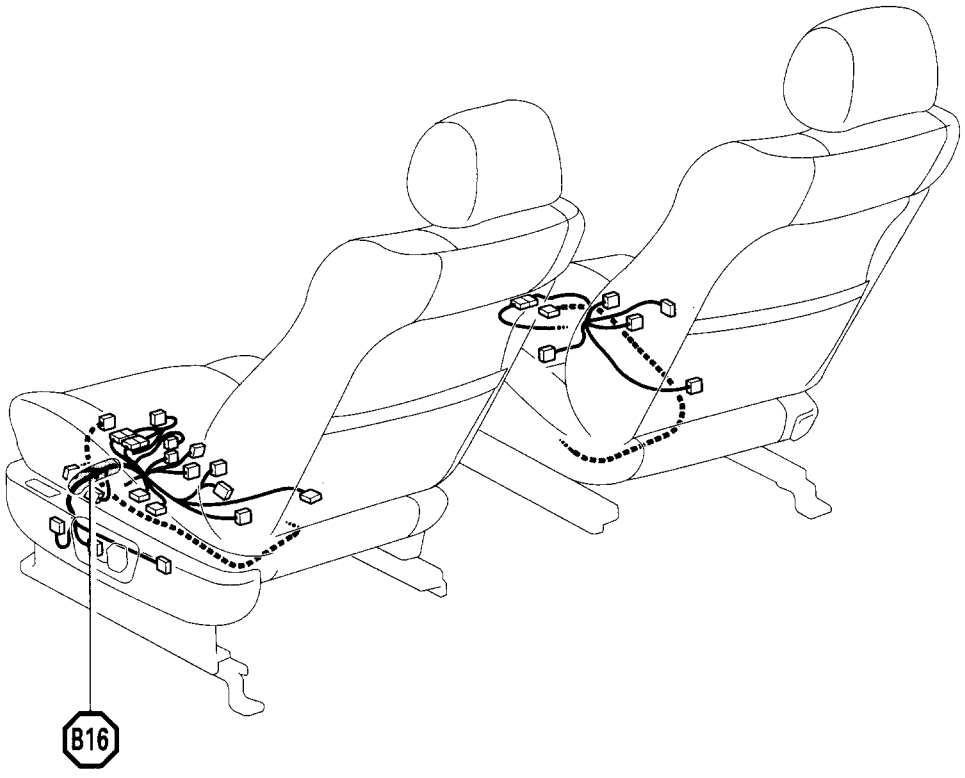


CODE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
BQ1	REAR DOOR LH WIRE AND FLOOR WIRE (LEFT CENTER PILLAR)
BR1	REAR DOOR RH WIRE AND FLOOR NO. 2 WIRE (RIGHT CENTER PILLAR)

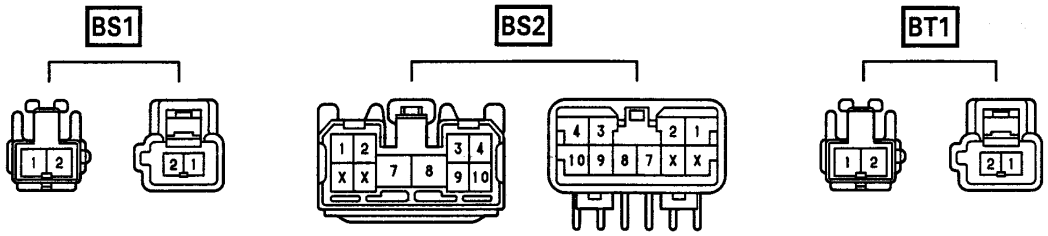
: Location of Connector Joining Wire Harness and Wire Harness



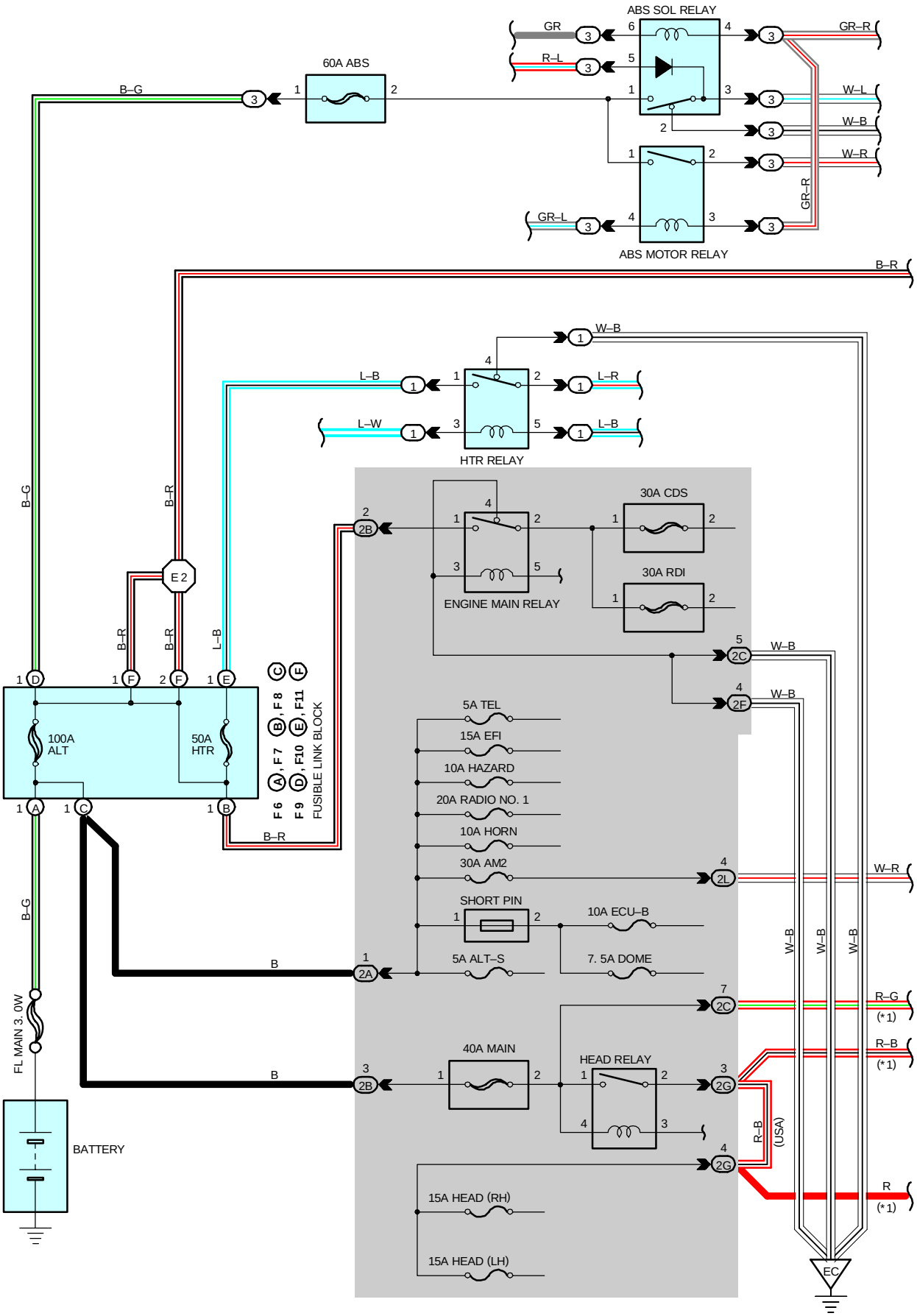
: Location of Splice Point

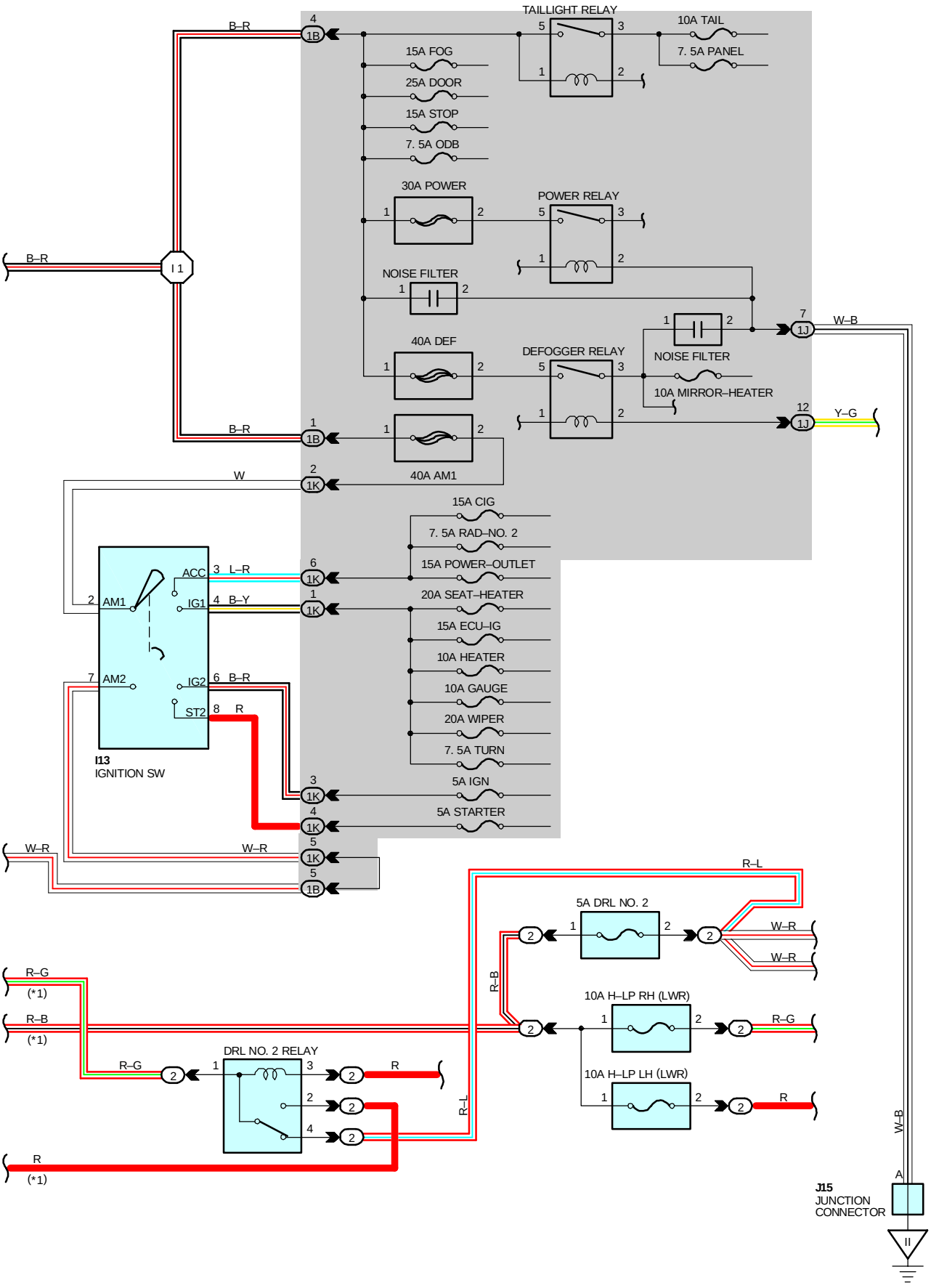


Connector Joining Wire Harness and Wire Harness



CODE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
BS1	FLOOR WIRE AND SEAT NO.1 WIRE (UNDER THE DRIVER'S SEAT)
BS2	
BT1	FLOOR NO.2 WIRE AND SEAT NO. 2 WIRE (UNDER THE FRONT PASSENGER'S SEAT)


ABS SOL RELAY
GR
R–L
GR–R
W–L
W–B
W–R
GR–L
GR–R
ABS MOTOR RELAY
60A ABS
B–G
B–R
HTR RELAY
L–B
L–W
L–R
W–B
30A CDS
30A RDI
ENGINE MAIN RELAY
E 2
100A ALT
50A HTR
FUSIBLE LINK BLOCK
F6
F7
F8
F9
F10
F11
5A TEL
15A EFI
10A HAZARD
20A RADIO NO. 1
10A HORN
30A AM2
SHORT PIN
10A ECU–B
5A ALT–S
7. 5A DOME
40A MAIN
HEAD RELAY
R–G
(*1)
R–B
(*1)
(USA)
R
(*1)
15A HEAD (RH)
15A HEAD (LH)
FL MAIN 3. 0W
BATTERY
EC


TAILLIGHT RELAY
10A TAIL
7. 5A PANEL
15A FOG
25A DOOR
15A STOP
7. 5A ODB
30A POWER
POWER RELAY
B–R
I 1
NOISE FILTER
40A DEF
DEFOGGER RELAY
NOISE FILTER
10A MIRROR–HEATER
W–B
Y–G
40A AM1
W
15A CIG
7. 5A RAD–NO. 2
15A POWER–OUTLET
20A SEAT–HEATER
15A ECU–IG
10A HEATER
10A GAUGE
20A WIPER
7. 5A TURN
5A IGN
5A STARTER
ACC
IG1
IG2
ST2
AM1
AM2
L–R
B–Y
B–R
R
I13
IGNITION SW
W–R
R–L
5A DRL NO. 2
10A H–LP RH (LWR)
10A H–LP LH (LWR)
R–G
R–B
(*1)
DRL NO. 2 RELAY
J15
JUNCTION
CONNECTOR

POWER SOURCE

SERVICE HINTS

TAILIGHT RELAY
5–3: CLOSED WITH THE LIGHT CONTROL SW AT **TAIL** OR **HEAD** POSITION

HEAD RELAY(USA)
1–2: CLOSED WITH THE LIGHT CONTROL SW AT **HEAD** POSITION OR THE DIMMER SW AT **FLASH** POSITION

HEAD RELAY(CANADA)
1–2: CLOSED WITH THE LIGHT CONTROL SW AT **HEAD** POSITION OR THE DIMMER SW AT **FLASH** POSITION
CLOSED WITH THE ENGINE RUNNING AND THE PARKING BRAKE PEDAL RELEASED (PARKING BRAKE SW OFF)

I13 IGNITION SW
2–3: CLOSED WITH THE IGNITION KEY AT **ACC** OR **ON** POSITION
2–4: CLOSED WITH THE IGNITION KEY AT **ON** OR **ST.** POSITION
7–6: CLOSED WITH THE IGNITION KEY AT **ON** OR **ST** POSITION
7–8: CLOSED WITH THE IGNITION KEY AT **ST** POSITION

: PARTS LOCATION

CODE		SEE PAGE	CODE		SEE PAGE	CODE	SEE PAGE
F 6	A	26	F 9	D	26	I13	28
F 7	B	26	F10	E	26	J15	29
F 8	C	26	F11	F	26		

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
1	22	ENGINE ROOM R/B (ENGINE COMPARTMENT LEFT)
2	23	ENGINE ROOM NO.2 R/B (ENGINE COMPARTMENT LEFT)
3	23	ENGINE ROOM NO.3 R/B (RADIATION UPPER SUPPORT RH)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

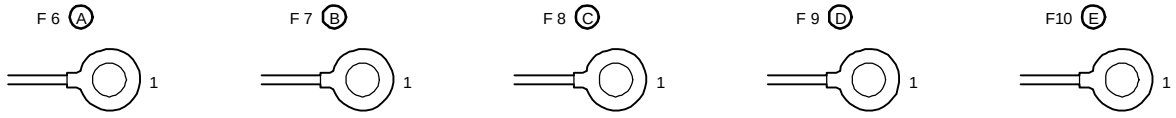
CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J		
1K		
2A	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2B		
2C		
2F		
2G		
2L	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

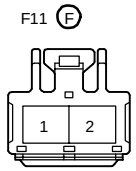
: GROUND POINTS

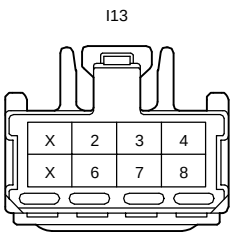
CODE	SEE PAGE	GROUND POINTS LOCATION
EC	34	LEFT RADIATION SIDE SUPPORT
II	36	INSTRUMENT PANEL BRACE LH

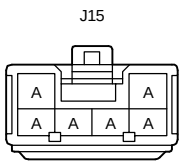
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 2	34	COWL WIRE	I 1	38	COWL WIRE

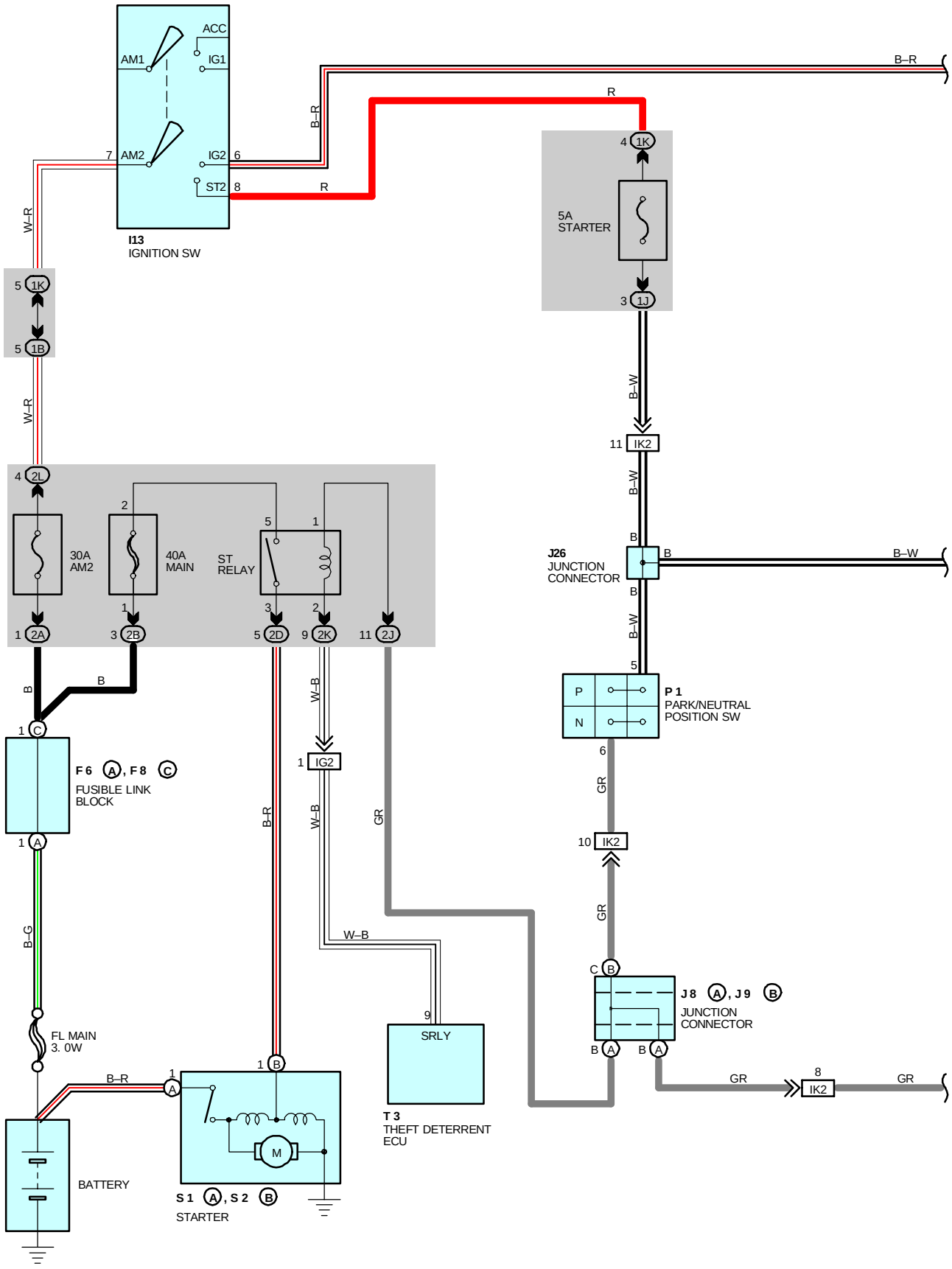


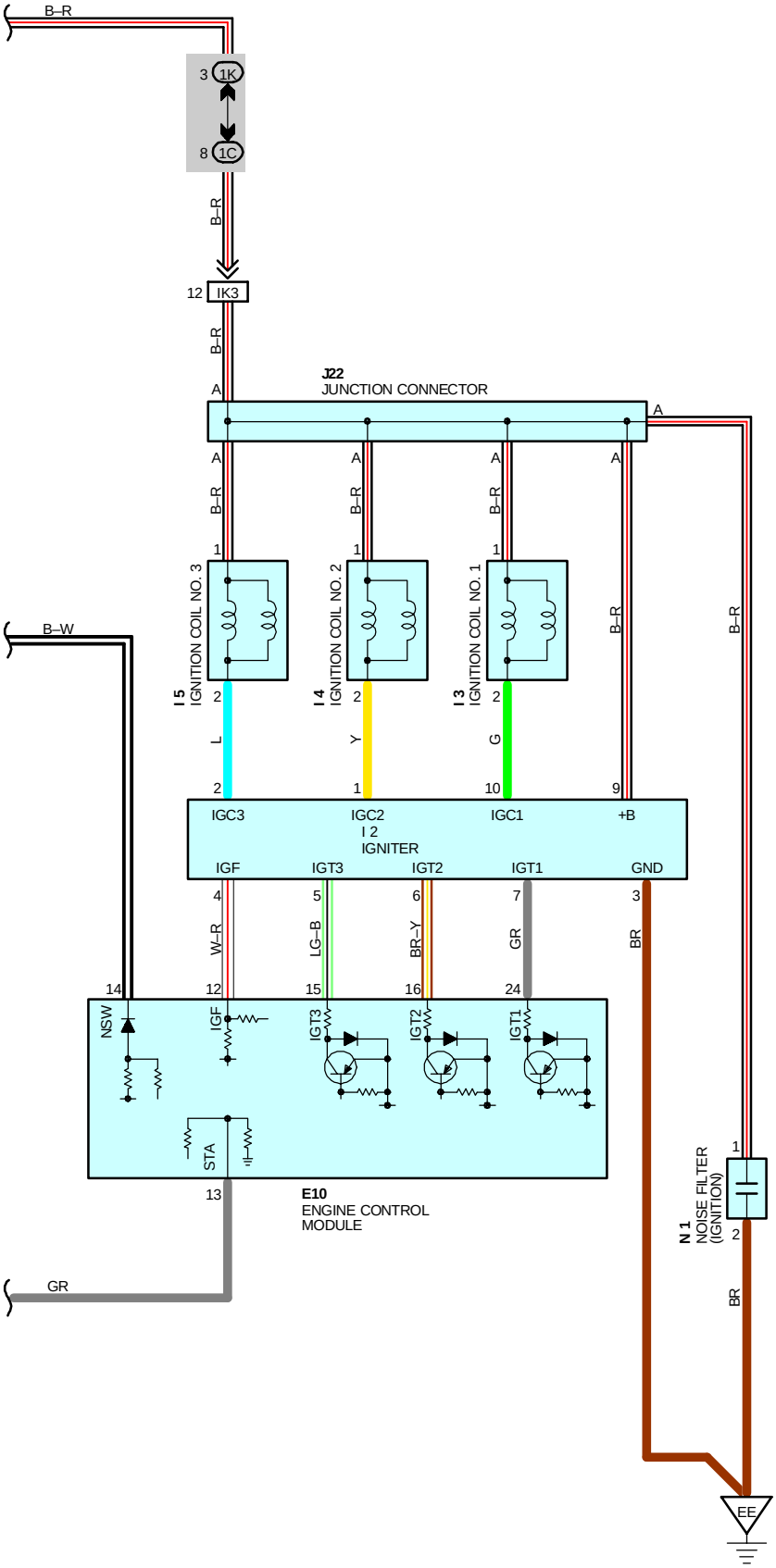






(HINT : SEE PAGE 7)


ACC
AM1
IG1
AM2
IG2
ST2
I13
IGNITION SW
B–R
R
W–R
5A
STARTER
4 1K
3 1J
5 1K
5 1B
B–W
11 IK2
4 2L
30A
AM2
40A
MAIN
ST
RELAY
J26
JUNCTION
CONNECTOR
1 2A
3 2B
5 2D
9 2K
11 2J
P 1
PARK/NEUTRAL
POSITION SW
P
N
B
W–B
GR
F6 A, F8 C
FUSIBLE LINK
BLOCK
1 IG2
10 IK2
J8 A, J9 B
JUNCTION
CONNECTOR
B–G
FL MAIN
3. 0W
SRLY
T3
THEFT DETERRENT
ECU
BATTERY
S1 A, S2 B
STARTER
M
8 IK2


B–R
3 1K
8 1C
B–R
12 IK3
B–R
J22
JUNCTION CONNECTOR
A
A
A
A
A
A
B–R
B–R
B–R
B–R
1
1
1
I 5
IGNITION COIL NO. 3
I 4
IGNITION COIL NO. 2
I 3
IGNITION COIL NO. 1
B–W
2
2
2
L
Y
G
2
1
10
9
IGC3
IGC2
I 2
IGNITER
IGC1
+B
IGF
IGT3
IGT2
IGT1
GND
4
5
6
7
3
W–R
LG–B
BR–Y
GR
BR
14
12
15
16
24
NSW
IGF
IGT3
IGT2
IGT1
STA
13
E10
ENGINE CONTROL
MODULE
GR
1
N 1
NOISE FILTER
(IGNITION)
2
BR
EE

STARTING AND INGNITION

SERVICE HINTS

I13 IGNITION SW
7–8 : CLOSED WITH THE IGNITION SW AT **ST** POSITION
7–6 : CLOSED WITH THE IGNITION SW AT **ON** OR **ST** POSITION

S 1 Ⓐ, S 2 Ⓑ STARTER
POINTS CLOSED WITH THE PARK/NEUTRAL POSITION SW IN **P** OR **N** POSITION AND THE IGNITION SW AT **ST** POSITION

P1 PARK/NEUTRAL POSITION SW
5–6 : CLOSED WITH THE A/T SHIFT LEVER IN **P** OR **N** POSITION

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
E10	28	I 5	27	N 1	27
F 6 A	26	I13	28	P 1	27
F 8 C	26	J 8 A	29	S 1 A	27
I 2	27	J 9 B	29	S 2 B	27
I 3	27	J22	29	T 3	29
I 4	27	J26	29		

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1C		
1J		
1K		
2A	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2B		
2D		
2J	20	COWL WIRE AND ENIGNE ROOM J/B (ENGINE COMPARTMENT LEFT)
2K		
2L		

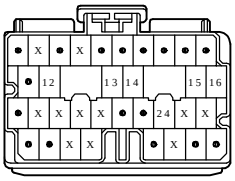
▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IG2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)
IK2	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK3		

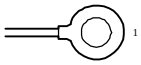
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EE	34	REAR SIDE OF SURGE TANK

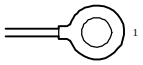
E10



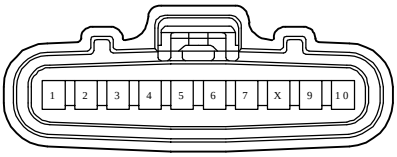
F6 (A)



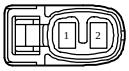
F8 (C)



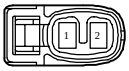
I2 BLACK



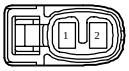
I3 BLACK



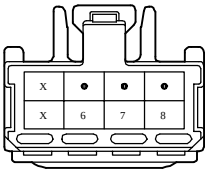
I4 BLACK



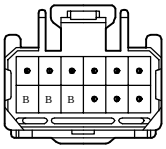
I5 BLACK



I13

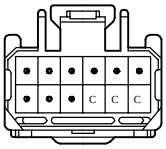


J8 (A) GRAY



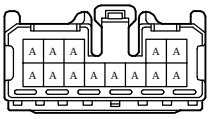
(HINT : SEE PAGE 7)

J9 (B) GRAY



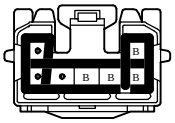
(HINT : SEE PAGE 7)

J22 ORANGE



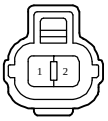
(HINT : SEE PAGE 7)

J26

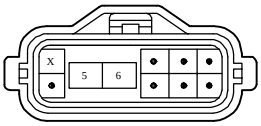


(HINT : SEE PAGE 7)

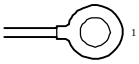
N1 GRAY



P1 GRAY

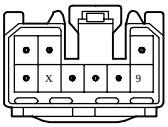


S1 (A)

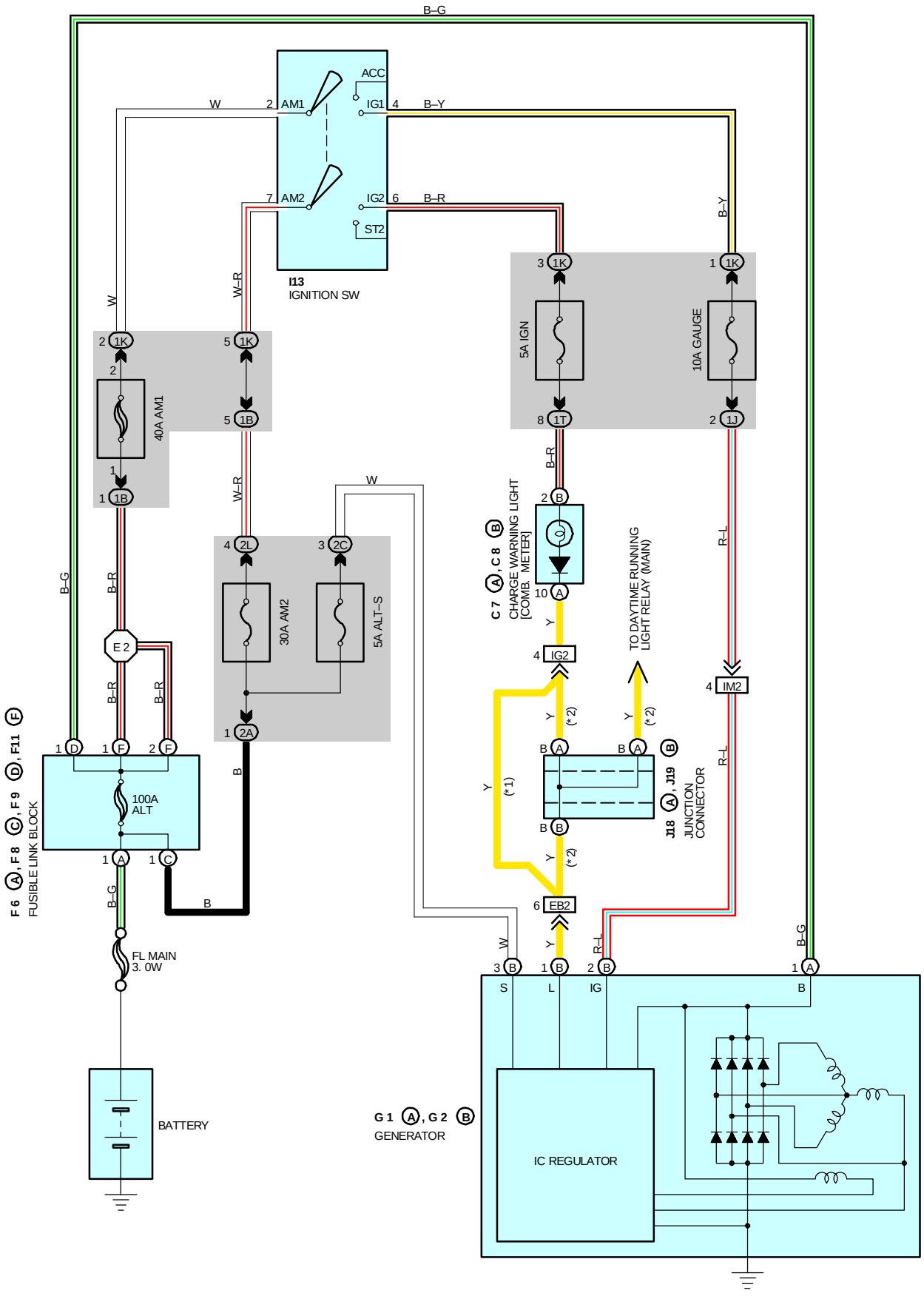


S2 (B) BLACK

T3 ORANGE



* 1 : USA
* 2 : CANADA



SERVICE HINTS

G 2 Ⓑ GENERATOR

Ⓑ 3–GROUND : **13.9–15.1** VOLTS WITH THE ENGINE RUNNING AT **2000** RPM AND **25•C (77•F)**
13.5–14.3 VOLTS WITH THE ENGINE RUNNING AT **2000** RPM AND **115•C (239•F)**

Ⓑ 2–GROUND : **0–4** VOLTS WITH THE IGNITION SW AT **ON** POSITION AND ENGINE NOT RUNNING

○ : PARTS LOCATION

CODE		SEE PAGE	CODE		SEE PAGE	CODE		SEE PAGE
C 7	A	28	F 9	D	26	I13		28
C 8	B	28	F11	F	26	J18	A	29
F 6	A	26	G 1	A	26	J19	B	29
F 8	C	26	G 2	B	26			

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J		
1K		
1T	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
2A	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2C		
2L	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

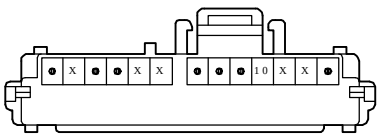
▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EB2	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE ENGINE ROOM J/B)
IG2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)
IN2	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)

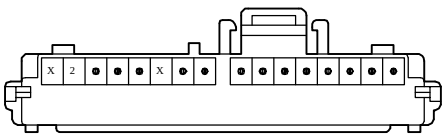
⬡ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 2	34	COWL WIRE			

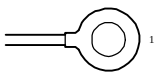
C 7 Ⓐ BLUE



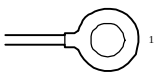
C 8 Ⓑ



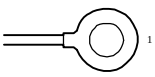
F 6 Ⓐ



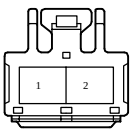
F 8 Ⓒ



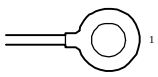
F 9 Ⓓ



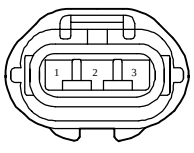
F11 Ⓕ



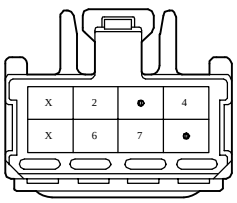
G 1 Ⓐ



G 2 Ⓑ BLACK



I13



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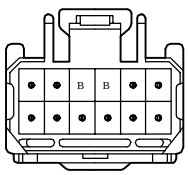
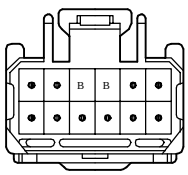


(HINT : SEE PAGE 7)

J19 Ⓑ BLACK



(HINT : SEE PAGE 7)

ENGINE CONTROL

SYSTEM OUTLINE

THIS SYSTEM UTILIZES AN ENGINE CONTROL MODULE AND MAINTAINS OVERALL CONTROL OF THE ENGINE, TRANSMISSION AND SO ON. AN OUTLINE OF THE ENGINE CONTROL IS EXPLAINED HERE.

1. INPUT SIGNALS

(1) ENGINE COOLANT TEMP. SIGNAL CIRCUIT
THE ENGINE COOLANT TEMP. SENSOR DETECTS THE ENGINE COOLANT TEMP. AND HAS A BUILT–IN THERMISTOR WITH A RESISTANCE WHICH VARIES ACCORDING TO THE WATER TEMP. IS INPUT INTO **TERMINAL THW** OF THE ENGINE CONTROL MODULE AS A CONTROL SIGNAL.

(2) INTAKE AIR TEMP. SIGNAL CIRCUIT
THE INTAKE AIR TEMP. SENSOR IS INSTALLED IN THE MASS AIR FLOW METER AND DETECTS THE INTAKE AIR TEMP., WHICH IS INPUT AS A CONTROL SIGNAL INTO **TERMINAL THA** OF THE ENGINE CONTROL MODULE.

(3) OXYGEN SENSOR SIGNAL SYSTEM
THE OXYGEN DENSITY IN THE EXHAUST GASES IS DETECTED AND INPUT AS A CONTROL SIGNAL INTO **TERMINALS OXL1, OXR1** AND **OXS** OF THE ENGINE CONTROL MODULE TO MAINTAIN STABLE DETECTION PERFORMANCE BY THE HEATED OXYGEN SENSOR, A HEATER IS USED FOR WARMING THE SENSOR. THE HEATER IS ALSO CONTROLLED BY THE ENGINE CONTROL MODULE **(HTL, HTR** AND **HTS).**

(4) RPM SIGNAL SYSTEM
CAMSHAFT POSITION AND CRANKSHAFT POSITION ARE DETECTED BY THE CAMSHAFT POSITION SENSOR AND CRANKSHAFT POSITION SENSOR. THE CAMSHAFT POSITION IS INPUT AS A CONTROL SIGNAL TO **TERMINAL G22+** OF THE ENGINE CONTROL MODULE, AND THE ENGINE RPM IS INPUT INTO **TERMINAL NE+.**

(5) THROTTLE SIGNAL CIRCUIT
THE THROTTLE POSITION SENSOR DETECTS THE THROTTLE VALVE OPENING ANGLE AS A CONTROL SIGNAL, WHICH IS INPUT INTO **TERMINAL VTA1** OF THE ENGINE CONTROL MODULE.

(6) VEHICLE SPEED SIGNAL SYSTEM
THE VEHICLE SPEED SENSOR, INSTALLED INSIDE THE TRANSMISSION, DETECTS THE VEHICLE SPEED AND INPUTS A CONTROL SIGNAL INTO **TERMINAL SPD** OF THE ENGINE CONTROL MODULE.

(7) PARK/NEUTRAL POSITION SW SIGNAL SYSTEM
THE PARK/NEUTRAL POSITION SW DETECTS WHETHER THE SHIFT POSITION IS IN NEUTRAL, PARKING OR NOT, AND INPUTS A CONTROL SIGNAL INTO **TERMINAL STA** OF THE ENGINE CONTROL MODULE

(8) A/C SW SIGNAL SYSTEM
THE A/C CONTROL ASSEMBLY INPUTS THE A/C OPERATIONS INTO **TERMINAL A/C** OF THE ENGINE CONTROL MODULE AS A CONTROL SIGNAL.

(9) BATTERY SIGNAL CIRCUIT
VOLTAGE IS CONSTANTLY APPLIED TO **TERMINAL BATT** OF THE ENGINE CONTROL MODULE. WHEN THE IGNITION SW IS TURNED ON, VOLTAGE FOR THE ENGINE CONTROL MODULE OPERATION IS APPLIED TO **TERMINAL +B** OF THE ENGINE CONTROL MODULE VIA THE EFI RELAY.

(10) INTAKE AIR VOLUME SIGNAL CIRCUIT
INTAKE AIR VOLUME IS DETECTED BY THE MASS AIR FLOW METER AND A SIGNAL IS INPUT INTO **TERMINAL VG** OF THE ENGINE CONTROL MODULE AS A CONTROL SIGNAL.

(11) NSW SIGNAL CIRCUIT
TO CONFIRM WHETHER THE ENGINE IS CRANKING, THE VOLTAGE APPLIED TO THE STARTER MOTOR DURING CRANKING IS DETECTED AND THE SIGNAL IS INPUT INTO **TERMINAL NSW** OF THE ENGINE CONTROL MODULE AS A CONTROL SIGNAL.

(12) ENGINE KNOCK SIGNAL CIRCUIT
ENGINE KNOCKING IS DETECTED BY THE KNOCK SENSOR 1 AND 2, THEN THE SIGNALS ARE INPUT INTO **TERMINALS KNKR** AND **KNKL** OF THE ENGINE CONTROL MODULE AS A CONTROL SIGNAL.

2. CONTROL SYSTEM

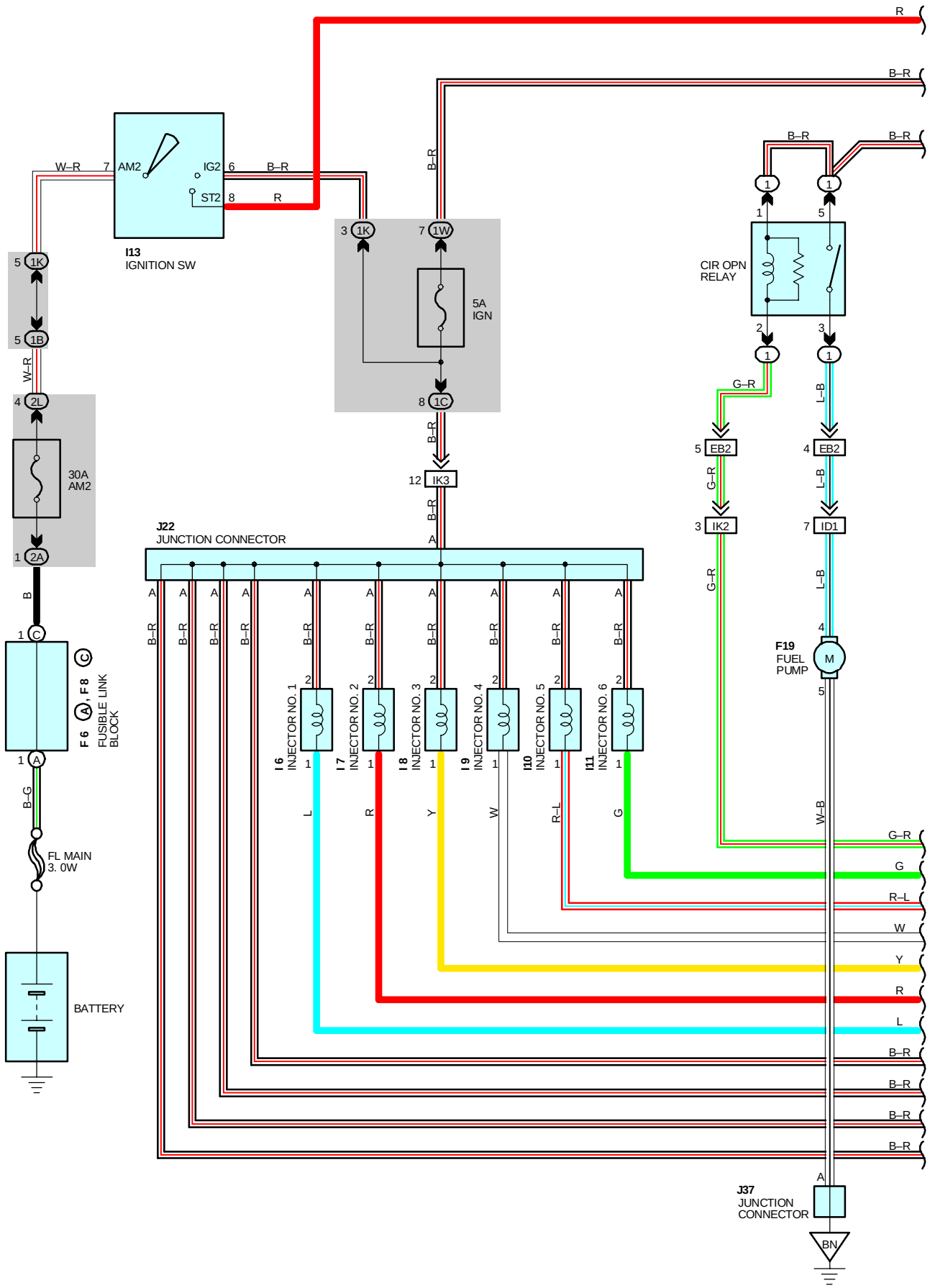
- SFI (SEQUENTIAL MULTIPORT FUEL INJECTION) SYSTEM
  THE SFI SYSTEM MONITORS THE ENGINE CONDITION THROUGH THE SIGNALS, WHICH ARE INPUT FROM EACH SENSOR (INPUT SIGNALS (1) TO (12)). THE BEST FUEL INJECTION VOLUME IS DECIDED BASED ON THIS DATA AND
  THE PROGRAM MEMORIZED BY THE ENGINE CONTROL MODULE, AND THE CONTROL SIGNAL IS OUTPUT TO **TERMINALS #10, #20, #30, #40, #50,** AND **#60** OF THE ENGINE CONTROL MODULE TO OPERATE THE INJECTOR (INJECT THE FUEL). THE SFI SYSTEM PRODUCES CONTROL OF FUEL INJECTION OPERATION BY THE ENGINE CONTROL MODULE IN RESPONSE TO THE DRIVING CONDITIONS.
- ESA (ELECTRONIC SPARK ADVANCE) SYSTEM
  THE ESA SYSTEM MONITORS THE ENGINE CONDITION THROUGH THE SIGNALS, WHICH ARE INPUT TO THE ENGINE CONTROL MODULE FROM EACH SENSOR (INPUT SIGNALS FROM 1, 3, 4, 12). THE BEST IGNITION TIMING IS DECIDED ACCORDING TO THIS DATA AND THE MEMORIZED DATA IN THE ENGINE CONTROL MODULE AND THE CONTROL SIGNAL IS OUTPUT TO **TERMINALS IGT1, IGT2** AND **IGT3.** THIS SIGNAL CONTROLS THE IGNITER TO PROVIDE THE BEST IGNITION TIMING FOR THE DRIVING CONDITIONS.
- HEATED OXYGEN SENSOR HEATER CONTROL SYSTEM
  THE HEATED OXYGEN SENSOR HEATER CONTROL SYSTEM TURNS THE HEATER ON WHEN THE INTAKE AIR VOLUME IS LOW (TEMP. OF EXHAUST EMISSIONS IS LOW), AND WARMS UP THE HEATED OXYGEN SENSOR TO IMPROVE DETECTION PERFORMANCE OF THE SENSOR. THE ENGINE CONTROL MODULE EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS FROM 1, 4, 9, 10), CURRENT IS OUTPUT TO **TERMINALS HTL, HTR** AND **HTS,** CONTROLLING THE HEATER.
- IDLE AIR CONTROL SYSTEM
  THE IDLE AIR CONTROL SYSTEM (ROTARY SOLENOID TYPE) INCREASES THE RPM AND PROVIDES IDLE STABILITY FOR FAST IDLE–UP WHEN THE ENGINE IS COLD, AND WHEN THE IDLE SPEED HAS DROPPED DUE TO ELECTRICAL LOAD AND SO ON, THE ENGINE CONTROL MODULE EVALUATES THE SIGNALS FROM EACH SENSOR (INPUT SIGNALS FROM 1, 4, 5, 8, 9), CURRENT IS OUTPUT TO **TERMINALS RSO** AND **RSC** TO CONTROL IDLE AIR CONTROL VALVE.
- EGR CONTROL SYSTEM
  THE EGR CONTROL SYSTEM DETECTS THE SIGNAL FROM EACH SENSOR (INPUT SIGNALS FROM 1, 4, 9, 10), AND OUTPUTS CURRENT TO **TERMINAL EGR** TO CONTROL THE VSV (EGR).
  THE EGR VALVE POSITION SENSOR IS MOUNTED ON THE EGR VALVE. THIS SENSOR CONVERTS THE EGR VALVE OPENING HEIGHT INTO A VOLTAGE AND SENDS IT TO THE ENGINE CONTROL MODULE AS THE EGR VALVE POSITION SIGNAL.
- ACIS (ACOUSTIC CONTROL INDUCTION SYSTEM)
  ACIS INCLUDES A VALVE IN THE BULKHEAD SEPARATING THE SURGE TANK INTO TWO PARTS. THIS VALVE IS OPENED AND CLOSED IN ACCORDANCE WITH THE DRIVING CONDITIONS TO CONTROL THE INTAKE MANIFOLD LENGTH IN TWO STAGES FOR INCREASED ENGINE OUTPUT IN ALL RANGES FROM LOW TO HIGH SPEEDS.
  THE ENGINE CONTROL MODULE JUDGES THE ENGINE SPEED BY THE SIGNALS ((4), (5)) FROM EACH SENSOR AND OUTPUTS SIGNALS TO THE **TERMINAL ACIS** TO CONTROL THE VSV (INTAKE AIR CONTROL).

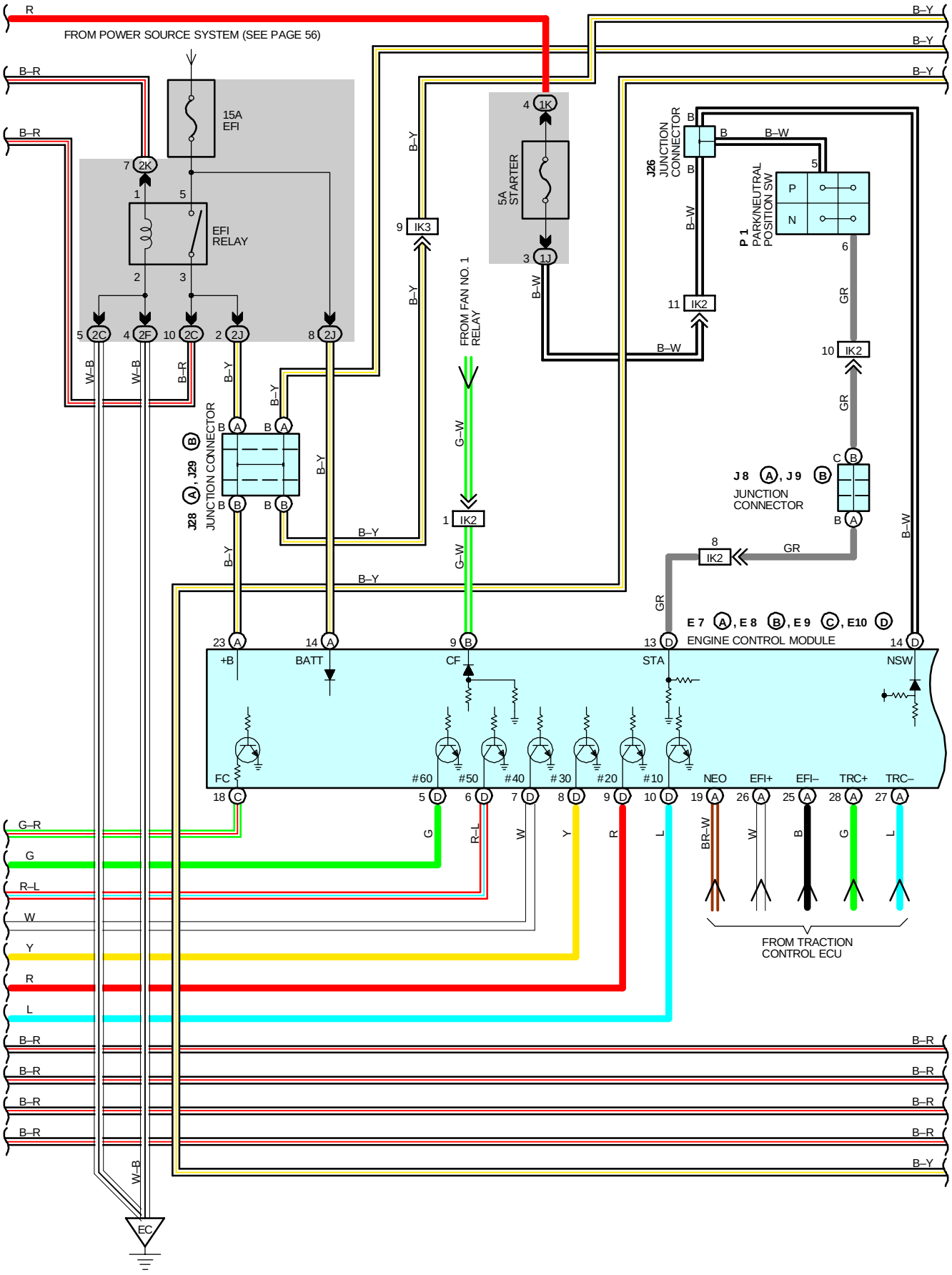
3. DIAGNOSIS SYSTEM

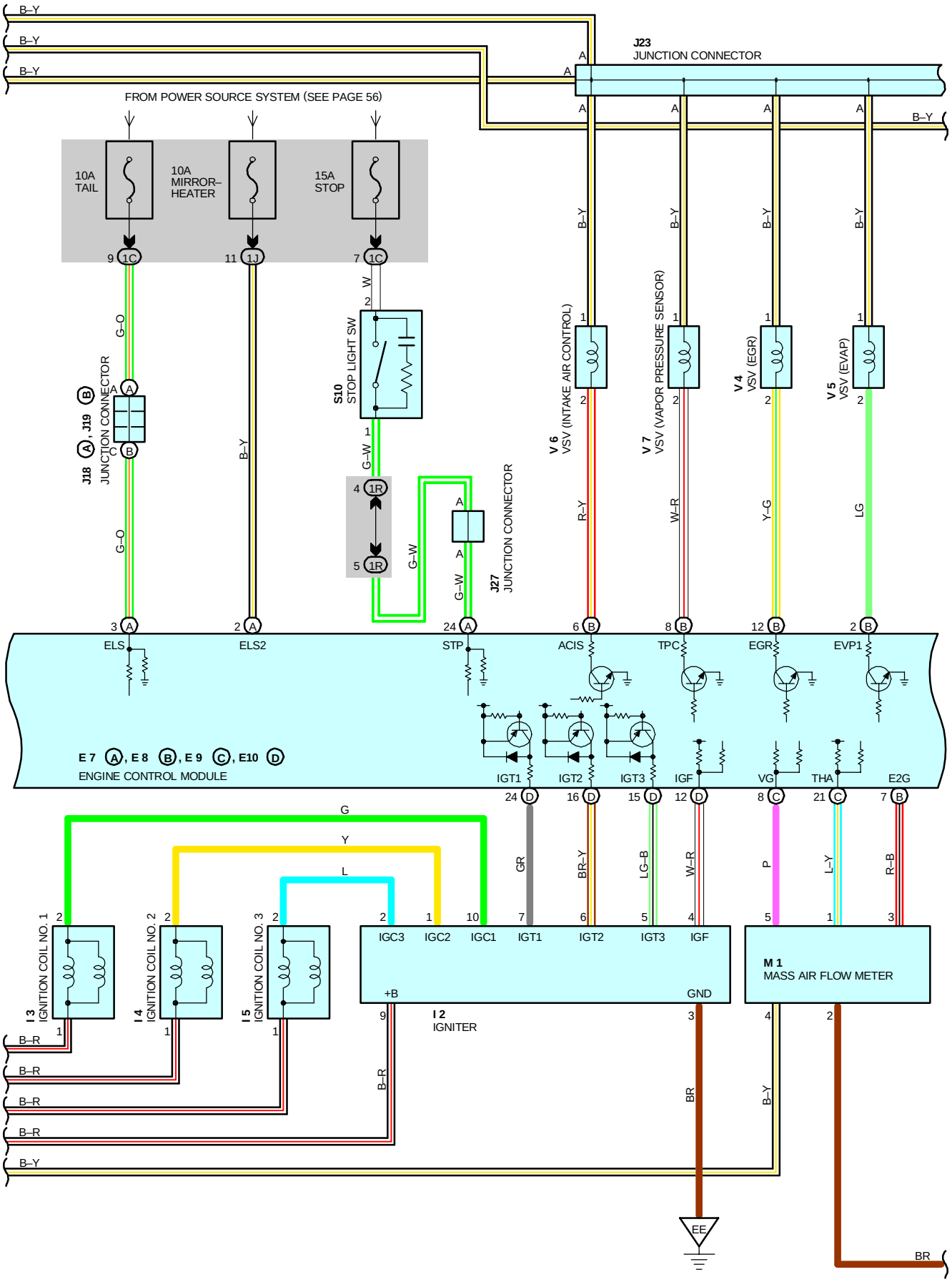
WITH THE DIAGNOSIS SYSTEM, WHEN THERE IS A MALFUNCTION IN THE ENGINE CONTROL MODULE SIGNAL SYSTEM, THE MALFUNCTIONING SYSTEM IS RECORDED IN THE MEMORY.

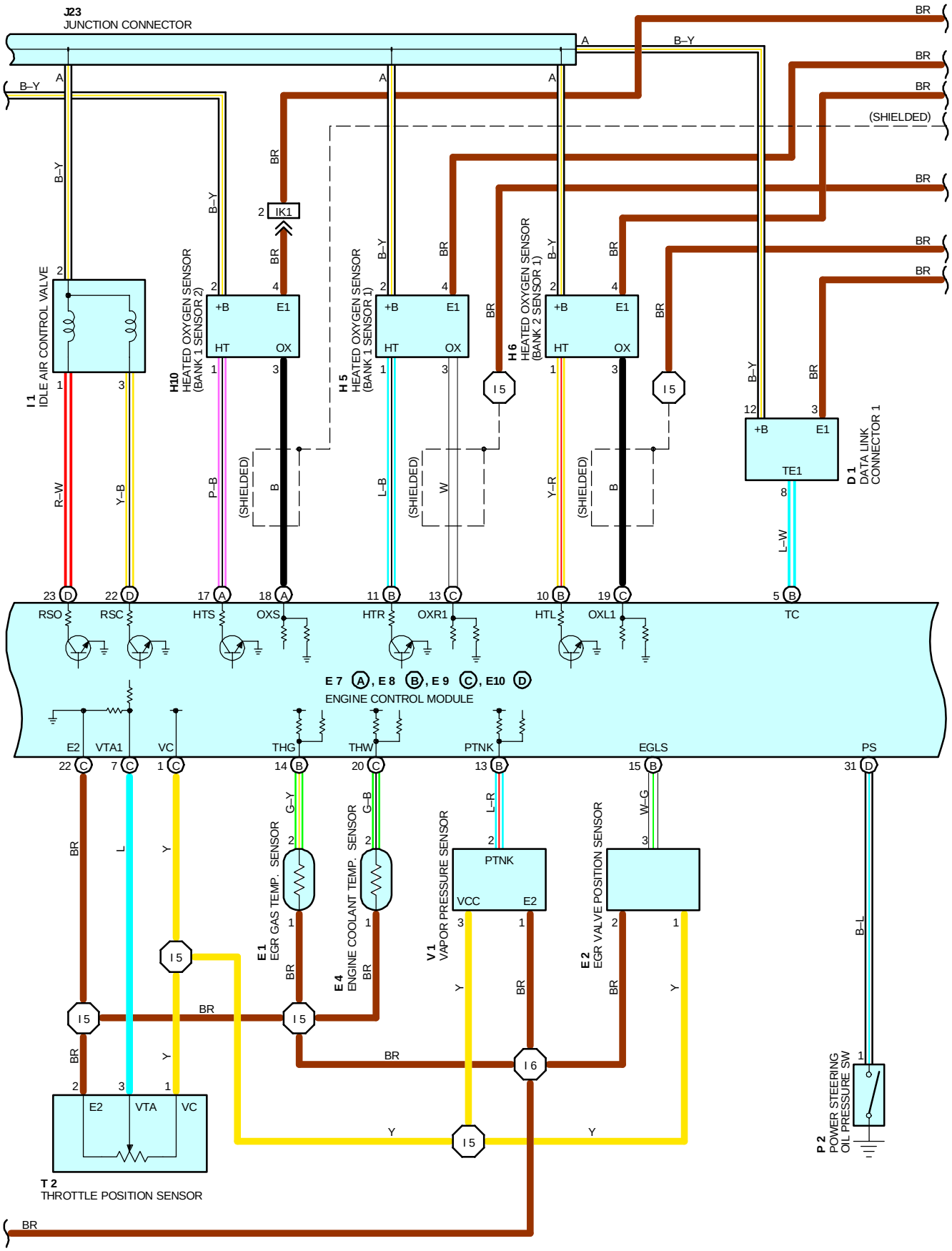
4. FAIL–SAFE SYSTEM

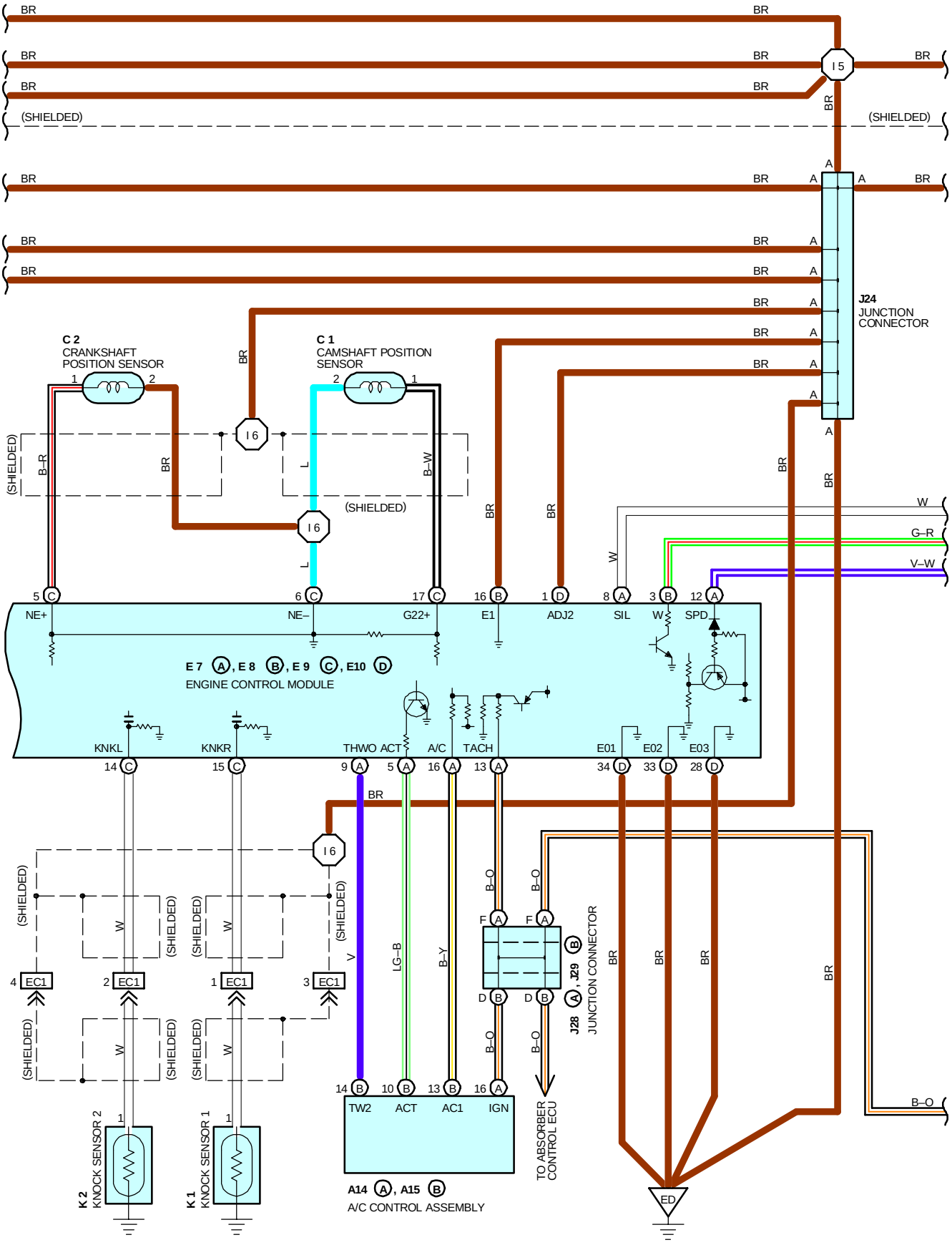
WHEN A MALFUNCTION OCCURS IN ANY SYSTEMS, IF THERE IS A POSSIBILITY OF ENGINE TROUBLE BEING CAUSED BY CONTINUED CONTROL BASED ON THE SIGNALS FROM THAT SYSTEM, THE FAIL–SAFE SYSTEM EITHER CONTROLS THE SYSTEM BY USING DATA (STANDARD VALUES) RECORDED IN THE ENGINE CONTROL MODULE MEMORY OR ELSE STOPS THE ENGINE.

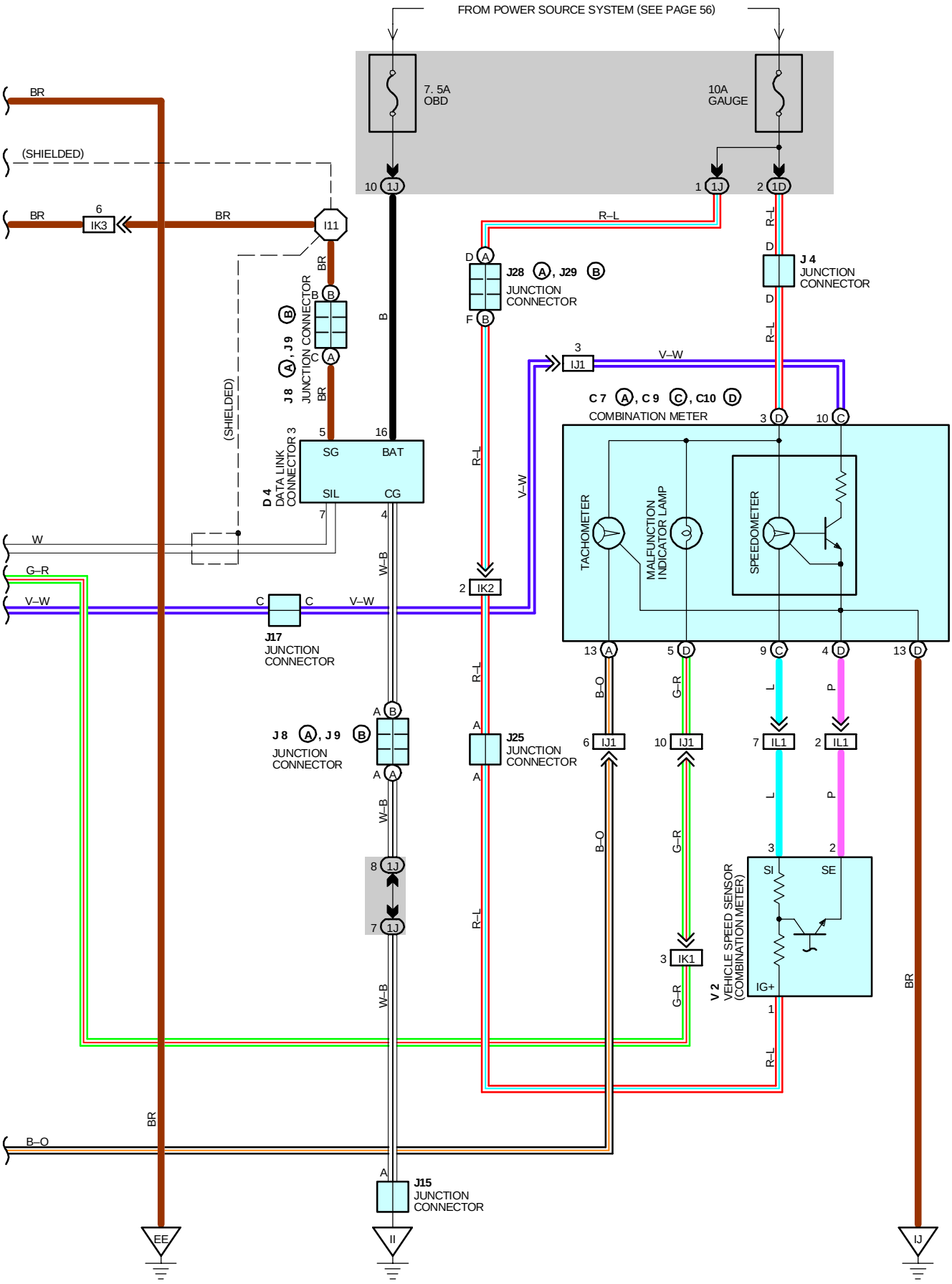

R
B–R
W–R
7
AM2
IG2
6
B–R
ST2
8
R
I13
IGNITION SW
3 1K
7 1W
5A
IGN
8 1C
5 1K
5 1B
W–R
4 2L
30A
AM2
1 2A
B
1 C
F6 A, F8 C
FUSIBLE LINK
BLOCK
1 A
B–G
FL MAIN
3. 0W
BATTERY
B–R
12 IK3
J22
JUNCTION CONNECTOR
A
I6 INJECTOR NO. 1
I7 INJECTOR NO. 2
I8 INJECTOR NO. 3
I9 INJECTOR NO. 4
I10 INJECTOR NO. 5
I11 INJECTOR NO. 6
L
R
Y
W
R–L
G
CIR OPN
RELAY
G–R
L–B
5 EB2
4 EB2
3 IK2
7 ID1
F19
FUEL
PUMP
M
W–B
G–R
G
R–L
W
Y
R
L
B–R
J37
JUNCTION
CONNECTOR
BN


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A EFI
EFI RELAY
5A STARTER
FROM FAN NO. 1 RELAY
J26 JUNCTION CONNECTOR
P 1 PARK/NEUTRAL POSITION SW
J28 (A), J29 (B) JUNCTION CONNECTOR
J8 (A), J9 (B) JUNCTION CONNECTOR
E7 (A), E8 (B), E9 (C), E10 (D) ENGINE CONTROL MODULE
+B
BATT
CF
STA
NSW
FC
#60
#50
#40
#30
#20
#10
NEO
EFI+
EFI–
TRC+
TRC–
FROM TRACTION CONTROL ECU
EC


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A TAIL
10A MIRROR– HEATER
15A STOP
J23 JUNCTION CONNECTOR
J18, J19 JUNCTION CONNECTOR
J27 JUNCTION CONNECTOR
S10 STOP LIGHT SW
V 6 VSV (INTAKE AIR CONTROL)
V 7 VSV (VAPOR PRESSURE SENSOR)
V 4 VSV (EGR)
V 5 VSV (EVAP)
E7 A, E8 B, E9 C, E10 D
ENGINE CONTROL MODULE
ELS
ELS2
STP
ACIS
TPC
EGR
EVP1
IGT1
IGT2
IGT3
IGF
VG
THA
E2G
I3 IGNITION COIL NO. 1
I4 IGNITION COIL NO. 2
I5 IGNITION COIL NO. 3
I2 IGNITER
IGC3
IGC2
IGC1
+B
GND
M1 MASS AIR FLOW METER
EE
B–Y
G–O
W
G–W
R–Y
W–R
Y–G
LG
GR
BR–Y
LG–B
P
L–Y
R–B
B–R
BR
G
Y
L


J23
JUNCTION CONNECTOR
I 1
IDLE AIR CONTROL VALVE
H10
HEATED OXYGEN SENSOR (BANK 1 SENSOR 2)
H 5
HEATED OXYGEN SENSOR (BANK 1 SENSOR 1)
H 6
HEATED OXYGEN SENSOR (BANK 2 SENSOR 1)
D 1
DATA LINK CONNECTOR 1
IK1
I 5
I 6
+B
E1
HT
OX
TE1
(SHIELDED)
RSO
RSC
HTS
OXS
HTR
OXR1
HTL
OXL1
TC
E 7 A, E 8 B, E 9 C, E10 D
ENGINE CONTROL MODULE
E2
VTA1
VC
THG
THW
PTNK
EGLS
PS
E 1
EGR GAS TEMP. SENSOR
E 4
ENGINE COOLANT TEMP. SENSOR
V 1
VAPOR PRESSURE SENSOR
E 2
EGR VALVE POSITION SENSOR
VCC
VTA
T 2
THROTTLE POSITION SENSOR
P 2
POWER STEERING OIL PRESSURE SW
BR
B–Y
R–W
Y–B
P–B
B
L–B
W
Y–R
L–W
G–Y
G–B
L–R
W–G
B–L
L
Y


BR
(SHIELDED)
I 5
I 6
J24
JUNCTION
CONNECTOR
C 2
CRANKSHAFT
POSITION SENSOR
C 1
CAMSHAFT POSITION
SENSOR
B–R
B–W
L
W
G–R
V–W
NE+
NE–
G22+
E1
ADJ2
SIL
W
SPD
E7 A, E8 B, E9 C, E10 D
ENGINE CONTROL MODULE
KNKL
KNKR
THWO
ACT
A/C
TACH
E01
E02
E03
EC1
V
LG–B
B–Y
B–O
J28 A, J29 B
JUNCTION CONNECTOR
TO ABSORBER
CONTROL ECU
TW2
ACT
AC1
IGN
A14 A, A15 B
A/C CONTROL ASSEMBLY
K 2
KNOCK SENSOR 2
K 1
KNOCK SENSOR 1
ED


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
7. 5A
OBD
10A
GAUGE
BR
(SHIELDED)
IK3
I11
J8 Ⓐ, J9 Ⓑ
JUNCTION CONNECTOR
D 4
DATA LINK
CONNECTOR 3
SG
BAT
SIL
CG
J28 Ⓐ, J29 Ⓑ
JUNCTION
CONNECTOR
J 4
JUNCTION
CONNECTOR
R–L
V–W
IJ1
IK2
C 7 Ⓐ, C 9 Ⓒ, C10 Ⓓ
COMBINATION METER
TACHOMETER
MALFUNCTION
INDICATOR LAMP
SPEEDOMETER
W
G–R
V–W
J17
JUNCTION
CONNECTOR
W–B
J25
JUNCTION
CONNECTOR
B–O
G–R
L
P
IL1
IK1
V 2
VEHICLE SPEED SENSOR
(COMBINATION METER)
SI
SE
IG+
J15
JUNCTION
CONNECTOR
EE
II
IJ

SERVICE HINTS

CIR OPN RELAY

(1) 5 – (1) 3 : CLOSED WITH THE STARTER RUNNING

EFI RELAY

5–3 : CLOSED WITH THE IGNITION SW AT **ON** OR **ST** POSITION

E 4 ENGINE COOLANT TEMP. SENSOR

1–2 : **10.0 –20.0** KΩ **(–20**°C, **–4**°F)
4.0 – 7.0 KΩ (**0**°C, **32**°F)
2.0 – 3.0 KΩ (**20**°C, **68**°F)
0.9 – 1.3 KΩ (**40**°C, **104**°F)
0.4 – 0.7 KΩ (**60**°C, **140**°F)
0.2 – 0.4 KΩ (**80**°C, **176**°F)

E7(A) , E 8(B) , E 9(C) , E10(D) ENGINE CONTROL MODULE

VOLTAGE AT ENGINE CONTROL MODULE WIRING CONNECTOR

BATT–E1 : ALWAYS **9.0–14.0** VOLTS
+B–E1 : 9.0–14.0 VOLTS (IGNITION SW TO **ON** POSITION)
VC–E2 : ALWAYS **4.5–5.5** VOLTS (IGNITION SW AT **ON** POSITION)
VTA1–E2 : 0.3–0.8 VOLTS (IGNITION SW ON AND THROTTLE VALVE FULLY CLOSED)
3.2–4.9 VOLTS (IGNITION SW ON AND THROTTLE VALVE FULLY OPEN)
VG–E2G : 1.1–1.5 VOLTS (ENGINE IDLING AND A/C SW OFF)
THA–E2 : 0.5–3.4 VOLTS (ENGINE IDLING AND INTAKE AIR TEMP. **20**°C, **68**°F)
THW–E2 : 0.2–1.0 VOLTS (ENGINE IDLING AND COOLANT TEMP. **80**°C, **176**°F)
IGF–E1 : 4.5–5.5 VOLTS (IGNITION SW AT **ON** POSITION)
PULSE GENERATION (ENGINE IDLING)
G22+–NE : PULSE GENERATION (ENGINE IDLING)
NE+–NE : PULSE GENERATION (ENGINE IDLING)
SIL–E1 : PULSE GENERATION (DURING TRANSMISSION)
TACH–E1 : PULSE GENERATION (ENGINE IDLING)
STA–E1 : 6.0 VOLTS OR MORE (ENGINE CRANKING)
THG–E2 : 4.5–5.5 VOLTS (IGNITION SW AT **ON** POSITION)
EGR–EO1: 9.0–14.0 VOLTS (IGNITION SW AT **ON** POSITION)
FC–E1 : 9.0–14.0 VOLTS (IGNITION SW AT **ON** POSITION)
0–3.0 VOLTS (ENGINE IDLING)
SPD–E1 : PULSE GENERATION (IGNITION SW ON AND ROTATE DRIVING WHEEL SLOWLY)
W–E1 : BELOW **3.0** VOLTS (IGNITION SW AT **ON** POSITION)
A/C–E1 : BELOW **2.0** VOLTS (ENGINE IDLING AND A/C SW ON)
9.0–14.0 VOLTS (A/C SW OFF)
ACT–E1 : 9.0–14.0 VOLTS (ENGINE IDLING AND A/C SW ON)
BELOW **2.0** VOLTS (A/C SW OFF)
ACIS–EO1 : 9.0–14.0 VOLTS (IGNITION SW AT **ON** POSITION)
NSW–E1 : 9.0–14.0 VOLTS (IGNITION SW ON AND OTHER SHIFT POSITION IN **P** OR **N** POSITION)
0–3.0 VOLTS (IGNITION SW ON AND SHIFT POSITION IN **P** OR **N** POSITION)
EVP–E01 : 9.0–14.0 VOLTS (IGNITION SW AT **ON** POSITION)
TC–E1 : 9.0–14.0 VOLTS (IGNITION SW AT **ON** POSITION)
STP–E1 : 7.5–14.0 VOLTS (IGNITION SW ON AND BRAKE PEDAL DEPRESSED)
0–1.5 VOLTS (IGNITION SW ON AND BRAKE PEDAL DEPRESSED)
CF–E1 : 9.0–14.0 VOLTS (COOLING FAN IS OPERATING ON HIGH SPEED)
: 0–2.0 VOLTS (COOLING FAN IS OPERATING ON LOW SPEED OR OFF)
TPC–E1 : 9.0–14.0 VOLTS (IGNITION SW ON AND DISCONNECT THE VACUUM HOSE FROM THE VAPOR PRESSURE SENSOR)
PTNK–E1 : 3.0–3.6 VOLTS (IGNITION SW AT **ON** POSITION)
1.3–2.1 VOLTS (IGNITION SW ON AND APPLY VACUUM **2.0** KPA)
RSC,RSO–E1 : 9.0–14.0 VOLTS (IGNITION SW AT **ON** POSITION)
KNKL,KNKR–E1 : PULSE GENERATION (ENGINE IDLING)
HTS, HTL, HTR–E03 : 9.0–14.0 VOLTS (IGNITION SW AT **ON** POSITION)
0–3.0 VOLTS (ENGINE IDLING)
OXS, OXL1, OXR1–E1 : PULSE GENERATION (MAINTAIN ENGINE SPEED AT **2500** RPM FOR TWO MINUTES AFTER WARMING UP)
IGT1, IGT2, IGT3–E1:PULSE GENERATION (ENGINE IDLING)
#10, #20, #30, #40, #50, #60–EO1:9.0–14.0 VOLTS (IGNITION SW AT **ON** POSITION)
:PULSE GENERATION (ENGINE IDLING)

I 6, I 7, I 8, I 9 , I10, I 11 INJECTOR

2–1 : APPROX. **13.8** Ω

T 2 THROTTLE POSITION SENSOR

2–1 **: 3.75** KΩ

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A14 A	28	H10	28	J23	29
A15 B	28	I 1	27	J24	29
C 1	26	I 2	27	J25	29
C 2	26	I 3	27	J26	29
C 7 A	28	I 4	27	J27	29
C 9 C	28	I 5	27	J28 A	29
C10 D	28	I 6	27	J29 B	29
D 1	26	I 7	27	J37	30
D 4	28	I 8	27	K 1	27
E 1	26	I 9	27	K 2	27
E 2	26	I10	27	M 1	27
E 4	26	I11	27	P 1	27
E 7 A	28	I13	28	P 2	27
E 8 B	28	J 4	29	S10	29
E 9 C	28	J 8 A	29	T 2	27
E10 D	28	J 9 B	29	V 1	27
F 6 A	26	J15	29	V 2	27
F 8 C	26	J17	29	V 4	27
F19	30	J18 A	29	V 5	27
H 5	26	J19 B	29	V 6	27
H 6	26	J22	29	V 7	27

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
1	22	ENGINE ROOM R/B (ENGINE COMPARTMENT LEFT)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1C		
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1K		
1R		
1W		
2A	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2C		
2F		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2K		
2L		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EB2	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE ENGINE ROOM J/B)
EC1	34	ENGINE WIRE AND SENSOR WIRE (LEFT BANK OF THE CYLINDER HEAD)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
ID1	36	FLOOR WIRE AND COWL WIRE (LEFT KICK PANEL)
IJ1	38	INSTRUMENT PANEL WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK2		
IK3		
IL1	38	ENGINE WIRE AND INSTRUMENT PANEL WIRE (UNDER THE GLOVE BOX)

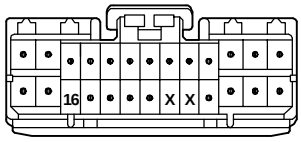
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EC	34	LEFT RADIATOR SIDE SUPPORT
ED	34	SURGE TANK RH
EE	34	REAR SIDE OF SURGE TANK
II	36	INSTRUMENT PANEL BRACE LH
IJ	36	INSTRUMENT PANEL BRACE RH
BN	40	UNDER THE LEFT CENTER PILLAR

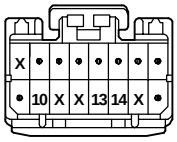
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 5	38	ENGINE WIRE	I11	38	INSTRUMENT PANEL WIRE
I 6					

A14 Ⓐ



A15 Ⓑ



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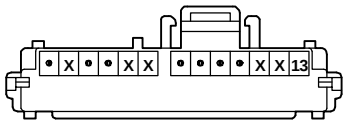
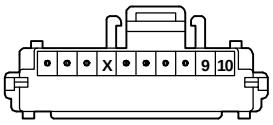
C 2 BLACK

C 7 Ⓐ BLUE



C 9 Ⓒ GRAY



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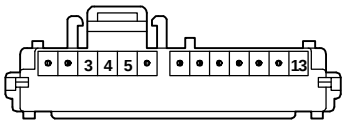

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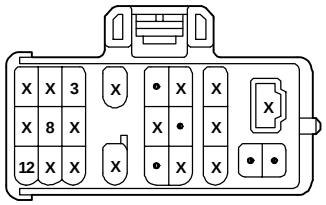

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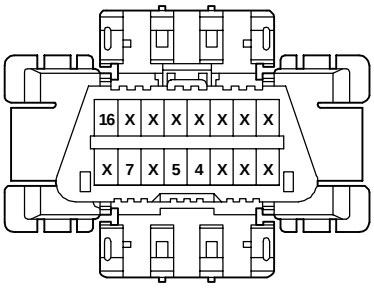

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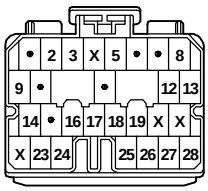
E 2 BLACK

E 4 DARK GRAY

E 7 Ⓐ



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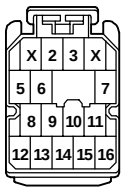

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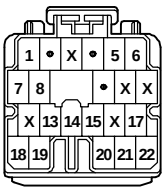

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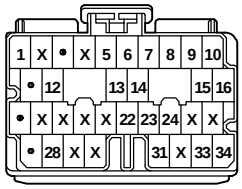

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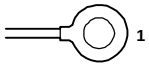

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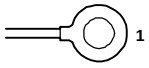

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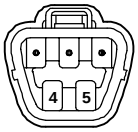

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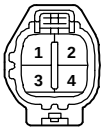

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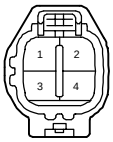

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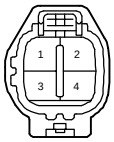

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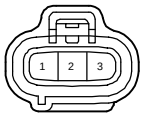

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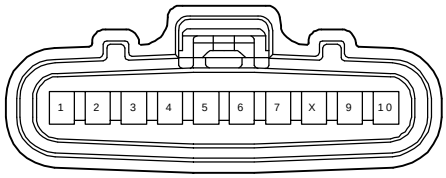

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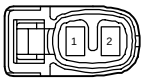

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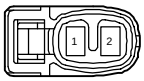

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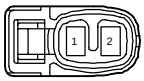


I 6 GRAY

I 7 GRAY

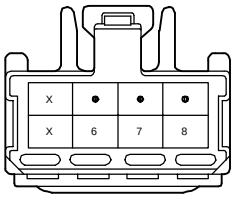
I 8 GRAY

I 9 GRAY

I10 GRAY

I11 GRAY

I13



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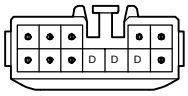
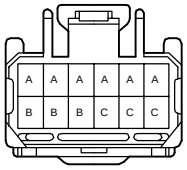


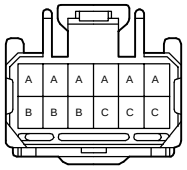
(HINT : SEE PAGE 7)

J 8 (A) GRAY



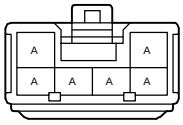
(HINT : SEE PAGE 7)

J 9 (B) GRAY



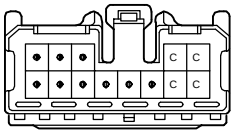
(HINT : SEE PAGE 7)

J15



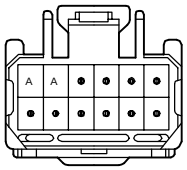
(HINT : SEE PAGE 7)

J17 BLUE



(HINT : SEE PAGE 7)

J18 (A) BLACK



(HINT : SEE PAGE 7)

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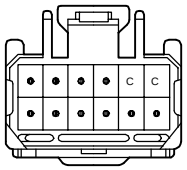
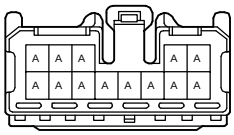


(HINT : SEE PAGE 7)

J22 ORANGE



(HINT : SEE PAGE 7)

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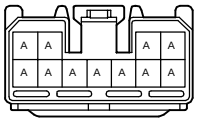

(HINT : SEE PAGE 7)

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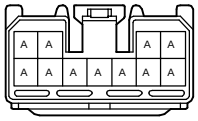
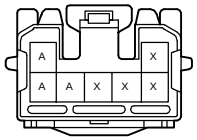


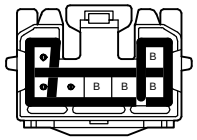
(HINT : SEE PAGE 7)

J25



(HINT : SEE PAGE 7)

J26



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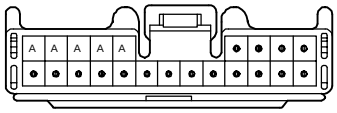

(HINT : SEE PAGE 7)

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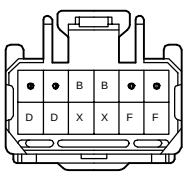
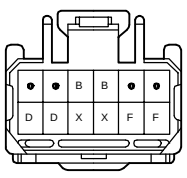


(HINT : SEE PAGE 7)

J29 (B)



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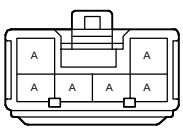
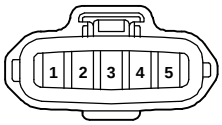


K 1 DARK GRAY

K 2 DARK GRAY

M 1 BLACK



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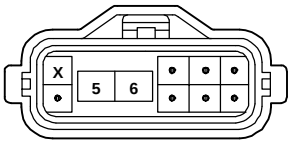

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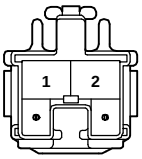
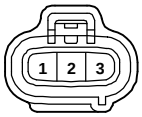


T 2 BLACK

V 1 GRAY



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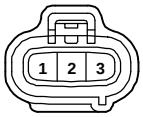

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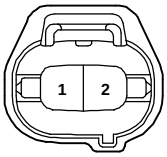

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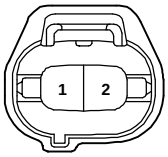
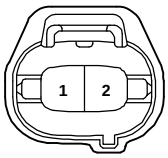
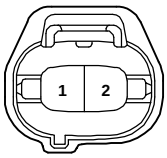


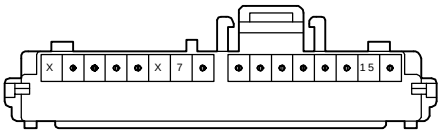
V 6 BROWN



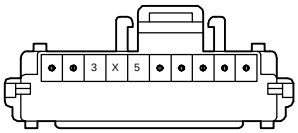
V 7 BLUE



C 8 (B)



C 9 (C) GRAY



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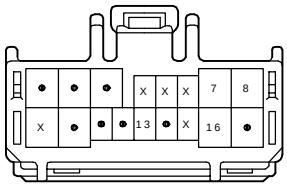
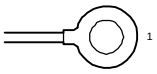
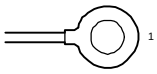


F 6 (A)



F 8 (C)



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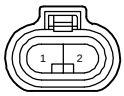

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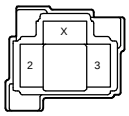

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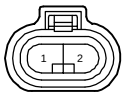

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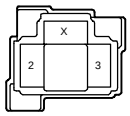

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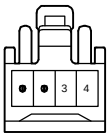
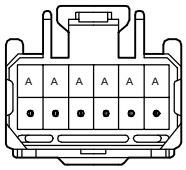
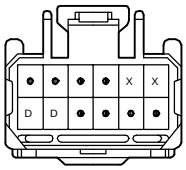


J 8 GRAY



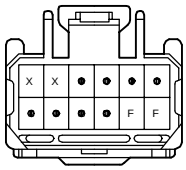
(HINT : SEE PAGE 7)

J10 (A)



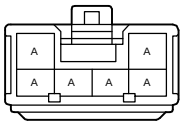
(HINT : SEE PAGE 7)

J11 (B)



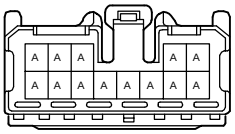
(HINT : SEE PAGE 7)

J15



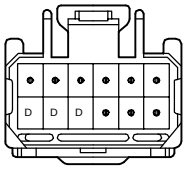
(HINT : SEE PAGE 7)

J16 ORANGE



(HINT : SEE PAGE 7)

J18 (A) BLACK



(HINT : SEE PAGE 7)

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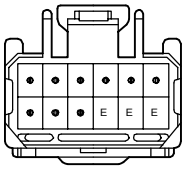

(HINT : SEE PAGE 7)

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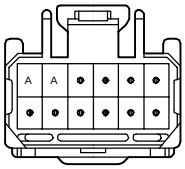

(HINT : SEE PAGE 7)

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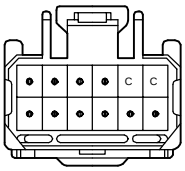
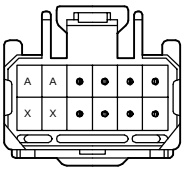


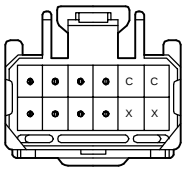
(HINT : SEE PAGE 7)

J31 (A)



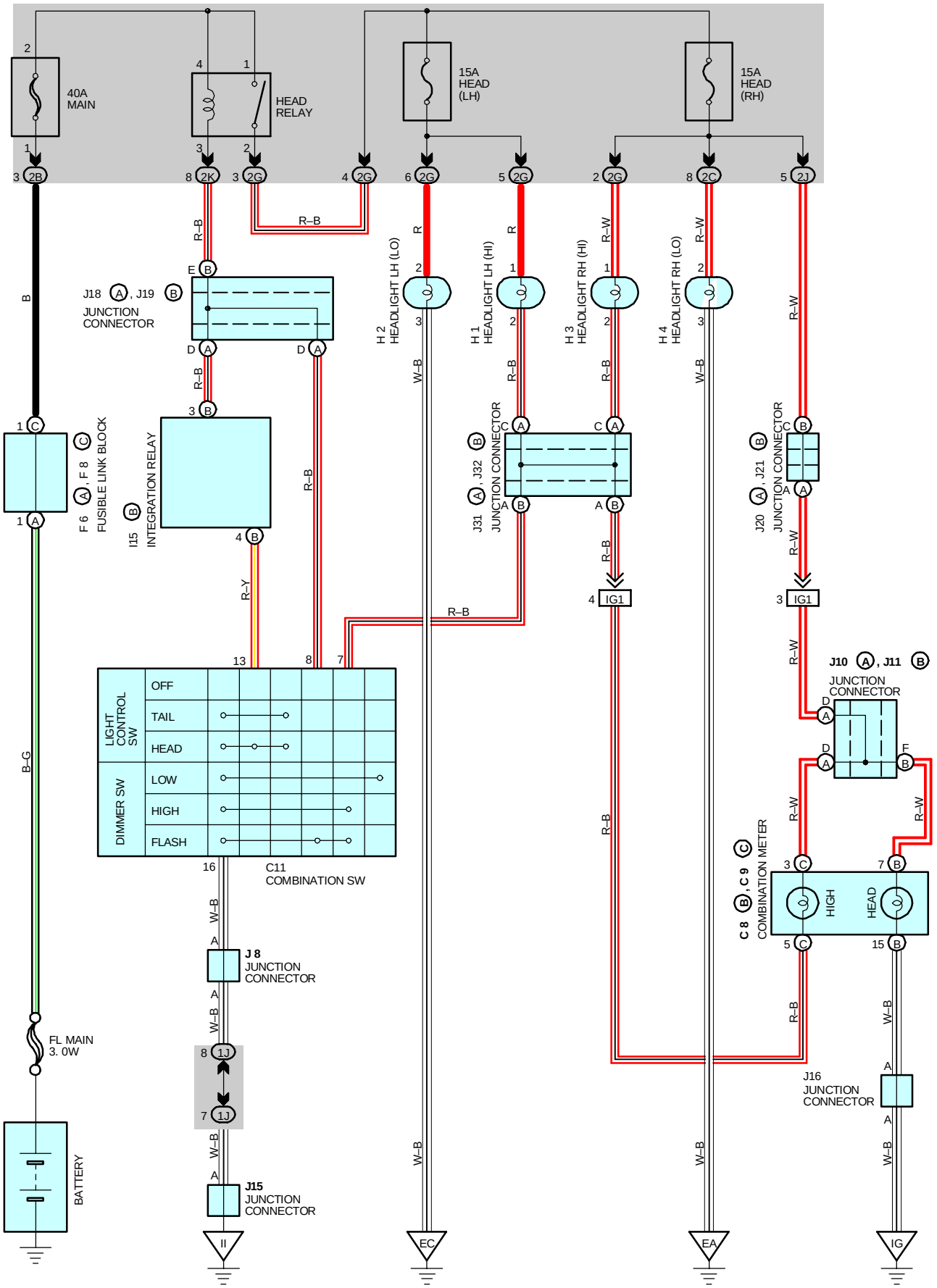
(HINT : SEE PAGE 7)

J32 (B)



(HINT : SEE PAGE 7)

HEADLIGHT (USA)



SERVICE HINTS

HEAD RELAY

1–2 : CLOSED WITH THE LIGHT CONTROL SW AT **HEAD** POSITION OR THE DIMMER SW AT **FLASH** POSITION

LIGHT AUTO TURN OFF OPERATION

PLEASE REFER TO THE LIGHT AUTO TURN OFF SYSTEM (SEE PAGE 115)

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 8 B	28	H 3	26	J16	29
C 9 C	28	H 4	26	J18 A	29
C11	28	I15 B	28	J19 B	29
F 6 A	26	J 8	29	J20 A	29
F 8 C	26	J10 A	29	J21 B	29
H 1	26	J11 B	29	J31 A	29
H 2	26	J15	29	J32 B	29

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
2B	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2C		
2G		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2K		

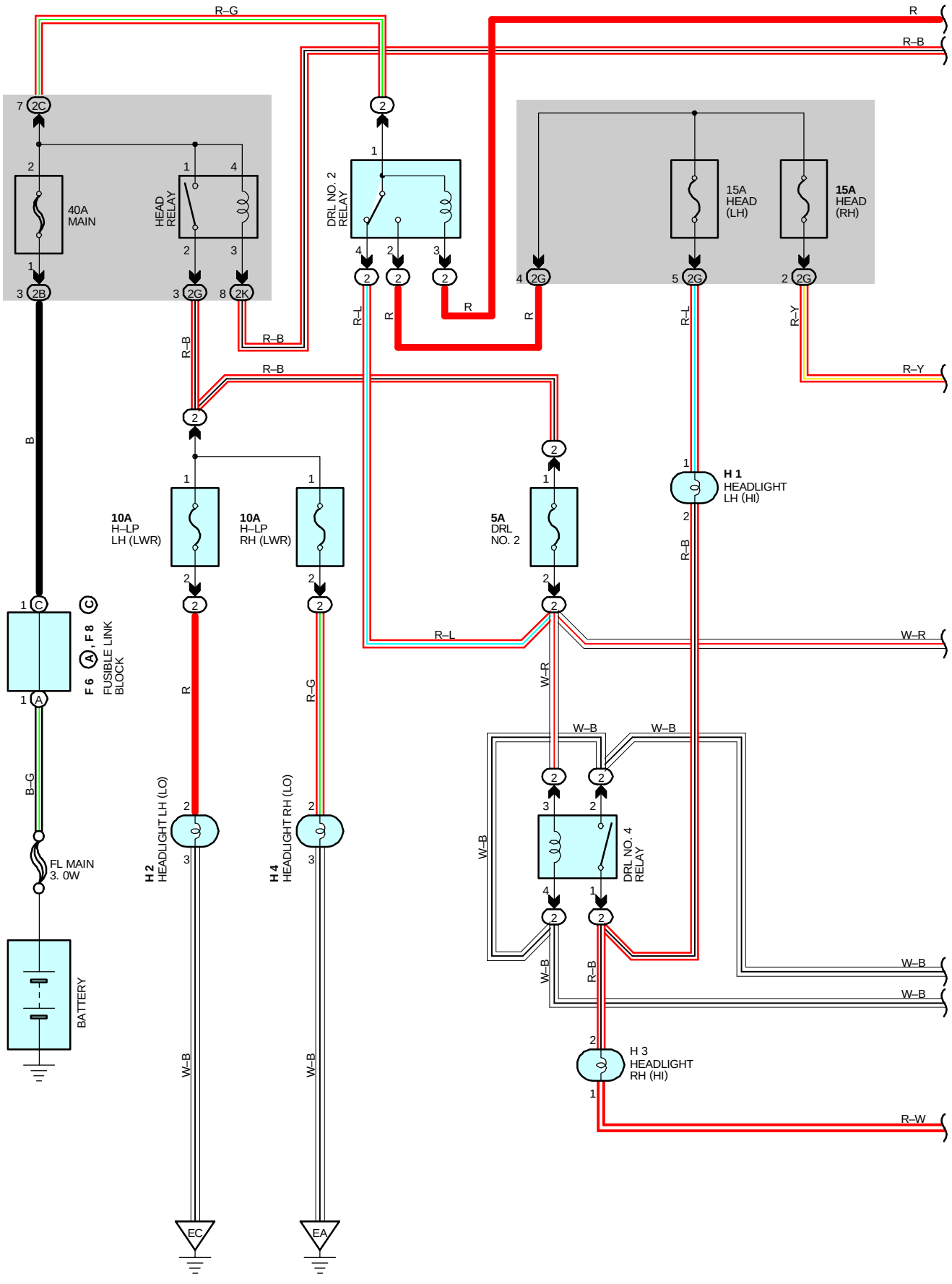
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

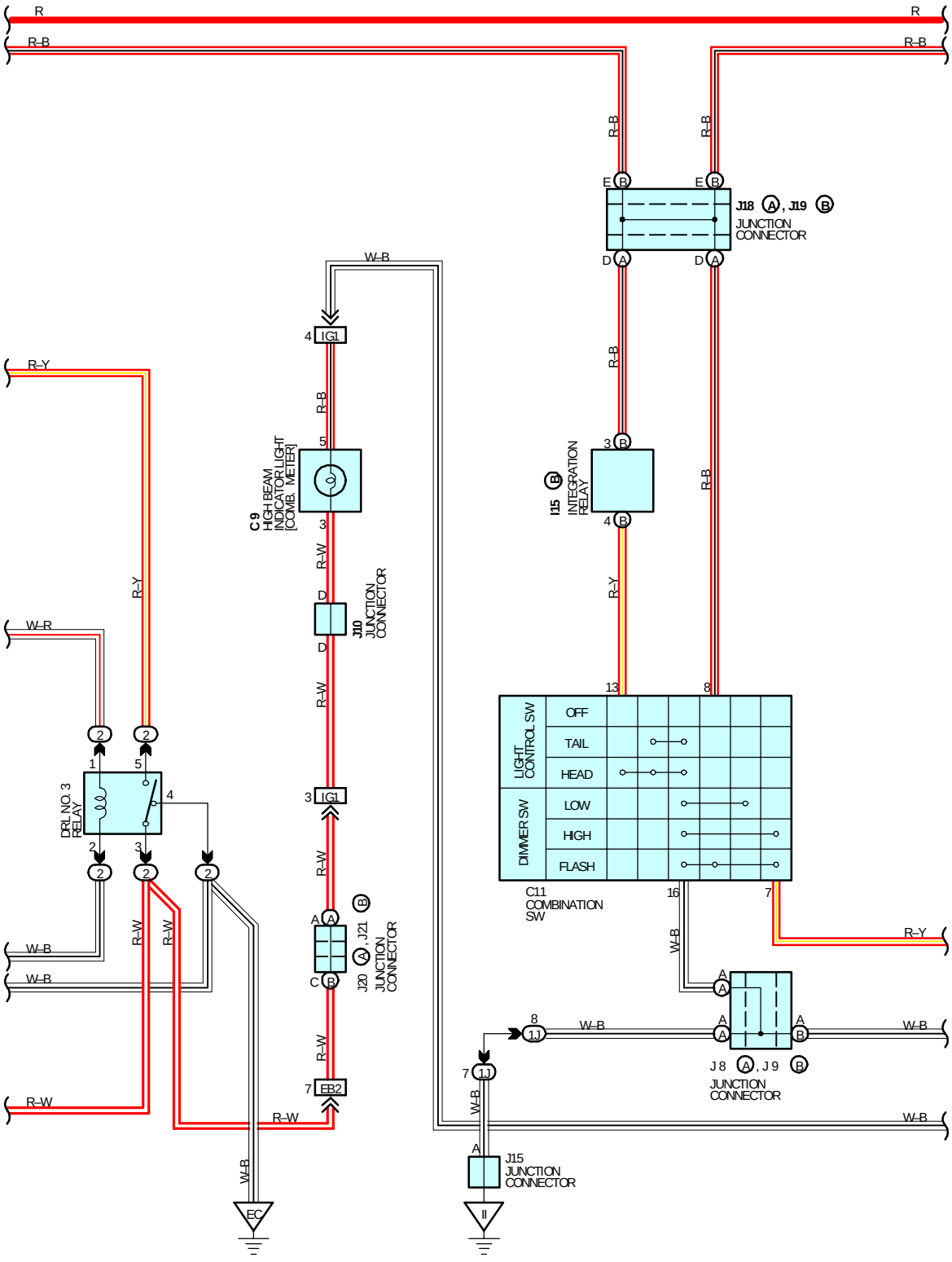
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IG1	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)

: GROUND POINTS

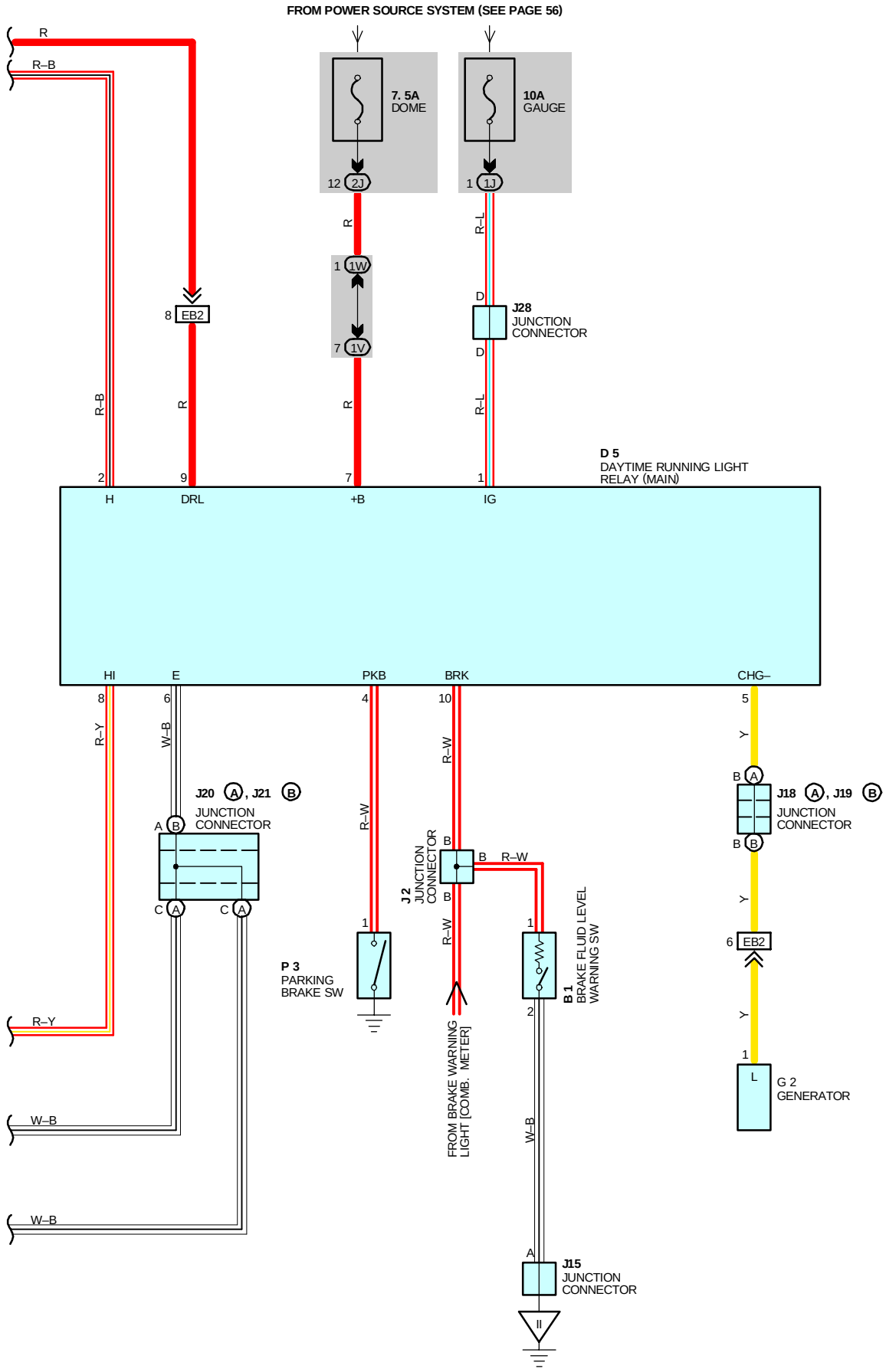
CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	RIGHT RADIATOR SIDE SUPPORT
EC	34	LEFT RADIATOR SIDE SUPPORT
IG	36	LEFT KICK PANEL
II	36	INSTRUMENT PANEL BRACE LH

HEADLIGHT(CANADA)




R
R-B
W-B
R-Y
W-R
R-W
J18 A, J19 B
JUNCTION CONNECTOR
C9
HIGH BEAM INDICATOR LIGHT [COMB. METER]
J10
JUNCTION CONNECTOR
I15
INTEGRATION RELAY
DRL NO. 3 RELAY
C11
COMBINATION SW
LIGHT CONTROL SW
DIMMER SW
OFF
TAIL
HEAD
LOW
HIGH
FLASH
IG1
EB2
J20 A, J21 B
JUNCTION CONNECTOR
J8 A, J9 B
JUNCTION CONNECTOR
J15
JUNCTION CONNECTOR
EC

HEADLIGHT(CANADA)



SYSTEM OUTLINE

CURRENT FROM THE BATTERY IS ALWAYS FLOWING FROM THE FL MAIN → **MAIN** FUSE → HEAD RELAY (COIL SIDE) → **TERMINAL 2** OF THE DAYTIME RUNNING LIGHT RELAY (MAIN) AND **TEINRMINAL 8** OF THE DIMMER SW, HEAD RELAY (COIL SIDE) → **TERMINAL Ⓑ 3** OF THE INTEGRATION RELAY → **TERMINAL Ⓒ 4** → **TERMINAL 13** OF THE LIGHT CONTROL SW, FL MAIN → **MAIN** FUSE → DRL NO.2 RELAY (COIL SIDE) → **TERMINAL 9** OF THE DAYTIME RUNNING LIGHT RELAY (MAIN).

1. DAYTIME RUNNING LIGHT OPERATION

WHEN THE ENGINE IS STARTED, VOLTAGE GENERATED AT **TERMINAL 'L'** OF THE GENERATOR IS APPLIED TO **TERMINAL 5** OF THE DAYTIME RUNNING LIGHT RELAY (MAIN).

IF THE PARKING BRAKE PEDAL IS DEPRESSED (PARKING BRAKE SW ON) AT THIS TIME, THE RELAY IS NOT ENERGIZED, SO THE DAYTIME RUNNING LIGHT SYSTEM DOES NOT OPERATE. IF THE PARKING PEDAL LEVER IS RELEASED (PARKING BRAKE SW OFF), THE SIGNAL IS INPUT TO **TERMINAL 4** OF THE RELAY. THIS ACTIVATES THE RELAY AND CURRENT FROM **MAIN** FUSE FLOWS TO DRL NO. 2 RELAY (POINT SIDE) → **HEAD (LH)** FUSE → **TERMINAL 1** OF THE HEADLIGHT LH (LH) → **TERMINAL 2** → **TERMINAL 2** OF THE HEADLIGHT RH (HI) → **TERMINAL 1** → **TERMINAL 3** OF THE DRL NO.3 RELAY → **TERMINAL 4** → TO **GROUND,** CAUSING THE HEADLIGHTS TO LIGHT UP DIMMER THAN NORMAL BRIGHTNESS.

THIS IS HOW THE DAYTIME RUNNING LIGHT SYSTEM OPERATES ONCE THE DAYTIME RUNNING LIGHT SYSTEM OPERATES AND THE HEADLIGHTS HAVE LIGHT UP, THE HEADLIGHTS REMAIN ON EVEN IF THE PARKING BRAKE PEDAL IS DEPRESSED (PARKING BRAKE SW ON).

EVEN IF THE ENGINE STALLS WITH THE IGNITION SW ON AND THERE IS NO VOLTAGE FROM **TERMINAL 'L'** OF THE GENERATOR, THE HEADLIGHTS REMAIN ON. IF THE IGNITION SW IS THEN TURNED OFF, HEADLIGHT ARE TURNED OFF.

IF THE ENGINE IS STARTED WHILE THE PARKING BRAKE PEDAL IS RELEASED (PARKING BRAKE SW OFF), THE DAYTIME RUNNING LIGHT SYSTEM OPERATES AND THE HEADLIGHTS LIGHT UP AS THE ENGINE STARTS.

2. HEADLIGHT OPERATION

- WHEN THE LIGHT CONTROL SW AT THE **HEAD** POSITION
  WHEN THE LIGHT CONTROL SW IS SET TO **HEAD** POSITION, THE CURRENT FLOWING TO THE HEAD RELAY (COIL SIDE) FLOWS TO **TERMINAL B 3** OF THE INTEGRATION RELAY → **TERMINAL Ⓑ 4** → **TERMINAL 13** OF THE LIGHT CONTROL SW → **TERMINAL 16** → **GROUND,** TURNING THE HEAD RELAY ON.
  THIS CAUSES THE CURRENT FLOWING TO THE HEAD RELAY (POINT SIDE) → **DRL NO. 2** FUSE → DRL NO.3 RELAY (COIL SIDE) AND DRL NO.4 RELAY (COIL SIDE) → **GROUND,** TURNING THE DRL NO.3 AND NO.4 RELAY ON. ALSO, CURRENT FROM THE HEAD RELAY (POINT SIDE) TO **HEAD (LWR)** FUSES → **TERMINAL 2** OF THE HEADLIGHT (LO) → **TERMINAL 3** → **GROUND,** SO THE HEADLIGHTS (LO SIDE) LIGHT UP.
- DIMMER SW AT **FLASH** POSITION
  WHEN THE DIMMER SW IS SET TO **FLASH** POSITION, CURRENT FLOWS FROM HEAD RELAY (COIL SIDE) → **TERMINAL 8** OF THE DIMMER SW → **TERMINAL 16** → **GROUND,** TURNING THE HEAD RELAY ON. AT THE SAME TIME, SIGNALS ARE OUTPUT FROM **TERMINAL 7** AND **TERMINAL 8** OF THE DIMMER SW TO **TERMINAL 8** AND **TERMINAL 2** OF THE DAYTIME RUNNING LIGHT RELAY (MAIN), ACTIVATING THE DAYTIME RUNNING LIGHT RELAY (MAIN) AND ALSO THE DRL NO.2 RELAY. WHEN THE HEAD RELAY AND DAYTIME RUNNING LIGHT RELAY (MAIN) ARE ACTIVATED, THE HEADLIGHTS (LO AND HI) THEN LIGHT UP.
- DIMMER SW AT **HIGH** POSITION
  WHEN THE LIGHT CONTROL SW IS SET TO **HEAD** POSITION, A SIGNAL IS OUTPUT FROM **TERMINAL 13** OF THE LIGHT CONTROL SW → **TERMINAL Ⓑ 4** OF THE INTEGRATION RELAY → **TERMINAL Ⓑ 3** → **TERMINAL 2** OF THE DAYTIME RUNNING LIGHT RELAY (MAIN). WHEN DIMMER SW IS SET TO **HIGH** POSITION, A SIGNAL IS OUTPUT FROM **TERMINAL 7** OF THE DIMMER SW TO **TERMINAL 8** OF THE DAYTIME RUNNING LIGHT RELAY (MAIN). THESE SIGNALS ACTIVATE DRL NO.2 RELAY, SO CURRENT FLOWS FROM DRL NO.2 RELAY (POINT SIDE) → **HEAD (LH)** FUSE → **TERMINAL 1** OF THE HEADLIGHT LH (HI) → **TERMINAL 2** → DRL NO.4 RELAY (POINT SIDE) → **GROUND,** AND CURRENT ALSO SIMULTANEOUSLY FLOWS FROM **HEAD (RH)** FUSE → DRL NO.3 RELAY (POINT SIDE) → **TERMINAL 1** OF THE HEADLIGHT RH (HI) → **TERMINAL 2** → DRL NO.4 RELAY (POINT SIDE), CAUSING THE HEADLIGHTS (HI SIDE) TO LIGHT UP.

SERVICE HINTS

D 5 DAYTIME RUNNING LIGHT RELAY (MAIN)

1–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
7–GROUND : ALWAYS APPROX. **12** VOLTS
4–GROUND : CONTINUITY WITH THE PARKING BRAKE PEDAL DEPRESSED (PARKING BRAKE SW ON)
5–GROUND : ALWAYS CONTINUITY

HEADLIGHT(CANADA)

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
B 1	26	H 2	26	J15	29
C 9	28	H 3	26	J18 A	29
C11	28	H 4	26	J19 B	29
D 5	28	I15 B	28	J20 A	29
F 6 A	26	J 2	29	J21 B	29
F 8 C	26	J 8 A	29	J28	29
G 2	26	J 9 B	29	P 3	29
H 1	26	J10	29		

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
2	23	ENGINE ROOM NO.2 R/B (ENGINE COMPARTMENT LEFT)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
IJ	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1V		
1W		
2B	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2C		
2G		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2K		

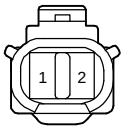
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EB2	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE ENGINE ROOM J/B)
IG1	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)

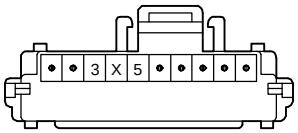
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	RIGHT RADIATOR SIDE SUPPORT
EC	34	LEFT RADIATOR SIDE SUPPORT
II	36	INSTRUMENT PANEL BRACE LH

B 1 GRAY



C 9 GRAY



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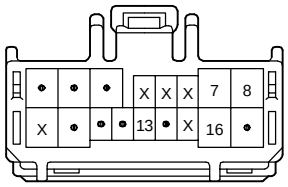
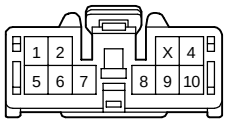
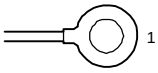


D 5 GRAY



F 6 (A)



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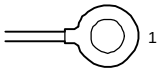

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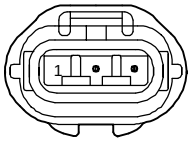
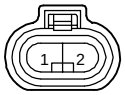


H 1 BLACK



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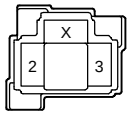

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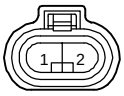
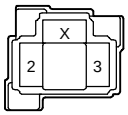
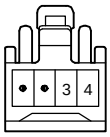


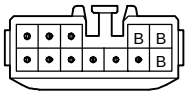
H 4 BLACK



I15 (B)

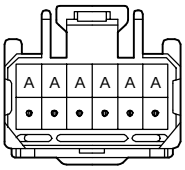


J 2 BLACK



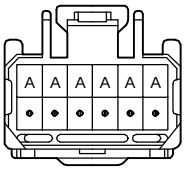
(HINT : SEE PAGE 7)

J 8 (A) GRAY



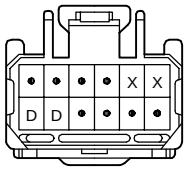
(**HINT : SEE PAGE 7**)

J 9 (B) GRAY



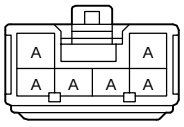
(HINT : SEE PAGE 7)

J10



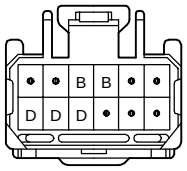
(HINT : SEE PAGE 7)

J15



(HINT : SEE PAGE 7)

J18 (A) BLACK



(HINT : SEE PAGE 7)

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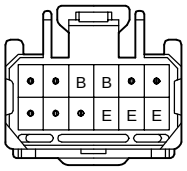
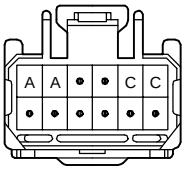


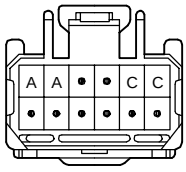
(HINT : SEE PAGE 7)

J20 (A) BLACK



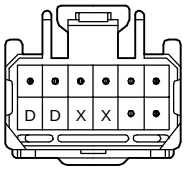
(HINT : SEE PAGE 7)

J21 (B) BLACK



(HINT : SEE PAGE 7)

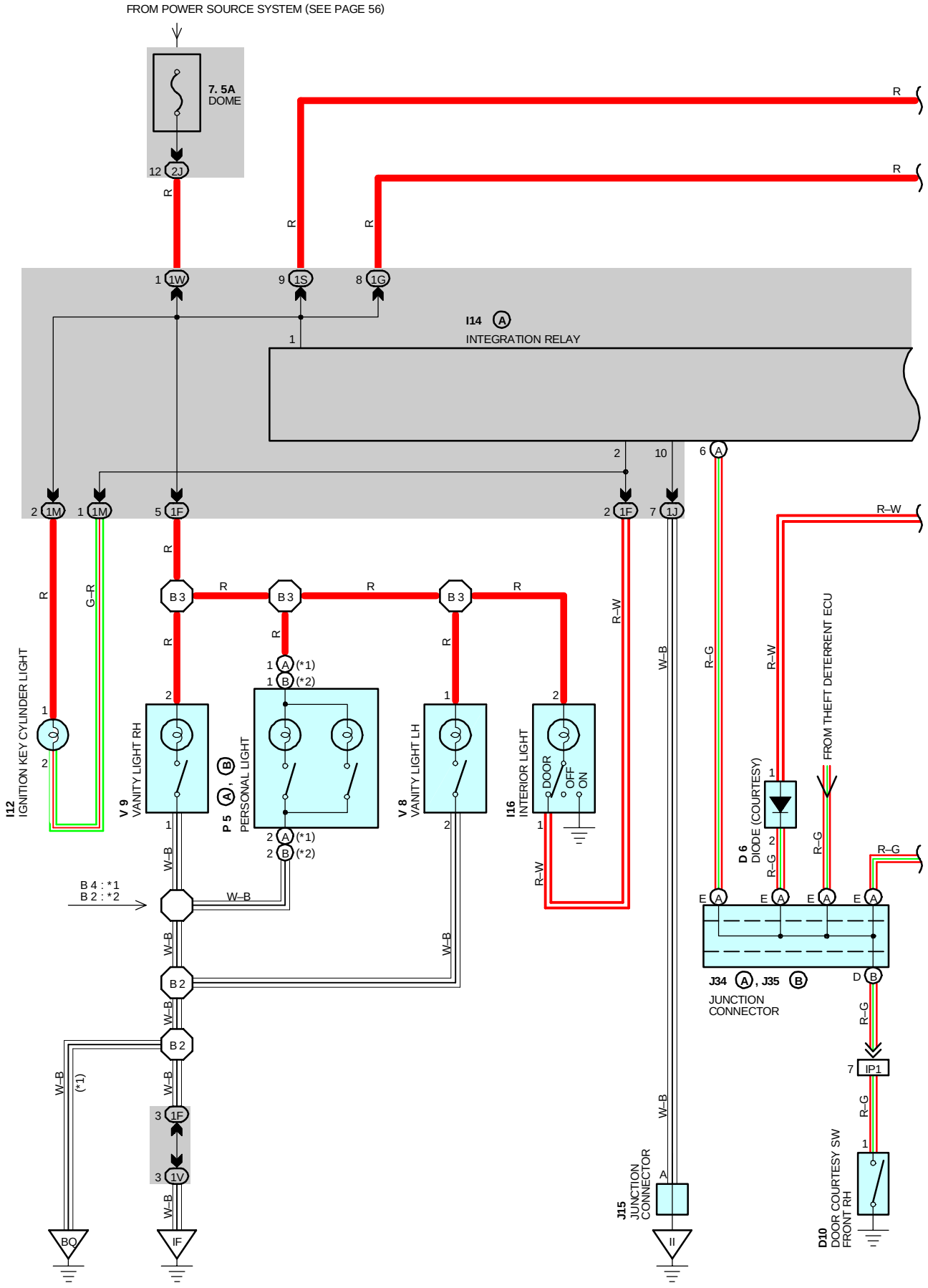
J28



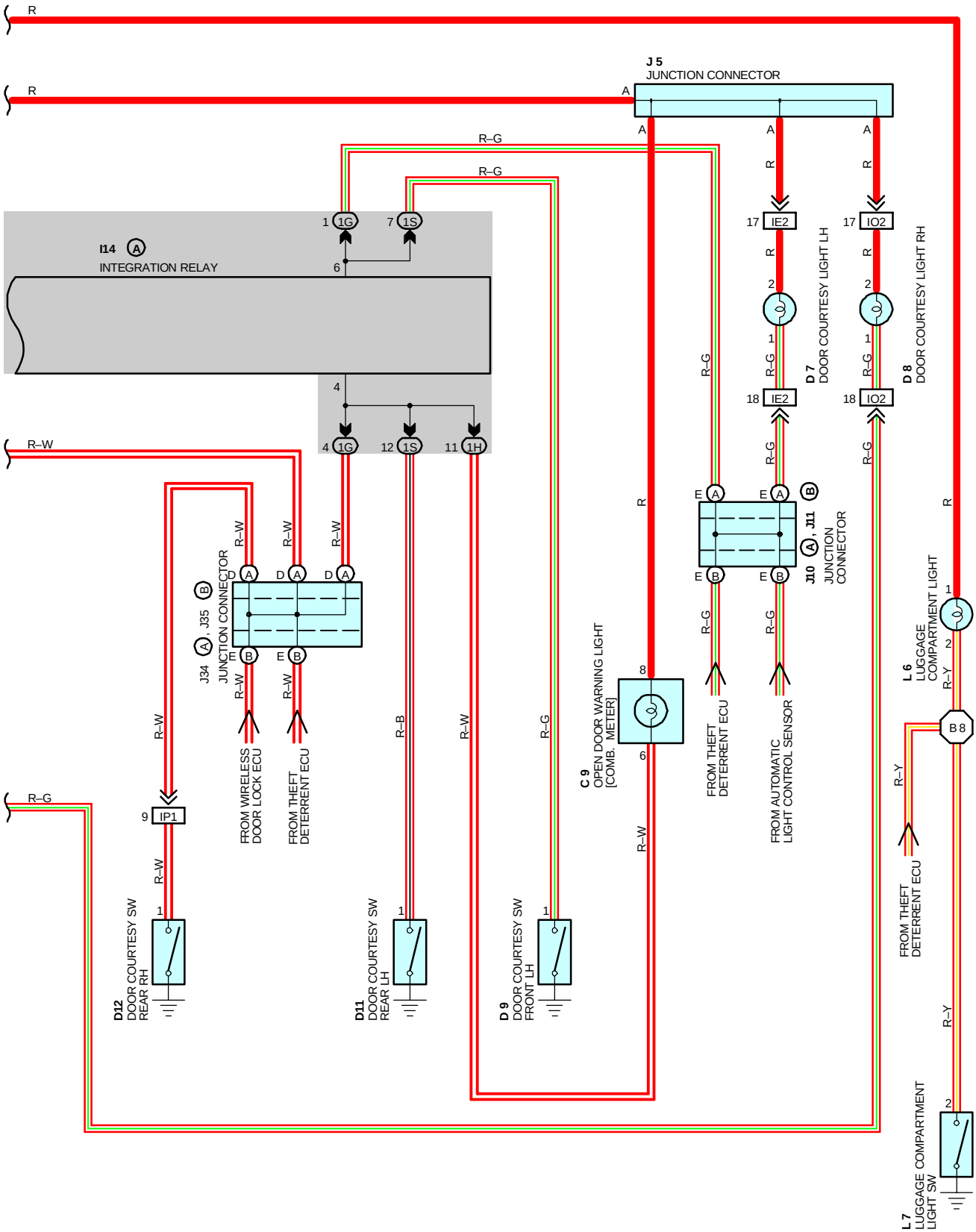
(HINT : SEE PAGE 7)

P 3

INTERIOR LIGHT



* 1 : W/ MOON ROOF
* 2 : W/O MOON ROOF



INTERIOR LIGHT

SERVICE HINTS

INTEGRATION RELAY

1–GROUND : ALWAYS APPROX. **12** VOLTS

4–GROUND : CONTINUITY WITH EACH DOOR (FRONT RH, REAR LH AND RH) OPEN

6–GROUND : CONTINUITY WITH THE FRONT LH DOOR OPEN

D 9, D10, D11, D12 DOORCOURTESY SW FRONT LH, RH, REAR, LH, RH

1–GROUND : CLOSED WITH THE DOOR OPEN

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 9	28	I12	28	J35 B	29
D 6	28	I14 A	28	L 6	30
D 7	30	I16	30	L 7	30
D 8	30	J 5	29	P 5 A	31
D 9	30	J10 A	29	P 5 B	31
D10	30	J11 B	29	V 8	31
D11	30	J15	29	V9	31
D12	30	J34 A	29		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
IF	24	ROOF WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
IG	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1H		
IJ	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1M		
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1V	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1W		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IE2	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
I02	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IP1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)

: GROUND POINTS

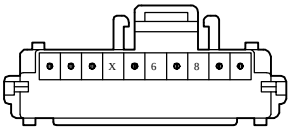
CODE	SEE PAGE	GROUND POINTS LOCATION
IF	36	COWL SIDE PANEL LH
II	36	INSTRUMENT PANEL BRACE LH
BQ	40	ROOF LEFT

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B 2	40	ROOF WIRE	B 4	40	FLOOR WIRE
B 3			B 8	40	ROOF WIRE

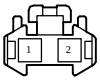
* 1 : W/ MOON ROOF
* 2 : W/O MOON ROOF

C 9 GRAY

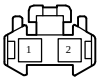


D 6 BLACK

D 7 GRAY



D 8 GRAY



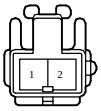
D 9

D10

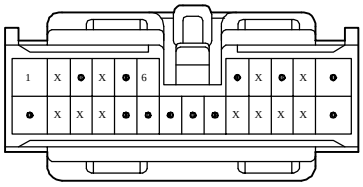
D11

D12

I12

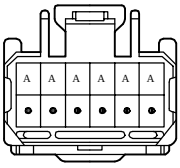


I14 (A) ORANGE



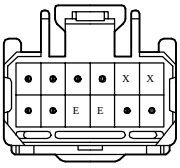
I16

J 5 GRAY



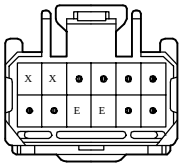
(HINT : SEE PAGE 7)

J10 (A)



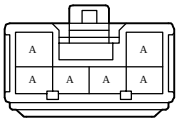
(HINT : SEE PAGE 7)

J11 (B)



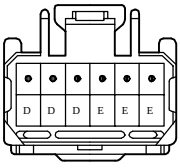
(HINT : SEE PAGE 7)

J15



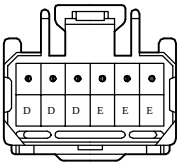
(HINT : SEE PAGE 7)

J34 (A) BLACK



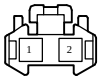
(HINT : SEE PAGE 7)

J35 (B) BLACK

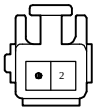


(HINT : SEE PAGE 7)

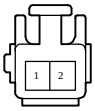
L 6 GRAY



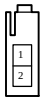
L 7 BLACK



P 5 (A) (*1)



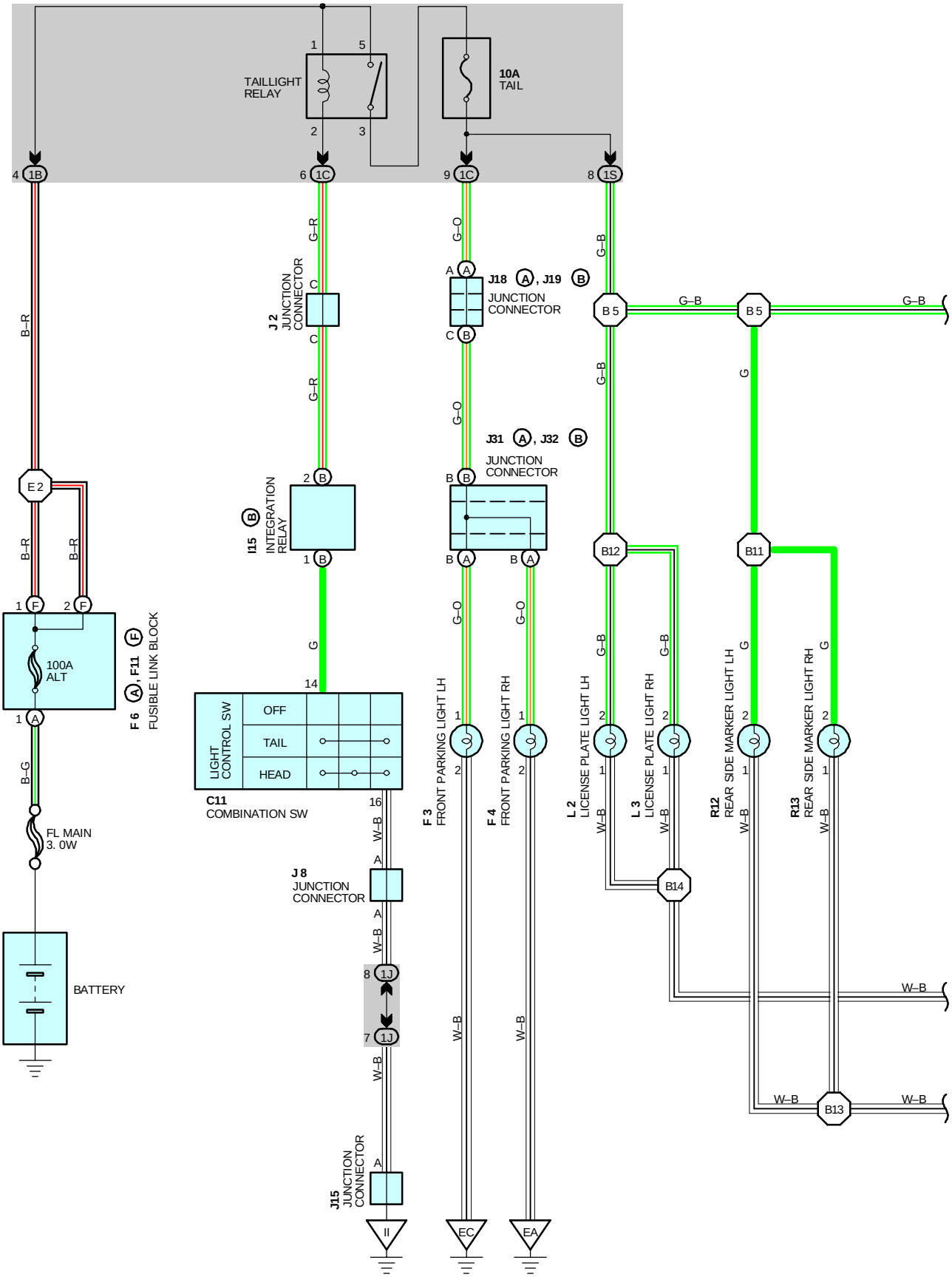
P 5 (B) (*2)

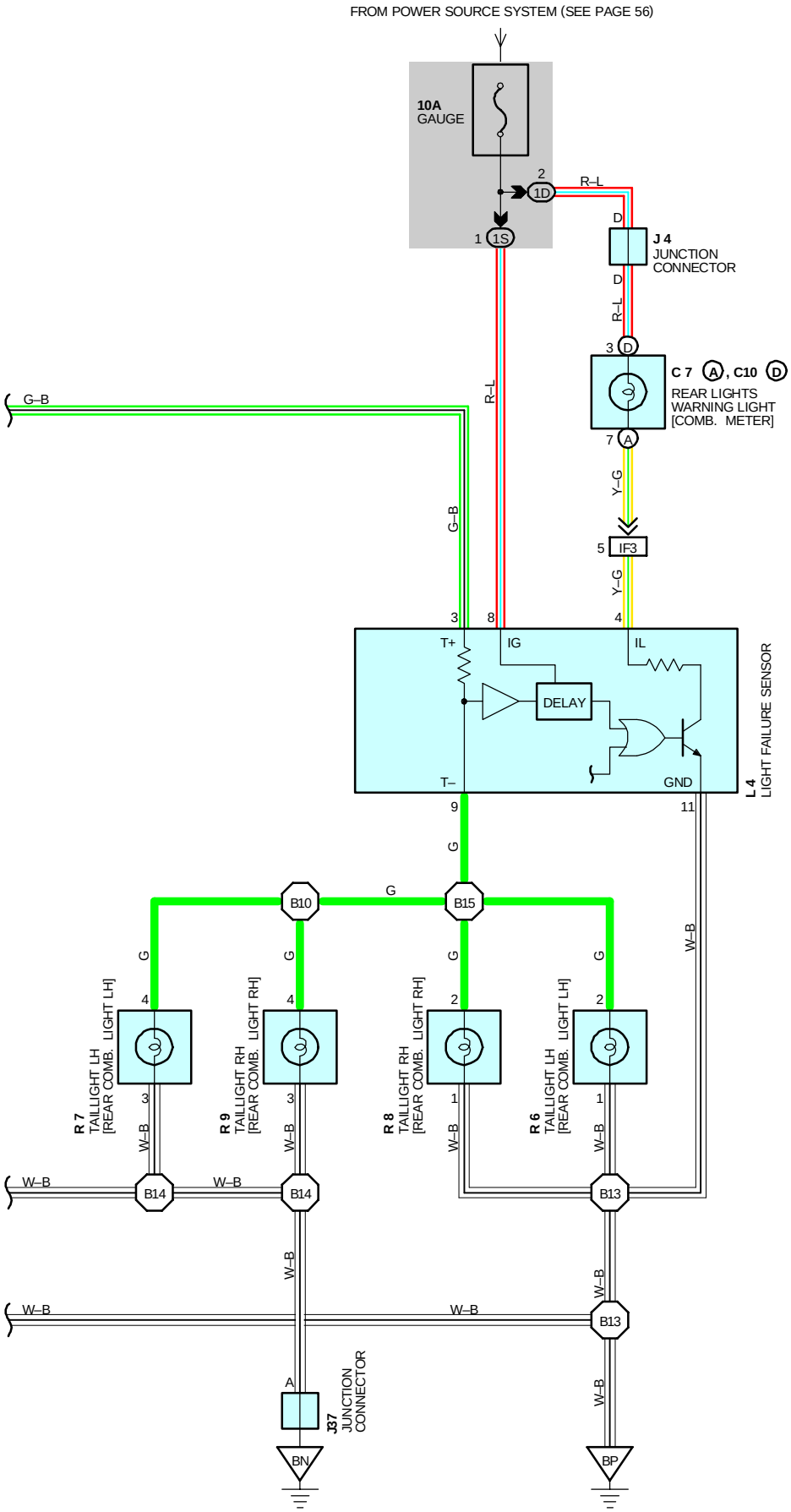


V 8 BLUE

V 9 BLUE

TAILLIGHT


TAILLIGHT RELAY
10A TAIL
4 1B
6 1C
9 1C
8 1S
J2 JUNCTION CONNECTOR
J18 A, J19 B JUNCTION CONNECTOR
J31 A, J32 B JUNCTION CONNECTOR
I15 B INTEGRATION RELAY
E2
100A ALT
F6 A, F11 F FUSIBLE LINK BLOCK
FL MAIN 3. 0W
BATTERY
LIGHT CONTROL SW
OFF
TAIL
HEAD
C11 COMBINATION SW
J8 JUNCTION CONNECTOR
J15 JUNCTION CONNECTOR
F3 FRONT PARKING LIGHT LH
F4 FRONT PARKING LIGHT RH
L2 LICENSE PLATE LIGHT LH
L3 LICENSE PLATE LIGHT RH
R12 REAR SIDE MARKER LIGHT LH
R13 REAR SIDE MARKER LIGHT RH
B5
B11
B12
B13
B14
II
EC
EA
B–R
G–R
G–O
G–B
G
B–G
W–B


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A
GAUGE
2
1D
R–L
1
1S
D
J 4
JUNCTION
CONNECTOR
D
R–L
3
D
C 7 A, C10 D
REAR LIGHTS
WARNING LIGHT
[COMB. METER]
7
A
Y–G
5
IF3
Y–G
G–B
R–L
G–B
3
8
4
T+
IG
IL
DELAY
T–
GND
L 4
LIGHT FAILURE SENSOR
9
11
G
B10
G
B15
W–B
G
G
G
G
4
4
2
2
R 7
TAILLIGHT LH
[REAR COMB. LIGHT LH]
R 9
TAILLIGHT RH
[REAR COMB. LIGHT RH]
R 8
TAILLIGHT RH
[REAR COMB. LIGHT RH]
R 6
TAILLIGHT LH
[REAR COMB. LIGHT LH]
3
3
1
1
W–B
W–B
W–B
W–B
W–B
W–B
B14
B14
B13
B13
W–B
W–B
W–B
W–B
A
J37
JUNCTION
CONNECTOR
BN
BP

TAILLIGHT

SYSTEM OUTLINE

WHEN THE LIGHT CONTROL SW IS TURNED TO **TAIL** OR **HEAD** POSITION, THE CURRENT FLOWS TO **TERMINAL 3** OF THE LIGHT FAILURE SENSOR THROUGH THE **TAIL** FUSE.
WHEN THE IGNITION SW IS TURNED ON, THE CURRENT FLOWS FROM THE **GAUGE** FUSE TO **TERMINAL 8** OF THE LIGHT FAILURE SENSOR, AND ALSO FLOWS THROUGH THE REAR LIGHT WARNING LIGHT TO **TERMINAL 4** OF THE LIGHT FAILURE SENSOR.

TAILIGHT DISCONNECTION WARNING

WITH THE IGNITION SW ON AND THE LIGHT CONTROL SW TURNED TO **TAIL** OR **HEAD** POSITION, IF THE TAILLIGHT CIRCUIT IS OPEN, THE LIGHT FAILURE SENSOR DETECTS THE FAILURE BY THE CHANGE IN CURRENT FLOWING FROM **TERMINAL 3** OF THE LIGHT FAILURE SENSOR TO **TERMINAL 9** AND THE WARNING CIRCUIT OF THE LIGHT FAILURE SENSOR IS ACTIVATED.
AS A RESULT, THE CURRENT FLOWS FROM **TERMINAL 4** OF THE LIGHT FAILURE SENSOR → **TERMINAL 11** → **GROUND** AND TURNS THE REAR LIGHTS WARNING LIGHT ON, WHICH REMAINS ON UNTIL THE LIGHT CONTROL SW IS TURNED OFF.

SERVICE HINTS

TAILLIGHT RELAY

5–3 : CLOSED WITH THE LIGHT CONTROL SW AT **TAIL** OR **HEAD** POSITION

L4 LIGHT FAILURE SENSOR

4,8–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
3–GROUND : APPROX. **12** VOLTS WITH THE LIGHT CONTROL SW AT **TAIL** OR **HEAD** POSITION
11–GROUND : ALWAYS CONTINUTIY

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 7 A	28	J 4	29	L 3	30
C10 D	28	J 8	29	L 4	30
C11	28	J15	29	R 6	31
F 3	26	J18 A	29	R 7	31
F 4	26	J19 B	29	R 8	31
F 6 A	26	J31 A	29	R 9	31
F11 F	26	J32 B	29	R12	31
I15 B	28	J37	30	R13	31
J 2	29	L 2	30		

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1C		
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IF3	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)

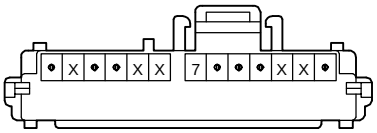
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	RIGHT RADIATOR SIDE SUPPORT
EC	34	LEFT RADIATOR SIDE SUPPORT
II	36	INSTRUMENT PANEL BRACE LH
BN	40	UNDER THE LEFT CENTER PILLAR
BP	40	BACK PANEL CENTER

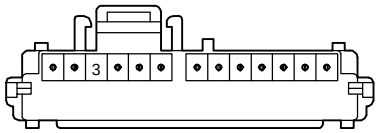
⯃ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 2	34	COWL WIRE	B12	40	FLOOR WIRE
B10	40	FLOOR WIRE	B13		
B11			B14		

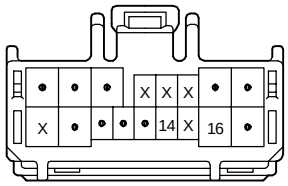
C 7 (A) BLUE



C10 (D) BROWN



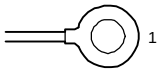
C11



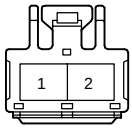
F 3 GRAY

F 4 GRAY

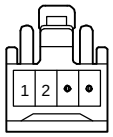
F 6 (A)



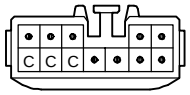
F11 (F)



I15 (B)

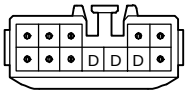


J 2 BLACK



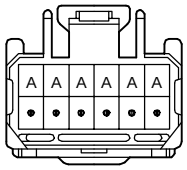
(HINT : SEE PAGE 7)

J 4 BLACK



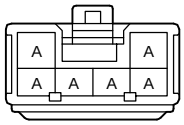
(HINT : SEE PAGE 7)

J 8 GRAY



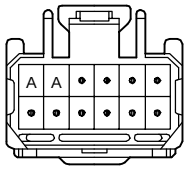
(HINT : SEE PAGE 7)

J15



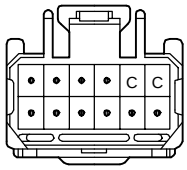
(HINT : SEE PAGE 7)

J18 (A) BLACK



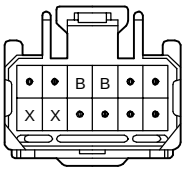
(HINT : SEE PAGE 7)

J19 (B) BLACK



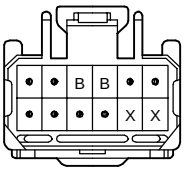
(HINT : SEE PAGE 7)

J31 (A)



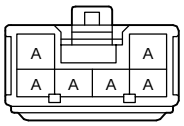
(HINT : SEE PAGE 7)

J32 (B)



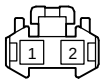
(HINT : SEE PAGE 7)

J37

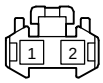


(HINT : SEE PAGE 7)

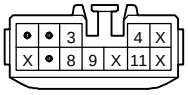
L 2 GRAY



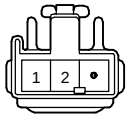
L 3 GRAY



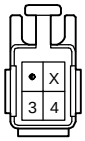
L 4



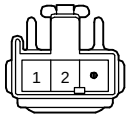
R 6 GRAY



R 7



R 8 GRAY



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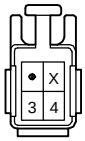
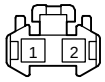
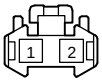


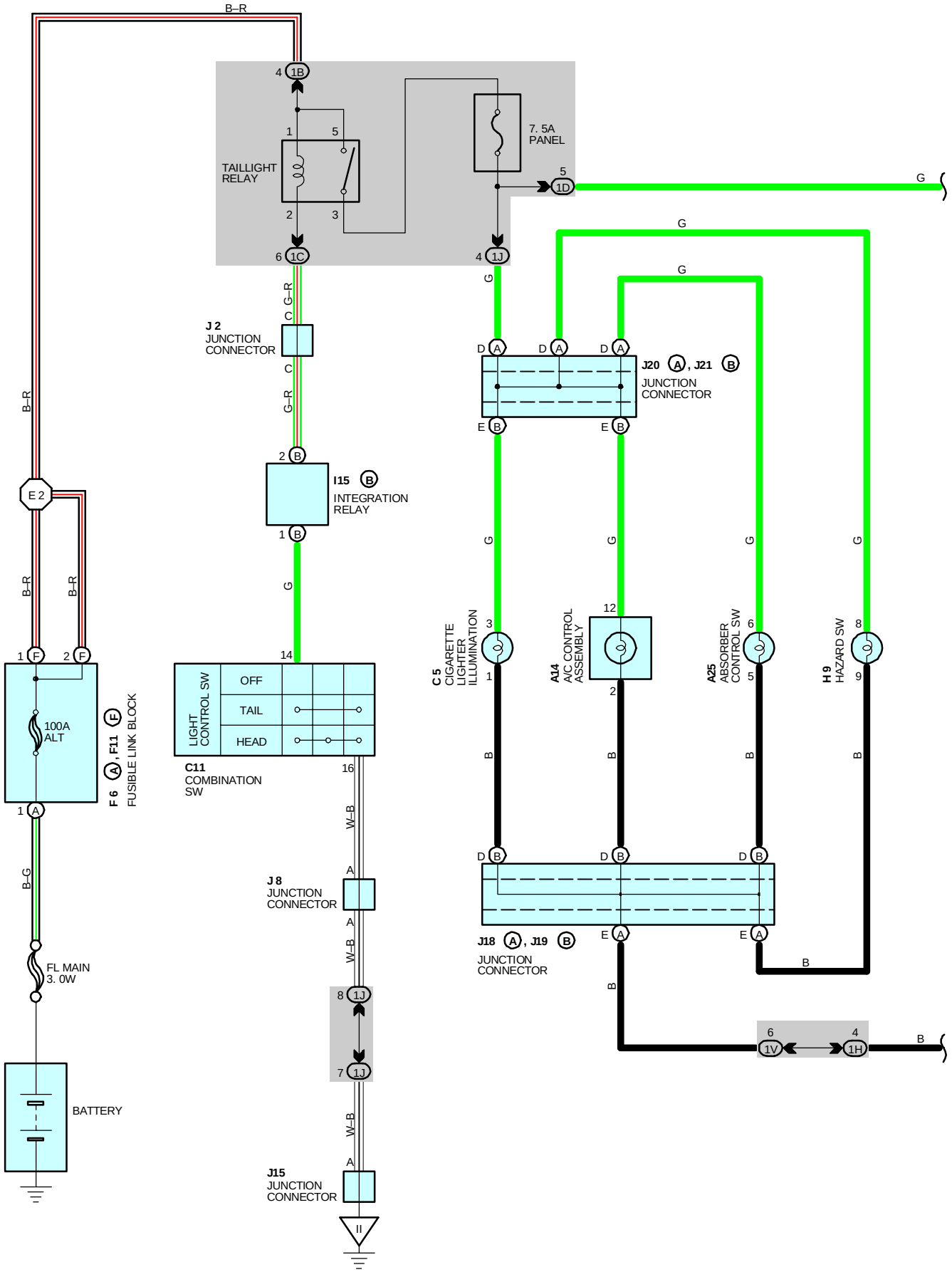
R12 GRAY

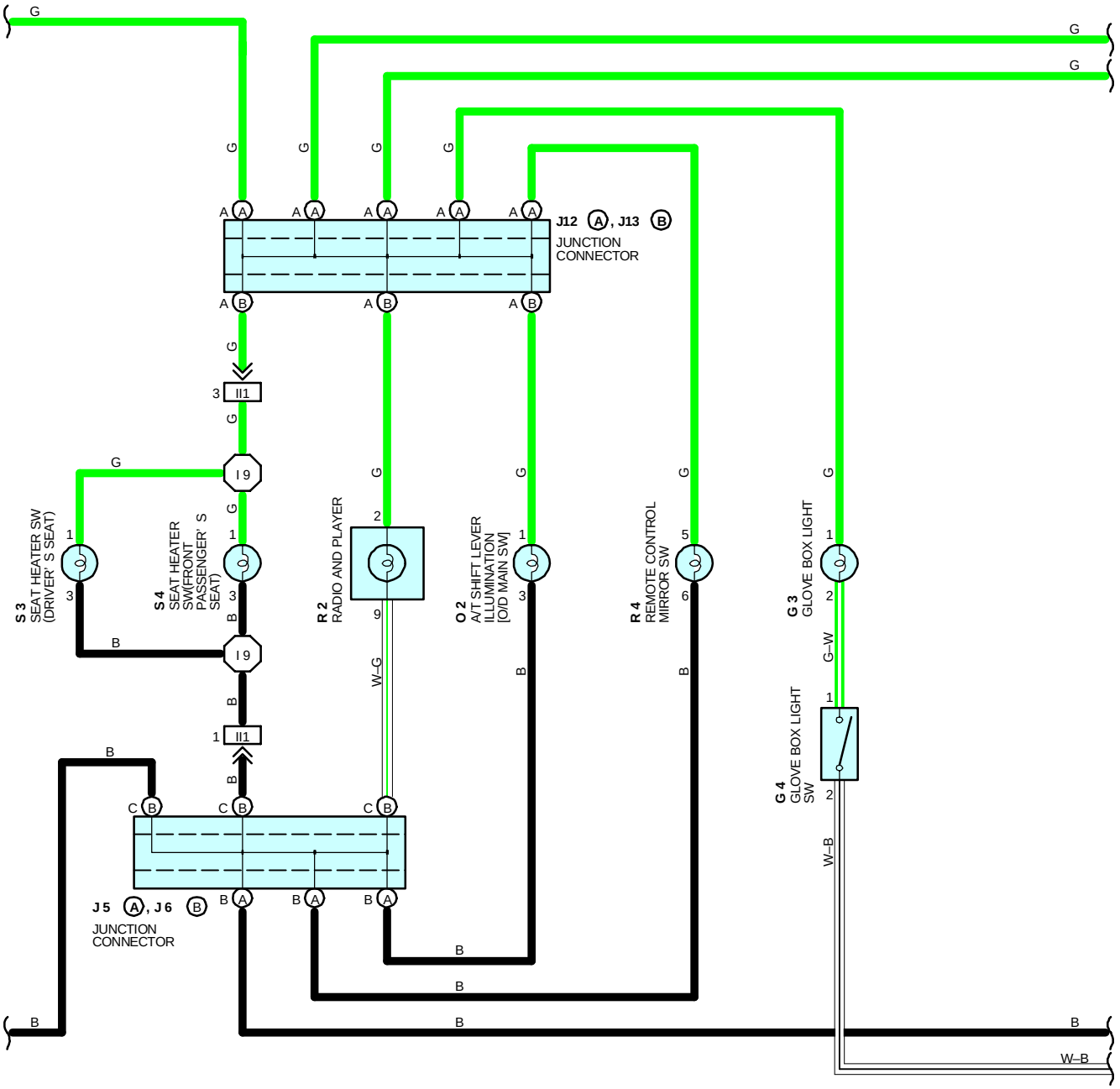


R13 GRAY

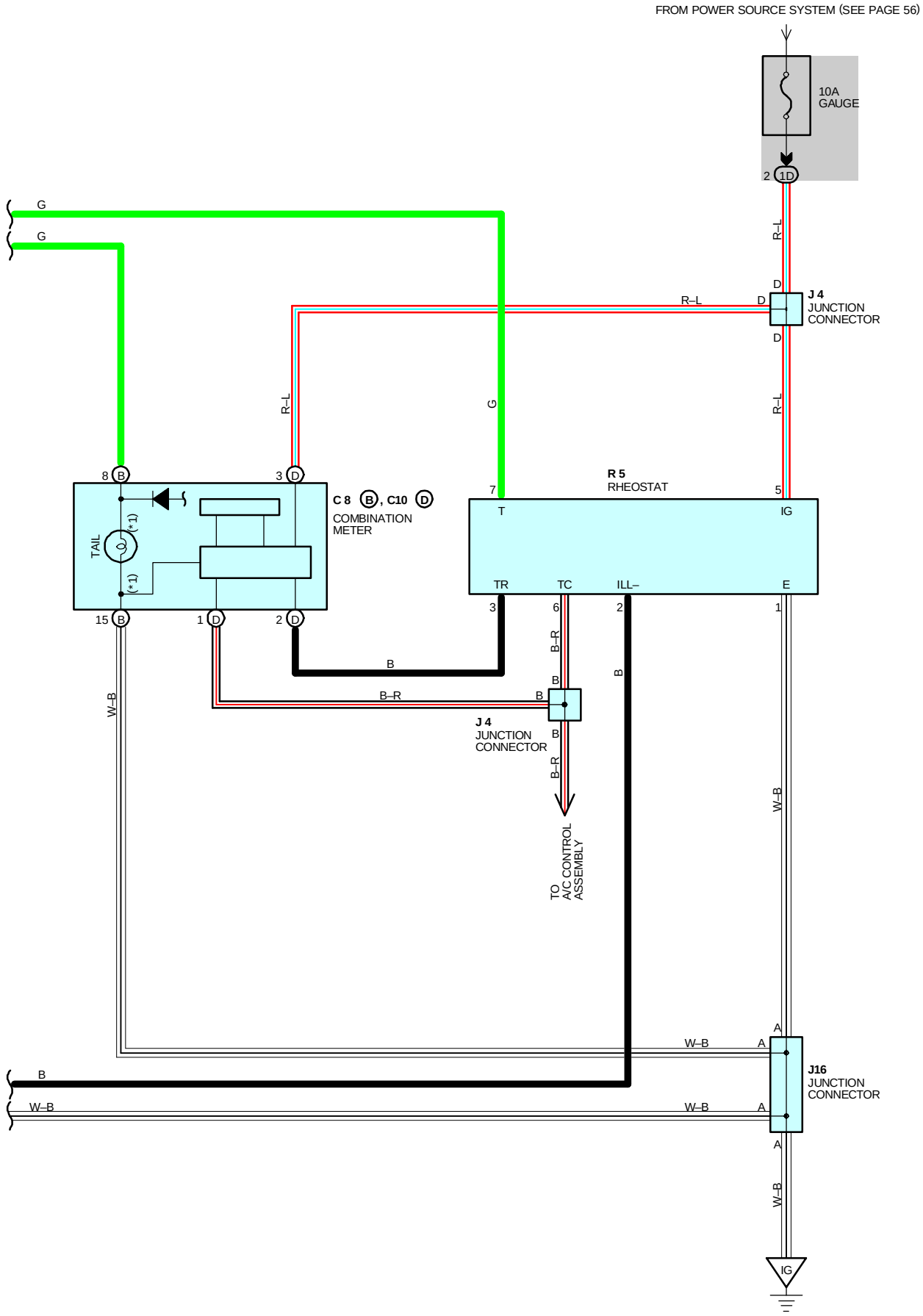


ILLUMINATION




J12 A , J13 B
JUNCTION CONNECTOR
S3 SEAT HEATER SW (DRIVER' S SEAT)
S4 SEAT HEATER SW(FRONT PASSENGER' S SEAT)
R2 RADIO AND PLAYER
O2 A/T SHIFT LEVER ILLUMINATION [O/D MAIN SW]
R4 REMOTE CONTROL MIRROR SW
G3 GLOVE BOX LIGHT
G4 GLOVE BOX LIGHT SW
J5 A , J6 B
JUNCTION CONNECTOR
I9
II1
G
B
W–G
G–W
W–B

* 1 : CANADA


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A
GAUGE
2 1D
G
G
R–L
D
J 4
JUNCTION
CONNECTOR
R–L
D
D
R–L
G
R–L
8 B
3 D
C 8 B, C10 D
COMBINATION
METER
TAIL
(*1)
(*1)
7
R 5
RHEOSTAT
5
T
IG
TR
TC
ILL–
E
3
6
2
1
15 B
1 D
2 D
B
B–R
B
B
B
B–R
W–B
J 4
JUNCTION
CONNECTOR
B
B–R
TO
A/C CONTROL
ASSEMBLY
W–B
A
W–B
A
J16
JUNCTION
CONNECTOR
B
W–B
W–B
A
A
W–B
IG

SERVICE HINTS

TAILIGHT RELAY

5–3 : CLOSED WITH THE LIGHT CONTROL SW AT **TAIL** OR **HEAD** POSITION (WHEN THE LIGHT AUTO TURN OFF SYSTEM IS OFF)

C11 COMBINATION SW

14–16:CLOSED WITH THE LIGHT CONTROL SW AT **TAIL** OR **HEAD** POSITION

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A14	28	I15 B	28	J19 B	29
A25	28	J 2	29	J20 A	29
C 5	28	J 4	29	J21 B	29
C 8 B	28	J 5 A	29	O 2	29
C10 D	28	J 6 B	29	R 2	29
C11	28	J 8	29	R 4	29
F 6 A	26	J12 A	29	R 5	29
F11 F	26	J13 B	29	S 3	29
G 3	28	J15	29	S 4	29
G 4	28	J16	29		
H 9	28	J18 A	29		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1C		
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINSIH PANEL)
1H		
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1V		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
II1	38	FLOOR NO.3 WIRE AND INSTRUMENT PANEL WIRE (UNDER THE CONSOLE BOX)

: GROUND POINTS

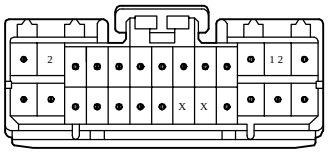
CODE	SEE PAGE	GROUND POINTS LOCATION
IG	36	LEFT KICK PANEL
II	36	INSTRUMENT PANEL BRACE LH

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 2	34	COWL WIRE	I 9	38	FLOOR NO. 3 WIRE

ILLUMINATION

A14



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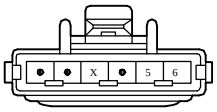
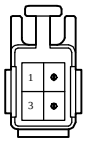
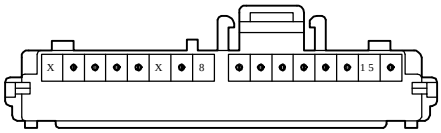


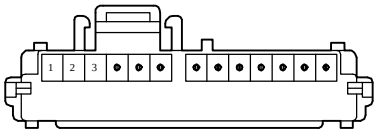
C 5



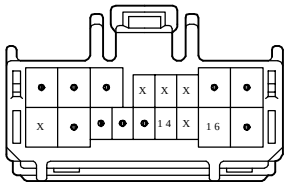
C 8 (B)



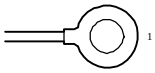
C10 (D) BROWN



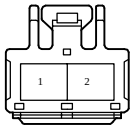
C11



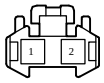
F 6 (A)



F11 (F)



G 3



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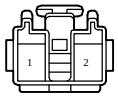
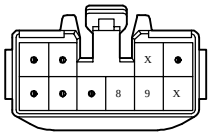
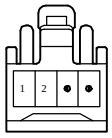


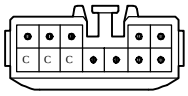
H 9 BLACK



I15 (B)

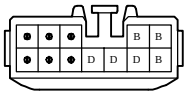


J 2 BLACK



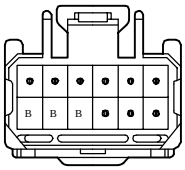
(HINT : SEE PAGE 7)

J 4 BLACK



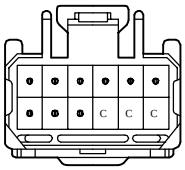
(HINT : SEE PAGE 7)

J 5 (A) GRAY



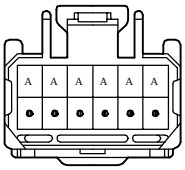
(HINT : SEE PAGE 7)

J 6 (B) GRAY



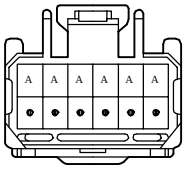
(HINT : SEE PAGE 7)

J 8 GRAY



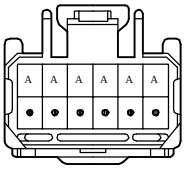
(HINT : SEE PAGE 7)

J12 (A) GRAY



(HINT : SEE PAGE 7)

J13 (B) GRAY



(HINT : SEE PAGE 7)

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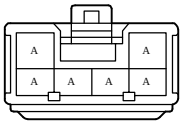
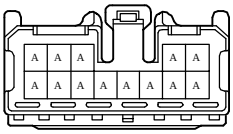


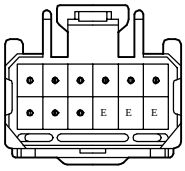
(HINT : SEE PAGE 7)

J16 ORANGE



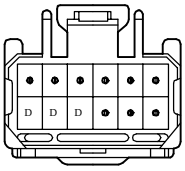
(HINT : SEE PAGE 7)

J18 (A) BLACK



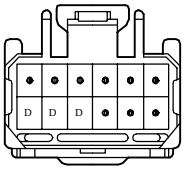
(HINT : SEE PAGE 7)

J19 (B) BLACK



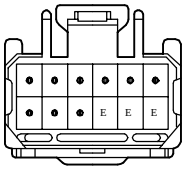
(HINT : SEE PAGE 7)

J20 (A) BLACK



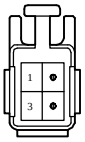
(HINT : SEE PAGE 7)

J21 (B) BLACK



(HINT : SEE PAGE 7)

O 2 BLUE



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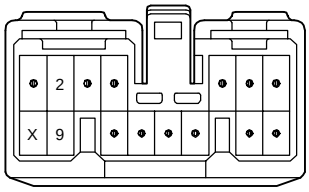

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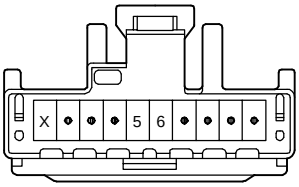

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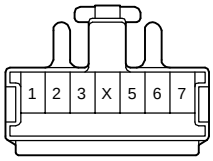
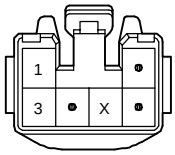


S 3 BLACK



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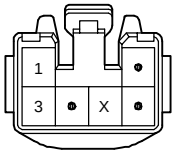
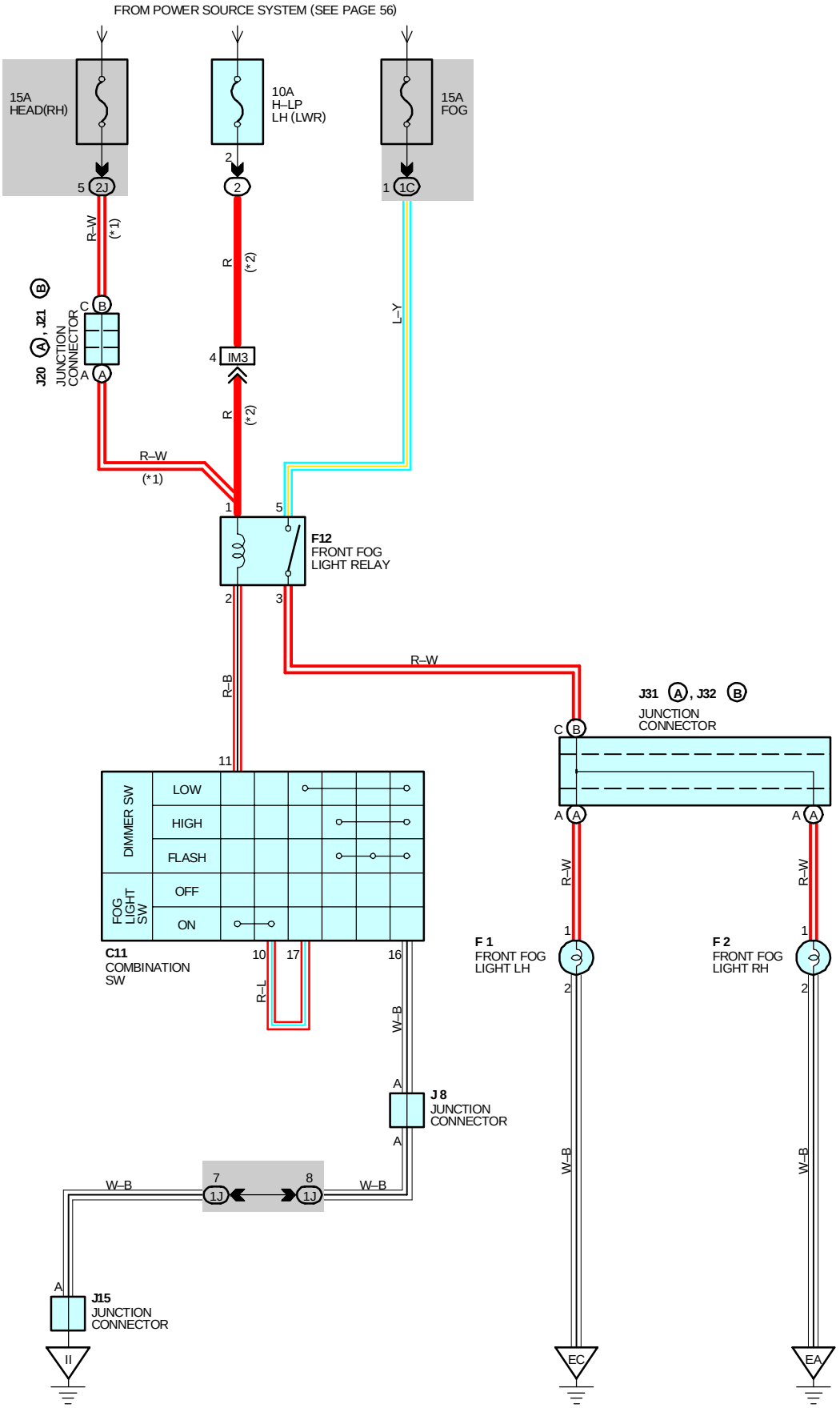


FRONT FOG LIGHT

* 1 : USA
* 2 : CANADA



SERVICE HINTS

F12 FRONT FOG LIGHT RELAY

3–5 : CLOSED WITH THE LIGHT CONTROL SW AT **HEAD** POSITION, DIMMER SW AT **LOW** POSITION AND FRONT FOG LIGHT SW ON

: PARTS LOCATION

CODE	SEE PAGE	CODE		SEE PAGE	CODE		SEE PAGE
C11	28	J 8		29	J31	A	29
F 1	26	J15		29	J32	B	29
F 2	26	J20	A	29			
F12	26	J21	B	29			

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
2	23	ENGINE ROOM NO.2 R/B (ENGINE COMPARTMENT LEFT)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

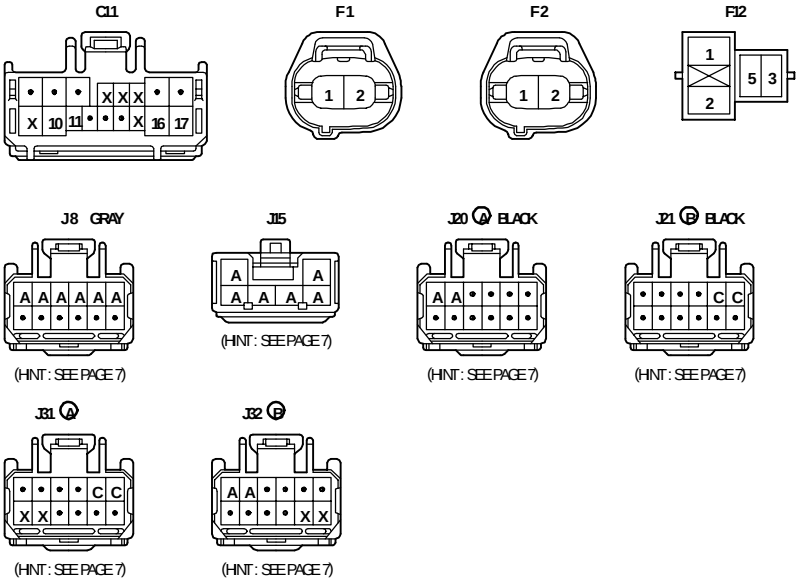
CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMAPRTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

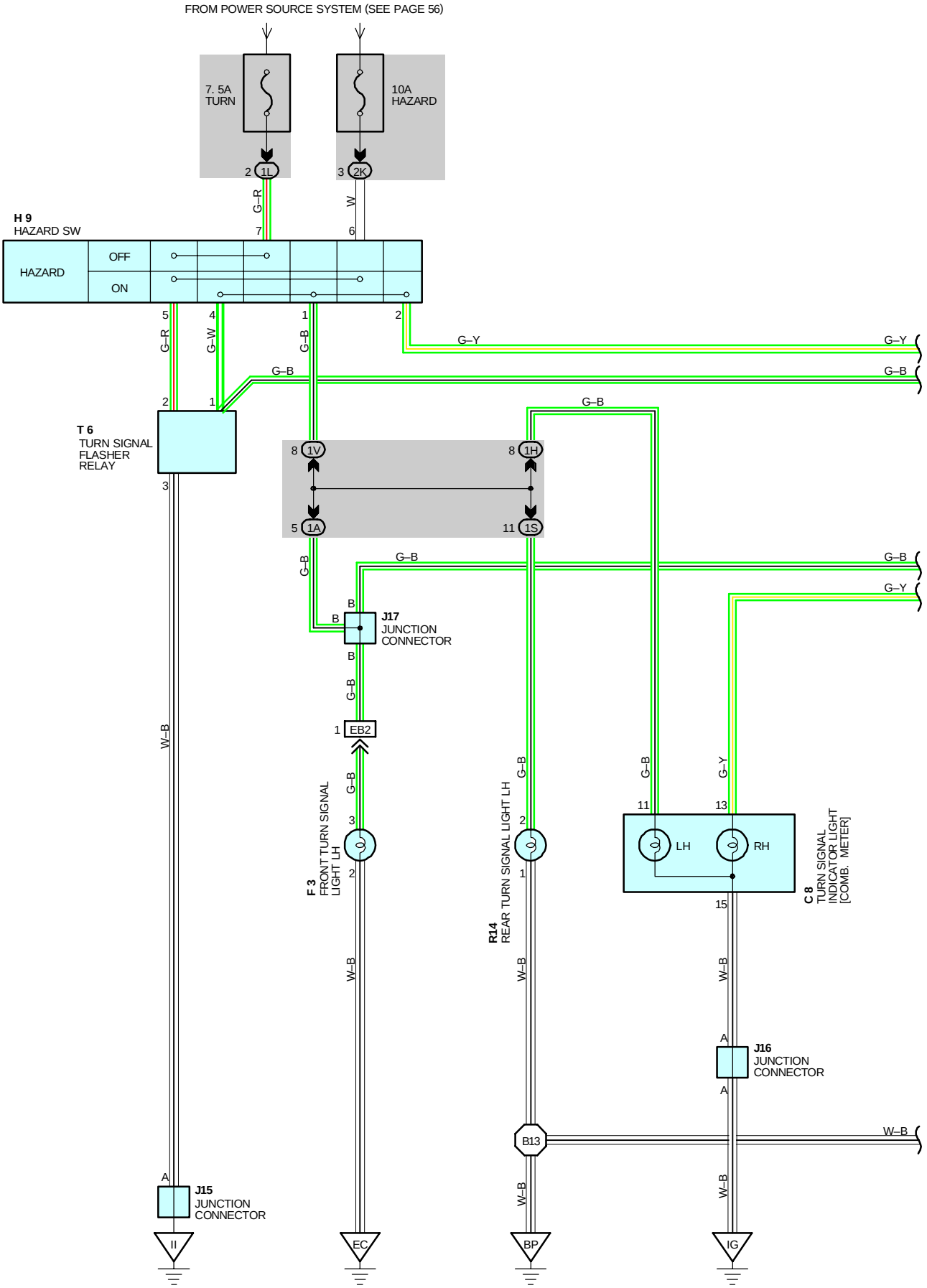
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IN3	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)

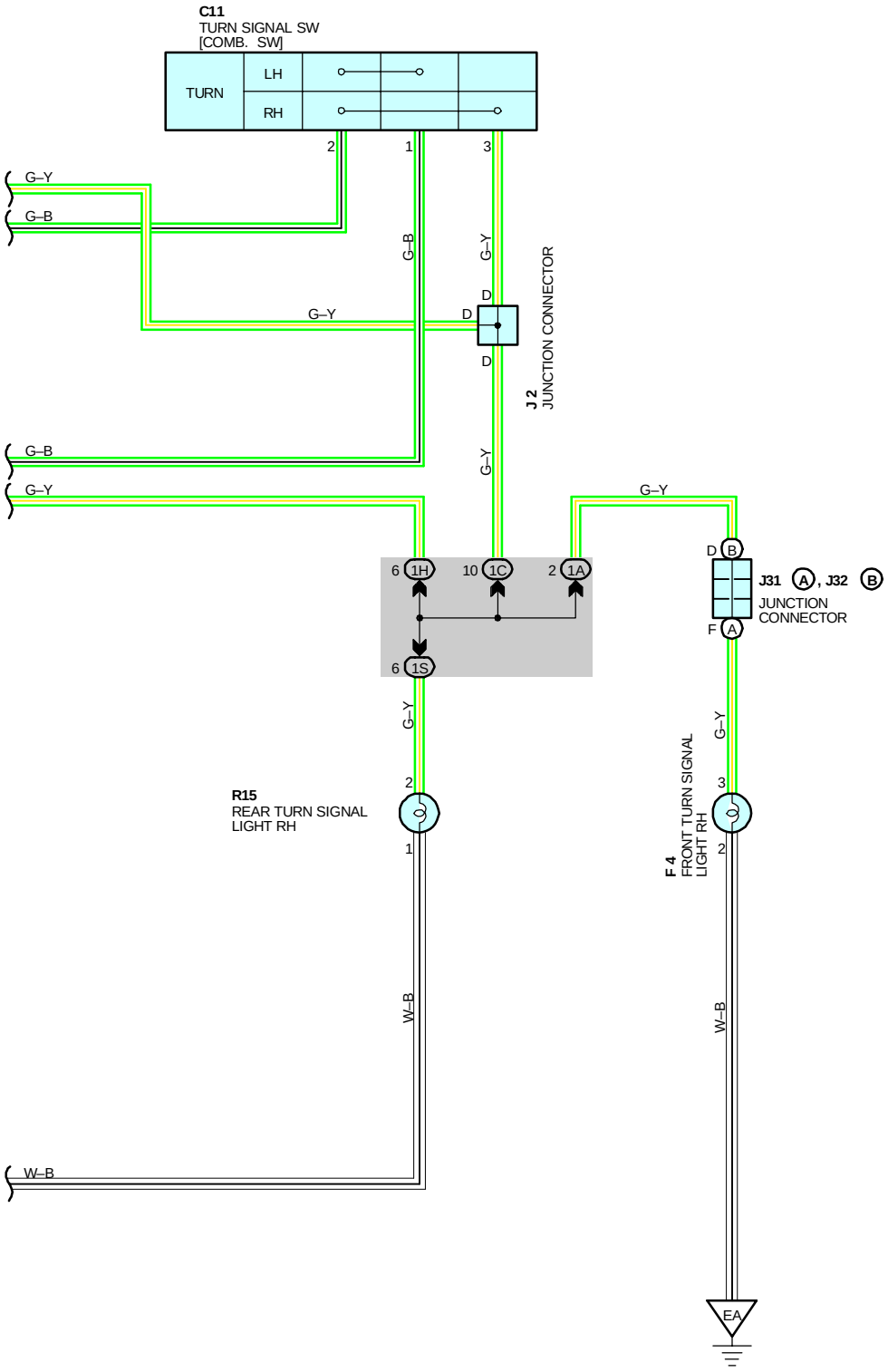
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	RIGHT RADIATOR SIDE SUPPORT
EC	34	LEFT RADIATOR SIDE SUPPORT
II	36	INSTRUMENT PANEL BRACE LH



TURN SIGNAL AND HAZARD WARNING LIGHT




C11
TURN SIGNAL SW
[COMB. SW]
TURN
LH
RH
2
1
3
G–Y
G–B
G–B
G–Y
G–Y
D
D
D
J 2
JUNCTION CONNECTOR
G–B
G–Y
G–Y
G–Y
6 1H
10 1C
2 1A
6 1S
D B
J31 A , J32 B
JUNCTION
CONNECTOR
F A
G–Y
G–Y
2
3
R15
REAR TURN SIGNAL
LIGHT RH
1
F 4
FRONT TURN SIGNAL
LIGHT RH
2
W–B
W–B
W–B
EA

TURN SIGNAL AND HAZARD WARNING LIGHT

SERVICE HINTS

T 6 TURN SIGNAL FLASHER RELAY

2–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW ON OR THE HAZARD SW ON.

1–GROUND : CHANGES FROM APPROX. **12** TO **0** VOLTS WITH THE IGNITION SW ON AND THE TURN SIGNAL SW LEFT OR RIGHT, OR THE HAZARD SW ON.

3–GROUND : ALWAYS CONTINUITY

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 8	28	J 2	29	J32 B	29
C11	28	J15	29	R14	31
F 3	26	J16	29	R15	31
F 4	26	J17	29	T 6	29
H 9	28	J31 A	29		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1C		
1H	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1L	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINSIH PANEL)
1V	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
2K	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EB2	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE ENGINE ROOM J/B)

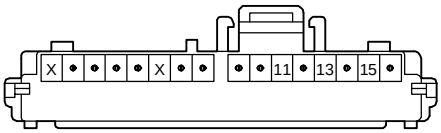
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	RIGHT RADIATOR SIDE SUPPORT
EC	34	LEFT RADIATOR SIDE SUPPORT
IG	36	LEFT KICK PANEL
II	36	INSTRUMENT PANEL BRACE LH
BP	40	BACK PANEL CENTER

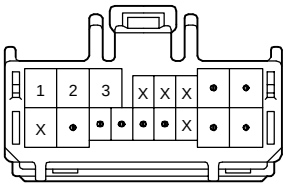
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B13	40	FLOOR WIRE			

C 8



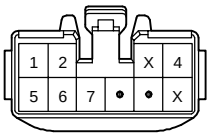
C11



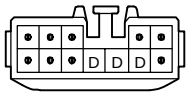
F 3 GRAY

F 4 GRAY

H 9 BLACK

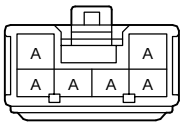


J 2 BLACK



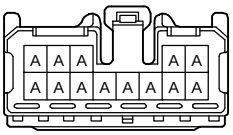
(HINT : SEE PAGE 7)

J15



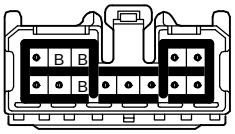
(HINT : SEE PAGE 7)

J16 ORANGE



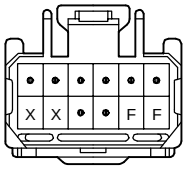
(HINT : SEE PAGE 7)

J17 BLUE



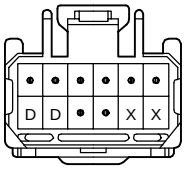
(HINT : SEE PAGE 7)

J31 (A)



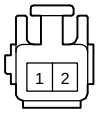
(HINT : SEE PAGE 7)

J32 (B)

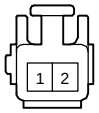


(HINT : SEE PAGE 7)

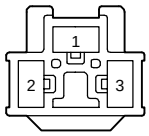
R14 GRAY



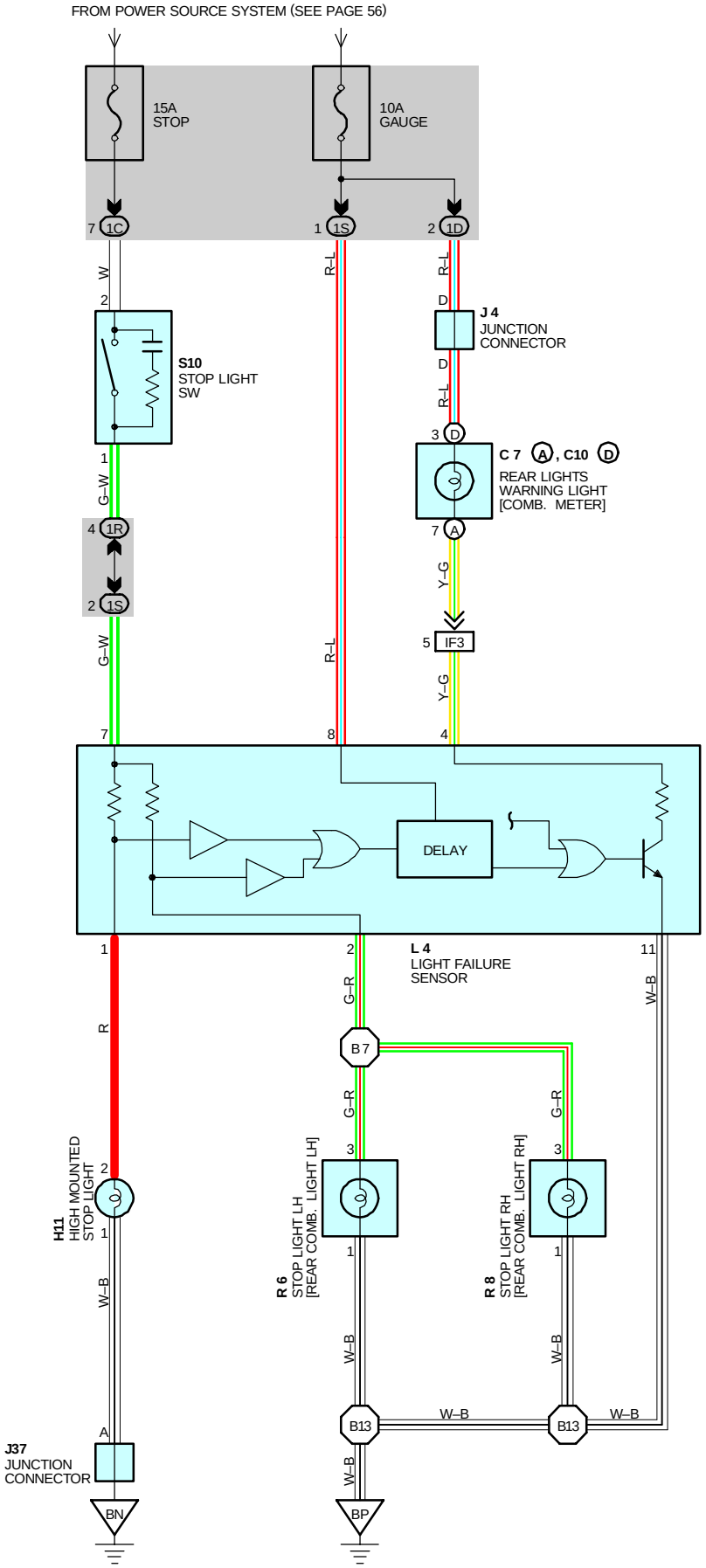
R15 GRAY



T 6



STOP LIGHT


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A
STOP
10A
GAUGE
7 1C
1 1S
2 1D
W
R–L
R–L
2
D
J 4
JUNCTION
CONNECTOR
S10
STOP LIGHT
SW
D
R–L
3 D
C 7 A, C10 D
REAR LIGHTS
WARNING LIGHT
[COMB. METER]
1
G–W
7 A
4 1R
2 1S
Y–G
5 IF3
G–W
R–L
Y–G
7
8
4
DELAY
1
2
11
L 4
LIGHT FAILURE
SENSOR
R
G–R
W–B
B7
G–R
G–R
3
3
H11
HIGH MOUNTED
STOP LIGHT
2
1
R 6
STOP LIGHT LH
[REAR COMB. LIGHT LH]
R 8
STOP LIGHT RH
[REAR COMB. LIGHT RH]
1
1
W–B
W–B
W–B
B13
W–B
B13
W–B
A
J37
JUNCTION
CONNECTOR
W–B
BN
BP

SYSTEM OUTLINE

CURRENT IS APPLIED AT ALL TIMES THROUGH A **STOP** FUSE TO **TERMINAL 2** OF THE STOP LIGHT SW. WHEN THE IGNITION SW IS TURNED ON, CURRENT FLOWS FROM THE **GAUGE** FUSE TO **TERMINAL 8** OF THE LIGHT FAILURE SENSOR, AND ALSO FLOWS THROUGH THE REAR LIGHTS WARNING LIGHT TO **TERMINAL 4** OF THE LIGHT FAILURE SENSOR.

STOP LIGHT DISCONNECTION WARNING

WHEN THE IGNITION SW IS TURNED ON AND THE BRAKE PEDAL IS PRESSED (STOP LIGHT SW ON), IF THE STOP LIGHT CIRCUIT IS OPEN, THE CURRENT FLOWING FROM **TERMINAL 7** OF THE LIGHT FAILURE SENSOR TO **TERMINALS 1, 2** CHANGES, SO THE LIGHT FAILURE SENSOR DETECTS THE DISCONNECTION AND THE WARNING CIRCUIT OF THE LIGHT FAILURE SENSOR IS ACTIVATED. AS A RESULT, THE CURRENT FLOWS FROM **TERMINAL 4** OF THE LIGHT FAILURE SENSOR → **TERMINAL 11** → **GROUND** AND TURNS THE REAR LIGHT WARNING LIGHT ON. BY PRESSING THE BRAKE PEDAL, THE CURRENT FLOWING TO **TERMINAL 8** OF THE LIGHT FAILURE SENSOR KEEPS THE WARNING CIRCUIT ON AND THE WARNING LIGHT ON UNTIL THE IGNITION SW IS TURNED OFF.

SERVICE HINTS

S10 STOP LIGHT SW

2–1 : CLOSED WITH THE BRAKE PEDAL DEPRESSED

L 4 LIGHT FAILURE SENSOR

1, 2, 7–GROUND : APPROX. **12** VOLTS WITH THE STOP LIGHT SW ON

4, 8–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION

11–GROUND : ALWAYS CONTINUTIY

○ : PARTS LOCATION

CODE		SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 7	A	28	J 4	29	R 6	31
C10	D	28	J37	30	R 8	31
H11		30	L 4	30	S10	29

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1R	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IF3	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)

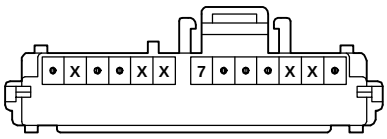
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
BN	40	UNDER THE LEFT CENTER PILLAR
BP	40	BACK PANEL CENTER

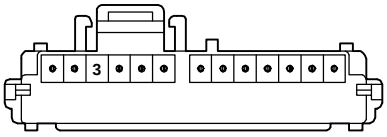
⯃ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B 7	40	FLOOR WIRE	B13	40	FLOOR WIRE

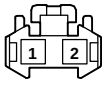
C 7 (A) BLUE



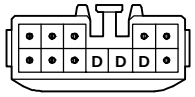
C10 (D) BROWN



H11

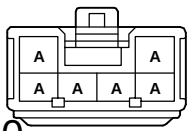


J 4 BLACK

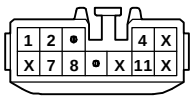


(HINT : SEE PAGE 7)

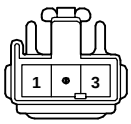
J37



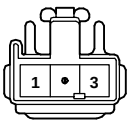
L 4



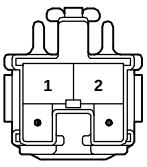
R 6 GRAY



R 8 GRAY

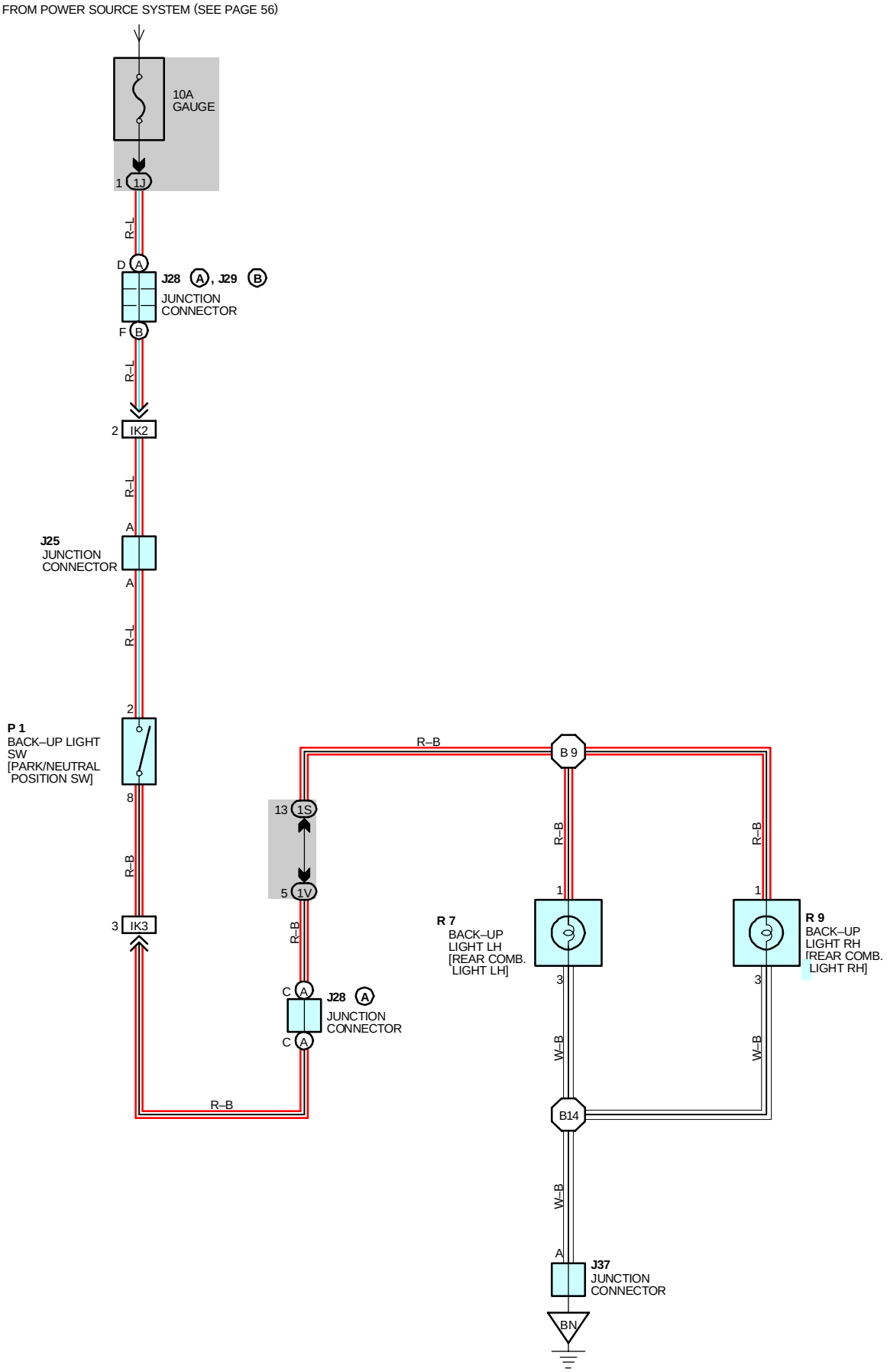


S10 BLUE



(HINT : SEE PAGE 7)

BACK–UP LIGHT



SERVICE HINTS

P 1 BACK–UP LIGHT SW (PARK/NEUTRAL POSITION SW)
2–8 : CLOSED WITH THE SHIFT LEVER IN **R** POSITION

: PARTS LOCATION

CODE		SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J25		29	J37	30	R 9	31
J28	A	29	P 1	27		
J29	B	29	R 7	31		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
IJ	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1V	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IK2	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK3		

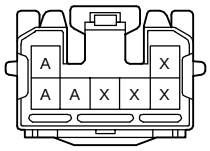
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
BN	40	UNDER THE LEFT CENTER PILLAR

: SPLICE POINTS

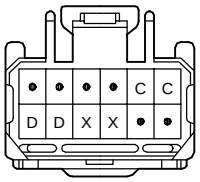
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B 9	40	FLOOR WIRE	B14	40	FLOOR WIRE

J25



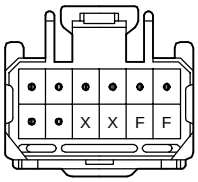
(HINT : SEE PAGE 7)

J28 (A)



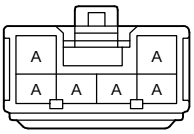
(HINT : SEE PAGE 7)

J29 (B)



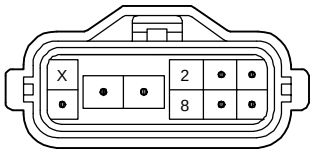
(HINT : SEE PAGE 7)

J37

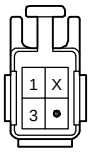


(HINT : SEE PAGE 7)

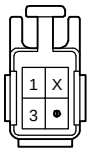
P 1 GRAY



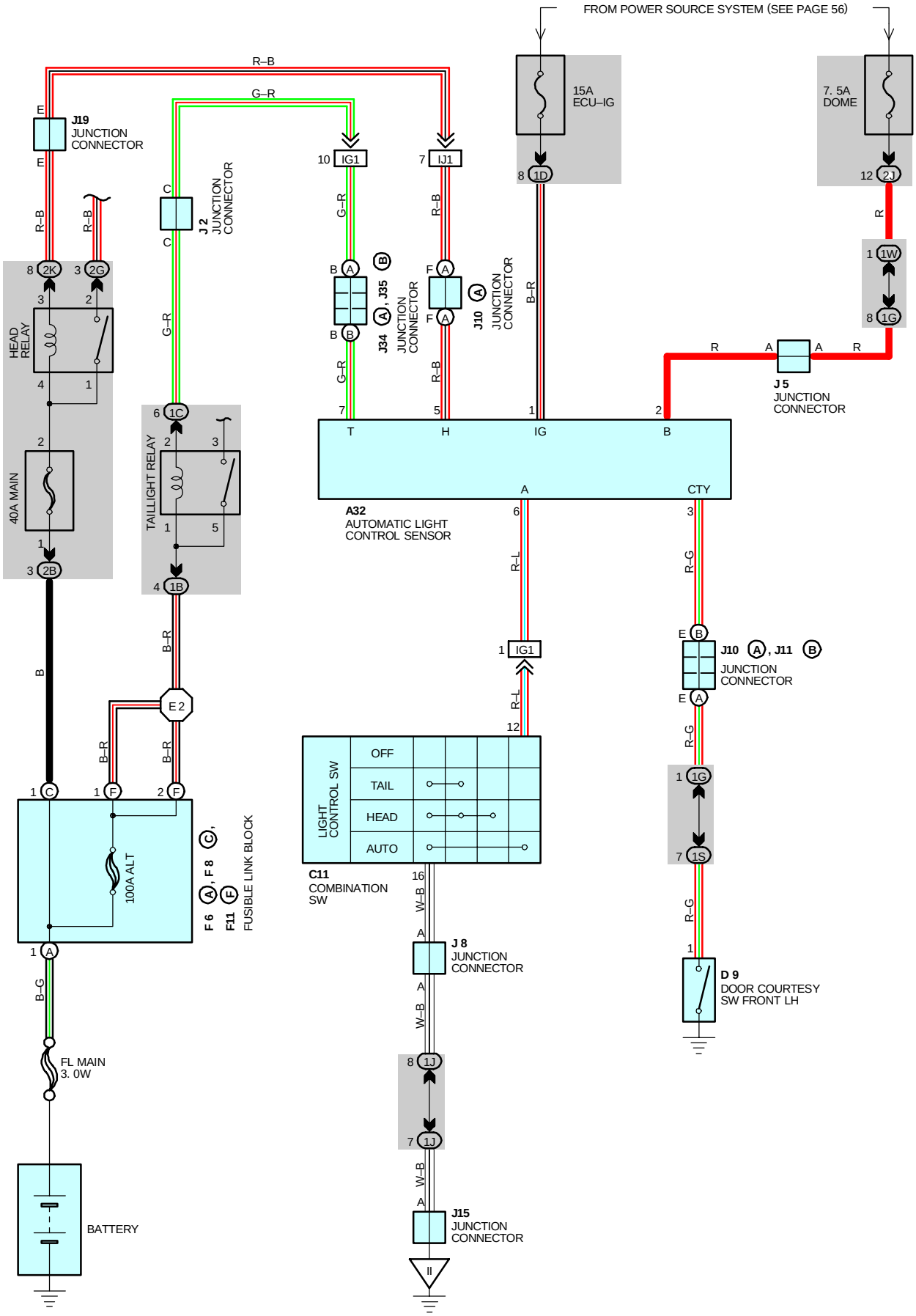
R 7



R 9



AUTOMATIC LIGHT CONTROL



SYSTEM OUTLINE

WITH THE IGNITION SW TURNED ON, CURRENT FLOWS FROM THE **ECU–IG** FUSE TO **TERMINAL 1** OF THE AUTOMATIC LIGHT CONTROL SENSOR. VOLTAGE IS APPLIED AT ALL TIMES TO **TERMINAL 2** OF THE AUTOMATIC LIGHT CONTROL SENSOR THROUGH THE **DOME** FUSE, AND TO **TERMINAL 7** OF THE AUTOMATIC LIGHT CONTROL SENSOR THROUGH THE TAILLIGHT RELAY (COIL SIDE), AND TO **TERMINAL 5** OF THE AUTOMATIC LIGHT CONTROL SENSOR THROUGH THE HEAD RELAY (COIL SIDE).

AUTOMATIC LIGHT CONTROL

WHEN THE LIGHT CONTROL SW IS AT AUTO POSITION, IF THE AUTOMATIC LIGHT CONTROL SENSOR DETECTS A DECREASE IN THE AMBIENT LIGHT (TO BETWEEN APPROX. **90** AND APPROX. **475** LUX), THE AUTOMATIC LIGHT CONTROL SENSOR IS ACTIVATED. ABOUT **5** SECONDS AFTER IT IS ACTIVATED, CURRENT FLOWS FROM **TERMINAL 6** OF THE SENSOR TO **TERMINAL 12** OF THE LIGHT CONTROL SW → **TERMINAL 16** → **GROUND,** LIGHTING UP THE HEADLIGHT AND TAILLIGHT.
IF THE AMBIENT LIGHT DROPS BELOW APPROX. **90** LUX, THE AUTOMATIC LIGHT CONTROL SENSOR IS ACTIVATED AND ABOUT **3** SECONDS LATER, CURRENT FLOWS FROM **TERMINAL 6** OF THE SENSOR TO **TERMINAL 12** OF THE LIGHT CONTROL SW → **TERMINAL 16** → **GROUND,** LIGHTING UP THE HEADLIGHT AND TAILLIGHT.
WHEN THE LIGHT CONTROL SW IS AT **AUTO** POSITION AND ACTIVATION OF THE AUTOMATIC LIGHT CONTROL SENSOR HAS TURNED ON THE HEADLIGHTS AND TAILLIGHTS, IF THE AUTOMATIC LIGHT CONTROL SENSOR DETECTS THE AMBIENT LIGHT ABOVE APPROX. **1000** LUX, THE SENSOR IS TURNED OFF AFTER ABOUT **5** SECONDS. SO THE CURRENT FROM **TERMINAL 6** OF THE SENSOR TO **TERMNAL 12** OF THE LIGHT CONTROL SW IS CUT OFF, AND THE HEADLIGHTS AND TAILLIGHTS TURN OFF.

SERVICE HINTS

A32 AUTOMATIC LIGHT CONTROL SENSOR

2–GROUND : ALWAYS APPROX. **12** VOLTS
1–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
6–GROUND : CONTINUITY WITH THE LIGHT CONTROL SW AT **AUTO** POSITION
3–GROUND : CONTINUITY WITH THE DRIVER'S DOOR OPEN

C11 COMBINATION SW

12–16 : CLOSED WITH THE LIGHT CONTROL SW AT **AUTO** POSITION

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A32	28	F11 F	26	J11 B	29
C11	28	J 2	29	J15	29
D 9	30	J 5	29	J19	29
F 6 A	26	J 8	29	J34 A	29
F 8 C	26	J10 A	29	J35 B	29

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1C		
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1G		
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1W	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL
2B	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2G		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2K		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IG1	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)
IJ1	38	INSTRUMENT PANEL WIRE AND COWL WIRE (UNDER THE GLOVE BOX)

: GROUND POINTS

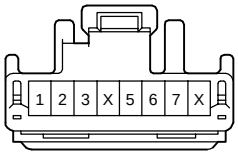
CODE	SEE PAGE	GROUND POINTS LOCATION
II	36	INSTRUMENT PANEL BRACE LH

AUTOMATIC LIGHT CONTROL

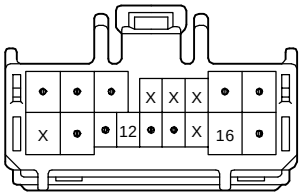
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 2	34	COWL WIRE			

A32 BLACK

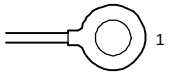


C11

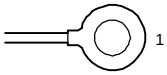


D 9

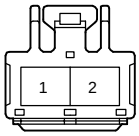
F 6 (A)



F 8 (C)



F11 (F)



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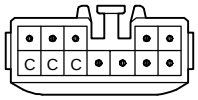
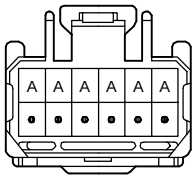


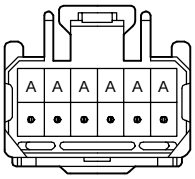
(HINT : SEE PAGE 7)

J 5 GRAY



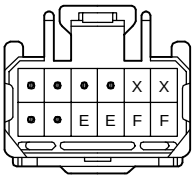
(HINT : SEE PAGE 7)

J 8 GRAY



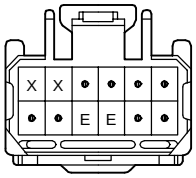
(HINT : SEE PAGE 7)

J10 (A)



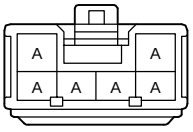
(HINT : SEE PAGE 7)

J11 (B)



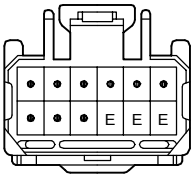
(HINT : SEE PAGE 7)

J15



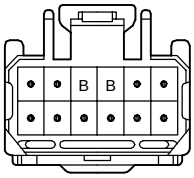
(HINT : SEE PAGE 7)

J19 BLACK



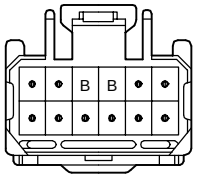
(HINT : SEE PAGE 7)

J34 (A) BLACK



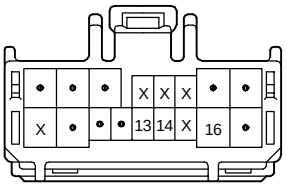
(HINT : SEE PAGE 7)

J35 (B) BLACK



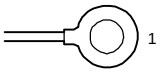
(HINT : SEE PAGE 7)

C11

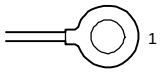


D 9

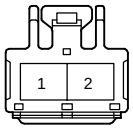
F 6 (A)



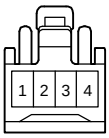
F 8 (C)



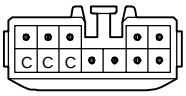
F11 (F)



I15 (B)

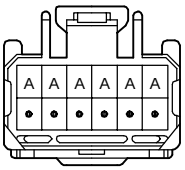


J 2 BLACK



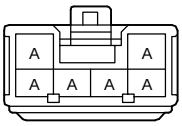
(HINT : SEE PAGE 7)

J 8 GRAY



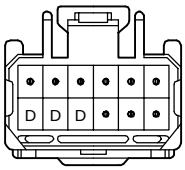
(HINT : SEE PAGE 7)

J15



(HINT : SEE PAGE 7)

J18 (A) BLACK



(HINT : SEE PAGE 7)

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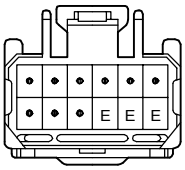
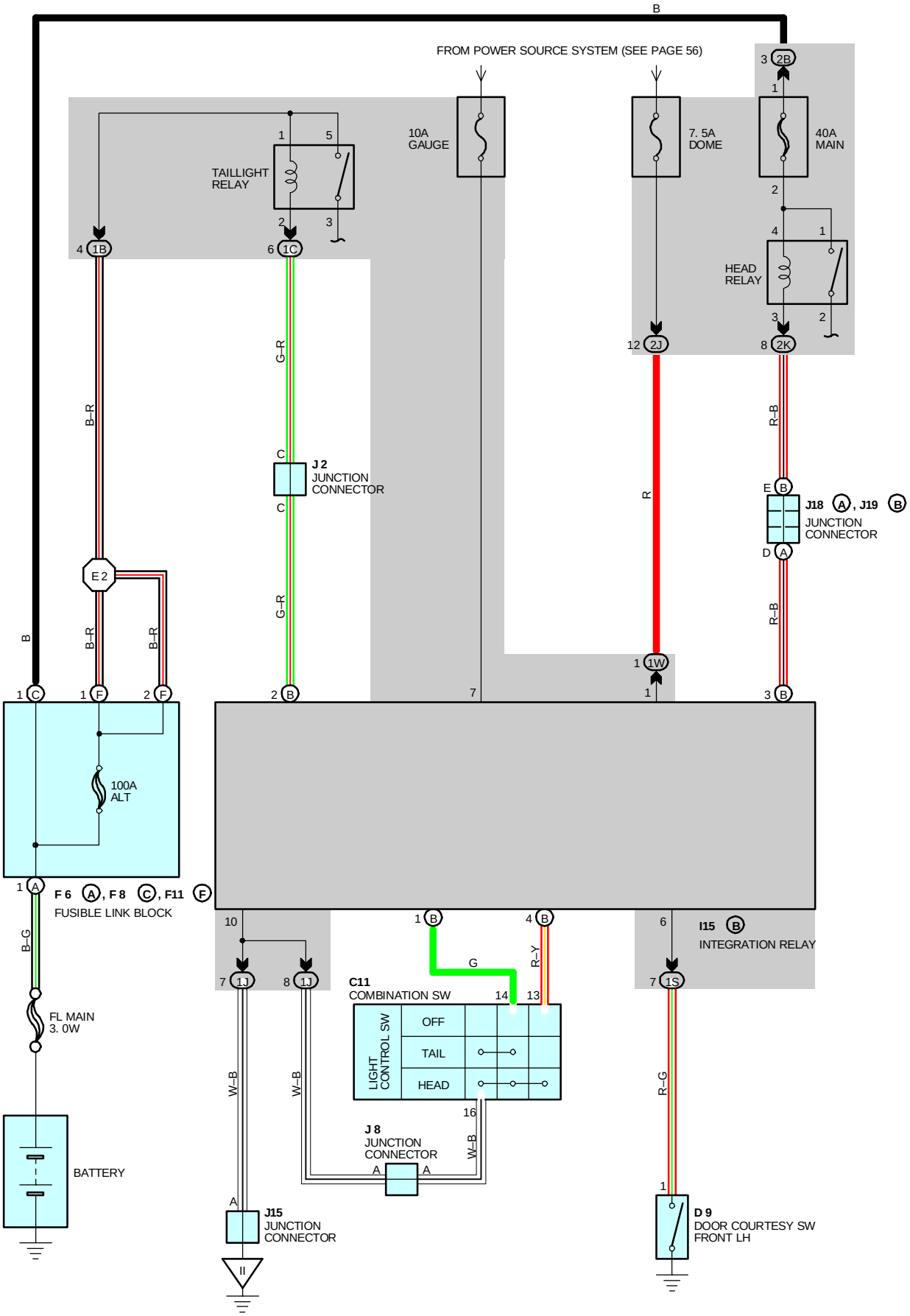


(HINT : SEE PAGE 7)

LIGHT AUTO TURN OFF



SYSTEM OUTLINE

WITH THE IGNITION SW TURNED ON, THE CURRENT FLOWS TO **TERMINAL 7** OF THE INTEGRATION RELAY THROUGH **GAUGE** FUSE. VOLTAGE IS APPLIED AT ALL TIMES TO **TERMINAL B2** OF THE INTEGRATION RELAY THROUGH THE TAILLIGHT RELAY (COIL SIDE), AND TO **TERMINAL B3** THROUGH THE HEAD RELAY (COIL SIDE).

1. NORMAL LIGHTING OPERATION

(TURN TAILLIGHT ON).
WITH THE LIGHT CONTROL SW TURNED TO **TAIL** POSITION, A SIGNAL IS INPUT INTO **TERMINAL B1** OF THE INTEGRATION RELAY. ACCORDING TO THIS SIGNAL, THE CURRENT FLOWING TO **TERMINAL B2** OF THE REALY FLOWS FROM **TERMINAL B1** → **TERMINAL 14** OF THE LIGHT CONTROL SW → **TERMINAL 16** → TO **GROUND** AND TAILLIGHT RELAY CAUSES TAILLIGHT TO TURN ON.

(TURN HEADLIGHT ON)
WITH THE LIGHT CONTROL SW TURNED TO **HEAD** POSITION, THE SIGNALS ARE INPUT INTO **TERMINALS B1** AND **B4** OF THE INTEGRATION RELAY. ACCORDING TO THESE SIGNALS, THE CURRENT FLOWING TO **TERMINAL B3** OF THE RELAY FLOWS TO **TERMINAL B4** → **TERMINAL 13** OF THE LIGHT CONTROL SW → **TERMINAL 16** → TO **GROUND** IN THE HEADLIGHT CIRCUIT, AND CAUSES TAILLIGHT AND HEAD RELAY TO TURN THE LIGHT ON. THE TAILLIGHT CIRCUIT IS SAME AS ABOVE.

2. LIGHT AUTO TURN OFF OPERATION

WITH THE LIGHTS ON AND THE IGNITION SW TURNED OFF (INPUT SIGNAL GOES TO **TERMINAL 7** OF THE REALY), WHEN DOOR ON FRONT LH SIDE IS OPENED (INPUT SIGNAL GOES TO **TERMINAL 6** OF THE RELAY), THE RELAY OPERATES AND THE CURRENT IS CUT OFF WHICH FLOWS FROM **TERMINAL B2** OF THE RELAY TO **TERMINAL B1** IN TAILLIGHT CIRCUIT AND FROM **TERMINAL B3** TO **TERMINAL B4** IN HEADLIGHT CIRCUIT. AS A RESULT, ALL LIGHTS ARE TURNED OFF AUTOMATICALLY.

SERVICE HINTS

I13 (B) INTEGRATION RELAY

(B) 3–GROUND : APPROX. **12** VOLTS WITH THE LIGHT CONTROL SW AT **OFF** OR **TAIL** POSITION
(B) 2–GROUND : APPROX. **12** VOLTS WITH THE LIGHT CONTROL SW AT **OFF** POSITION
(B) 4–GROUND : CONTINUITY WITH THE LIGHT CONTROL SW AT **HEAD** POSITION
(B) 1–GROUND : CONTINUITY WITH THE LIGHT CONTROL SW AT **TAIL** OR **HEAD** POSITION
6–GROUND : CONTINUITY WITH THE FRONT LH DOOR OPEN
7–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
1–GROUND : ALWAYS APPROX. **12** VOLTS
10–GROUND : ALWAYS CONTINUITY

: PARTS LOCATION

CODE		SEE PAGE	CODE		SEE PAGE	CODE		SEE PAGE
C11		28	F11	F	26	J15		29
D 9		30	I15	B	28	J18	A	29
F 6	A	26	J 2		29	J19	B	29
F 8	C	26	J 8		29			

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

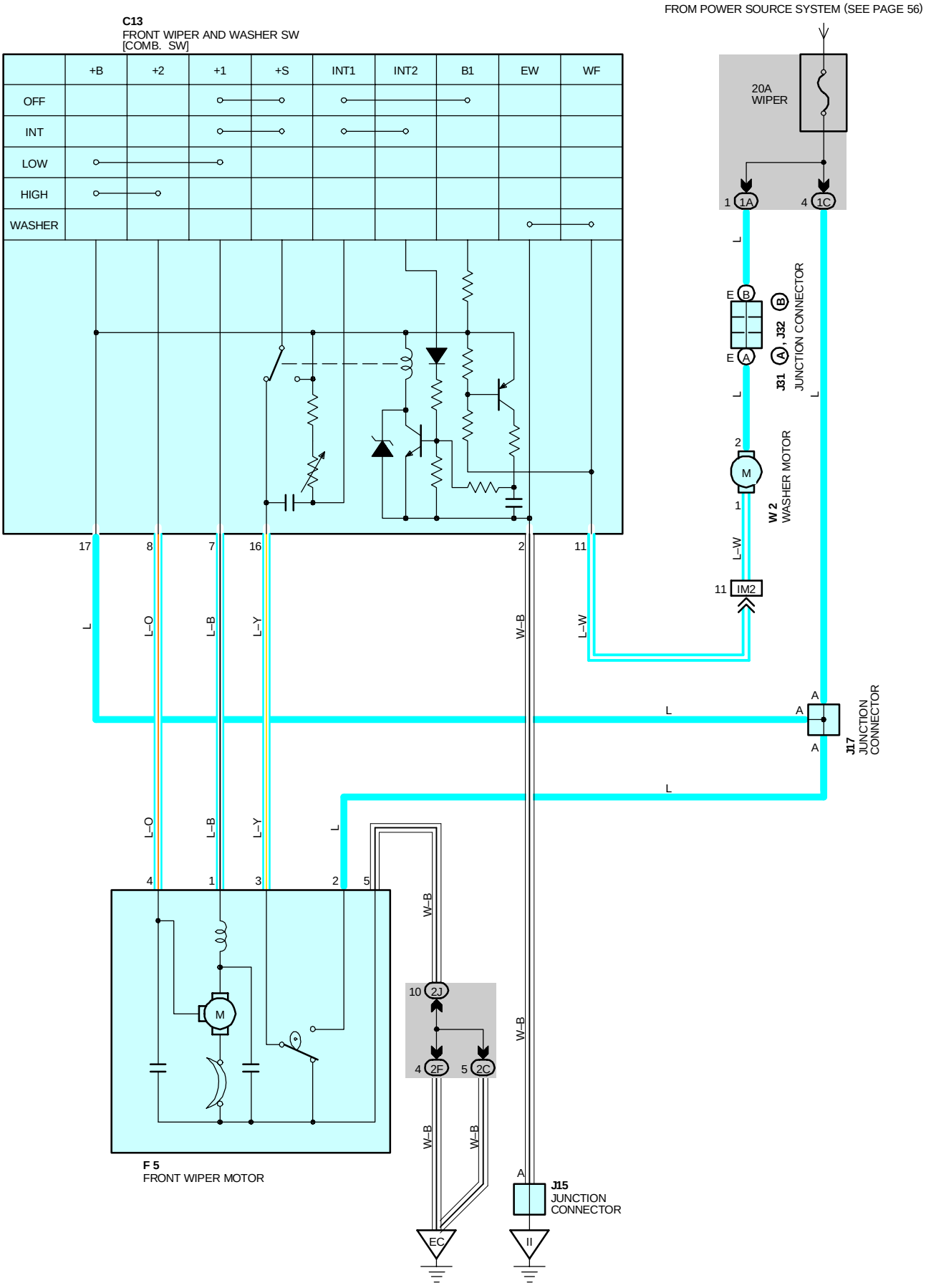
CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1C		
1J		
1S	24	FLOOR WIIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1W	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
2B	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2K		

: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
II	36	INSTRUMENT PANEL BRACE LH

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 2	34	COWL WIRE			


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
C13
FRONT WIPER AND WASHER SW
[COMB. SW]
+B
+2
+1
+S
INT1
INT2
B1
EW
WF
OFF
INT
LOW
HIGH
WASHER
20A
WIPER
1 1A
4 1C
L
E B
E A
J31, J32
JUNCTION CONNECTOR
2
M
1
W 2
WASHER MOTOR
L–W
11 IM2
17
8
7
16
2
11
L
L–O
L–B
L–Y
W–B
L–W
A
A
A
J17
JUNCTION
CONNECTOR
4
1
3
2
5
W–B
10 2J
4 2F
5 2C
M
F 5
FRONT WIPER MOTOR
A
J15
JUNCTION
CONNECTOR
EC
II

SYSTEM OUTLINE

WITH THE IGNITION SW TURNED ON, CURRENT FLOWS TO **TERMINAL 17** OF THE FRONT WIPER AND WASHER SW. **TERMINAL 2** OF THE WASHER MOTOR AND **TERMINAL 2** OF THE FRONT WIPER MOTOR THROUGH THE **WIPER** FUSE.

1. LOW SPEED POSITION

WITH THE WIPER SW TURNED TO **LOW** POSITION, THE CURRENT FLOWS THROUGH **TERMINAL 17** OF THE FRONT WIPER AND WASHER SW TO **TERMINAL 7** → **TERMINAL 1** OF THE FRONT WIPER MOTOR → **TERMINAL 5** → **GROUND** AND CAUSES THE WIPER MOTOR TO RUN AT LOW SPEED.

2. HIGH SPEED POSITION

WITH THE WIPER SW TURNED TO **HIGH** POSITION, THE CURRENT FLOWS THROUGH **TERMINAL 17** OF THE FRONT WIPER AND WASHER SW TO **TERMINAL 8** → **TERMINAL 4** OF THE FRONT WIPER MOTOR → **TERMINAL 5** → **GROUND** AND CAUSES THE WIPER MOTOR TO RUN AT HIGH SPEED.

3. INT POSITION

WITH THE WIPER SW TURNED TO **INT** POSITION, THE RELAY OPERATES AND THE CURRENT WHICH IS CONNECTED BY RELAY FUNCTION FLOWS THROUGH **TERMINAL 17** OF THE FRONT WIPER AND WASHER SW TO **TERMINAL 2** → **GROUND.** THIS FLOW OF CURRENT OPERATES THE INTERMITTENT CIRCUIT AND CURRENT FLOWS THROUGH **TERMINAL 17** OF THE FRONT WIPER AND WASHER SW TO **TERMINAL 7** → **TERMINAL 1** OF THE FRONT WIPER MOTOR → **TERMINAL 5** → **GROUND** AND THE WIPER FUNCTIONS.
THE INTERMITTENT OPERATION IS CONTROLLED BY A CONDENSER'S CHARGED AND DISCHARGED FUNCTION INSTALLED IN THE RELAY AND THE INTERMITTENT TIME IS CONTROLLED BY A TIME CONTROL SW TO CHARGE THE CHARGING TIME OF CONDENSOR.

4. WASHER CONTINUOUS OPERATION

WITH THE WIPER SW TURNED TO ON, THE CURRENT FLOWS THROUGH **TERMINAL 2** OF THE WASHER MOTOR TO **TERMINAL 1** → **TERMINAL 11** OF THE FRONT WIPER AND WASHER SW → **TERMINAL 2** → **GROUND** AND CAUSES THE WASHER MOTOR TO RUN AND THE WINDOW WASHER TO JET. THIS CAUSES THE CURRENT TO FLOW TO WASHER CONTINUOUS OPERATION CIRCUIT IN **TERMINAL 17** OF THE FRONT WIPER AND WASHER SW → **TERMINAL 7** → **TERMINAL 1** OF THE FRONT WIPER MOTOR → **TERMINAL 5** → **GROUND** AND THE WIPER FUNCTIONS.

SERVICE HINTS

C13 FRONT WIPER AND WASHER SW (COMB. SW)

2–GROUND : ALWAYS CONTINUITY
17–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
7–GROUND : APPROX. **12** VOLTS WITH THE FRONT WIPER AND WASHER SW AT **LOW** POSITION
APPROX. **12** VOLTS **2** TO **12** SECONDS INTERMITTELTLY WITH THE FRONT WIPER AND WASHER SW AT **INT** POSITION
16–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW ON UNLESS THE FRONT WIPER MOTOR AT **STOP** POSITION
8–GROUND : APPROX. **12** VOLTS WITH THE FRONT WIPER AND WASHER SW AT **HIGH** POSITION

F 5 FRONT WIPER MOTOR

2–3 : CLOSED UNLESS THE FRONT WIPER MOTOR AT **STOP** POSITION

○ : PARTS LOCATION

CODE	SEE PAGE	CODE		SEE PAGE	CODE	SEE PAGE
C13	28	J17		29	W 2	27
F 5	26	J31	A	29		
J15	29	J32	B	29		

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINSIH PANEL)
1C		
2C	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2F		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

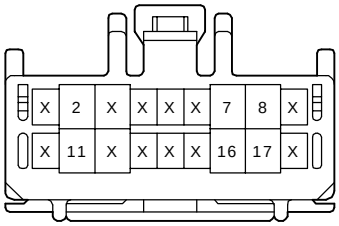
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IM2	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)

▽ : GROUND POINTS

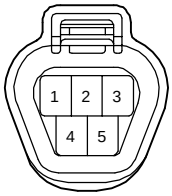
CODE	SEE PAGE	GROUND POINTS LOCATION
EC	34	LEFT RADIATOR SIDE SUPPORT
II	36	INSTRUMENT PANEL BRACE LH

WIPER AND WASHER

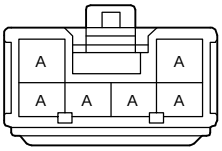
C13 BLACK



F 5 GRAY

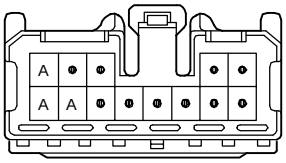


J15



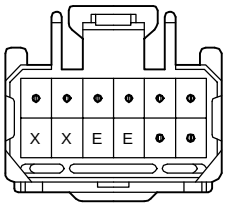
(HINT : SEE PAGE 7)

J17 BLUE



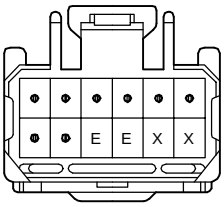
(HINT : SEE PAGE 7)

J31 (A)



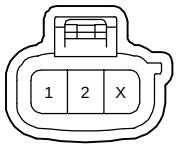
(HINT : SEE PAGE 7)

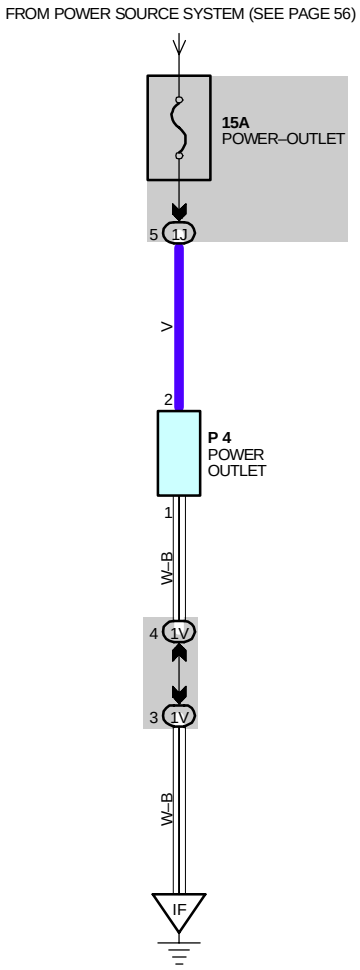
J32 (B)



(HINT : SEE PAGE 7)

W 2 BLACK





SERVICE HINTS

P 4 POWER OUTLET

2–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ACC** OR **ON** POSITION

1–GROUND : ALWAY CONTINUTIY

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
P 4	29				

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

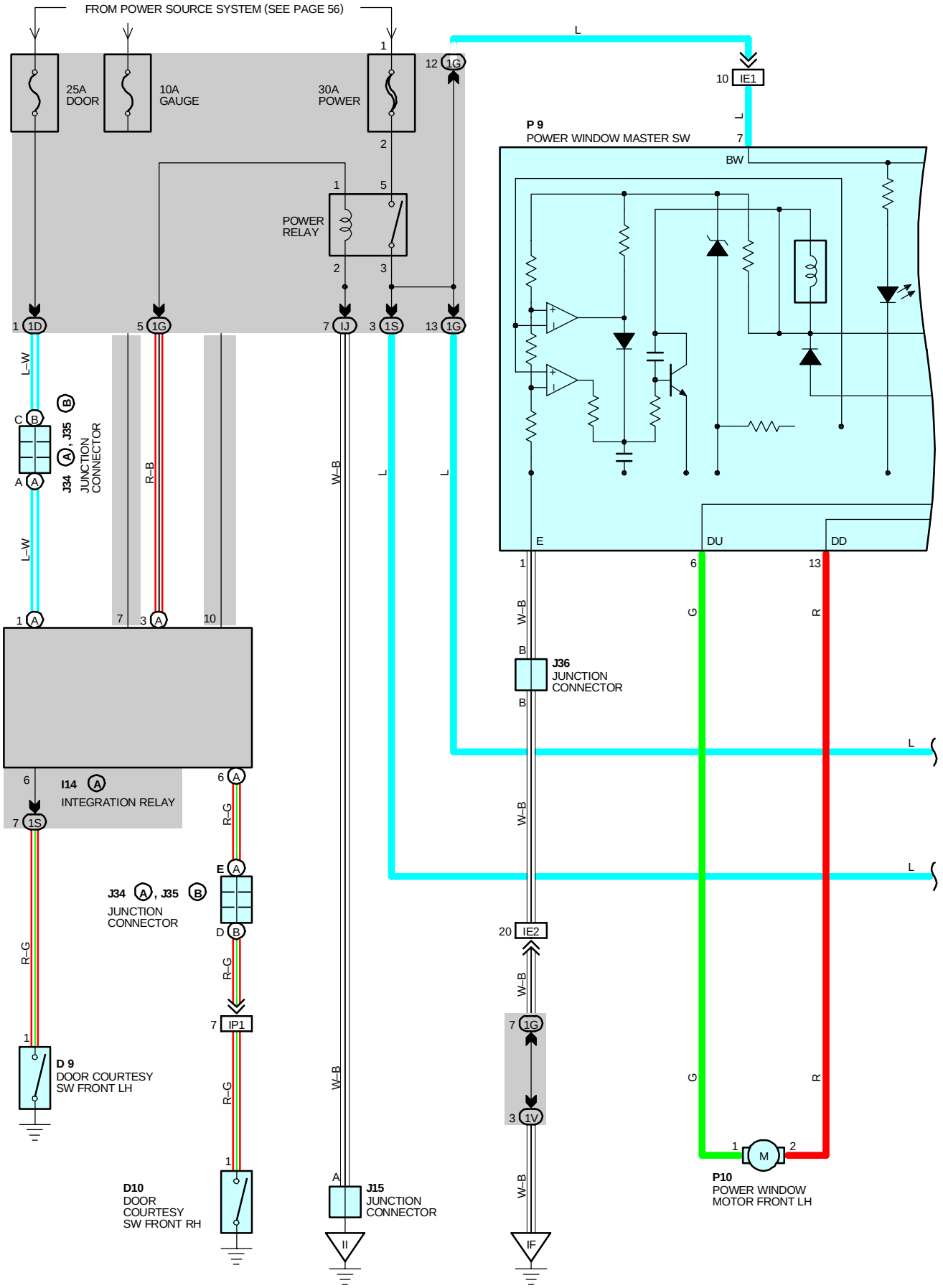
CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1V		

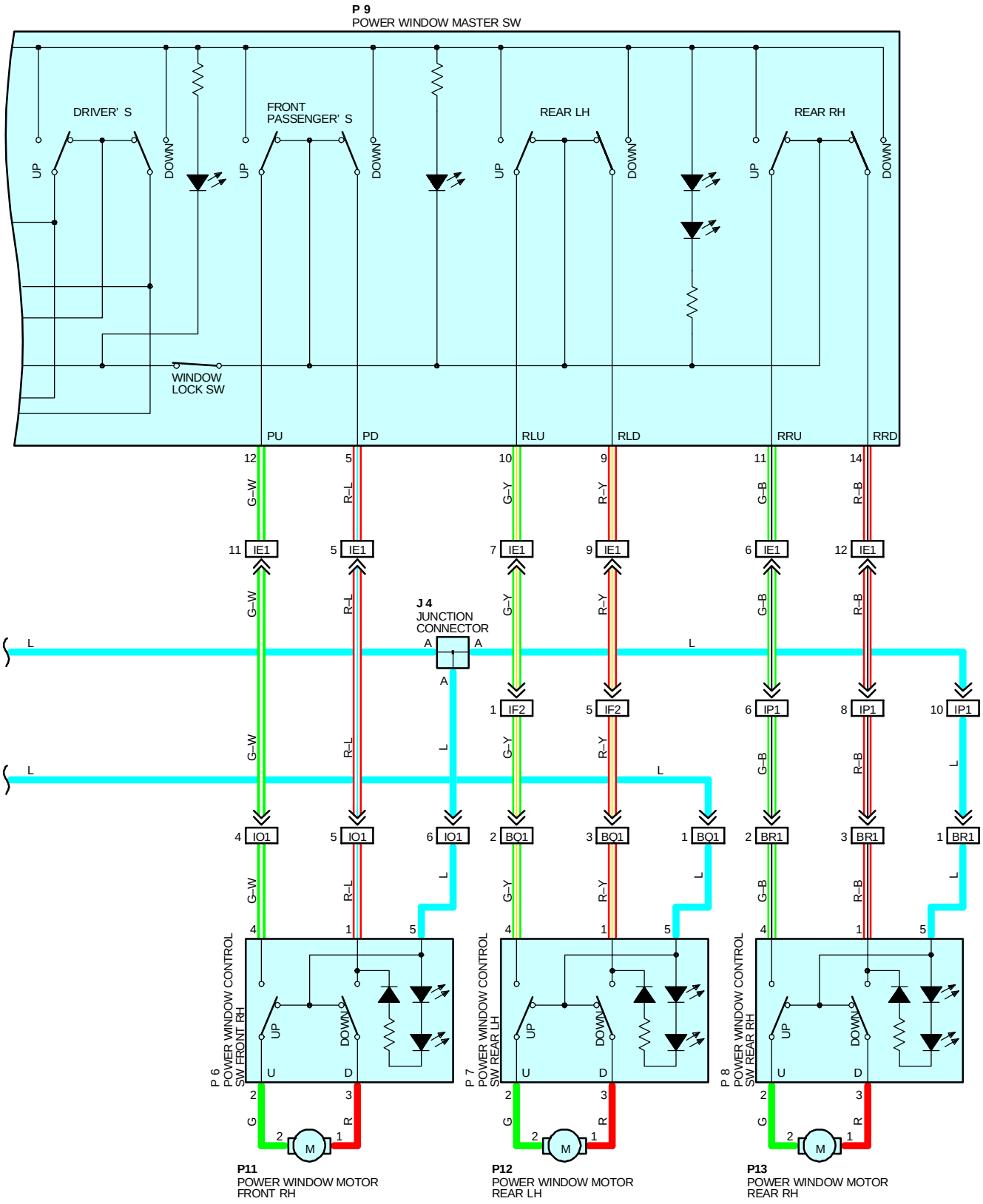
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IF	36	COWL SIDE PANEL LH

P4

POWER WINDOW




P 9
POWER WINDOW MASTER SW
DRIVER' S
FRONT PASSENGER' S
REAR LH
REAR RH
UP
DOWN
WINDOW LOCK SW
PU
PD
RLU
RLD
RRU
RRD
J 4
JUNCTION CONNECTOR
IE1
IF2
IO1
BQ1
IP1
BR1
G–W
R–L
G–Y
R–Y
G–B
R–B
L
P 6
POWER WINDOW CONTROL SW FRONT RH
P 7
POWER WINDOW CONTROL SW REAR LH
P 8
POWER WINDOW CONTROL SW REAR RH
U
D
G
R
M
P11
POWER WINDOW MOTOR FRONT RH
P12
POWER WINDOW MOTOR REAR LH
P13
POWER WINDOW MOTOR REAR RH

POWER WINDOW

SYSTEM OUTLINE

WHEN THE IGNITION SW TURNED ON, CURRENT FLOWS THROUGH THE **GAUGE** FUSE → **TERMINAL 7** OF INTEGRATION RELAY → **TERMINAL** Ⓐ**3** → **TERMINAL 1** OF THE POWER RELAY → **TERMINAL 2** → TO **GROUND.** THIS ACTIVATES THE RELAY AND THE CURRENT FLOWING TO **TERMINAL 5** OF THE RELAY FROM **POWER** FUSE FLOWS TO **TERMINAL 3** OF THE RELAY → **TERMINAL 7** OF THE POWER WINDOW MASTER SW, **TERMINAL 5** OF THE POWER WINDOW CONTROL SW.

1. MANUAL OPERATION (DRIVER'S WINDOW)

WITH THE IGNITION SW TURNED ON AND WITH THE POWER WINDOW MASTER SW (FRONT LH) IN **UP** POSITION, THE CURRENT FLOWING TO **TERMINAL 7** OF THE POWER WINDOW MASTER SW FLOWS TO **TERMINAL 6** OF THE MASTER SW → **TERMINAL 1** OF THE POWER WINDOW MOTOR → **TERMINAL 2** → **TERMINAL 13** OF THE MASTER SW → **TERMINAL 1** → TO **GROUND** AND CAUSES THE POWER WINDOW MOTOR TO ROTATE IN THE UP DIRECTION. THE WINDOW ASCENDS ONLY WHILE THE SW IS BEING PUSHED. IN DOWN OPERATION, THE FLOW OF CURRENT FROM → **TERMINAL 7** OF THE POWER WINDOW MASTER SW TO **TERMINAL 13** OF THE MASTER SW CAUSES THE FLOW OF CURRENT FROM **TERMINAL 2** OF THE MOTOR → **TERMINAL 1** → **TERMINAL 6** OF THE MASTER SW → **TERMINAL 1** → TO **GROUND.** FLOWING IN THE OPPOSITE DIRECTION TO MANUAL UP OPERATION AND CAUSING THE MOTOR TO ROTATE IN REVERSE, LOWERING THE WINDOW.

2. AUTO DOWN OPERATION

WHEN THE FRONT LH WINDOW CONTROL SW IN THE POWER WINDOW MASTER SW IS PUSHED STRONGLY ON THE DOWN SIDE, CURRENT FLOWS FROM **TERMINAL 7** OF THE MASTER SW → **TERMINAL 13** → **TERMINAL 2** OF THE POWER WINDOW MOTOR → **TERMINAL 1** → **TERMINAL 6** OF THE MASTER SW → **TERMINAL 1** → TO **GROUND.** BECAUSE THE HOLD CIRCUIT INSIDE THE MASTER SW KEEPS THE RELAY ON THE DOWN SIDE ACTIVATED, THE POWER WINDOW MOTOR CONTINUES OPERATING EVEN IF THE POWER WINDOW MASTER SW IS RELEASED. WHEN THE DRIVER'S WINDOW IS FULLY LOWERED, THE HOLD CIRUCIT TURNS OFF AND THE RELAY ON THE DOWN SIDE TURNS OFF, SO AUTO DOWN OPERATION STOPS.

3. STOPPING OFAUTO DOWN AT DRIVER'S WINDOW

WHEN THE MANUAL SW (FRONT LH) IS PULLED TO THE UP SIDE DURING AUTO DOWN OPERATION, A GROUND CIRCUIT OPENS IN THE MASTER SW AND CURRENT DOES NOT FLOW FROM **TERMINAL 6** OF THE MASTER SW → TO **TERMINAL 1,** SO THE MOTOR STOPS, CAUSING AUTO DOWN OPERATION TO STOP. IF THE MASTER SW IS PULLED CONTINUOUS, THE MOTOR ROTATES IN THE UP DIRECTION IN MANUAL UP OPERATION.

4. MANUAL OPERATION BY POWER WINDOW SW (FRONT RH WINDOW)

WITH THE POWER WINDOW CONTROL SW (FRONT RH) PULLED TO THE UP SIDE, CURRENT FLOWING FROM **TERMINAL 5** OF THE POWER WINDOW CONTROL SW FLOWS TO **TERMINAL 2** OF THE POWER WINDOW CONTROL SW → **TERMINAL 2** OF THE POWER WINDOW MOTOR → **TERMINAL 1** → **TERMINAL 3** OF THE POWER WINDOW CONTROL SW → **TERMINAL 1** → **TERMINAL 5** OF THE MASTER SW → **TERMINAL 1** → TO **GROUND** AND CAUSES THE POWER WINDOW MOTOR (FRONT RH) TO ROTATE IN THE UP DIRECTION. UP OPERATION CONTINUES ONLY WHILE THE POWER WINDOW CONTROL SW IS PULLED TO THE UP SIDE. WHEN THE WINDOW DESCENDS, THE CURRENT FLOWING TO THE MOTOR FLOWS IN THE OPPOSITE DIRECTION, FROM **TERMINAL 2** TO **TERMINAL 1,** AND THE MOTOR ROTATES IN REVERSE. WHEN THE WINDOW LOCK SW IS PUSHED TO THE LOCK SIDE, THE GROUND CIRCUIT TO THE PASSENGER'S WINDOW BECOMES OPEN. AS A RESULT, EVEN IF OPEN/CLOSE OPERATION OF THE PASSENGER'S WINDOW IS TRIED, THE CURRENT FROM **TERMINAL 1** OF THE POWER WINDOW MASTER SW IS NOT GROUNDED AND THE MOTOR DOES NOT ROTATE, SO THE PASSENGER'S WINDOW CAN NOT BE OPERATED AND WINDOW LOCK OCCURS. FURTHERMORE REAR LH, RH WINDOW OPERATE THE SAME AS THE ABOVE CIRCUIT.

5. KEY OFF POWER WINDOW OPERATION

WITH THE IGNITION SW TURNED FROM ON TO OFF, INTEGRATION RELAY OPERATES AND CURRENT FLOWS FROM **DOOR** FUSE TO **TERMINAL** Ⓐ**13** OF THE RELAY → **TERMINAL** Ⓒ**3** → **TERMINAL 1** OF POWER RELAY → **TERMINAL 2** → TO **GROUND** FOR ABOUT **43** SECONDS. THE SAME AS NORMAL OPERATION, THE CURRENT FLOWS FROM **POWER** FUSE → **TERMINAL 5** OF THE POWER RELAY → **TERMINAL 3** → **TERMINAL 7** OF THE POWER WINDOW MASTER SW AND **TERMINAL 3** OF THE POWER RELAY → TO **TERMINAL 5** OF THE POWER WINDOW CONTROL SW. AS A RESULT, FOR ABOUT **43** SECONDS AFTER THE IGNITION SW IS TURNED OFF, THE FUNCTIONING OF THIS RELAY MAKES IT POSSIBLE TO RAISE AND LOWER THE POWER WINDOW. ALSO, BY OPENING THE FRONT DOOR (DOOR OPEN DETECTION SW ON) WITHIN ABOUT **43** SECONDS AFTER TURNING THE IGNITION SW TO OFF, A SIGNAL IS INPUT TO **TERMINALS** Ⓐ**6** OR **6** OF INTEGRATION RELAY. AS A RESULT, THE RELAY TURNS OFF AND UP AND DOWN MOVEMENT OF THE POWER WINDOW STOPS.

SERVICE HINTS

P 9 POWER WINDOW MASTER SW

7–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
1–GROUND : ALWAYS CONTINUITY
6–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW ON AND MASTER SW (FRONT LH WINDOW) UP
13–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW ON AND MASTER SW (FRONT LH WINDOW) AT **DOWN** OR **AUTO DOWN** POSITION

WINDOW LOCK SW

OPEN WITH WINDOW LOCK SW AT **LOCK** POSITION

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
D 9	30	J35 B	29	P10	31
D10	30	J36	30	P11	31
I14 A	28	P 6	31	P12	31
J 4	29	P 7	31	P13	31
J15	29	P 8	31		
J34 A	29	P 9	31		

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1G		
1J	24	COWL WIRE AND INSTRUMENT PANLE J/B (LOWER FINISH PANEL)
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1V	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IE1	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IE2		
IF2	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
I01	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IP1	38	FLOOR NO.2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BQ1	40	REAR DOOR LH WIRE AND FLOOR WIRE (LEFT CENTER PILLAR)
BR1	40	REAR DOOR RH WIRE AND FLOOR NO.2 WIRE (RIGHT CENTER PILLAR)

▽ : GROUND POINTS

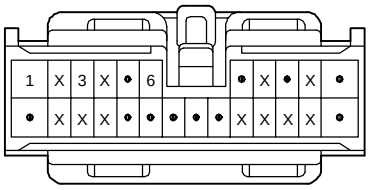
CODE	SEE PAGE	GROUND POINTS LOCATION
IF	36	COWL SIDE PANEL LH
II	36	INSTRUMENT PANEL BRACE LH

POWER WINDOW

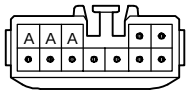
D 9

D10

I14 (A) ORANGE

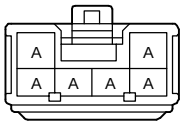


J 4 BLACK



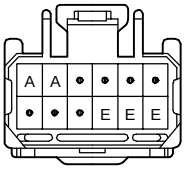
(HINT : SEE PAGE 7)

J15



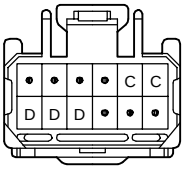
(HINT : SEE PAGE 7)

J34 (A) BLACK



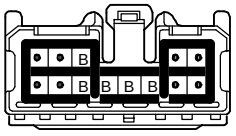
(HINT : SEE PAGE 7)

J35 (B) BLACK



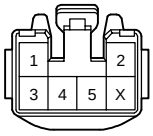
(HINT : SEE PAGE 7)

J36

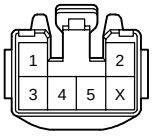


(HINT : SEE PAGE 7)

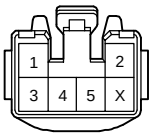
P 6



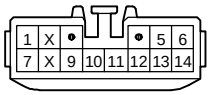
P 7



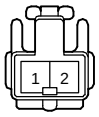
P 8



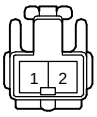
P 9



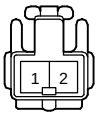
P10



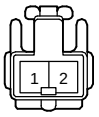
P11



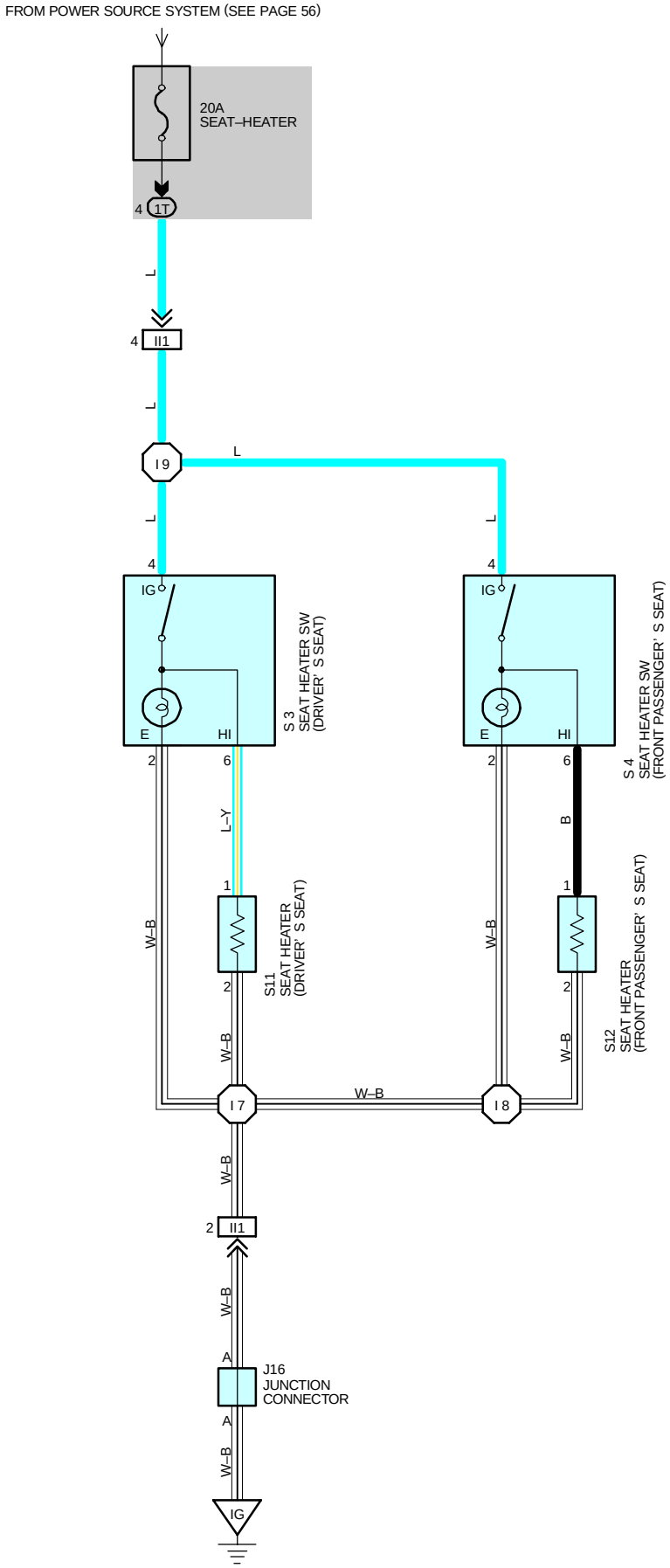
P12



P13



SEAT HEATER


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
20A
SEAT–HEATER
4
1T
L
4
II1
L
I 9
L
L
L
4
4
IG
IG
E
HI
E
HI
S 3
SEAT HEATER SW
(DRIVER' S SEAT)
S 4
SEAT HEATER SW
(FRONT PASSENGER' S SEAT)
2
6
2
6
L–Y
B
1
1
W–B
W–B
S11
SEAT HEATER
(DRIVER' S SEAT)
S12
SEAT HEATER
(FRONT PASSENGER' S SEAT)
2
2
W–B
W–B
I 7
W–B
I 8
W–B
2
II1
W–B
A
J16
JUNCTION
CONNECTOR
A
W–B
IG

SERVICE HINTS

S 3, S 4 SEAT HEATER SW

4–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION

2–GROUND : ALWAYS CONTINUITY

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J16	29	S 4	29	S12	32
S 3	29	S11	32		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
IT	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
II1	38	FLOOR NO.3 WIRE AND INSTRUMENT PANEL WIRE (UNDER THE CONSOLE BOX)

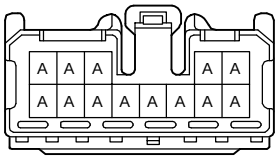
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IG	36	LEFT KICK PANEL

: SPLICE POINTS

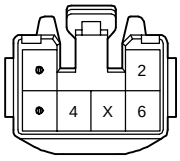
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 7	38	FLOOR NO.3 WIRE	I 9	38	FLOOR NO.3 WIRE
I 8					

J16 ORANGE

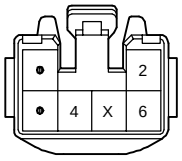


(HINT : SEE PAGE 7)

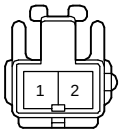
S 3 BLACK



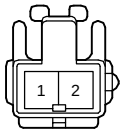
S 4 BLUE



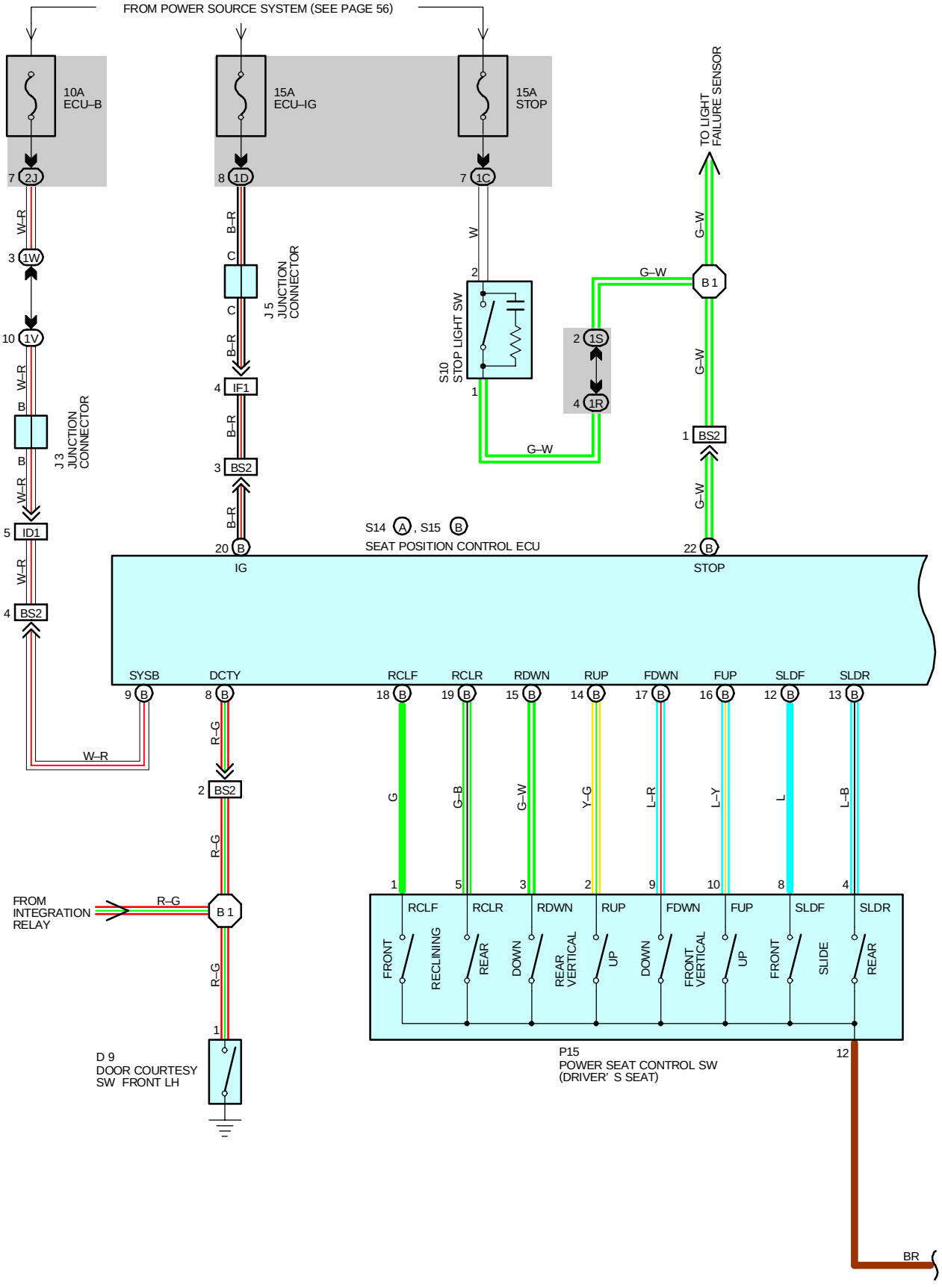
S11



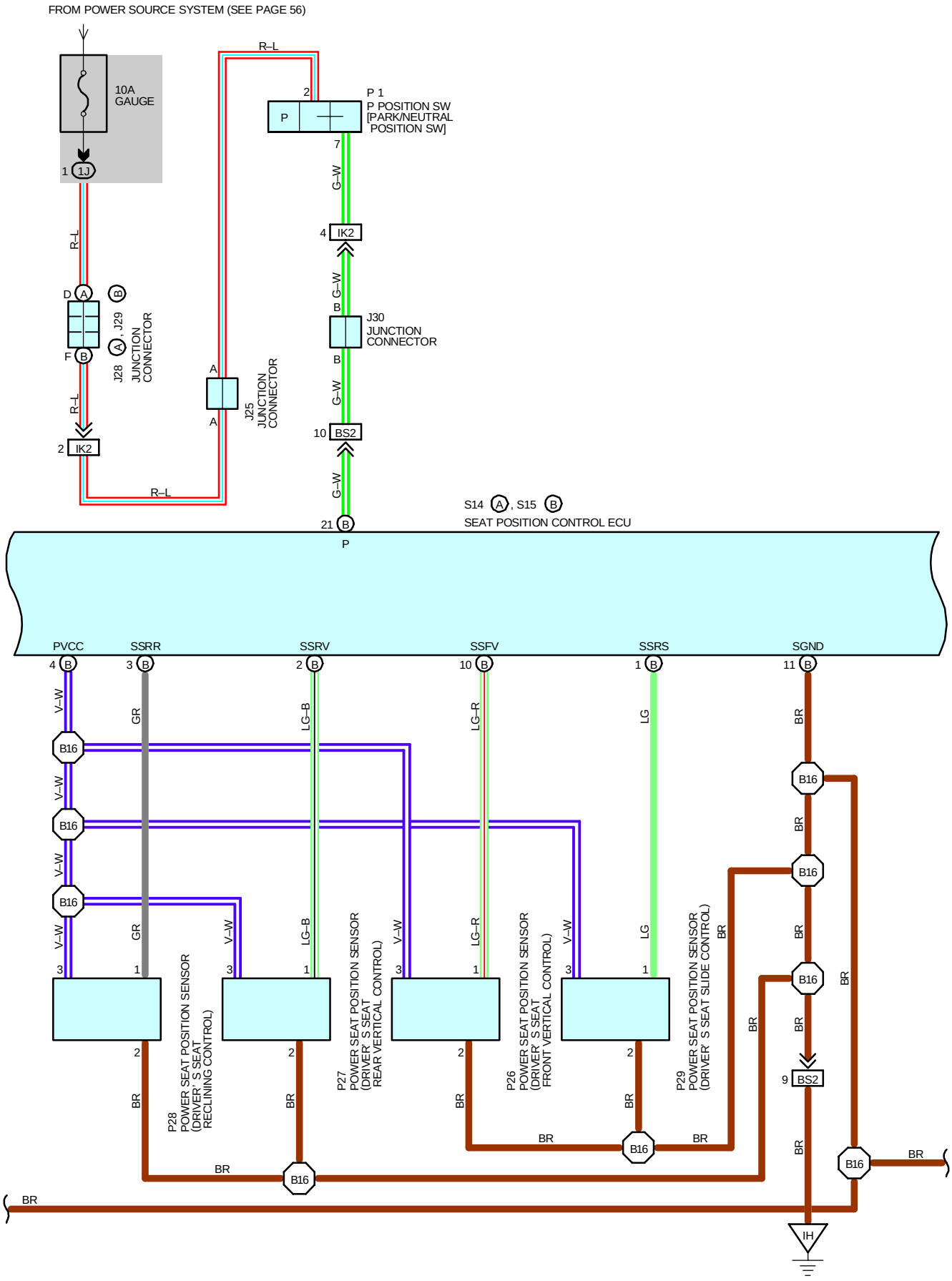
S12 BLUE



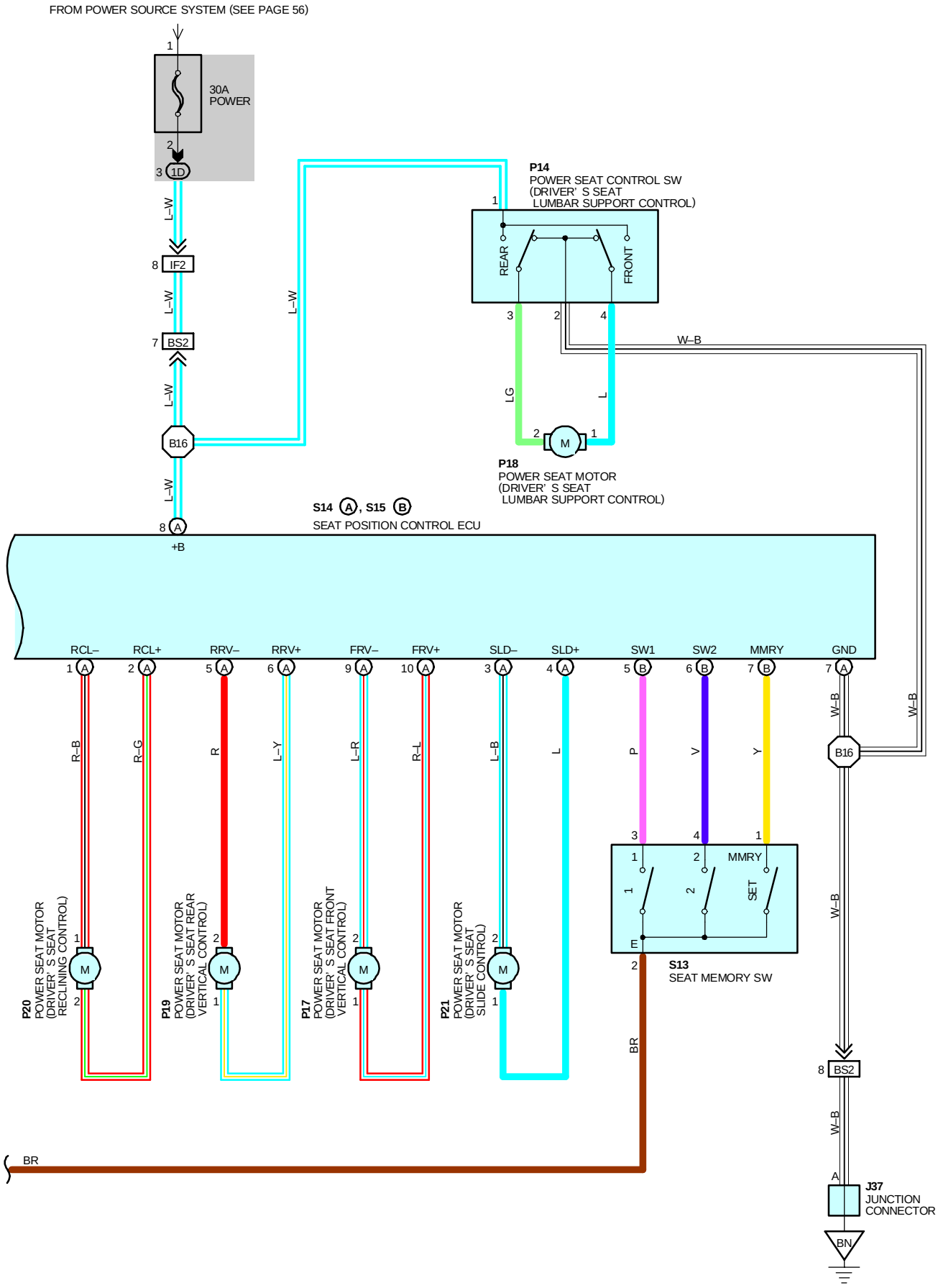
POWER SEAT


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A ECU–B
15A ECU–IG
15A STOP
TO LIGHT FAILURE SENSOR
7 2J
8 1D
7 1C
W–R
B–R
W
G–W
3 1W
C
2
10 1V
J 5 JUNCTION CONNECTOR
S10 STOP LIGHT SW
2 1S
4 1R
B 1
1 BS2
J 3 JUNCTION CONNECTOR
B
4 IF1
3 BS2
5 ID1
4 BS2
20 B
IG
S14 A, S15 B
SEAT POSITION CONTROL ECU
22 B
STOP
SYSB
DCTY
RCLF
RCLR
RDWN
RUP
FDWN
FUP
SLDF
SLDR
9 B
8 B
18 B
19 B
15 B
14 B
17 B
16 B
12 B
13 B
R–G
G
G–B
G–W
Y–G
L–R
L–Y
L
L–B
2 BS2
1
5
3
2
9
10
8
4
FROM INTEGRATION RELAY
R–G
B 1
FRONT
RECLINING
REAR
DOWN
REAR VERTICAL
UP
DOWN
FRONT VERTICAL
UP
FRONT
SLIDE
REAR
D 9
DOOR COURTESY SW FRONT LH
P15
POWER SEAT CONTROL SW (DRIVER' S SEAT)
12
BR

(DRIVER'S SEAT w/ DRIVING POSITION MEMORY)



POWER SEAT


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
30A POWER
1D
L–W
IF2
BS2
B16
P14
POWER SEAT CONTROL SW (DRIVER' S SEAT LUMBAR SUPPORT CONTROL)
REAR
FRONT
W–B
LG
L
P18
POWER SEAT MOTOR (DRIVER' S SEAT LUMBAR SUPPORT CONTROL)
S14 A, S15 B
SEAT POSITION CONTROL ECU
+B
RCL–
RCL+
RRV–
RRV+
FRV–
FRV+
SLD–
SLD+
SW1
SW2
MMRY
GND
R–B
R–G
R
L–Y
L–R
R–L
L–B
L
P
V
Y
W–B
P20
POWER SEAT MOTOR (DRIVER' S SEAT RECLINING CONTROL)
P19
POWER SEAT MOTOR (DRIVER' S SEAT REAR VERTICAL CONTROL)
P17
POWER SEAT MOTOR (DRIVER' S SEAT FRONT VERTICAL CONTROL)
P21
POWER SEAT MOTOR (DRIVER' S SEAT SLIDE CONTROL)
S13
SEAT MEMORY SW
SET
BR
J37
JUNCTION CONNECTOR
BN

(DRIVER'S SEAT w/ DRIVING POSITION MEMORY)

SYSTEM OUTLINE

CURRENT IS ALWAYS APPLIED FROM **ECU–B** FUSE TO **TERMINAL SYSB** OF THE SEAT POSITION CONTROL ECU, FROM **POWER** FUSE TO **TERMINAL +B** OF THE SEAT POSITION CONTROL ECU, AND FROM **STOP** FUSE TO **TERMINAL 2** OF THE STOP LIGHT SW.
WITH THE IGNITION SW TURNED ON, CURRENT FLOWS FROM **ECU–IG** FUSE TO **TERMINAL IG** OF THE SEAT POSITION CONTROL ECU AND FROM THE **GAUGE** FUSE TO **TERMINAL 2** OF THE P POSITION SW.

POWER SEAT OPERATION (DRIVER'S SEAT)

CURRENT IS ALWAYS APPLIED TO **TERMINAL SYSB** AND **TERMINAL +B** OF THE SEAT POSITION CONTROL ECU SO THAT SEAT POSITION CONTROL ECU IS ALWAYS READY TO OPERATE.
WHEN THE POWER SEAT CONTROL SW IS PUSHED TO THE **"FRONT SLIDE** POSITION" SIDE, A SIGNAL IS INPUT INTO **TERMINAL SLDF** OF THE SEAT POSITION CONTROL ECU, THE ECU OPERATES AND THE CURRENT TO **TERMINAL +B** OF THE SEAT POSITION CONTROL ECU FLOWS FROM **TERMINAL SLD+** OF THE SEAT POSITION CONTORL ECU → **TERMINAL 1** OF THE POWER SEAT MOTOR (DRIVER'S SEAD SLIDE CONTROL) → **TERMINAL 2** → **TERMINAL SLD–** OF THE SEAT POSITION CONTROL ECU → **TERMINAL GND** → **GROUND,** ROTATING THE POWER SEAT MOTOR SO THAT THE SEAT SLIDES FORWARD WHILE THE POWER SEAT CONTROL SW IS BEING PRESSED.
TO SLIDE THE DRIVER'S SEAT TO THE REAR, PUSHING THE POWER SEAT CONTROL SW TO THE **"REAR SIDE** POSITION" SIDE, INPUTS A SIGNAL TO **TERMINAL SLDR** OF THE SEAT POSITION CONTROL ECU. THIS CAUSES THE CURRENT FLOWING FROM THE ECU TO THE MOTOR TO FLOW FROM **TERMINAL SLD–** OF THE SEAT POSITION CONTROL ECU → **TERMINAL 2** OF THE POER SEAT MOTOR (DRIVER'S SEAT SLIDE CONTROL) → **TERMINAL 1** → **TERMINAL SLD+** OF THE SEAT POSITION CONTROL ECU, FLOWING THE REVERSE TO FRONT SLIDE OPERATION AND CAUSING THE MOTOR TO ROTATE IN REVERSE, SO THAT THE DRIVER'S SEAT MOVES TO THE REAR.

THE MOVEMENT TO OTHER POSITIONS OCCURS SIMILARLY, SO ONLY THE FLOW OF CURRENT TO EACH MOTOR IS SHOWN:

FRONT VERTICAL CONTROL 'UP' OPERATION

TERMINAL +B OF THE SEAT POSITION CONTROL ECU → **TERMINAL FRV+** → **TERMINAL 1** OF THE POWER SEAT MOTOR (DRIVER'S SEAT FRONT VERTICAL CONTROL) → **TERMINAL 2** → **TERMINAL FRV–** OF THE ECU → **TERMINAL GND** → **GROUND.**

FRONT VERTICAL CONTROL 'DOWN' OPERATION

TERMINAL +B OF THE SEAT POSITION CONTROL ECU → **TERMINAL FRV–** → **TERMINAL 2** OF THE POWER SEAT MOTOR (DRIVER'S SEAT FRONT VERTICAL CONTROL) → **TERMINAL 1** → **TERMINAL FRV+** OF THE ECU → **TERMINAL GND** → **GROUND.**

REAR VERTICAL CONTROL 'UP' OPERATION

TERMINAL +B OF THE SEAT POSITION CONTROL ECU → **TERMINAL RRV+** → **TERMINAL 1** OF THE POWER SEAT MOTOR (DRIVER'S SEAT REAR VERTICAL CONTROL) → **TERMINAL 2** → **TERMINAL RRV–** OF THE ECU → **TERMINAL GND** → **GROUND.**

REAR VERTICAL CONTROL 'DOWN' OPERATION

TERMINAL +B OF THE SEAT POSITION CONTROL ECU → **TERMINAL RRV–** → **TERMINAL 2** OF THE POWER SEAT MOTOR (DRIVER'S SEAT REAR VERTICAL CONTROL) → **TERMINAL 1** → **TERMINAL RRV+** OF THE ECU → **TERMINAL GND** → **GROUND.**

RECLINING CONTROL OF 'FRONT' OPERATION

TERMINAL +B OF THE SEAT POSITION CONTROL ECU → **TERMINAL RCL+** → **TERMINAL 2** OF THE POWER SEAT MOTOR (DRIVER'S SEAT RECLINING CONTROL) → **TERMINAL 1** → **TERMINAL RCL–** OF THE ECU → **TERMINAL GND** → **GROUND.**

RECLINING CONTROL OF 'REAR' OPERATION

TERMINAL +B OF THE SEAT POSITION CONTROL ECU → **TERMINAL RCL–** → **TERMINAL 1** OF THE POWER SEAT MOTOR (DRIVER'S SEAT RECLINING CONTROL) → **TERMINAL 2** → **TERMINAL RCL+** OF THE ECU → **TERMINAL GND** → **GROUND.**

THE NUMBER OF TURNS OF EACH MOTOR (AMOUNT OF MOVEMENT OF EACH PART OF THE SEAT) IS DETECTED BY THE POSITION SENSORS AND INPUT TO THE ECU, MAKING IT POSSIBLE TO PERFORM MEMORY AND RETURN FUNCTIONS FOR THE SEAT POSITION USING THE SEAT MEMORY SWITCH.

POWER SEAT

SERVICE HINTS

P I P POSITION SW (PARK/NEUTRAL POSITION SW)

2–7 : CLOSED WITH SHIFT LEVER AT “P” POSITION

S14 (A), S15 (B) SEAT POSITION CONTROL ECU

(B) 22–GROUND : APPROX. **12** VOLTS WITH STOP LIGHT SW ON
(A) 8–GROUND : ALWAYS APPROX. **12** VOLTS
(B) 21–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ON** OR **ST** POSITION AND SHIFT LEVER AT “P” POSITION
(A) 4–GROUND : APPROX. **12** VOLTS WITH DRIVER’S SEAT AT FRONT SLIDE OPERATION
(A) 3–GROUND : APPROX. **12** VOLTS WITH DRIVER’S SEAT AT REAR SLIDE OPERATION
(A) 10–GROUND : APPROX. **12** VOLTS WITH DRIVER’S SEAT AT FRONT VERTICAL UP OPERAITON
(A) 9–GROUND : APPROX. **12** VOLTS WITH DRIVER’S SEAT AT FRONT VERTICAL DOWN OPERATION
(A) 6–GROUND : APPROX. **12** VOLTS WITH DRIVER’S SEAT AT REAR VERTICAL UP OPERATION
(A) 5–GROUND : APPROX. **12** VOLTS WITH DRIVER’S SEAT AT REAR VERTICAL DOWN OPERATION
(A) 2–GROUND : APPROX. **12** VOLTS WITH DRIVER’S SEAT AT FRONT RECLINING OPERATION
(A) 1–GROUND : APPROX. **12** VOLTS WITH DRIVER’S SEAT AT REAR RECLINING OPERATION
(B) 11–GROUND : ALWAYS CONTINUITY
(B) 9–GROUND : ALWAYS APPROX. **12** VOLTS
(B) 7–GROUND : ALWAYS CONTINUITY

PI5 POWER SEAT CONTROL SW (DRIVER’S SEAT)

1–12 : CLOSED WITH DRIVER’S SEAT AT FRONT RECLINING OPERATION
5–12 : CLOSED WITH DRIVER’S SEAT AT REAR RECLINING OPERATION
8–12 : CLOSED WITH DRIVER’S SEAT AT FRONT SLIDE OPERATION
4–12 : CLOSED WITH DRIVER’S SEAT AT REAR SLIDE OPERATION
10–12 : CLOSED WITH DRIVER’S SEAT AT FRONT VERTICAL UP OPERATION
9–12 : CLOSED WITH DRIVER’S SEAT AT FRONT VERTICAL DOWN OPERATION
2–12 : CLOSED WITH DRIVER’S SEAT AT REAR VERTICAL UP OPERATION
3–12 : CLOSED WITH DRIVER’S SEAT AT REAR VERTICAL DOWN OPERATION

SI0 STOP LIGHT SW

2–1 : CLOSED WITH BRAKE PEDAL DEPRESSED

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
D 9	30	P 1	27	P26	32
J 3	29	P14	32	P27	32
J 5	29	P15	32	P28	32
J25	29	P17	32	P29	32
J28 A	29	P18	32	S10	29
J29 B	29	P19	32	S13	32
J30	29	P20	32	S14 A	32
J37	30	P21	32	S15 B	32

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINSIH PANEL)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1R		
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1V	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1W		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
ID1	36	FLOOR WIRE AND COWL WIRE (LEFT KICK PANEL)
IF1	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IF2		
IK2	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
BS2	42	FLOOR WIRE AND SEAT NO. 1 WIRE (UNDER THE DRIVER’S SEAT)

: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IH	36	LEFT KICK PANEL
BN	40	UNDER THE LEFT CENTER PILLAR

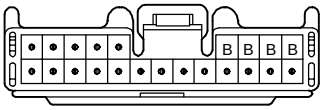
(DRIVER'S SEAT w/ DRIVING POSITION MEMORY)

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B 1	40	FLOOR WIRE	B16	42	SEAT NO. 1 WIRE

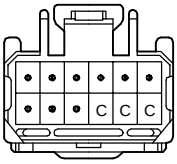
D 9

J 3



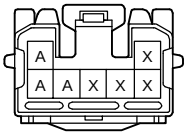
(HINT : SEE PAGE 7)

J 5 GRAY



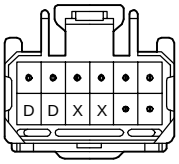
(HINT : SEE PAGE 7)

J25



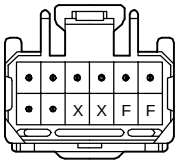
(HINT : SEE PAGE 7)

J28 Ⓐ



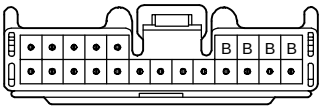
(HINT : SEE PAGE 7)

J29 Ⓑ



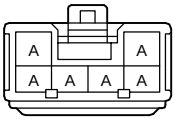
(HINT : SEE PAGE 7)

J30



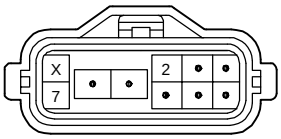
(HINT : SEE PAGE 7)

J37



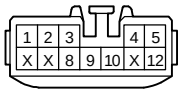
(HINT : SEE PAGE 7)

P 1 GRAY

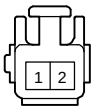


P14 GRAY

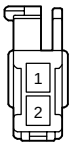
P15 BLACK



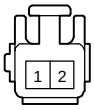
P17



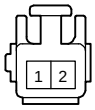
P18



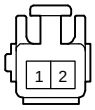
P19



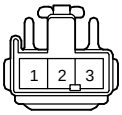
P20



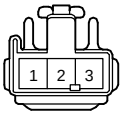
P21



P26



P27



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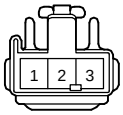

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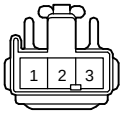

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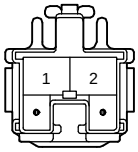

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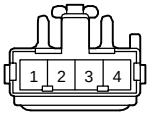
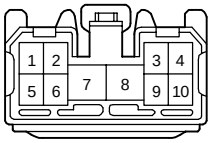
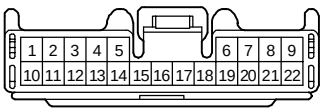


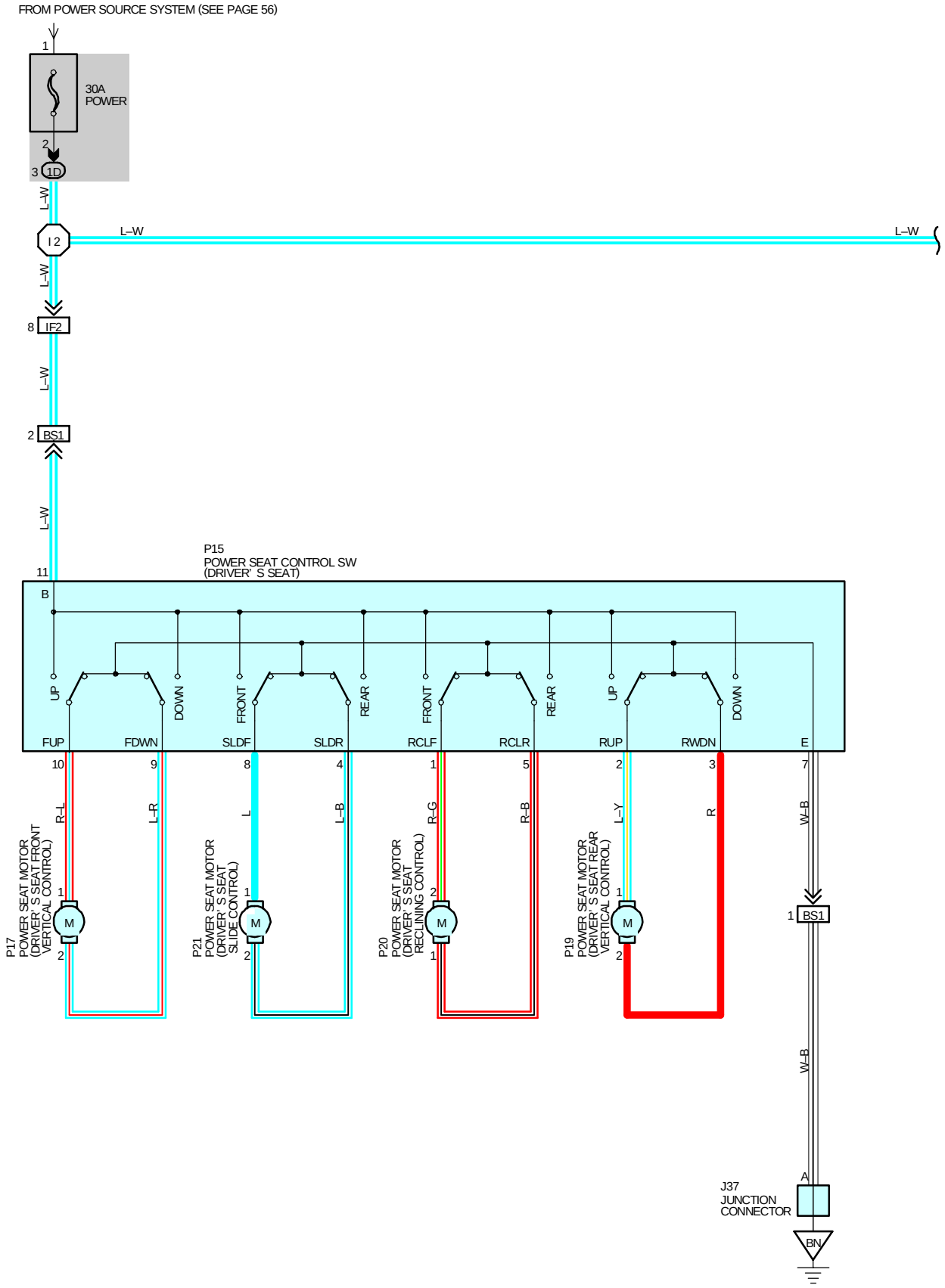
S14 Ⓐ

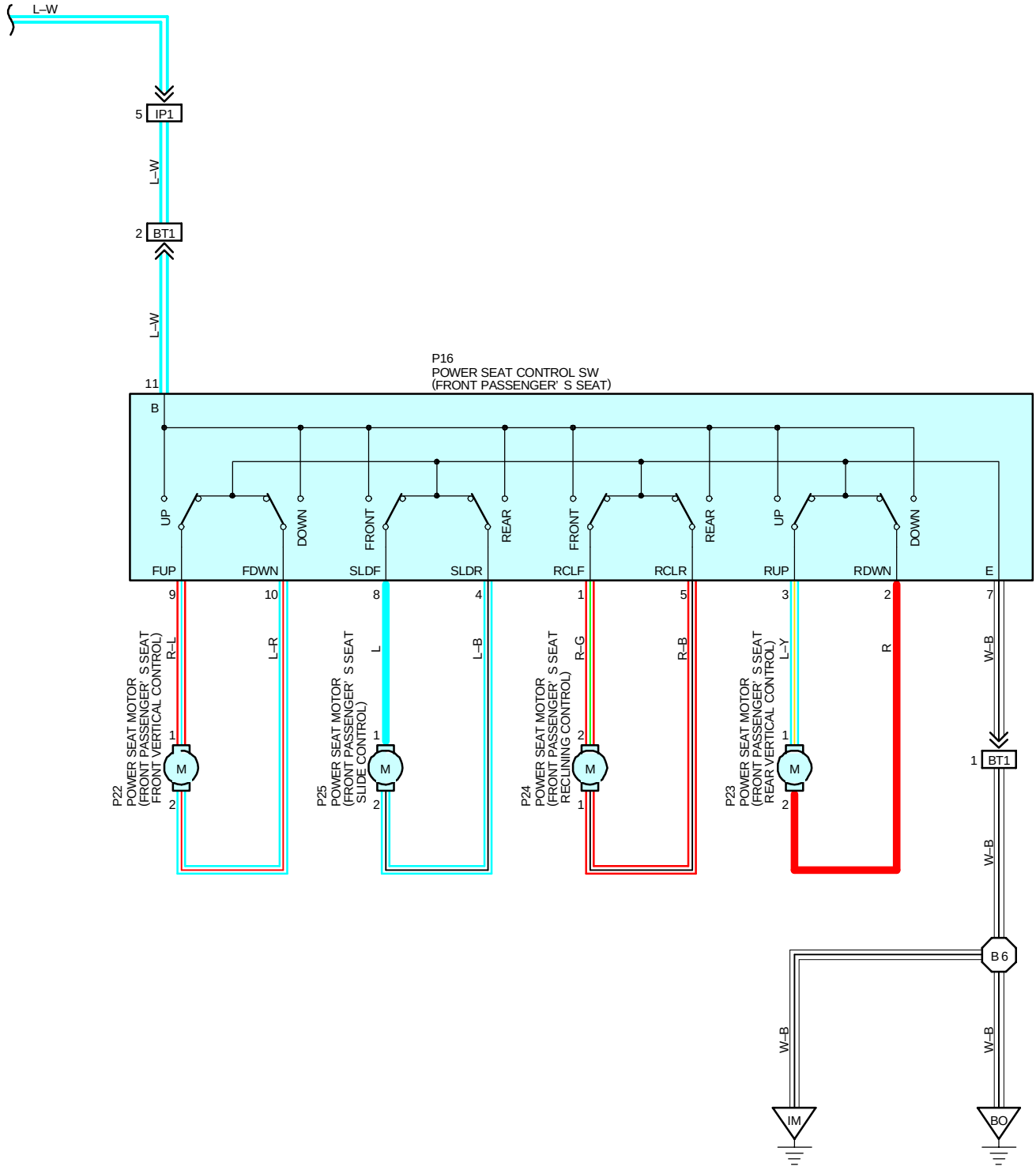


S15 Ⓑ



POWER SEAT (DRIVER'S SEAT w/o DRIVING POSITION MEMORY), (FRONT PASSENGER'S SEAT)




L–W
5 IP1
L–W
2 BT1
L–W
11
P16
POWER SEAT CONTROL SW
(FRONT PASSENGER' S SEAT)
B
UP
DOWN
FRONT
REAR
FRONT
REAR
UP
DOWN
FUP
FDWN
SLDF
SLDR
RCLF
RCLR
RUP
RDWN
E
9
10
8
4
1
5
3
2
7
R–L
L–R
L
L–B
R–G
R–B
L–Y
R
W–B
P22
POWER SEAT MOTOR
(FRONT PASSENGER' S SEAT
FRONT VERTICAL CONTROL)
P25
POWER SEAT MOTOR
(FRONT PASSENGER' S SEAT
SLIDE CONTROL)
P24
POWER SEAT MOTOR
(FRONT PASSENGER' S SEAT
RECLINING CONTROL)
P23
POWER SEAT MOTOR
(FRONT PASSENGER' S SEAT
REAR VERTICAL CONTROL)
M
1 BT1
W–B
B 6
W–B
W–B
IM
BO

POWER SEAT (DRIVER'S SEAT w/o DRIVING POSITION MEMORY), (FRONT PASSENGER'S SEAT)

SERVICE HINTS

P15 POWER SEAT CONTROL SW (DRIVER'S SEAT)
11–GROUND : ALWAYS APPOX **12** VOLTS
7–GROUND : ALWAYS CONTINUTIY

P16 POWER SEAT CONTROL SW (FRONT PASSENGER'S SEAT)
11–GROUND : ALWAYS APPOX **12** VOLTS
7–GROUND : ALWAYS CONTINUTIY

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J37	30	P19	32	P23	32
P15	32	P20	32	P24	32
P16	32	P21	32	P25	32
P17	32	P22	32		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINSIH PANEL)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IF2	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IP1	38	FLOOR NO.2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BS1	42	FLOOR WIRE AND SEAT NO.1 WIRE (UNDER THE DRIVER'S SEAT)
BT1	42	FLOOR NO.2 WIRE AND SEAT NO.2 WIRE (UNDER THE FRONT PASSENGER'S SEAT)

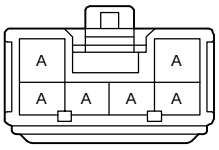
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IN	36	RIGHT KICK PANEL
BN	40	UNDER THE LEFT CENTER PILLAR
BO	40	UNDER THE RIGHT CENTER PILLAR

: SPLICE POINTS

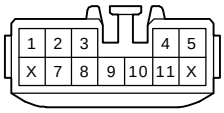
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 2	38	INSTRUMENT PANEL WIRE	B 6	40	FLOOR NO.2 WIRE

J37



(HINT : SEE PAGE 7)

P15 GRAY



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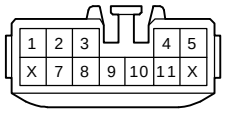

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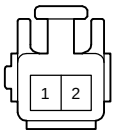

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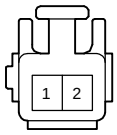

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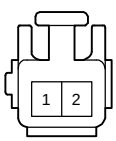

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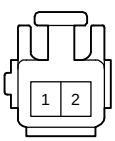

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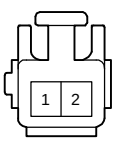
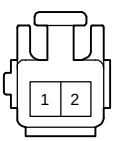


P23



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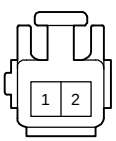
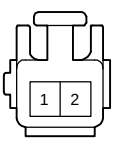
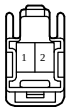


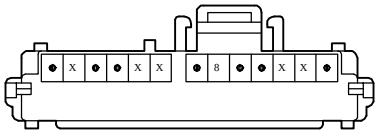
P25



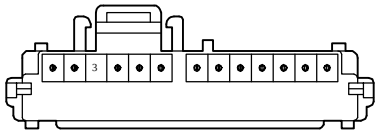
B 4



C 7 (A) **BLUE**

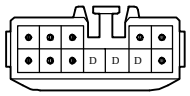


C10 (D) BROWN



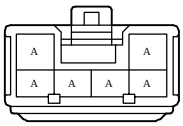
D 9

J 4 BLACK



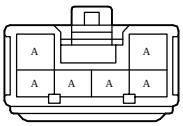
(HINT : SEE PAGE 7)

J15



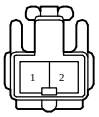
(HINT : SEE PAGE 7)

J37

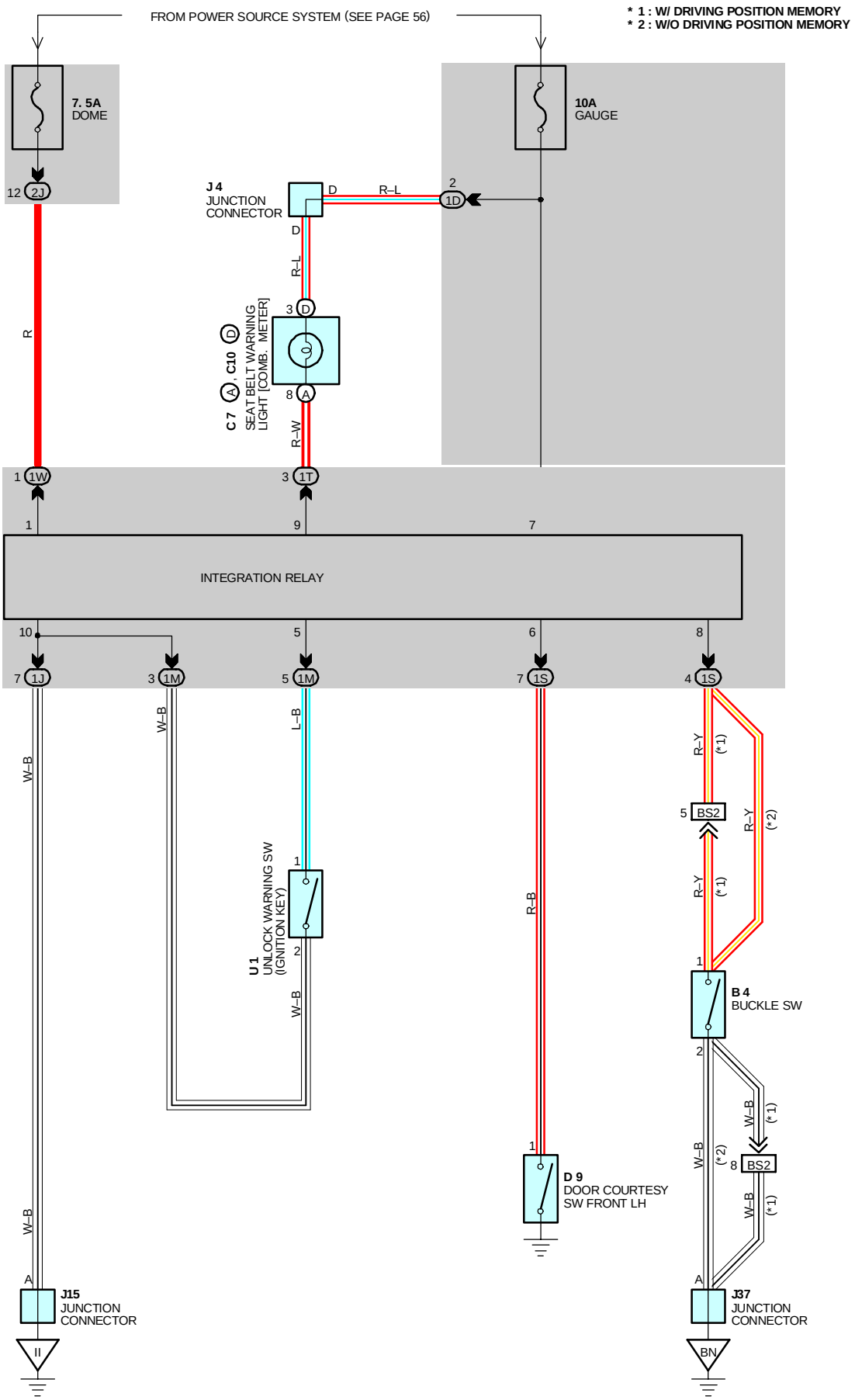


(HINT : SEE PAGE 7)

U 1



UNLOCK AND SEAT BELT WARNING



SYSTEM OUTLINE

CURRENT ALWAYS FLOWS TO **TERMINAL 1** OF THE INTEGRATION RELAY THROUGH THE **DOME** FUSE.

1. SEAT BELT WARNING SYSTEM

WHEN THE IGNITION SW IS TURNED ON, CURRENT FLOWS FROM THE **GAUGE** FUSE TO THE **TERMINAL 7** OF THE INTEGRATION RELAY AT THE SAME TIME, CURRENT FLOWS TO **TERMINAL 9** OF THE RELAY FROM THE **GAUGE** FUSE THROUGH THE SEAT BELT WARNING LIGHT THIS CURRENT ACTIVATES THE INTEGRATION RELAY AND, FOR APPROX. **4–8** SECONDS, CURRENT FLOWING THROUGH THE WARNING LIGHT FLOWS FROM **TERMINAL 9** OF THE RELAY → **TERMINAL 10** → **GROUND**, CAUSING THE WARNING LIGHT TO LIGHT UP. AT THE SAME TIME AS THE WARNING LIGHT LIGHTS UP, A BUCKLE SW OFF SIGNAL IS INPUT TO **TERMINAL 8** OF THE RELAY, THE CURRENT FLOWING TO **TERMINAL 1** OF THE RELAY FLOWS FROM **TERMINAL 10** → **GROUND** AND THE SEAT BELT WARNING BUZZER SOUNDS FOR APPROX. **4–8** SECONDS. HOWEVER, IF SEAT BELT IS PUT ON DURING THIS PERIOD (WHILE THE BUZZER IS SOUNDING), SIGNAL INPUT TO **TERMINAL 8** OF THE RELAY STOPS AND THE CURRENT FLOW FROM **TERMINAL 1** OF THE RELAY → **TERMINAL 10** → **GROUND** IS CUT, CAUSING THE BUZZER TO STOP.

2. KEY REMINDER SYSTEM

WITH THE IGNITION KEY INSERTED IN THE KEY CYLINDER (UNLOCK WARNING SW ON), THE IGNITION SW STILL OFF AND DOOR OPEN (DOOR COURTESY SW ON), WHEN A SIGNAL IS INPUT **TERMINAL 5** AND **6** OF THE RELAY, THE INTEGRATION RELAY OPERATES, CURRENT FLOWS FROM **TERMINAL 1** OF THE RELAY → **TERMINAL 10** → **GROUND** AND THE KEY REMINDER BUZZER SOUNDS.

SERVICE HINTS

B 4 BUCKLE SW

1–2 : CLOSED WITH THE DRIVER'S SEAT BELT USE

D 9 DOOR COURTESY SW FRONT LH

1–GROUND : CLOSED WITH THE FRONT LH DOOR OPEN

INTEGRATION RELAY

10–GROUND : ALWAYS CONTINUITY
6–GROUND : CONTINUITY WITH THE FRONT LH DOOR OPEN
5–GROUND : CONTINUITY WITH THE IGNITION KEY IN CYLINDER
8–GROUND : CONTINUITY UNLESS DRIVER'S SEAT BELT IN USE
9–GROUND : **0** VOLTS FOR **4–8** SECONDS WITH THE IGNITION SW ON AND **12** VOLTS **4–8** SECONDS AFTER IGNITION SW ON
1–GROUND : ALWAYS APPROX. **12** VOLTS
7–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION

U 1 UNLOCK WARNING SW (IGNITION KEY)

1–2 : CLOSED WITH THE IGNITION KEY CYLINDER

○ : PARTS LOCATION

CODE		SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
B4		32	D 9	30	J37	30
C 7	A	28	J 4	29	U 1	29
C10	D	28	J15	29		

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1N		
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1T	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1W	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

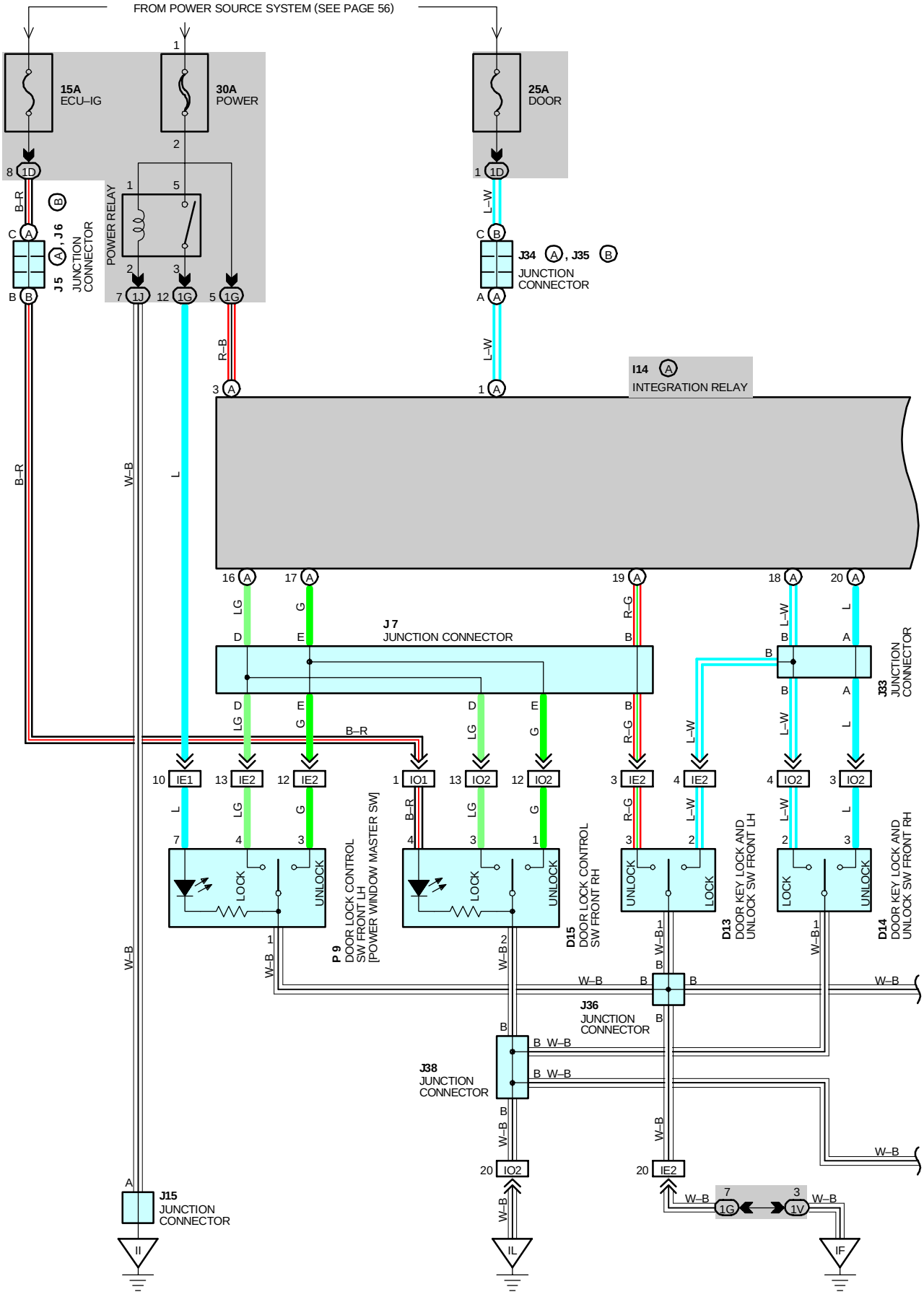
▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

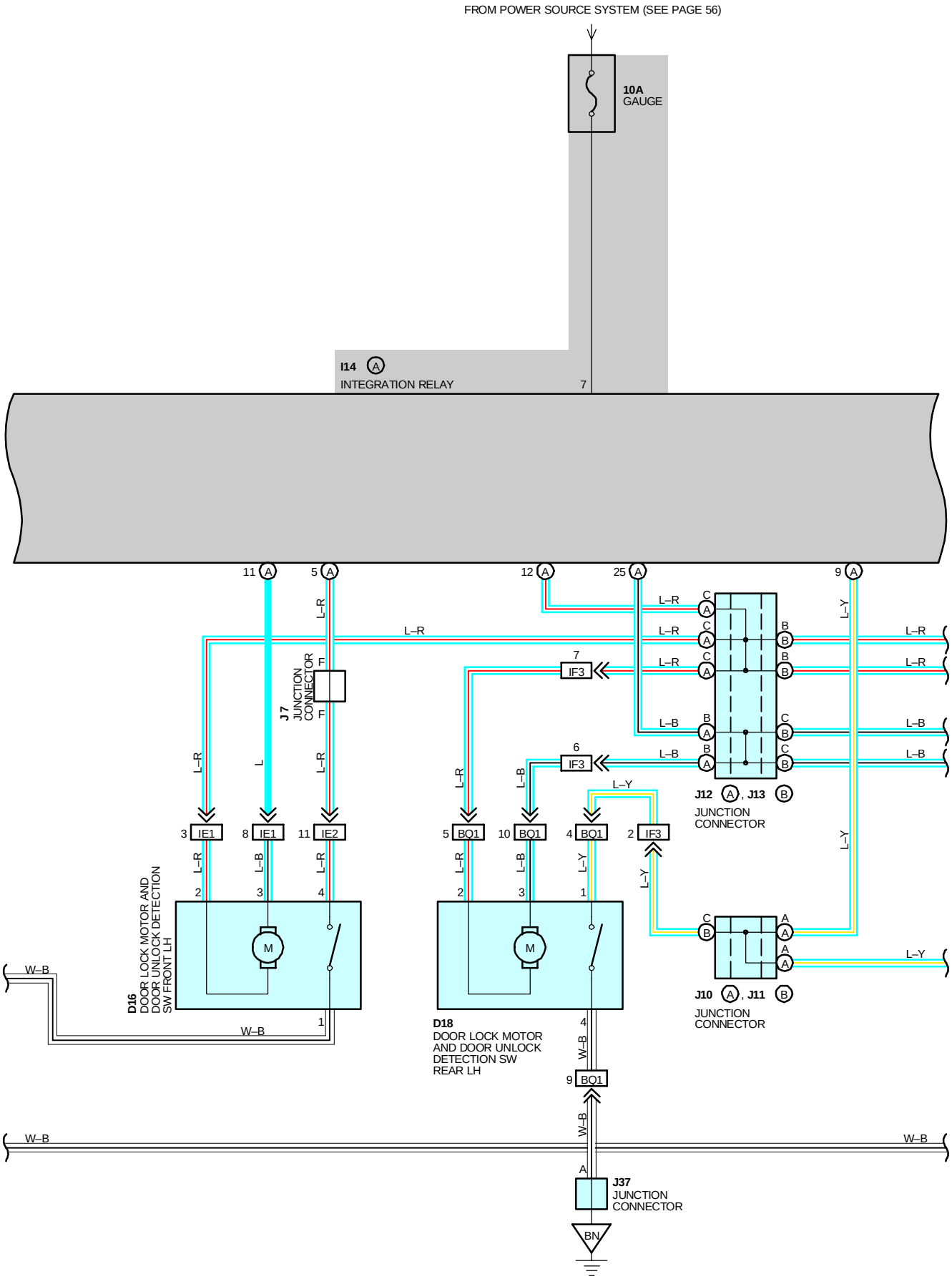
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
BS2	42	FLOOR WIRE AND SEAT NO. 1 WIRE (UNDER THE DRIVER'S SEAT)

▽ : GROUND POINTS

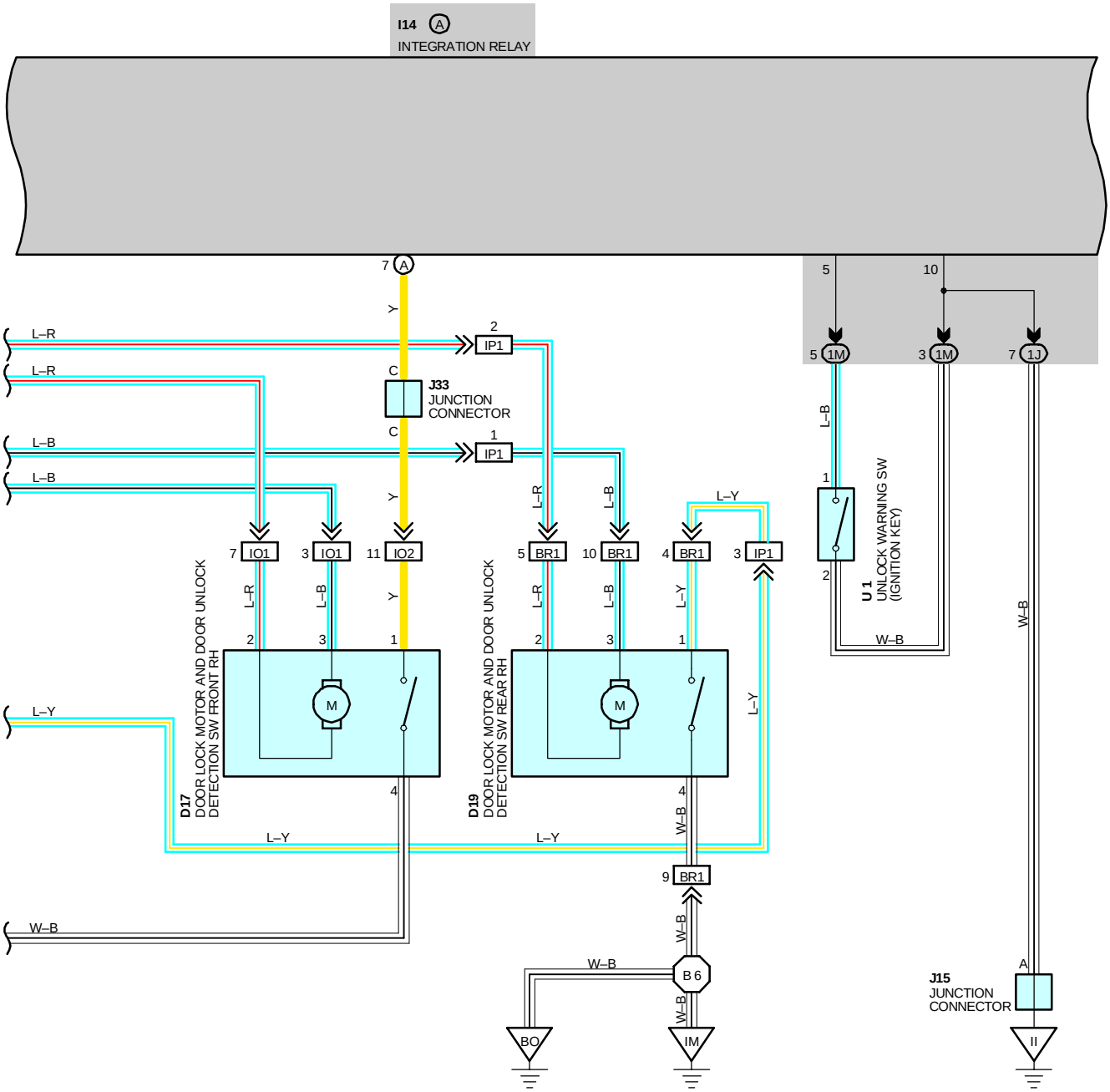
CODE	SEE PAGE	GROUND POINTS LOCATION
II	36	INSTRUMENT PANEL BRACE LH
BN	40	UNDER THE LEFT CENTER PILLAR

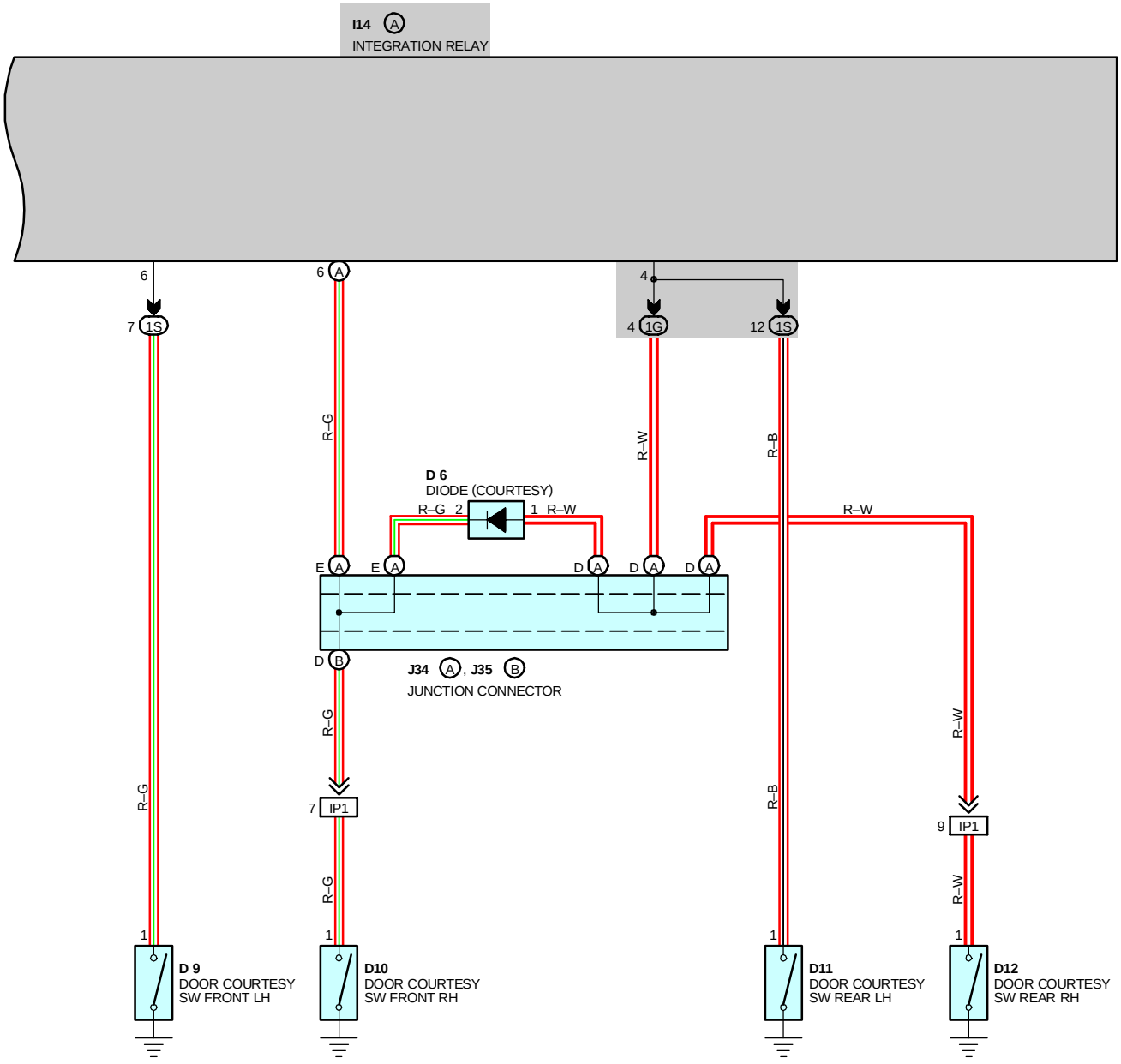
DOOR LOCK CONTROL




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A
GAUGE
I14 A
INTEGRATION RELAY
7
11 A
5 A
12 A
25 A
9 A
L–R
L
L–B
L–Y
W–B
J7
JUNCTION CONNECTOR
F
IF3
IE1
IE2
BQ1
J12 A, J13 B
JUNCTION CONNECTOR
J10 A, J11 B
JUNCTION CONNECTOR
D16
DOOR LOCK MOTOR AND DOOR UNLOCK DETECTION SW FRONT LH
D18
DOOR LOCK MOTOR AND DOOR UNLOCK DETECTION SW REAR LH
M
J37
JUNCTION CONNECTOR
BN

DOOR LOCK CONTROL




I14 A
INTEGRATION RELAY
6
7 1S
6 A
4
4 1G
12 1S
R–G
R–W
R–B
D 6
DIODE (COURTESY)
R–G 2
1 R–W
R–W
E A
E A
D A
D A
D A
D B
J34 A, J35 B
JUNCTION CONNECTOR
R–G
7 IP1
R–G
R–G
1
D 9
DOOR COURTESY
SW FRONT LH
1
D10
DOOR COURTESY
SW FRONT RH
R–B
1
D11
DOOR COURTESY
SW REAR LH
R–W
9 IP1
R–W
1
D12
DOOR COURTESY
SW REAR RH

DOOR LOCK CONTROL

SYSTEM OUTLINE

CURRENT ALWAYS FLOWS TO **TERMINAL** Ⓐ**1** OF THE INTEGRATION RELAY THROUGH THE **DOOR** FUSE.
WHEN THE IGNITION SW IS TURNED ON, THE CURRENT FLOWING THROUGH THE **GAUGE** FUSE FLOWS TO **TERMINAL 7** OF THE INTEGRATION RELAY → **TERMINAL** Ⓐ**3** → THE POWER RELAY (COIL SIDE) → **GROUND**. AS A RESULT, THE CURRENT FLOWING THROUGH THE PWR FUSE FLOWS TO THE POWER RELAY (POINT SIDE) → **TERMINAL 7** OF THE DOOR LOCK CONTROL SW LH → **TERMINAL 1** → **GROUND**, CAUSING THE INDICATOR LIGHT TO LIGHT UP.

1. MANUAL LOCK OPERATION

WHEN THE LOCK CONTROL SW OR DOOR KEY LOCK AND UNLOCK SW ARE PUSHED TO **LOCK** POSITION, A LOCK SIGNAL IS INPUT TO **TERMINAL** Ⓐ**16** OR Ⓐ**18** OF THE INTEGRATION RELAY AND CAUSES THE RELAY TO FUNCTION. CURRENT FLOWS FROM **TERMINAL** Ⓐ**1** OF THE RELAY → **TERMINAL** Ⓐ**12** → **TERMINAL 2** OF THE DOOR LOCK MOTORS → **TERMINAL 3** OF THE DOOR LOCK MOTORS → **TERMINAL** Ⓐ**25** OF THE RELAY → **TERMINAL 10** → **GROUND** AND THE DOOR LOCK MOTOR CAUSES THE DOOR TO LOCK.

2. MANUAL UNLOCK OPERATION

WHEN THE DOOR LOCK CONTROL SW OR DOOR KEY LOCK AND UNLOCK SW ARE PUSHED TO **UNLOCK** POSITION, AN UNLOCK SIGNAL IS INPUT TO **TERMINAL** Ⓐ**17** OR Ⓐ**19** OR Ⓐ**20** OF THE INTEGRATION RELAY AND CAUSES THE RELAY TO FUNCTION. CURRENT FLOWS FROM **TERMINAL** Ⓐ**1** OF THE RELAY → **TERMINAL** Ⓐ**25** → **TERMINAL 3** OF THE DOOR LOCK MOTORS → **TERMINAL 2** OF THE DOOR LOCK MOTORS → **TERMINAL** Ⓐ**12** OF THE RELAY → **TERMINAL 10** → **GROUND** AND THE DOOR LOCK MOTOR CAUSES THE DOOR TO LOCK.

3. DOUBLE OPERATION UNLOCK OPERATION

WHEN THE DOOR KEY LOCK AND UNLOCK SW LH IS TURNED TO THE UNLOCK SIDE, ONLY THE DRIVER'S DOOR IS MECHANICALLY UNLOCKED. TURNING THE DOOR KEY LOCK AND UNLOCK SW LH TO THE UNLOCK SIDE CAUSES A SIGNAL TO BE INPUT TO **TERMINAL** Ⓐ**19** OF THE RELAY, AND IF THE SIGNAL IS INPUT AGAIN WITHIN **3** SECONDS BY TURNING THE SW TO THE UNLOCK SIDE AGAIN, CURRENT FLOWS FROM **TERMINAL** Ⓐ**25** OF THE INTEGRATION RELAY → **TERMINAL 3** OF THE DOOR LOCK MOTORS → **TERMINAL 2** OF THE DOOR LOCK MOTORS → **TERMINAL** Ⓐ**12** OF THE RELAY → **TERMINAL 10** → **GROUND**, CAUSING THE DOOR LOCK MOTORS TO OPERATE AND UNLOCK THE DOORS.

4. IGNITION KEY REMINDER OPERATION

*OPERATING DOOR LOCK KNOB (OPERATION OF DOOR LOCK MOTORS)

WITH IGNITION KEY IN CYLINDER (UNLOCK WARNING SW ON), WHEN THE DOOR IS OPENED AND LOCKED USING DOOR LOCK KNOB (DOOR LOCK MOTOR), THE DOOR IS LOCKED ONCE BUT EACH DOOR IS UNLOCKED SOON BY THE FUNCTION OF RELAY. AS A RESULT, THE CURRENT FLOWS FROM **TERMINAL** Ⓐ **1** OF THE INTEGRATION RELAY → **TERMINAL** Ⓐ**25** → **TERMINAL 3** OF THE DOOR LOCK MOTORS → **TERMINAL 2** OF THE DOOR LOCK MOTOR → **TERMINAL** Ⓐ**12** OF THE RELAY → **TERMINAL 10** → **GROUND** AND CAUSES ALL THE DOORS TO UNLOCK.

* OPERATING THE DOOR LOCK CONTROL SW OR DOOR KEY LOCK AND UNLOCK SW

WITH IGNITION KEY IN CYLINDER (UNLOCK WARNING SW ON), WHEN THE DOOR IS OPENED AND LOCKED USING DOOR LOCK CONTROL SW OR KEY SW, THE DOOR IS LOCKED ONCE BUT EACH DOOR IS UNLOCKED BY THE FUNCTION OF SW CONTAINED IN MOTORS, WHICH THE SIGNAL IS INPUT TO **TERMINAL** Ⓐ**5** (FRONT LH) OR Ⓐ**7** (FRONT RH) OR Ⓐ**9**(REAR LH, RH) OF THE RELAY. ACCORDING TO THIS INPUT SIGNAL, THE CURRENT IN ECU FLOWS FROM **TERMINAL** Ⓐ**1** OF THE RELAY → **TERMINAL** Ⓐ**25** → **TERMINAL 3** OF THE DOOR LOCK MOTORS → **TERMINAL 2** OF THE DOOR LOCK MOTORS → **TERMINAL 12** OF THE RELAY → **TERMINAL 10** → **GROUND** AND CAUSES ALL THE DOORS TO UNLOCK.

* IN CASE OF KEYLESS LOCK

WITH IGNITION KEY IN CYLINDER (UNLOCK WARNING SW ON), WHEN THE UNLOCK FUNCTION IS DISTURBED MORE THAN **0.2** SECONDS, FOR EXAMPLE PUSHING THE DOOR LOCK KNOB ETC., THE DOOR HOLDS ON LOCK CONDITION. CLOSING THE DOOR AFTER, DOOR COURTESY SW INPUTS THE SIGNAL INTO **TERMINAL 4** OR **6** OR Ⓐ**6** OF THE INTEGRATION RELAY. BY THIS INPUT SIGNAL, THE ECU WORKS AND CURRENT FLOWS FROM **TERMINAL** Ⓐ**1** OF THE RELAY → **TERMINAL** Ⓐ**25** → **TERMINAL 3** OF THE DOOR LOCK MOTORS → **TERMINAL 2** OF THE DOOR LOCK MOTORS → **TERMINAL** Ⓐ**12** OF THE RELAY → **TERMINAL 10** → **GROUND** AND CAUSES ALL THE DOORS TO UNLOCK.

SERVICE HINTS

I14Ⓐ INTEGRATION RELAY

10–GROUND : ALWAYS CONTINUITY
6–GROUND : CONTINUITY WITH DRIVER'S DOOR OPEN
Ⓐ 1–GROUND : ALWAYS APPROX. **12** VOLTS
Ⓐ25–GROUND : APPROX. **12** VOLTS **0.2** SECONDS WITH FOLLOWING OPERATION
* DOOR LOCK CONTROL SW UNLOCKED
* DOOR LOCK CONTROL SW LOCKED WITH IGNITION KEY IN CYLINDER AND DRIVER'S DOOR OPEN (IGNITION KEY REMINDER FUNCTION)
* DOOR LOCK KNOB LOCKED WITH IGNITION KEY IN CYLINDER AND DRIVER'S DOOR OPEN (IGNITION KEY REMINDER FUNCTION)
* UNLOCKING THE DRIVER'S, PASSENGER'S DOOR CYLINDER WITH KEY
Ⓐ12–GROUND : APPROX. **12** VOLTS **0.2** SECONDS WITH FOLLOWING OPERATION
* DOOR LOCK CONTROL SW LOCKED
* LOCKING THE DRIVER'S, PASSENGER'S DOOR CYLINDER WITH KEY
Ⓐ16–GROUND : **0** VOLTS WITH DOOR LOCK CONTROL SW LOCKED
Ⓐ 6–GROUND : CONTINUITY WITH FRONT PASSENGER'S DOOR OPEN
Ⓐ 5–GROUND : CONTINUITY WITH DRIVER'S DOOR LOCK KNOB UNLOCKED
7–GROUND : CONTINUITY WITH FRONT PASSENGER'S DOOR LOCK KNOB UNLOCKED
Ⓐ17–GROUND : **0** VOLTS WITH DOOR LOCK CONTROL SW UNLOCKED
Ⓐ20–GROUND : **0** VOLTS WITH PASSENGER'S DOOR LOCK CYLINDER UNLOCKED WITH KEY
7–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT ON POSITION
Ⓐ19–GROUND : **0** VOLTS WITH DRIVER'S DOOR LOCK CYLINDER UNLOCKED WITH KEY
Ⓐ18–GROUND : **0** VOLTS WITH DRIVER'S, PASSENGER'S DOOR LOCK CYLINDER LOCKED WITH KEY
Ⓐ 9–GROUND : CONTINUITY WITH REAR PASSENGER'S DOOR LOCK KNOB UNLOCKED
4–GROUND : CONTINUITY WITH REAR PASSENGER'S DOOR OPEN

D 9, D10, D11, D12 DOOR COURTESY SW FRONT LH, RH, REAR LH, RH

1–GROUND : CLOSED WITH EACH DOOR OPEN

D13 DOOR KEY LOCK AND UNLOCK SW FRONT LH

2–1 : CLOSED WITH DOOR LOCK CYLINDER LOCKED WITH KEY
3–1 : CLOSED WITH DOOR LOCK CYLINDER UNLOCKED WITH KEY

D14 DOOR KEY LOCK AND UNLOCK SW FRONT RH

2–1 : CLOSED WITH DOOR LOCK CYLINDER LOCKED WITH KEY
3–1 : CLOSED WITH DOOR LOCK CYLINDER UNLOCKED WITH KEY

D16, D17, D18,D19 DOOR LOCK MOTOR AND DOOR UNLOCK DETECTION SW FRONT LH, RH, REAR LH, RH

1–4 : CLOSED WITH **UNLOCK** POSITION

U 1 UNLOCK WARNING SW (IGNITION KEY)

1–2 : CLOSED WITH IGNITION KEY IN CYLINDER

DOOR LOCK CONTROL

: PARTS LOCATION

CODE	SEE PAGE	CODE	See Page	Code	See Page
D 6	28	D18	30	J15	29
D 9	30	D19	30	J33	29
D10	30	I14 A	28	J34 A	29
D11	30	J 5 A	29	J35 B	29
D12	30	J 6 B	29	J36	30
D13	30	J 7	29	J37	30
D14	30	J10 A	29	J38	30
D15	30	J11 B	29	P 9	31
D16	30	J12 A	29	U 1	29
D17	30	J13 B	29		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1G		
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1H		
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1V	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IE1	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IE2		
IF3	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IO1	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IO2		
IP1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BQ1	40	REAR DOOR LH WIRE AND FLOOR WIRE (LEFT CENTER PILLAR)
BR1	40	REAR DOOR RH WIRE AND FLOOR NO. 2 WIRE (RIGHT CENTER PILLAR)

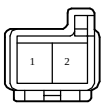
: GROUND POINTS

Code	See Page	GROUND POINTS LOCATION
IF	36	COWL SIDE PANEL LH
II	36	INSTRUMENT PANEL BRACE LH
IL	36	RIGHT KICK PANEL
IN		
BN	40	UNDER THE LEFT CENTER PILLAR
BO	40	UNDER THE RIGHT CENTER PILLAR

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B 6	40	FLOOR NO. 2 WIRE			

D 6 BLACK



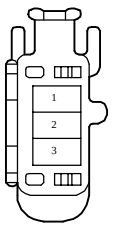
D 9

D10

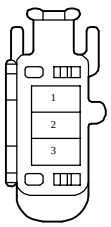
D11

D12

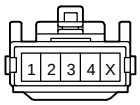
D13



D14



D15



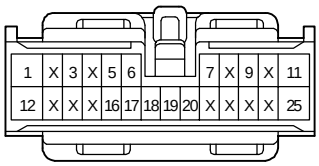
D16 BLACK

D17 BLACK

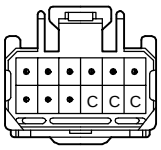
D18 BLACK

D19 BLACK

I14 (A) ORANGE

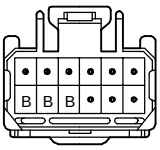


J5 (A) GRAY



(HINT : SEE PAGE 7)

J6 (B) GRAY

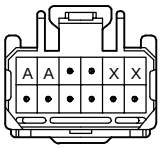


(HINT : SEE PAGE 7)

J7

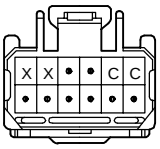
(HINT : SEE PAGE 7)

J10 (A)



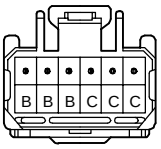
(HINT : SEE PAGE 7)

J11 (B)



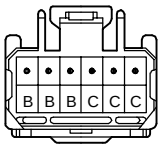
(HINT : SEE PAGE 7)

J12 (A) GRAY



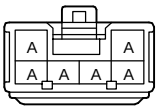
(HINT : SEE PAGE 7)

J13 (B) GRAY



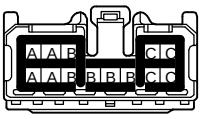
(HINT : SEE PAGE 7)

J15



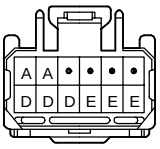
(HINT : SEE PAGE 7)

J33



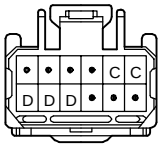
(HINT : SEE PAGE 7)

J34 (A) BLACK



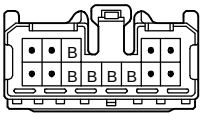
(HINT : SEE PAGE 7)

J35 (B) BLACK



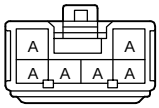
(HINT : SEE PAGE 7)

J36



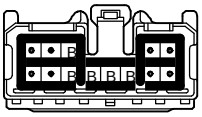
(HINT : SEE PAGE 7)

J37



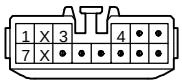
(HINT : SEE PAGE 7)

J38

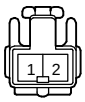


(HINT : SEE PAGE 7)

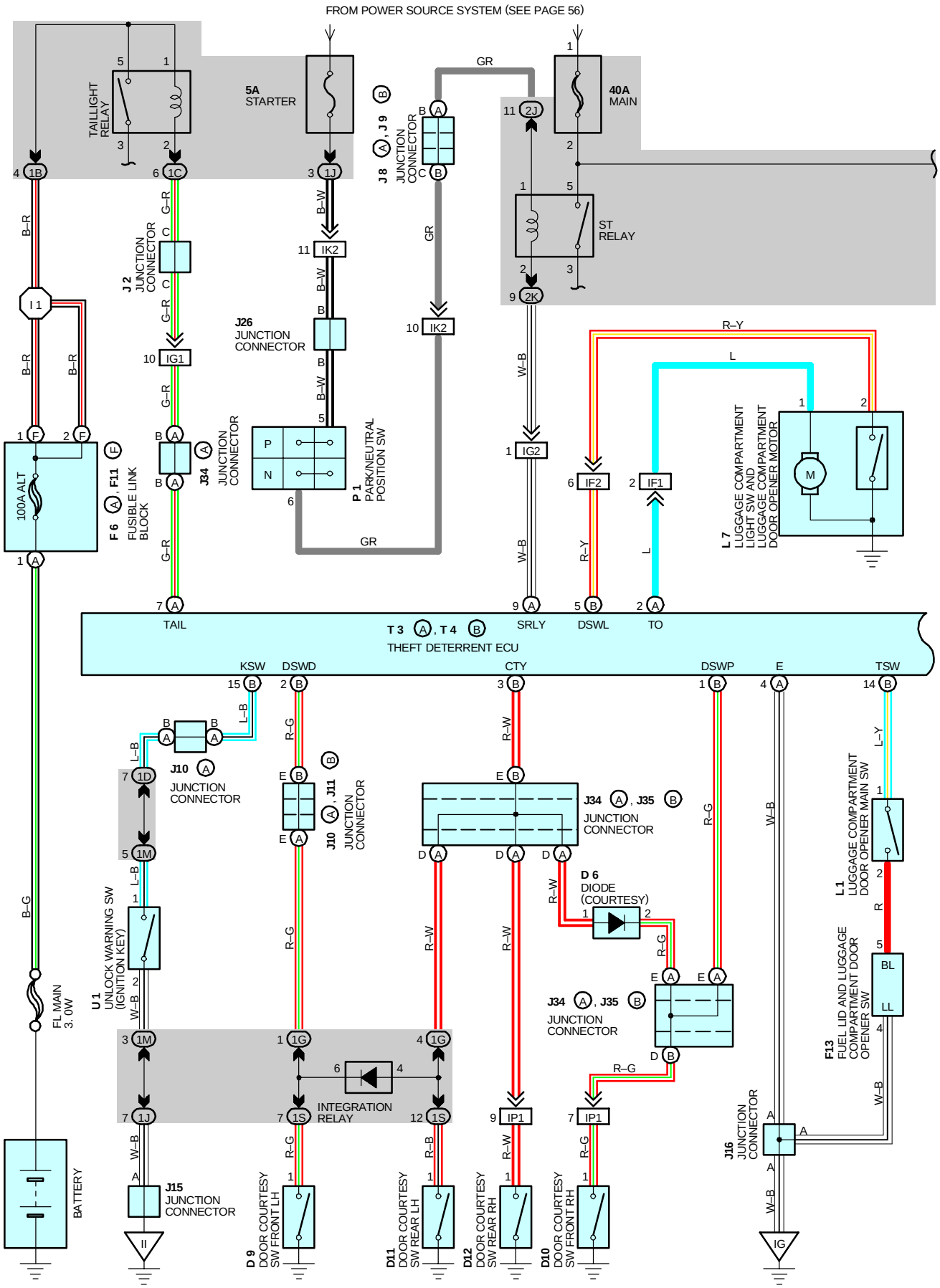
P9

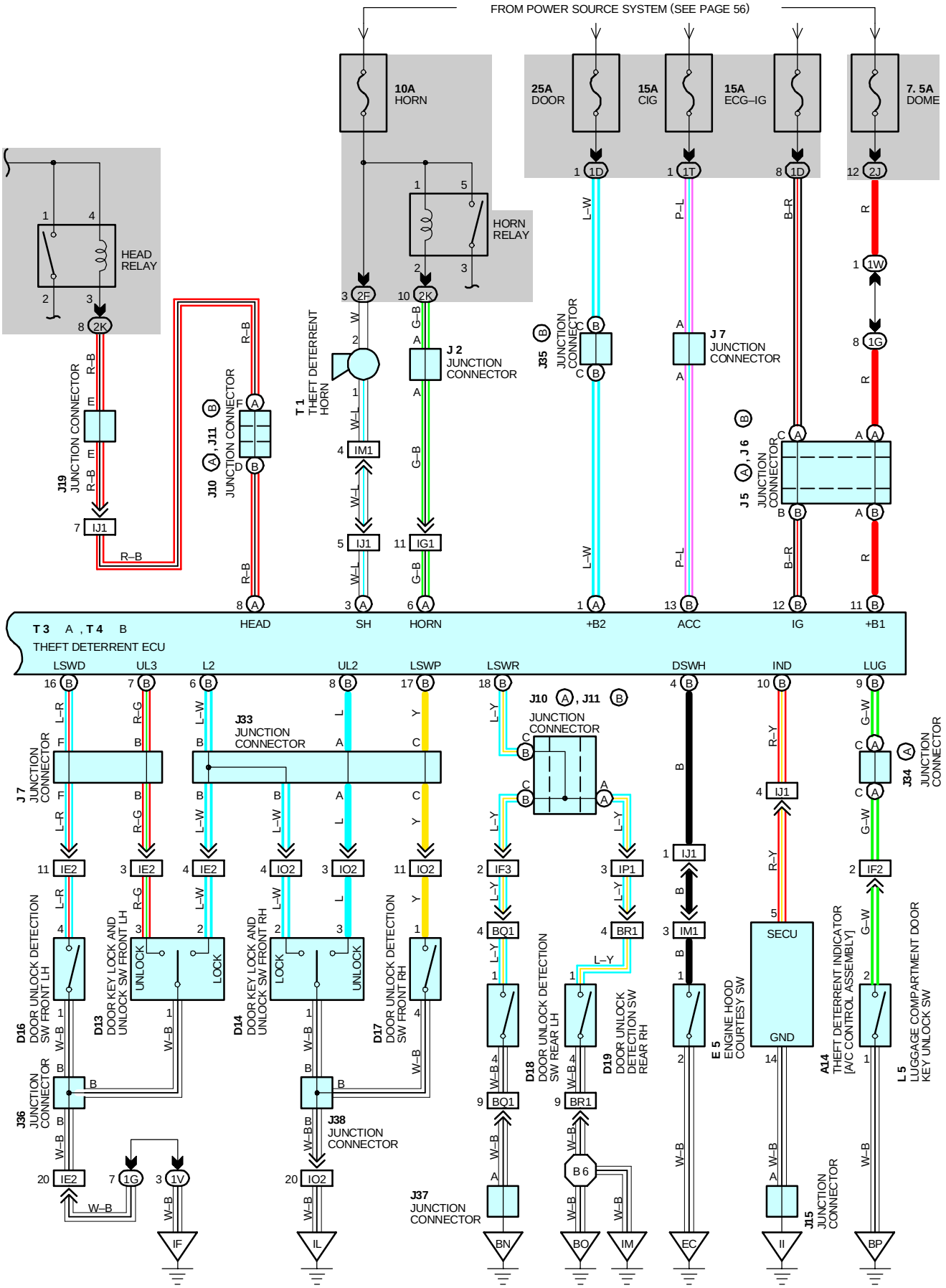


U1



THEFT DETERRENT




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A HORN
25A DOOR
15A CIG
15A ECG–IG
7. 5A DOME
HEAD RELAY
HORN RELAY
T1 THEFT DETERRENT HORN
J2 JUNCTION CONNECTOR
J35 JUNCTION CONNECTOR
J7 JUNCTION CONNECTOR
J19 JUNCTION CONNECTOR
J10, J11 JUNCTION CONNECTOR
J5, J6 JUNCTION CONNECTOR
T3 A, T4 B
THEFT DETERRENT ECU
HEAD
SH
HORN
+B2
ACC
IG
+B1
LSWD
UL3
L2
UL2
LSWP
LSWR
DSWH
IND
LUG
J33 JUNCTION CONNECTOR
J34 JUNCTION CONNECTOR
D16 DOOR UNLOCK DETECTION SW FRONT LH
D13 DOOR KEY LOCK AND UNLOCK SW FRONT LH
D14 DOOR KEY LOCK AND UNLOCK SW FRONT RH
D17 DOOR UNLOCK DETECTION SW FRONT RH
D18 DOOR UNLOCK DETECTION SW REAR LH
D19 DOOR UNLOCK DETECTION SW REAR RH
E5 ENGINE HOOD COURTESY SW
A14 THEFT DETERRENT INDICATOR [A/C CONTROL ASSEMBLY]
L5 LUGGAGE COMPARTMENT DOOR KEY UNLOCK SW
J36 JUNCTION CONNECTOR
J38 JUNCTION CONNECTOR
J37 JUNCTION CONNECTOR
J15 JUNCTION CONNECTOR
SECU
GND
UNLOCK
LOCK
IF
IL
BN
BO
IM
EC
II
BP

THEFT DETERRENT

SERVICE HINTS

D13, D14 DOOR KEY LOCK AND UNLOCK SW FRONT LH, RH

3–1 : CLOSED WITH THE DOOR LOCK CYLINDER UNLOCKED WITH KEY
2–1 : CLOSED WITH THE DOOR LOCK CYLINDER LOCKED WITH KEY

D16, D17, D18, D19 DOOR UNLOCK DETECTION SW FRONT LH, RH, REAR LH, RH

1–4 : CLOSED WITH UNLOCK POSITION

E 5 ENGINE HOOD COURTESY SW

1–2 : CLOSED WITH THE ENGINE HOOD OPEN

U 1 UNLOCK WARNING SW (IGNITION KEY)

1–2 : CLOSED WITH THE IGNITION KEY IN CYLINDER

L 5 LUGGAGE COMPARTMENT DOOR KEY UNLOCK SW

1–2 : CLOSED WITH THE LUGGAGE COMPARTMENT DOOR LOCK CYLINDER UNLOCK WITH KEY

L 7 LUGGAGE COMPARTMENT LIGHT SW

2–GROUND : CLOSED WITH THE LUGGAGE COMPARTMENT DOOR OPEN

T 3 Ⓐ , T 4Ⓑ THEFT DETERRENT ECU

Ⓐ 9–GROUND : APPROX. **12** VOLTS WITH THE SHIFT LEVER IN **N** OR **P** POSITION AND THE IGNITION SW AT **ST** POSITION
Ⓑ12–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
Ⓑ15–GROUND : CONTINUITY WITH THE IGNITION KEY IN CYLINDER
Ⓑ17–GROUND : CONTINUITY WITH THE FRONT RH DOOR TO **UNLOCK** POSITION
Ⓑ11–GROUND : ALWAYS APPROX. **12** VOLTS
Ⓑ 7–GROUND : CONTINUITY WITH THE DOOR KEY LOCK AND UNLOCK SW FRONT LH TO **UNLOCK** POSITION
Ⓑ16–GROUND : CONTINUITY WITH THE FRONT LH DOOR TO **UNLOCK** POSITION
Ⓑ 1–GROUND : CONTINUITY WITH THE FRONT RH DOOR OPENED
Ⓑ 2–GROUND : CONTINUITY WITH THE FRONT LH DOOR OPENED
Ⓑ 6–GROUND : CONTINUITY WITH THE DOOR KEY LOCK AND UNLOCK SW TO **LOCK** POSITION
Ⓐ 4–GROUND : ALWAYS CONTINUITY
Ⓑ 8–GROUND ; CONTINUITY WITH THE DOOR KEY LOCK AND UNLOCK SW FRONT RH TO **UNLOCK** POSITION
Ⓐ 1–GROUND : ALWAYS APPROX. **12** VOLTS
Ⓑ 9–GROUND : CONTINUITY WITH THE LUGGAGE COMPARTMENT DOOR LOCK CYLINDER UNLOCK WITH KEY
Ⓑ 3–GROUND : CONTINUITY WITH EACH DOOR OPEN
Ⓑ 4–GROUND : CONTINUITY WITH THE ENGINE HOOD OPEN
Ⓑ 5–GROUND : CONTINUITY WITH THE LUGGAGE COMPARTMENT DOOR OPEN
Ⓑ13–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ACC** OR **ON** POSITION
Ⓑ18–GROUND : CONTINUITY WITH THE REAR DOOR TO **UNLOCK** POSITION

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A14	28	F11 F	26	J33	29
D 6	28	F13	28	J34 A	29
D 9	30	J 2	29	J35 B	29
D10	30	J 5 A	29	J36	30
D11	30	J 6 B	29	J37	30
D12	30	J 7	29	J38	30
D13	30	J 8 A	29	L 1	29
D14	30	J 9 B	29	L 5	30
D16	30	J10 A	29	L 7	30
D17	30	J11 B	29	P 1	27
D18	30	J15	29	T 1	27
D19	30	J16	29	T 3 A	29
E 5	26	J19	29	T 4 B	29
F 6 A	26	J26	29	U 1	29

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1C		
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1G		
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1H		
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1T	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1V	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1W		
2F	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2K		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IE2	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IF1	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IF2		
IF3		
IG1	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)
IG2		
IJ1	38	INSTRUMENT PANEL WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK2	38	ENGINE WIRE AND COWLWIRE (UNDER THE GLOVE BOX)
IH1	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IO2	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IP1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BQ1	40	REAR DOOR LH WIRE AND FLOOR WIRE (LEFT CENTER PILLAR)
BR1	40	REAR DOOR RH WIRE AND FLOOR NO. 2 WIRE (RIGHT CENTER PILLAR)

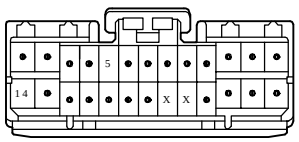
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EC	34	LEFT RADIATOR SIDE SUPPORT
IF	36	COWL SIDE PANEL LH
IG	36	LEFT KICK PANEL
II	36	INSTRUMENT PANEL BRACE LH
IL	36	RIGHT KICK PANEL
IM		
IN	40	UNDER THE LEFT CENTER PILLAR
BN	40	UNDER THE RIGHT CENTER PILLAR
BO	40	BACK PANEL CENTER

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 2	34	COWL WIRE	B 6	40	FLOOR NO. 2 WIRE

A14



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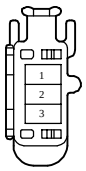
D 9

D10

D11

D12

D13



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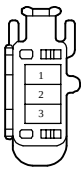

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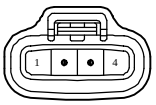

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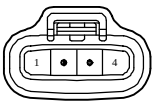

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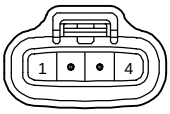

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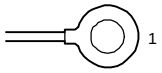

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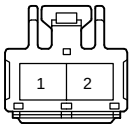

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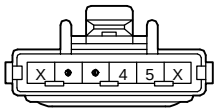

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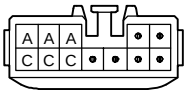

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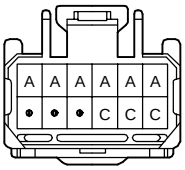

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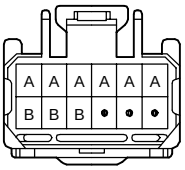

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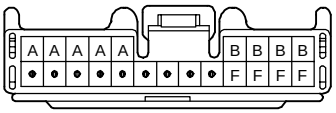

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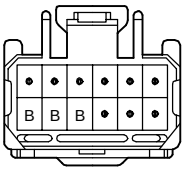

(HINT : SEE PAGE 7)

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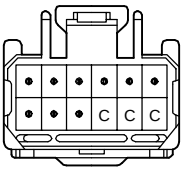

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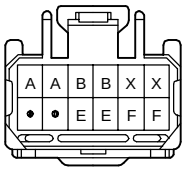

(HINT : SEE PAGE 7)

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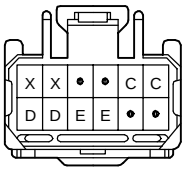

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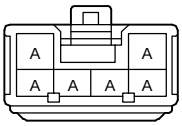

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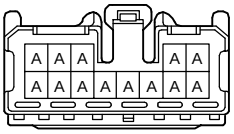

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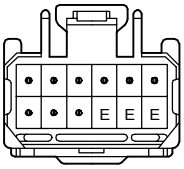

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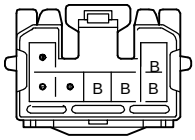

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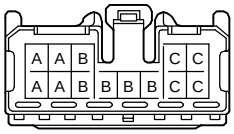

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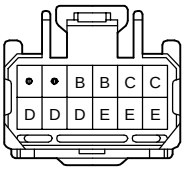

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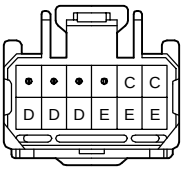

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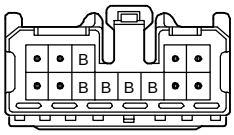

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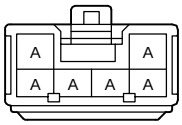

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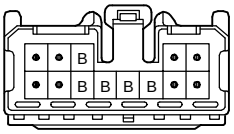

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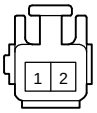
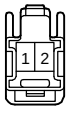


L 5



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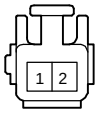

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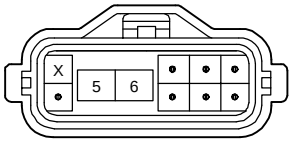

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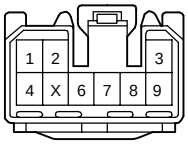

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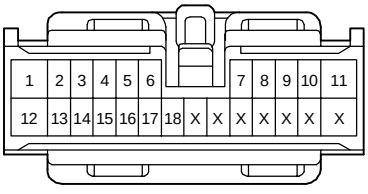

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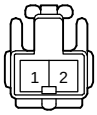
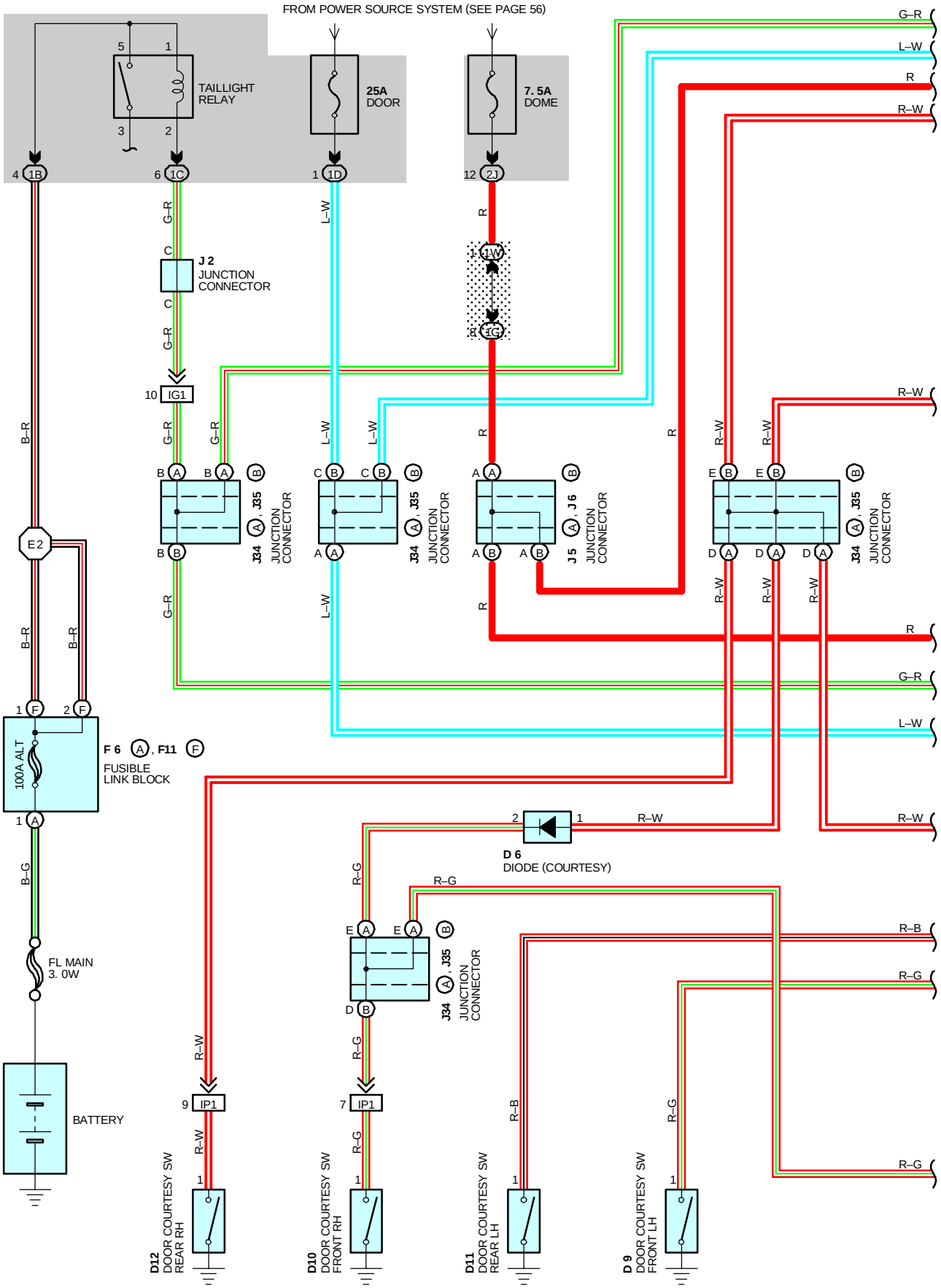
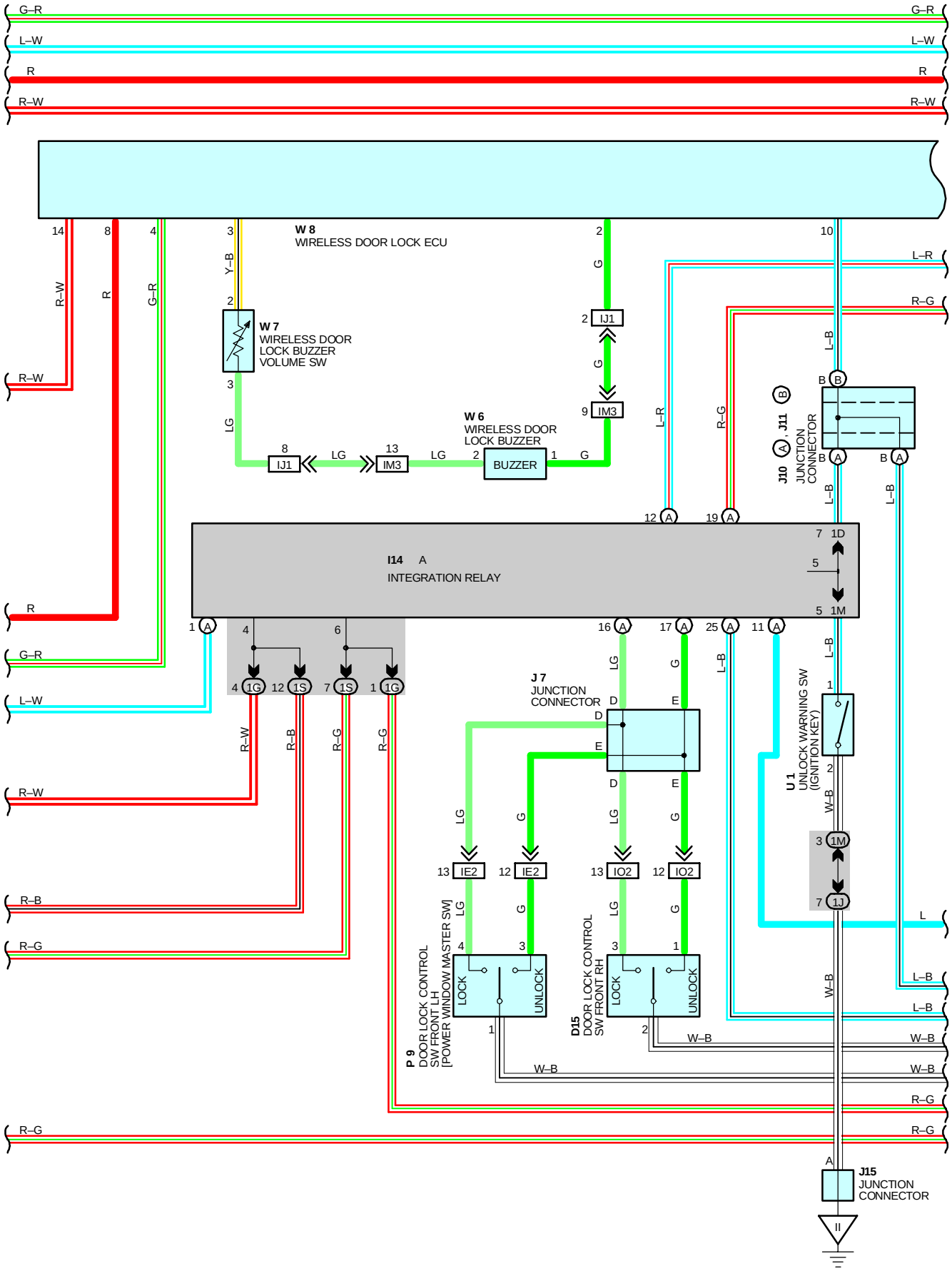
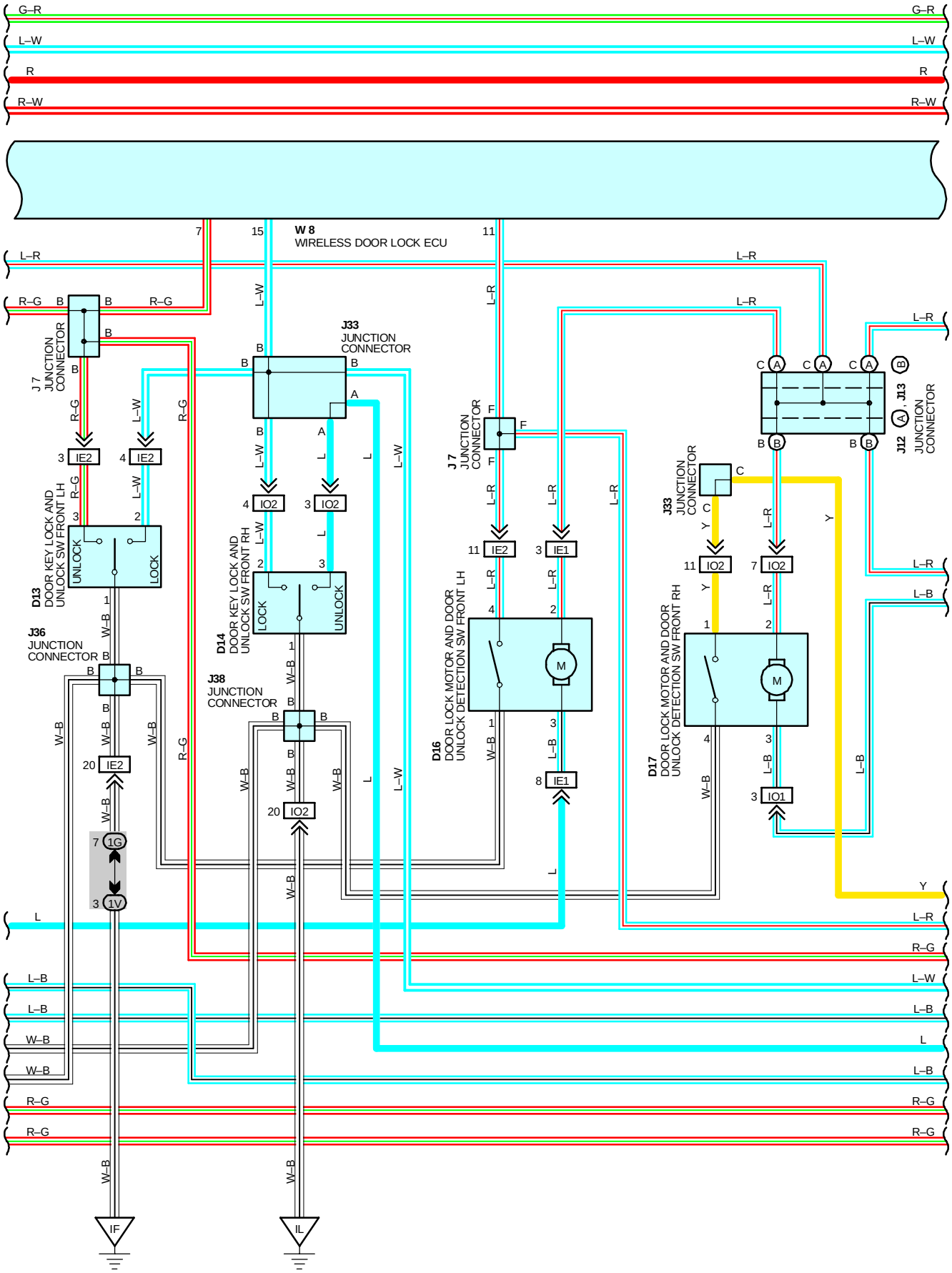


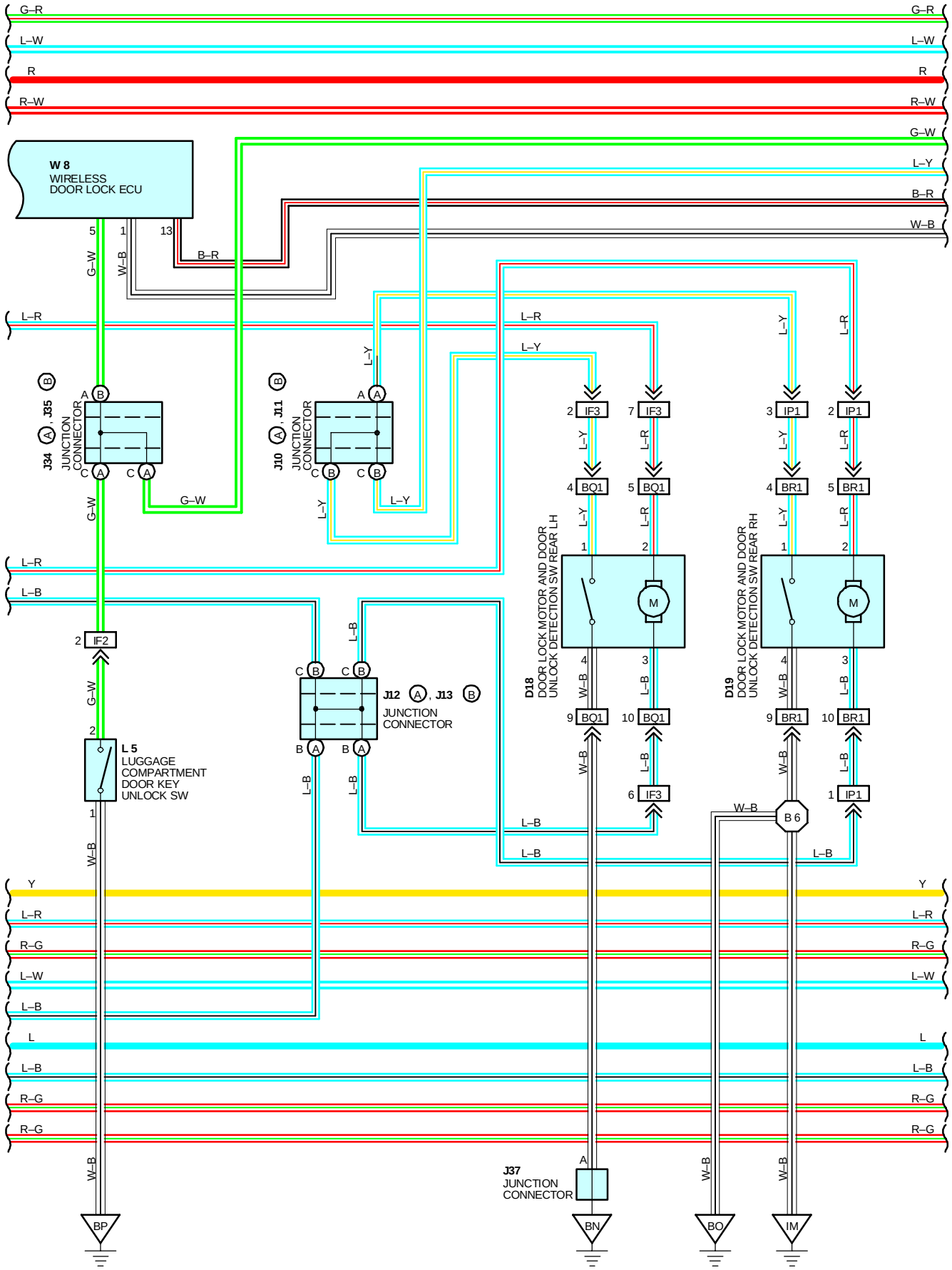
WIRELESS DOOR LOCK CONTROL



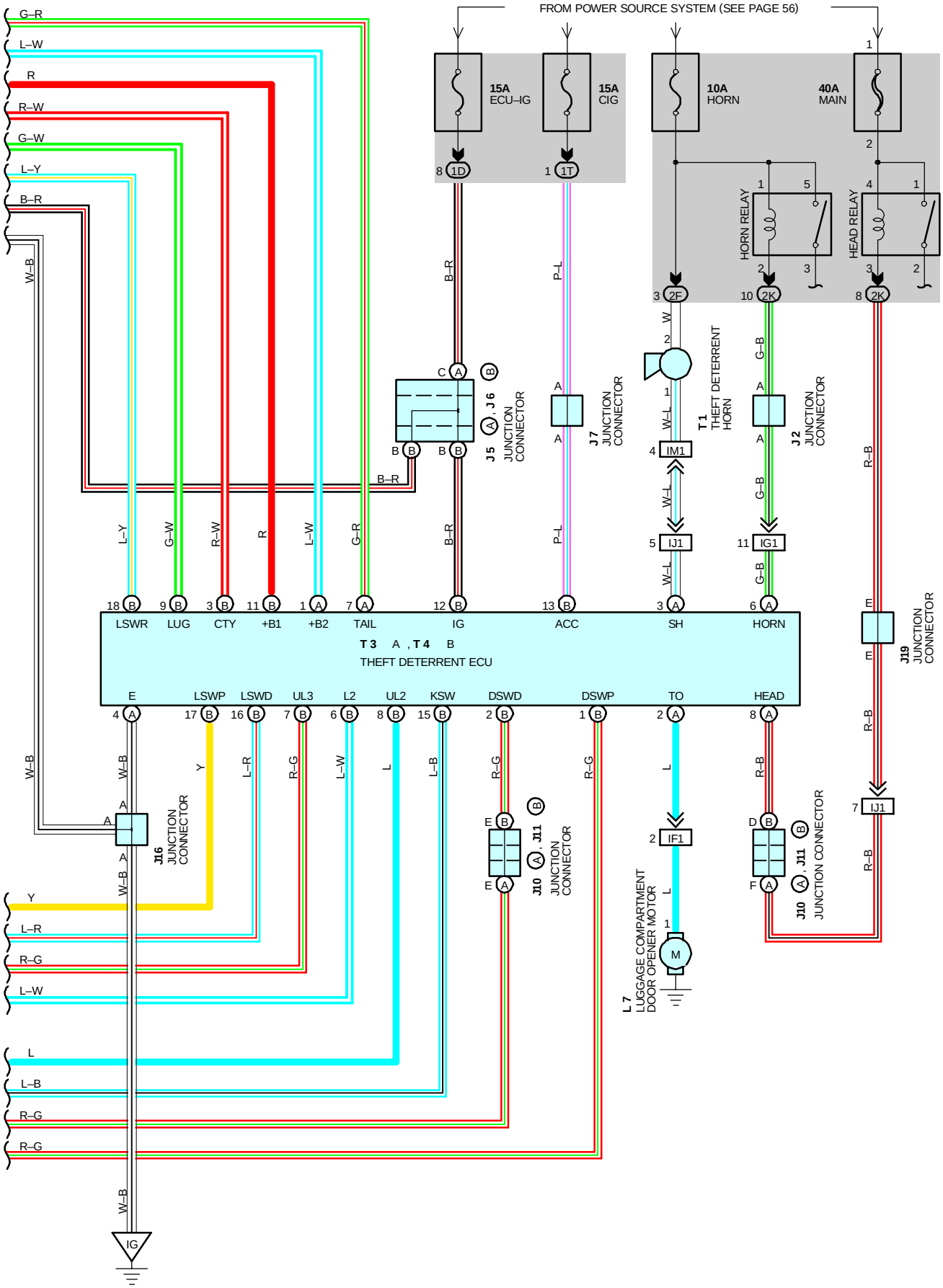

G–R
L–W
R
R–W
W 8
WIRELESS DOOR LOCK ECU
W 7
WIRELESS DOOR LOCK BUZZER VOLUME SW
W 6
WIRELESS DOOR LOCK BUZZER
BUZZER
IJ1
IM3
J10, J11
JUNCTION CONNECTOR
I14 A
INTEGRATION RELAY
J 7
JUNCTION CONNECTOR
U 1
UNLOCK WARNING SW (IGNITION KEY)
P 9
DOOR LOCK CONTROL SW FRONT LH [POWER WINDOW MASTER SW]
D15
DOOR LOCK CONTROL SW FRONT RH
LOCK
UNLOCK
IE2
IO2
J15
JUNCTION CONNECTOR
L–R
R–G
L–B
Y–B
LG
G
W–B
R–B

WIRELESS DOOR LOCK CONTROL




G–R
L–W
R
R–W
G–W
L–Y
B–R
W–B
W 8
WIRELESS
DOOR LOCK ECU
5
1
13
G–W
W–B
B–R
L–R
L–Y
J34 , J35
JUNCTION
CONNECTOR
J10 , J11
JUNCTION
CONNECTOR
2 IF3
7 IF3
3 IP1
2 IP1
4 BQ1
5 BQ1
4 BR1
5 BR1
D18
DOOR LOCK MOTOR AND DOOR
UNLOCK DETECTION SW REAR LH
D19
DOOR LOCK MOTOR AND DOOR
UNLOCK DETECTION SW REAR RH
M
9 BQ1
10 BQ1
9 BR1
10 BR1
6 IF3
1 IP1
W–B
L–B
2 IF2
J12 , J13
JUNCTION
CONNECTOR
L 5
LUGGAGE
COMPARTMENT
DOOR KEY
UNLOCK SW
B 6
Y
R–G
L
J37
JUNCTION
CONNECTOR
BP
BN
BO
IM

WIRELESS DOOR LOCK CONTROL



SYSTEM OUTLINE

DOOR LOCK CONTROL (LOCK AND UNLOCK) AND LUGGAGE COMPARTMENT DOOR CONTROL (LUGGAGE COMPARTMENT DOOR OPEN) IS PERFORMED BY REMOTE CONTROL, WITHOUT THE IGNITION KEY INSERTED IN THE DOOR KEY CYLINDER, USING LOW–POWER ELECTRICAL WAVE EMITTED BY A TRANSMITTER.

1. WIRELESS DOOR LOCK OR UNLOCK NORMAL OPERATION

WITH THE IGNITION KEY NOT INSERTED INTO THE IGNITION KEY CYLINDER (UNLOCK WARNING SW OFF) AND ALL THE DOORS COMPLETELY CLOSED, WHEN THE LOCK BUTTON (TRANSMITTER) IS PUSHED, THE WIRELESS DOOR LOCK CONTROL ECU RECEIVES THE ELECTRICAL WAVES FROM THE TRANSMITTER, CAUSING IT TO OPERATE.
AS A RESULT, THE ECU JUDGES WHETHER THE DOOR IS LOCKED OR UNLOCKED BASED ON THE SIGNAL FROM THE DOOR LOCK MOTOR AND DOOR UNLOCK DETECTION SW, AND SENDS A SIGNAL TO THE THEFT DETERRENT AND DOOR LOCK CONTROL ECU TO SWITCH THE CONDITION FROM LOCK TO UNLOCK OR VICE VERSA, CAUSING THE DOOR LOCK MOTOR TO OPERATE.

2. WIRELESS LUGGAGE COMPARTMENT DOOR OPEN NORMAL OPERATION

WITH THE IGNITION KEY NOT INSERTED INTO THE IGNITION KEY CYLINDER (UNLOCK WARNING SW OFF), WHEN THE LUGGAGE COMPARTMENT DOOR OPENER BUTTON (TRANSMITTER) IS PUSHED, THE WIRELESS DOOR LOCK CONTROL ECU RECEIVES THE ELECTRICAL WAVES FROM THE TRANSMITTER, CAUSING IT TO OPERATE.
AS A RESULT, A SIGNAL FROM THE LUGGAGE COMPARTMENT DOOR UNLOCK SW IS SENT TO THE THEFT DETERRENT ECU, CAUSING THE LUGGAGE COMPARTMENT DOOR OPENER MOTOR TO OPERATE.

3. WIRELESS DOOR UNLOCK OPERATION

PUSHING THE UNLOCK BUTTON (TRANSMITTER) ONCE, DRIVER'S DOOR IS UNLOCKED. FURTHERMORE, PUSHING THE BUTTON AGAIN WITHIN **3** SECONDS, THE OTHER DOORS ARE UNLOCKED.

4. AUTOMATIC LOCK OPERATION

WITH THE IGNITION KEY NOT INSERTED INTO THE IGNITION KEY CYLINDER (UNLOCK WARNING SW OFF) AND ALL THE DOORS COMPLETELY CLOSED, AFTER PUSHING THE BUTTON (TRANSMITTER) TO UNLOCK ALL THE DOORS, IF A DOOR IS NOT OPENED WITHIN **30** SECONDS, ALL THE DOORS WILL BE AUTOMATICALLY RELOCKED.

5. WIRELESS CONTROL STOP FUNCTION

IF A DOOR IS OPEN (DOOR COURTESY SW ON), A SIGNAL IS INPUT FROM THE DOOR COURTESY SW TO THE WIRELESS DOOR LOCK CONTROL ECU, STOPPING WIRELESS DOOR LOCK AND WIRELESS LUGGAGE COMPARTMENT DOOR OPEN.
IF THE IGNITION KEY IS IN THE IGNITION KEY CYLINDER (UNLOCK WARNING SW ON), THE UNLOCK WARNING SW INPUTS A SIGNAL TO THE WIRELESS DOOR LOCK CONTROL ECU, STOPPING WIRELESS DOOR LOCK OR UNLOCK AND WIRELESS LUGGAGE COMPARTMENT DOOR OPEN.

6. DOOR LOCK MOTOR PROTECTIVE FUNCTION

IF THE DOOR LOCK OR UNLOCK CONDITION DOES NOT CHANGE AFTER WIRELESS DOOR LOCK OR UNLOCK OPERATION, **2** SECONDS LATER, THE DOOR LOCK ECU SENDS CURRENT THREE TIMES TO THE DOOR LOCK MOTOR. IF THE DOOR LOCK CONDITION STILL HAS NOT CHANGED AS A RESULT, THE WIRELESS DOOR LOCK ECU STOPS RECEPTION AND STOPS DOOR LOCK AND UNLOCK FUNCTION.

7. VISUAL CONFIRMATION OF LOCK OR UNLOCK FUNCTION

IF ALL DOORS INDICATE THEY ARE LOCKED AFTER THE LOCK COMMAND, TAILLIGHTS AND PARKING LIGHTS WILL FLASH ONCE.
IF ANY DOOR INDICATES IT IS OPEN AFTER THE LOCK COMMAND, TAILLIGHTS AND PARKING LIGHTS WILL FLASH TWICE.

SERVICE HINTS

D 9, D10, D11, D12 DOOR COURTESY SW FRONT LH, RH, REAR LH, RH

1–GROUND : CLOSED WITH THE DOOR OPEN

U 1 UNLOCK WARNING SW (IGNITION KEY)

2–1 : CLOSED WITH THE IGNITION KEY IN THE CYLINDER

W 8 WIRELESS DOOR LOCK CONTROL ECU

8–GROUND : ALWAYS APPROX. **12** VOLTS
1–GROUND : ALWAYS CONTINUITY
14–GROUND : CONTINUITY WITH EACH OF THE DOOR OPEN
10–GROUND : CONTINUITY WITH THE IGNITION KEY IN THE CYLINDER

WIRELESS DOOR LOCK CONTROL

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
D 6	28	I14 A	28	J35 B	29
D 9	30	J 2	29	J36	30
D10	30	J 5 A	29	J37	30
D11	30	J 6 B	29	J38	30
D12	30	J 7	29	L 5	30
D13	30	J10 A	29	L 7	30
D14	30	J11 B	29	P 9	31
D15	30	J12 A	29	T 1	27
D16	30	J13 B	29	T 3 A	29
D17	30	J15	29	T 4 B	29
D18	30	J16	29	U 1	29
D19	30	J19	29	W 6	27
F 6 A	26	J33	29	W 7	29
F11 F	26	J34 A	29	W 8	29

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1B 1C	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1D 1G	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J 1N	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1T	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1V 1W	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
2F	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2J 2K	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IE1 IE2	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IF1 IF2 IF3	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IG1	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)
IJ1	38	INSTRUMENT PANEL WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM1 IN1	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IO1 IO2	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IP1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BQ1	40	REAR DOOR LH WIRE AND FLOOR WIRE (LEFT CENTER PILLAR)
BR1	40	REAR DOOR RH WIRE AND FLOOR NO. 2 WIRE (RIGHT CENTER PILLAR)

: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IF	36	COWL SIDE PANEL LH
IG	36	LEFT KICK PANEL
II	36	INSTRUMENT PANEL BRACE LH
IL IM	36	RIGHT KICK PANEL
BN	40	UNDER THE LEFT CENTER PILLAR
BO	40	UNDER THE RIGHT CENTER PILLAR
BP	40	BACK PANEL CENTER

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 2	34	COWL WIRE	B 6	40	FLOOR NO. 2 WIRE

D 6 BLACK

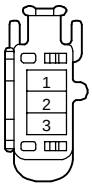
D 9

D10

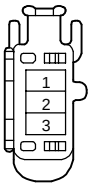
D11

D12

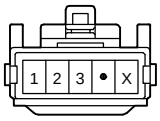
D13



D14



D15



D16 BLACK

D17 BLACK

D18 BLACK

D19 BLACK

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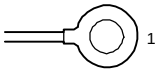
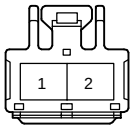


F11 (F)



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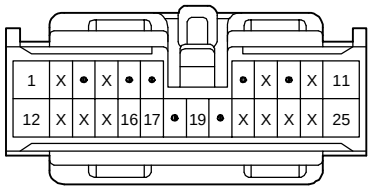
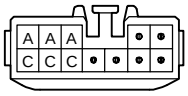
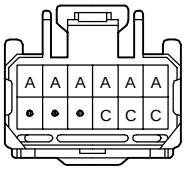


J 2 BLACK



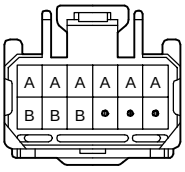
(HINT : SEE PAGE 7)

J 5 (A) GRAY



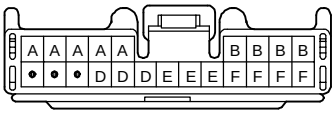
(HINT : SEE PAGE 7)

J 6 (B) GRAY



(HINT : SEE PAGE 7)

J 7



(HINT : SEE PAGE 7)

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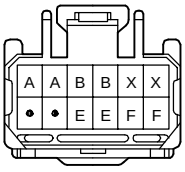
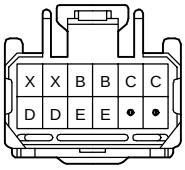


(HINT : SEE PAGE 7)

J11 (B)



(HINT : SEE PAGE 7)

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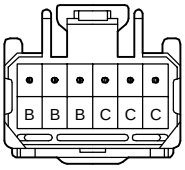
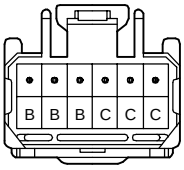


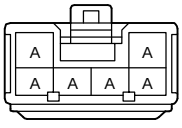
(HINT : SEE PAGE 7)

J13 (B) GRAY



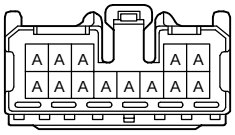
(HINT : SEE PAGE 7)

J15



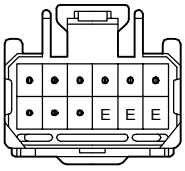
(HINT : SEE PAGE 7)

J16 ORANGE



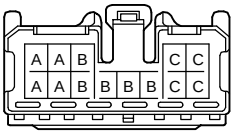
(HINT : SEE PAGE 7)

J19 BLACK



(HINT : SEE PAGE 7)

J33



(HINT : SEE PAGE 7)

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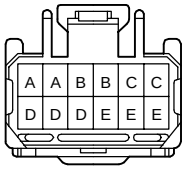

(HINT : SEE PAGE 7)

WIRELESS DOOR LOCK CONTROL

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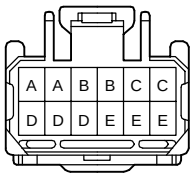
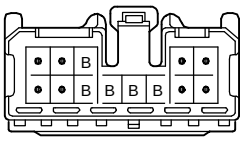


(HINT : SEE PAGE 7)

J36



(HINT : SEE PAGE 7)

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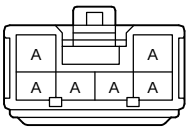
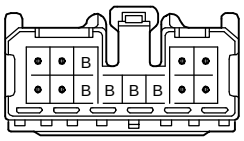


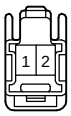
(HINT : SEE PAGE 7)

J38



(HINT : SEE PAGE 7)

L 5



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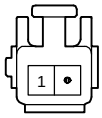

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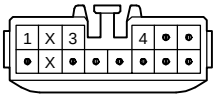

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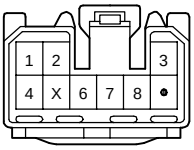
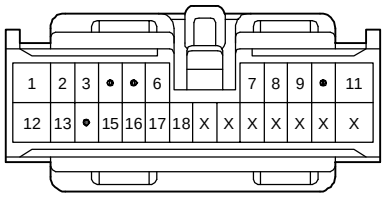
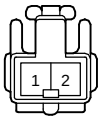
T 3 (A) ORANGE



T 4 (B) ORANGE



U 1



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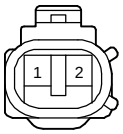

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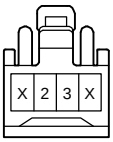

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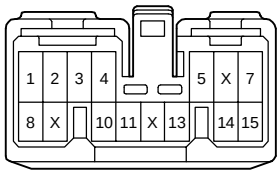
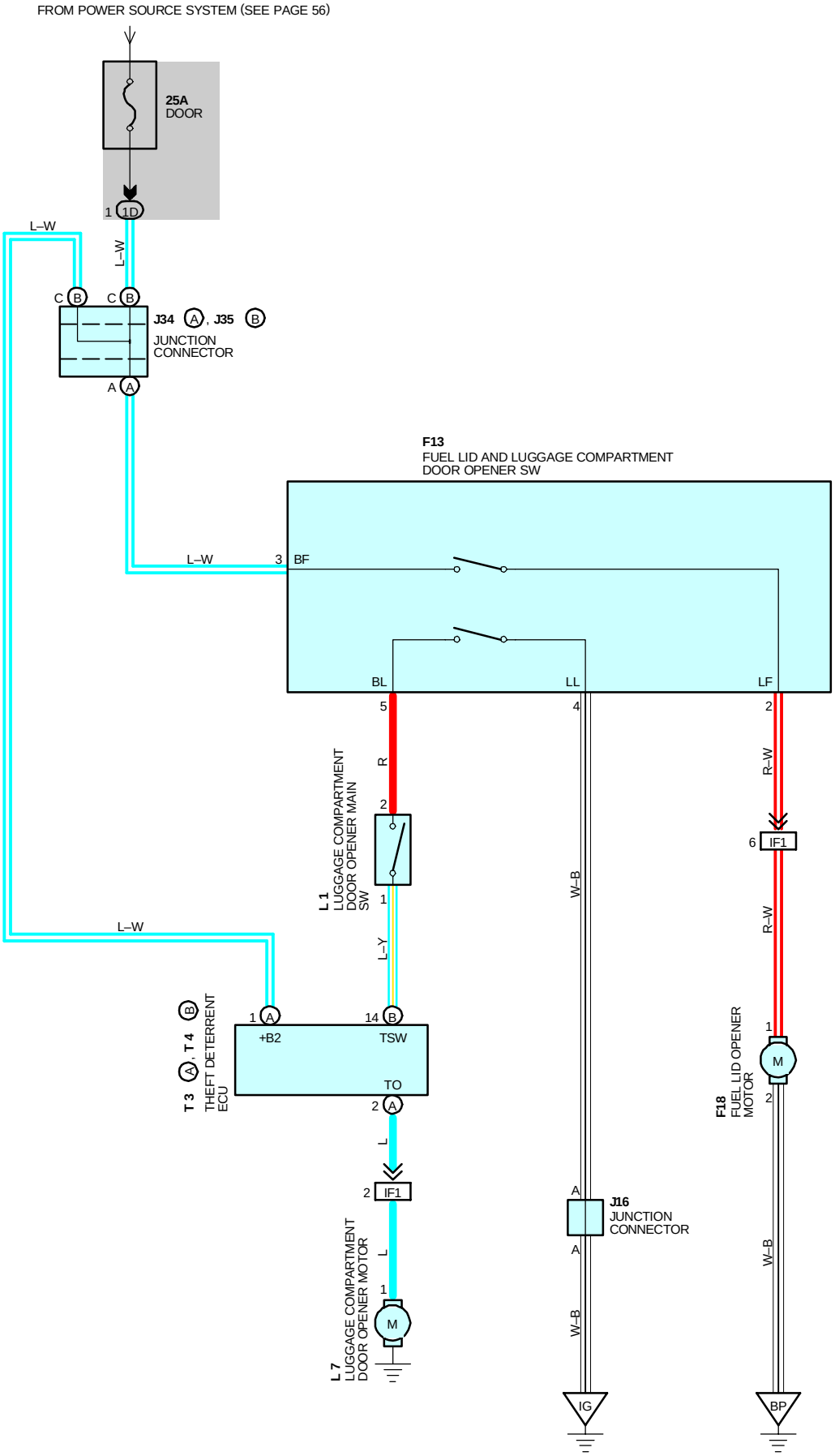


FUEL LID AND LUGGAGE COMPARTMENT DOOR OPENER



SERVICE HINTS

F13 FUEL LID AND LUGGAGE COMPARTMENT DOOR OPENER SW

3–2 : CLOSED WITH FUEL LID OPENER SW ON

○ : PARTS LOCATION

CODE	SEE PAGE	CODE		SEE PAGE	CODE		SEE PAGE
F13	28	J34	A	29	L 7		30
F18	30	J35	B	29	T 3	A	29
J16	29	L 1		29	T 4	B	29

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)

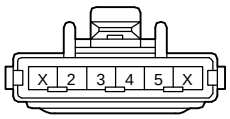
▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IF1	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)

▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IG	36	LEFT KICK PANEL
BP	40	BACK PANEL CENTER

F13



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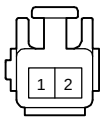
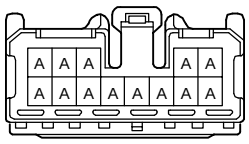


J16 ORANGE



(HINT : SEE PAGE 7)

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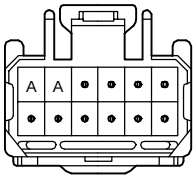

(HINT : SEE PAGE 7)

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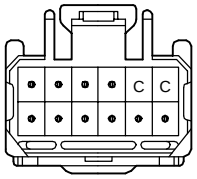
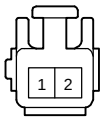


(HINT : SEE PAGE 7)

L 1



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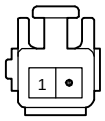
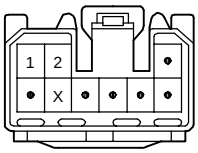
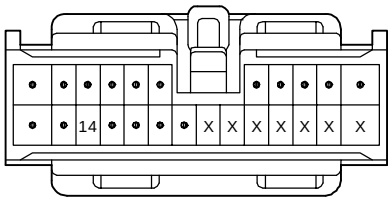


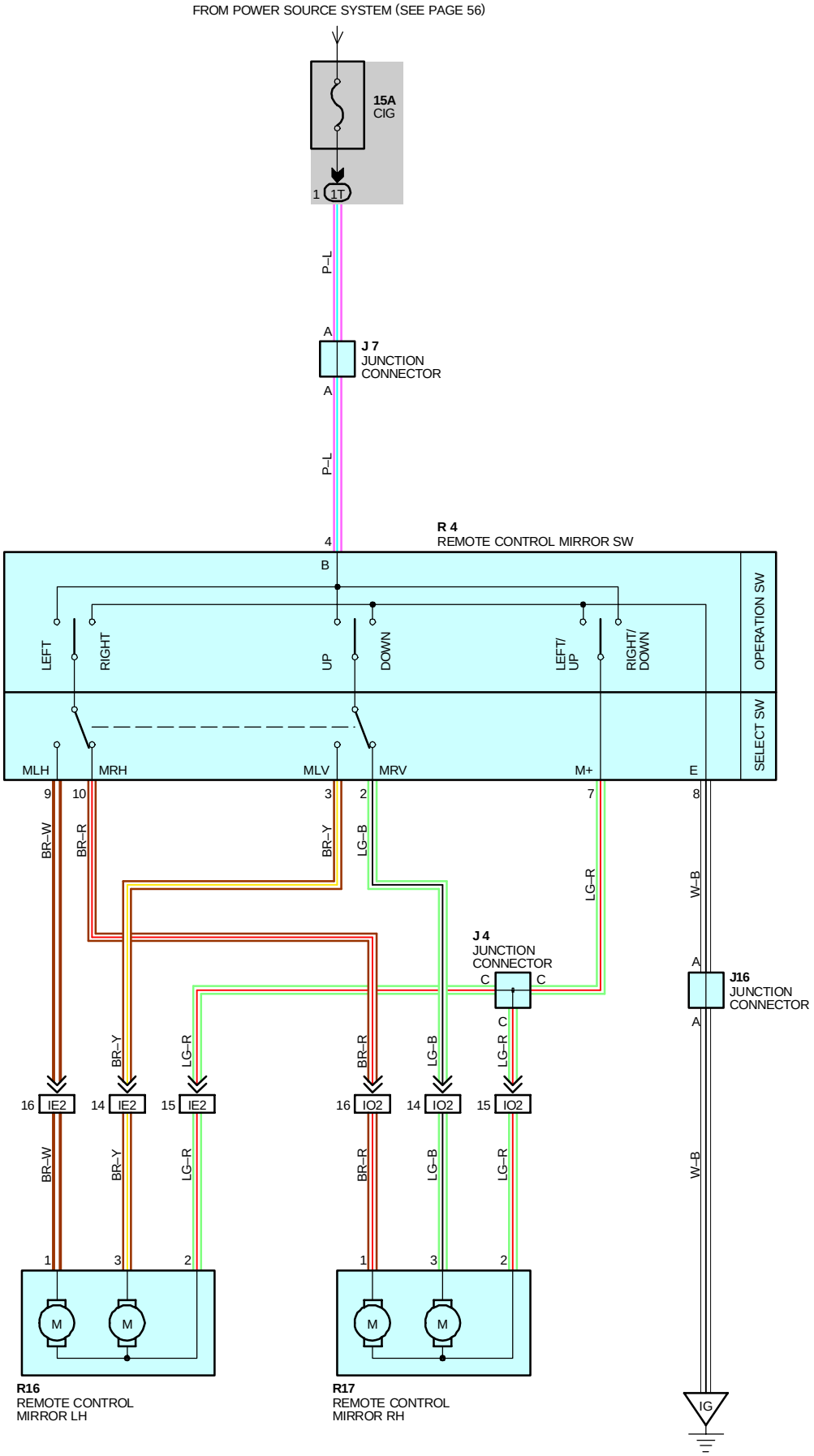
T 3 (A) ORANGE



T 4 (B) ORANGE



REMOTE CONTROL MIRROR



SERVICE HINTS

R 4 REMOTE CONTROL MIRROR SW

4–GROUND : APPROX. **12** VOLTS WITH IGNITION SW AT **ACC** OR **ON** POSITION
7–8 : CONTINUITY WITH THE OPERATION SW AT **UP** OR **LEFT** POSITION
4–7 ; CONTINUITY WITH THE OPERATION SW AT **DOWN** OR **RIGHT** POSITION

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J 4	29	J16	29	R16	31
J 7	29	R 4	29	R17	31

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1T	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)

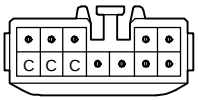
▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IE2	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IO2	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)

▽ : GROUND POINTS

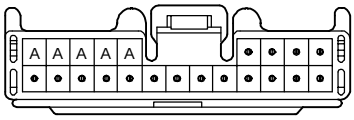
CODE	SEE PAGE	GROUND POINTS LOCATION
IG	36	LEFT KICK PANEL

J 4 BLACK



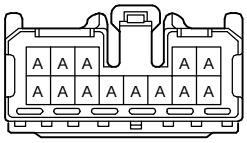
(HINT : SEE PAGE 7)

J 7



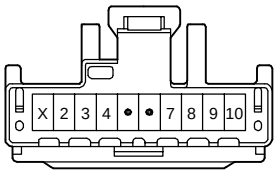
(HINT : SEE PAGE 7)

J16 ORANGE



(HINT : SEE PAGE 7)

R 4 BLACK



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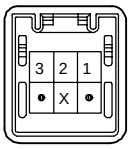

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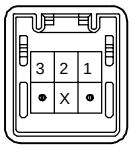
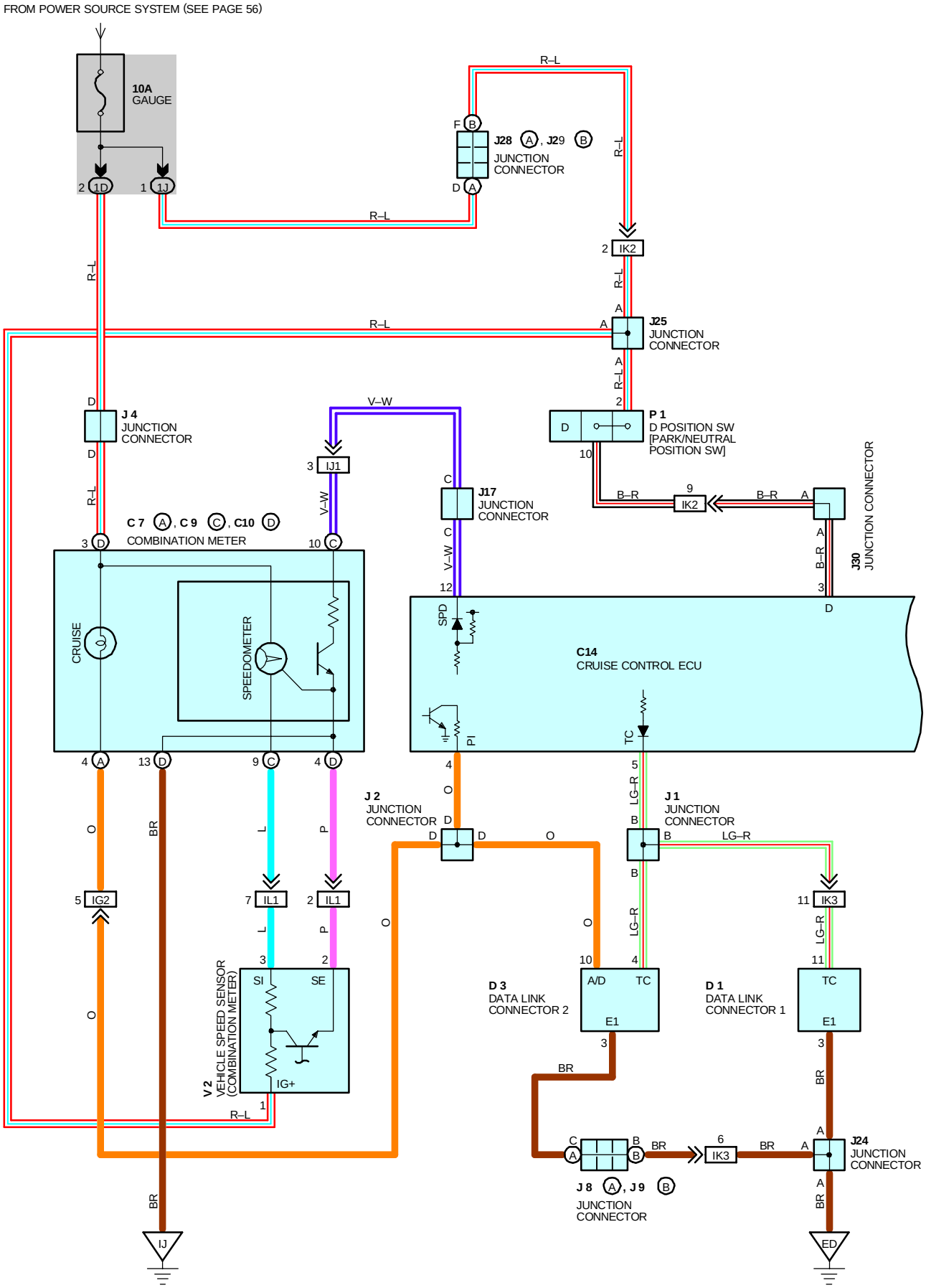
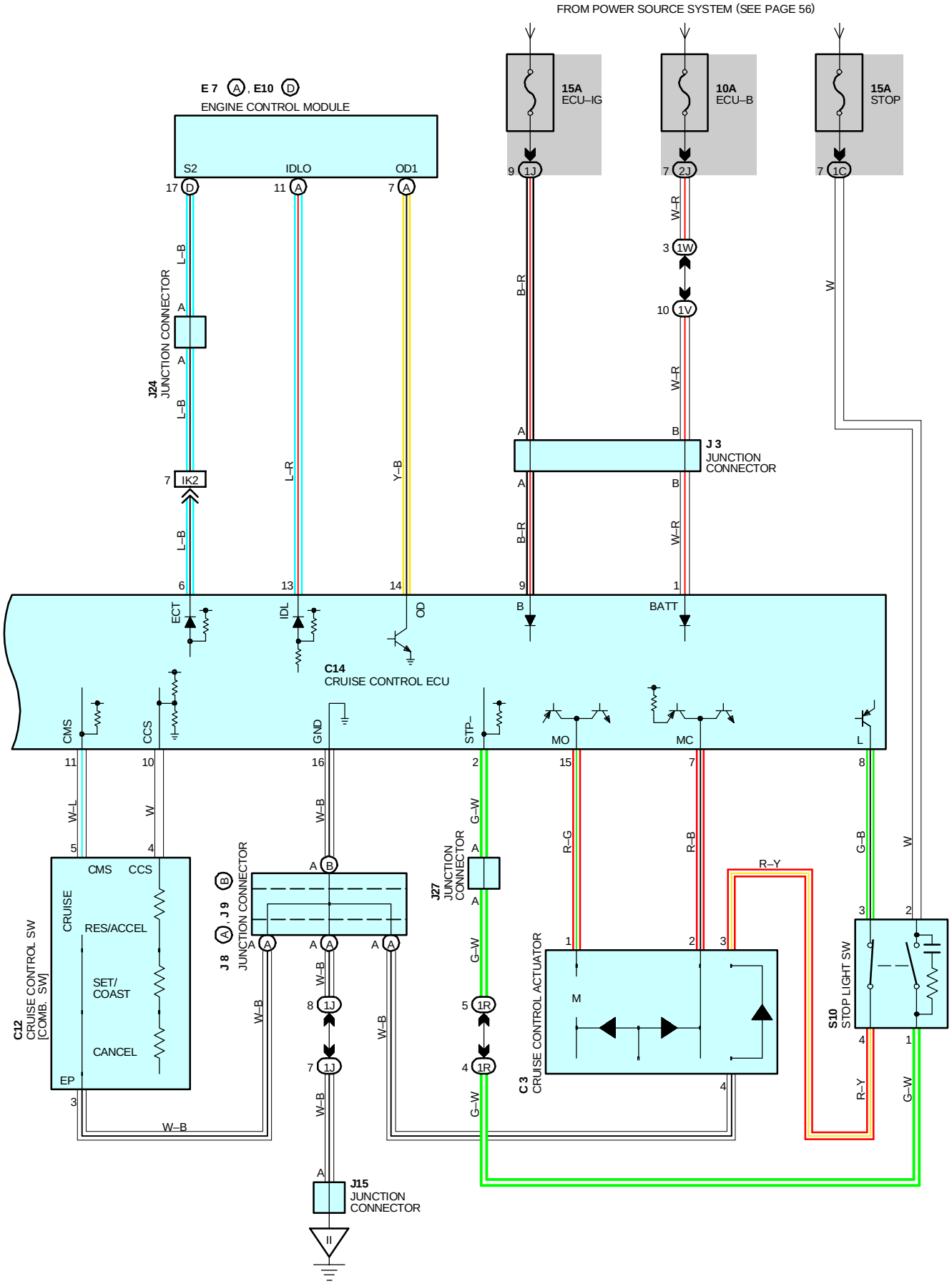



FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A
GAUGE
2 1D
1 1J
R–L
F B
J28 A, J29 B
JUNCTION
CONNECTOR
D A
2 IK2
A
J25
JUNCTION
CONNECTOR
D
J 4
JUNCTION
CONNECTOR
D
V–W
3 IJ1
C
J17
JUNCTION
CONNECTOR
C
V–W
12
P 1
D POSITION SW
[PARK/NEUTRAL
POSITION SW]
10
B–R
9 IK2
B–R
A
J30
JUNCTION CONNECTOR
C 7 A, C 9 C, C10 D
COMBINATION METER
3 D
10 C
CRUISE
SPEEDOMETER
SPD
C14
CRUISE CONTROL ECU
PI
TC
4 A
13 D
9 C
4 D
4
O
5 IG2
7 IL1
2 IL1
L
P
BR
J 2
JUNCTION
CONNECTOR
D
D
O
J 1
JUNCTION
CONNECTOR
B
LG–R
11 IK3
V 2
VEHICLE SPEED SENSOR
(COMBINATION METER)
SI
SE
IG+
1
D 3
DATA LINK
CONNECTOR 2
A/D
TC
E1
D 1
DATA LINK
CONNECTOR 1
TC
E1
C
A
B
BR
6 IK3
BR
A
J24
JUNCTION
CONNECTOR
J 8 A, J 9 B
JUNCTION
CONNECTOR
IJ
ED


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
E 7 A, E10 D
ENGINE CONTROL MODULE
S2
IDLO
OD1
15A
ECU–IG
10A
ECU–B
15A
STOP
J24
JUNCTION CONNECTOR
J 3
JUNCTION CONNECTOR
C14
CRUISE CONTROL ECU
ECT
IDL
OD
BATT
CMS
CCS
GND
STP–
MO
MC
L
C12
CRUISE CONTROL SW
[COMB. SW]
CRUISE
RES/ACCEL
SET/
COAST
CANCEL
EP
J 8 A, J 9 B
JUNCTION CONNECTOR
J27
JUNCTION
CONNECTOR
C3
CRUISE CONTROL ACTUATOR
M
S10
STOP LIGHT SW
J15
JUNCTION
CONNECTOR
L–B
W–L
W
W–B
G–W
R–G
R–B
R–Y
G–B
B–R
W–R
L–R
Y–B

SYSTEM OUTLINE

CURRENT IS APPLIED AT ALL TIMES THROUGH THE STOP FUSE TO **TERMINAL 2** OF THE STOP LIGHT SW, AND ALSO THROUGH THE **ECU–B** FUSE TO **TERMINAL 1** OF THE CRUISE CONTROL ECU.
WITH THE IGNITION SW TURNED TO ON, CURRENT FLOWS THROUGH THE **GAUGE** FUSE TO **TERMINAL** Ⓓ **3** OF THE COMBINATION METER AND THE CURRENT THROUGH THE **ECU–IG** FUSE FLOWS TO **TERMINAL 9** OF THE CRUISE CONTROL ECU.
WHEN THE IGNITION SW IS ON AND THE CRUISE CONTROL MAIN SWITCH IS TURNED ON, A SIGNAL IS INPUT FROM **TERMINAL 5** OF THE CRUISE CONTROL SW TO **TERMINAL 11** OF THE CRUISE CONTROL ECU. AS A RESULT, THE CRUISE CONTROL ECU FUNCTIONS AND THE CURRENT FLOWS FROM THE **ECU–IG** FUSE TO **TERMINAL 9** OF THE CRUISE CONTROL ECU → **TERMINAL 16** → **GROUND**, AND THE CRUISE CONTROL IS READY FOR OPERATION.
AT THE SAME TIME, THE CURRENT THROUGH THE **GAUGE** FUSE FLOWS TO **TERMINAL** Ⓓ **3** OF THE CRUISE CONTROL INDICATOR LIGHT → **TERMINAL** Ⓐ**4** → **TERMINAL 4** OF THE CRUISE CONTROL ECU → **TERMINAL 16** → **GROUND**, CAUSING THE CRUISE CONTROL INDICATOR LIGHT TO LIGHT UP, INDICATING THAT THE CRUISE CONTROL IS READY FOR OPERATION.

1. SET OPERATION

WHEN THE CRUISE CONTROL MAIN SW IS TURNED ON AND THE SET SW IS PUSHED WITH THE VEHICLE SPEED WITHIN THE SET LIMIT (APPROX. **40** KM/H, **25** MPH TO **200** KM/H, **124** MPH). A SIGNAL IS INPUT TO **TERMINAL 10** OF THE CRUISE CONTROL ECU AND THE VEHICLE SPEED AT THE TIME THE SET SW IS RELEASED IS MEMORIZED IN THE ECU AS THE SET SPEED.

2. SET SPEED CONTROL

DURING CRUISE CONTROL DRIVING, THE ECU COMPARES THE SET SPEED MEMORIZED IN THE ECU WITH THE ACTUAL VEHICLE SPEED INPUT INTO **TERMINAL 12** OF THE CRUISE CONTROL ECU FROM THE SPEEDOMETER, AND CONTROLS THE CRUISE CONTROL ACTUATOR TO MAINTAIN THE SET SPEED.
WHEN THE ACTUAL SPEED IS LOWER THAN THE SET SPEED, THE ECU CAUSES THE CURRENT TO THE CRUISE CONTROL ACTUATOR TO FLOW FROM **TERMINAL 15** OF THE CRUISE CONTROL ECU → **TERMINAL 1** OF THE CRUISE CONTROL ACTUATOR **TERMINAL 2** → **TERMINAL 7** OF THE CRUISE CONTROL ECU. AS A RESULT, THE MOTOR IN THE CRUISE CONTROL ACTUATOR IS ROTATED TO OPEN THE THROTTLE VALVE AND THE THROTTLE CABLE IS PULLED TO INCREASE THE VEHICLE SPEED. WHEN THE ACTUAL DRIVING SPEED IS HIGHER THAN THE SET SPEED, THE CURRENT TO THE CRUISE CONTROL ACTUATOR FLOWS FROM **TERMINAL 7** OF THE ECU → **TERMINAL 2** OF THE CRUISE CONTROL ACTUATOR → **TERMINAL 1** → **TERMINAL 15** OF THE CRUISE CONTROL ECU.
THIS CAUSES THE MOTOR IN THE CRUISE CONTROL ACTUATOR TO ROTATE TO CLOSE THE THROTTLE VALVE AND RETURN THE THROTTLE CABLE TO DECREASE THE VEHICLE SPEED.

3. COAST CONTROL

DURING THE CRUISE CONTROL DRIVING, WHILE THE COAST SW IS ON, THE CRUISE CONTROL ACTUATOR RETURNS THE THROTTLE CABLE TO CLOSE THE THROTTLE VALVE AND DECREASE THE DRIVING SPEED. THE VEHICLE SPEED WHEN THE COAST SWITCH IS TURNED OFF IS MEMORIZED AND THE VEHICLE CONTINUES AT THE NEW SET SPEED.

4. ACCEL CONTROL

DURING CRUISE CONTROL DRIVING, WHILE THE ACCEL SW IS TURNED ON, THE CRUISE CONTROL ACTUATOR PULLS THE THROTTLE CABLE TO OPEN THE THROTTLE VALVE AND INCREASE THE DRIVING SPEED.
THE VEHICLE SPEED WHEN THE ACCEL SW IS TURNED OFF IS MEMORIZED AND THE VEHICLE CONTINUES AT THE NEW SET SPEED.

5. RESUME CONTROL

UNLESS THE VEHICLE SPEED FALLS BELOW THE MINIMUM SPEED LIMIT (APPROX. **40** KM/H, **25** MPH) AFTER CANCELING THE SET SPEED BY THE CANCEL SW, PUSHING THE RESUME SW WILL CAUSE THE VEHICLE TO RESUME THE SPEED SET BEFORE CANCELLATION.

6. MANUAL CANCEL MECHANISM

IF ANY OF THE FOLLOWING OPERATIONS OCCURS DURING CRUISE CONTROL OPERATION, THE MAGNETIC CLUTCH OF THE ACTUATOR TURNS OFF AND THE MOTOR ROTATES TO CLOSE THE THROTTLE VALVE AND THE CRUISE CONTROL IS RELEASED.

- PLACING THE SHIFT LEVER EXCEPT “D” POSITION (PARK/NEUTRAL POSITION SW EXCEPT **“D”** POSITION). “SIGNAL IS NOT INPUT TO **TERMINAL 3** OF THE ECU”
- DEPRESSING THE BRAKE PEDAL (STOP LIGHT SW ON). “SIGNAL INPUT TO **TERMINAL 2** OF THE ECU”
- PULL THE CANCEL SWITCH (CANCEL SW ON). “SIGNAL INPUT TO **TERMINAL 10** OF THE ECU”
- PUSHING THE MAIN SWITCH (MAIN SW OFF). “SIGNAL INPUT TO **TERMINAL 11** OF THE ECU”

SYSTEM OUTLINE

7. AUTO CANCEL FUNCTION

A) IF ANY OF THE FOLLOWING OPERATING CONDITIONS OCCURS DURING CRUISE CONTROL OPERATION, THE SET SPEED IS ERASED, THE CURRENT FLOW TO THE MAGNETIC CLUTCH IS STOPPED AND THE CRUISE CONTROL IS RELEASED. (MAIN SW TURNS OFF).
WHEN THIS OCCURS, THE IGNITION SW MUST BE TURNED OFF ONCE BEFORE THE MAIN SW WILL TURN ON.

* WHEN CURRENT CONTINUED TO FLOW TO THE MOTOR INSIDE THE ACTUATOR IN THE THROTTLE VALVE “OPEN” DIRECTION.
* THE MOTOR DOES NOT OPERATE DESPITE THE MOTOR DRIVE SIGNAL BEING OUTPUT.

B) IF ANY OF THE FOLLOWING OPERATING CONDITIONS OCCURS DURING CRUISE CONTROL OPERATION, THE SET SPEED IS ERASED, THE CURRENT FLOW TO THE MAGNETIC CLUTCH IS STOPPED AND THE CRUISE CONTROL IS RELEASED. (MAIN SW TURN OFF).
WHEN THIS OCCURS, THE CANCEL STATE IS CLEARED AS THE MAIN SW WILL TURN ON AGAIN.

* OVER CURRENT TO TRANSISTOR DRIVING THE MOTOR AND/OR THE MAGNETIC CLUTCH.
* OPEN CIRCUIT IN THE MAGNETIC CLUTCH.
* MOMENTARY INTERRUPTION OF VEHICLE SPEED SIGNAL
* SHORT CIRCUIT IN THE CRUISE CONTROL SW.
* WHEN THE VEHICLE SPEED FALLS MORE THAN **16** KM/H (**10** MPH) BELOW THE SET SPEED, E.G. ON AN UPWARD SLOPE.

C) IF ANY OF THE FOLLOWING CONDITIONS OCCURS DURING CRUISE CONTROL OPERATION, THE SET SPEED IS ERASED AND THE CRUISE CONTROL IS RELEASED. (THE POWER TO THE MAGNETIC CLUTCH IS CUT OFF UNTIL THE SET SW IS “ON” AGAIN.)

* WHEN THE VEHICLE SPEED FALLS BELOW THE MINIMUM SPEED LIMIT, APPROX. **40** KM/H (**25** MPH)
* WHEN POWER TO THE CRUISE CONTROL SYSTEM IS MOMENTARILY CUT OFF.

D) IF ANY OF THE FOLLOWING CONDITIONS OCCURS DURING CRUISE CONTROL OPERATION, THE CRUISE CONTROL IS RELEASED.

* OPEN THE CIRCUIT FOR **TERMINAL 2** OF THE STOP LIGHT SW.

8. AUTOMATIC TRANSMISSION CONTROL FUNCTION

* IN OVERDRIVE, IF THE VEHICLE SPEED BECOMES LOWER THAN THE OVERDRIVE CUT SPEED (SET SPEED MINUS APPROX. **4** KM/H, **2.5** MPH) DURING CRUISE CONTROL OPERATION, SUCH AS DRIVING UP A HILL, THE OVERDRIVE IS RELEASED AND THE POWER INCREASED TO PREVENT A REDUCTION IN VEHICLE SPEED.
* AFTER RELEASING THE OVERDRIVE, VEHICLE SPEED BECOMES HIGHER THAN THE OVERDRIVE RETURN SPEED (SET SPEED MINUS APROX, **2** KM/H, **1.2** MPH) AND THE ECU JUDGES BY THE SIGNALS FROM THE ACTUATOR’S POTENTIOMETER THAT THE UPWARD SLOPE HAS FINISHED, THE OVERDRIVE IS RESUMED AFTER APPROXIMATELY **2** SECONDS.
* DURING CRUISE CONTROL DRIVING, THE CRUISE CONTROL OPERATION SIGNAL IS OUTPUT FROM THE CRUISE CONTROL ECU TO THE ENGINE CONTROL MODULE. UPON RECEIVING THIS SIGNAL, THE ENGINE CONTROL MODULE CHANGES THE SHIFT PATTERN TO NORMAL.
TO MAINTAIN SMOOTH CRUISE CONTROL OPERATION (ON A DOWNWARD SLOPE ETC.), THE LOCK–UP RELEASE OF THE TRANSMISSION WHEN THE IDLING POINT OF THE THROTTLE POSITION IS “ON” IS FORBIDDEN.

SERVICE HINTS

C 3 CRUISE CONTROL ACTUATOR

3–4 : APPROX. **38** Ω

C12 CRUISE CONTROL SW [COMB. SW]

5–3 : CONTINUITY WITH THE MAIN SW ON
4–3 : APPROX. **418** Ω WITH THE CANCEL SW ON
APPROX. **68** Ω WITH THE RES/ACCEL SW ON
APPROX. **198** Ω WITH THE SET/COAST SW ON

C14 CRUISE CONTROL ECU

9–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
1–GROUND : ALWAYS APPROX **12** VOLTS
12–GROUND : **4** PLUSES WITH 1 ROTATION OF THE ROTOR SHAFT
10–GROUND : APPROX. **418** Ω WITH THE CANCEL SW ON IN THE CONTROL SW
APPROX. **198** Ω WITH THE SET/COAST SW ON IN THE CONTROL SW
APPROX. **68** Ω WITH THE RES/ACCEL SW ON IN THE CONTROL SW
16–GROUND : ALWAYS CONTINUITY

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 3	26	E10 D	28	J24	29
C 7 A	28	J 1	29	J25	29
C 9 C	28	J 2	29	J27	29
C10 D	28	J 3	29	J28 A	29
C12	28	J 4	29	J29 B	29
C14	28	J 8 A	29	J30	29
D 1	26	J 9 B	29	P 1	27
D 3	28	J15	29	S10	29
E 7 A	28	J17	29	V 2	27

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1R		
1V		
1W		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

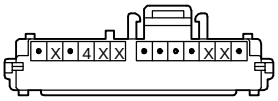
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IG2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)
IJ1	38	INSTRUMENT PANEL WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK2	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK3		
IL1	38	ENGINE WIRE AND INSTRUMENT PANEL WIRE (UNDER THE GLOVE BOX)

: GROUND POINTS

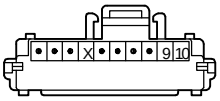
CODE	SEE PAGE	GROUND POINTS LOCATION
ED	34	SURGE TANK RH
II	36	INSTRUMENT PANEL BRACE LH
IJ	36	INSTRUMENT PANEL BRACE RH

C3 BLACK

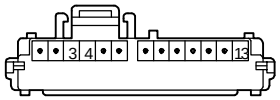
C7 A BLUE



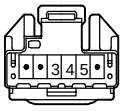
C9 C GRAY



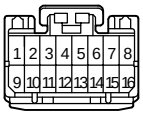
C10 D BROWN



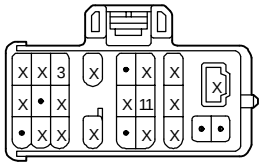
C12 BLACK



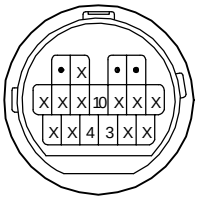
C14



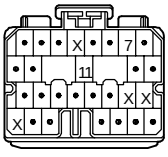
D1 BLACK



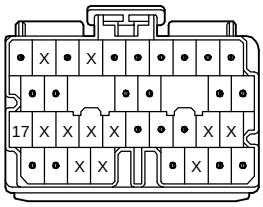
D3 DARK GRAY



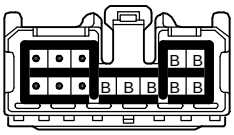
E7 A



E10 (D)

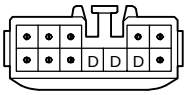


J1 GRAY



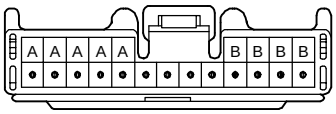
(HINT : SEE PAGE 7)

J2 BLACK



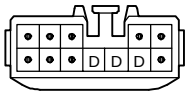
(HINT : SEE PAGE 7)

J3



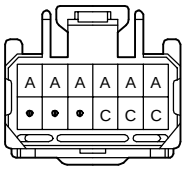
(HINT : SEE PAGE 7)

J4 BLACK



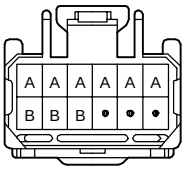
(HINT : SEE PAGE 7)

J8 (A) GRAY



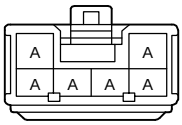
(HINT : SEE PAGE 7)

J9 (B) GRAY



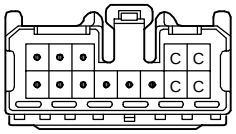
(HINT : SEE PAGE 7)

J15



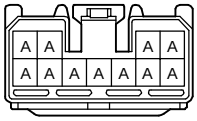
(HINT : SEE PAGE 7)

J17 BLUE



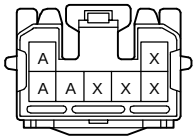
(HINT : SEE PAGE 7)

J24



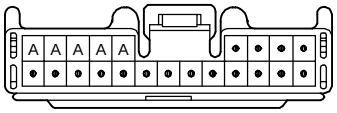
(HINT : SEE PAGE 7)

J25



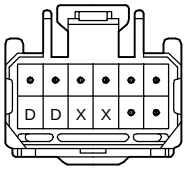
(HINT : SEE PAGE 7)

J27



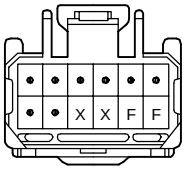
(HINT : SEE PAGE 7)

J28 (A)



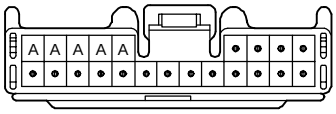
(HINT : SEE PAGE 7)

J29 (B)



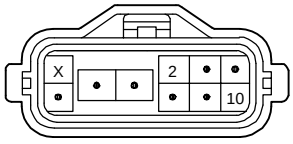
(HINT : SEE PAGE 7)

J30

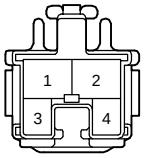


(HINT : SEE PAGE 7)

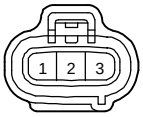
P1 GRAY



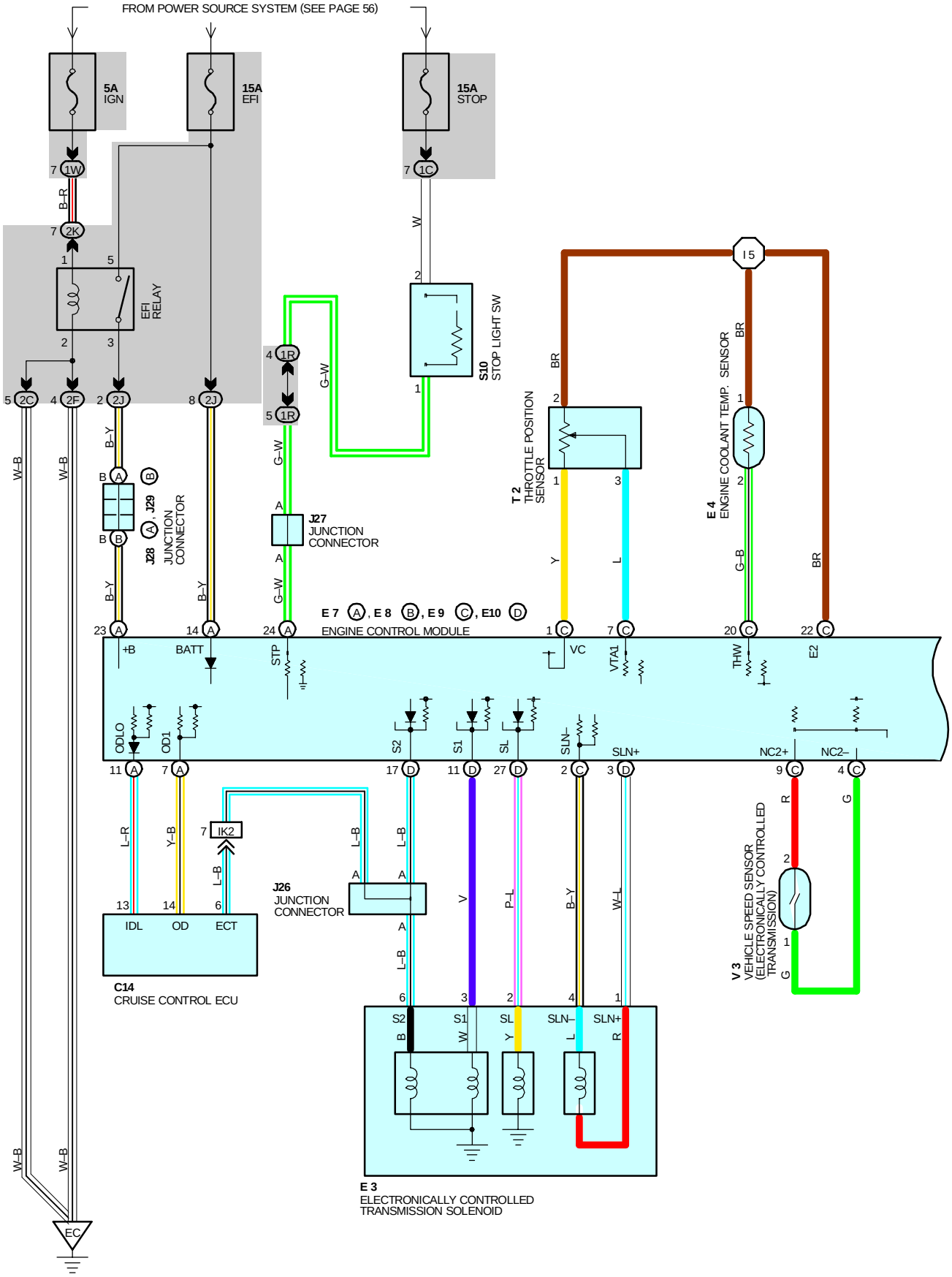
S10 BLUE



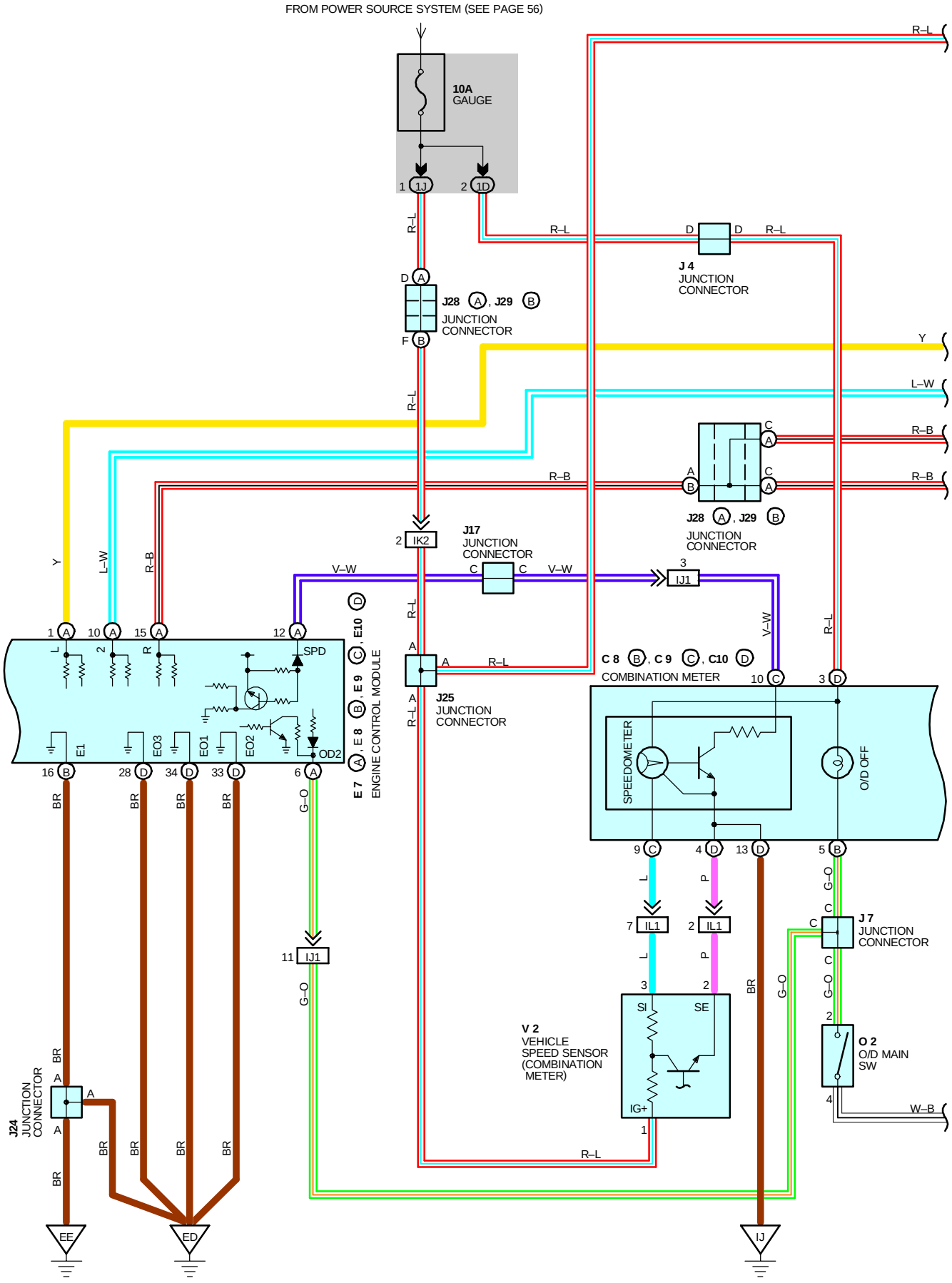
V2 BLACK

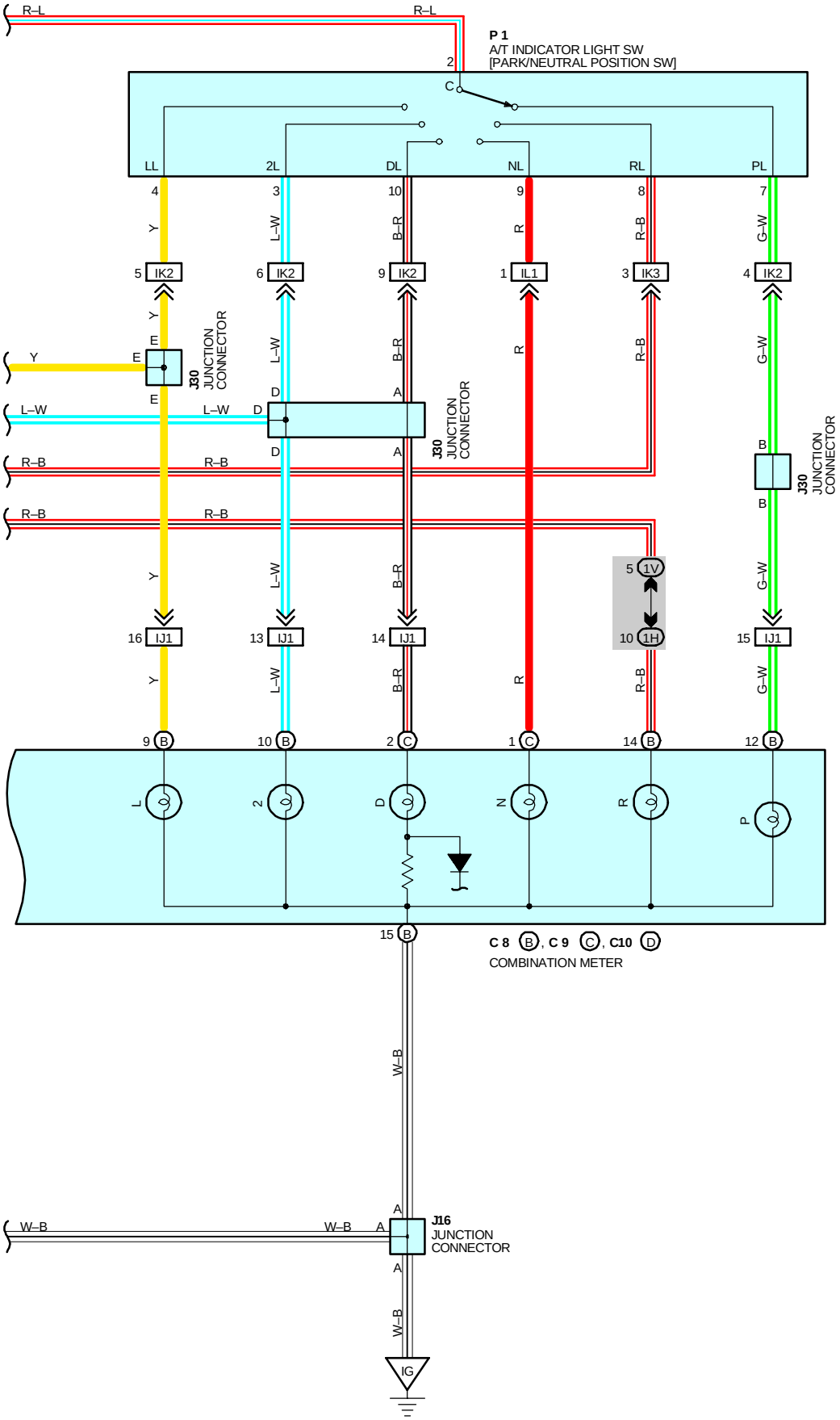


ELECTRONICALLY CONTROLLED TRANSMISSION



AND A/T INDICATOR




R–L
R–L
P 1
A/T INDICATOR LIGHT SW
[PARK/NEUTRAL POSITION SW]
2
C
LL
2L
DL
NL
RL
PL
4
3
10
9
8
7
Y
L–W
B–R
R
R–B
G–W
5 IK2
6 IK2
9 IK2
1 IL1
3 IK3
4 IK2
J30
JUNCTION
CONNECTOR
E
D
A
B
L–W
R–B
16 IJ1
13 IJ1
14 IJ1
5 1V
10 1H
15 IJ1
9 B
10 B
2 C
1 C
14 B
12 B
L
2
D
N
R
P
15 B
C 8 B, C 9 C, C10 D
COMBINATION METER
W–B
J16
JUNCTION
CONNECTOR
IG

AND A/T INDICATOR

SYSTEM OUTLINE

PREVIOUS AUTOMATIC TRANSAXLE HAVE SELECTED EACH GEAR SHIFT USING THE MECHANICALLY CONTROLLED THROTTLE HYDRAULIC PRESSURE, GOVERNOR HYDRAULIC PRESSURE AND LOCK–UP HYDRAULIC PRESSURE. THE ELECTRONICALLY CONTROLLED TRANSMISSION HOWEVER, ELECTRICALLY CONTROLS THE LINE PRESSURE AND LOCK–UP PRESSURE ETC., THROUGH THE SOLENOID VALVE. ENGINE CONTROL MODULE CONTROL OF THE SOLENOID VALVE BASED ON THE INPUT SIGNAL FROM EACH SENSOR MAKES SMOOTH DRIVING POSSIBLE BY SHIFT SELECTION FOR EACH GEAR WHICH IS MOST APPROPRIATE TO THE DRIVING CONDITIONS AT THAT TIME.

1. GEAR SHIFT OPERATION

DURING DRIVING, THE ENGINE CONTROL MODULE SELECTS THE SHIFT FOR EACH GEAR WHICH IS MOST APPROPRIATE TO THE DRIVING CONDITIONS, BASED ON INPUT SIGNALS FROM THE ENGINE COOLANT TEMP. SENSOR TO **TERMINAL THW** OF THE ENGINE CONTROL MODULE, AND ALSO THE INPUT SIGNALS TO **TERMINAL NC2+** OF THE ENGINE CONTROL MODULE FROM THE VEHICLE SPEED SENSOR DEVOTED TO THE ELECTRONICALLY CONTROLLED TRANSMISSION. CURRENT IS THEN OUTPUT TO THE ELECTRONICALLY CONTROLLED TRANSMISSION SOLENOID. WHEN SHIFTING TO 1ST SPEED, CURRENT FLOWS FROM **TERMINAL S1** OF THE ENGINE CONTROL MODULE → **TERMINAL 3** OF THE ELECTRONICALLY CONTROLLED TRANSMISSION SOLENOID → **GROUND**, AND CONTINUITY TO THE NO. 1 SOLENOID CAUSES THE SHIFT.

FOR THE 2ND SPEED, CURRENT FLOWS FROM **TERMINAL S** OF THE ENGINE CONTROL MODULE → **TERMINAL 3** OF THE ELECTRONICALLY CONTROLLED TRANSMISSION SOLENOID → **GROUND**, AND FROM **TERMINAL S2** OF THE ENGINE CONTROL MODULE → **TERMINAL 6** OF THE ELECTRONICALLY CONTROLLED TRANSMISSION SOLENOID → **GROUND**, AND CONTINUITY TO SOLENOID NO. 1 AND NO. 2 CAUSES THE SHIFT.

FOR THE 3RD SPEED, THERE IS NO CONTINUITY TO NO. 1 SOLENOID, ONLY TO NO. 2, CAUSING THE SHIFT.

SHIFTING INTO 4TH SPEED (OVERDRIVE) TAKES PLACE WHEN THERE IS NO CONTINUITY TO EITHER NO. 1 OR NO. 2 SOLENOID.

2. LOCK–UP OPERATION

WHEN THE ENGINE CONTROL MODULE JUDGES FROM EACH SIGNAL THAT LOCK–UP OPERATION CONDITIONS HAVE BEEN MET, CURRENT FLOWS FROM **TERMINAL SL** OF THE ENGINE CONTROL MODULE → **TERMINAL 2** OF THE ELECTRONICALLY CONTROLLED TRANSMISSION SOLENOID → **GROUND**, CAUSING CONTINUITY TO THE LOCK–UP SOLENOID AND CAUSING LOCK–UP OPERATION.

3. STOP LIGHT SW CIRCUIT

IF THE BRAKE PEDAL IS DEPRESSED (STOP LIGHT SW ON) WHEN DRIVING IN LOCK–UP CONDITION, A SIGNAL IS INPUT TO **TERMINAL STP** OF THE ENGINE CONTROL MODULE, THE ENGINE CONTROL MODULE OPERATES AND CONTINUITY TO THE LOCK–UP SOLENOID IS CUT.

4. OVERDRIVE CIRCUIT

* OVERDRIVE ON

  WHEN THE O/D MAIN SW IS TURNED ON (O/D OFF INDICATOR LIGHT TURNS OFF), A SIGNAL IS INPUT TO **TERMINAL OD2** OF THE ENGINE CONTROL MODULE AND ENGINE CONTROL MODULE OPERATION CAUSES GEAR SHIFT WHEN THE CONDITIONS FOR OVERDRIVE ARE MET.

* OVERDRIVE OFF

  WHEN THE O/D MAIN SW IS TURNED TO OFF (O/D OFF INDICATOR LIGHT TURNS ON), THE CURRENT FLOWING THROUGH THE O/D OFF INDICATOR LIGHT FLOWS THROUGH THE O/D MAIN SW TO **GROUND**. CAUSING THE INDICATOR LIGHT TO LIGHT UP. AT THE SAME TIME, A SIGNAL IS INPUT TO **TERMINAL OD2** OF THE ENGINE CONTROL MODULE AND ENGINE CONTROL MODULE OPERATION PREVENTS SHIFT INTO OVERDRIVE.

ELECTRONICALLY CONTROLLED TRANSMISSION

SERVICE HINTS

E 7 Ⓐ, E 8 Ⓑ,E 9 Ⓒ,E10 Ⓓ ENGINE CONTROL MODULE

S1, S2–E1 : **9.0–14.0** VOLTS WITH THE SOLENOID ON
0–1.5 VOLTS WITH SOLENOID OFF
L–E1 : **7.5–14.0** VOLTS WITH THE IGNITION SW ON AND SHIFT LEVER AT **L** POSITION
2–E1 : **7.5–14.0** VOLTS WITH THE IGNITION SW ON AND SHIFT LEVER AT **2** POSITION
R–E1 : **7.5–14.0** VOLTS WITH THE IGNITION SW ON AND SHIFT LEVER AT **R** POSITION
STP–E1 : **9.0–14.0** VOLTS WITH THE IGNITION SW ON AND BRAKE PEDAL DEPRESSED
THW–E2 : **0.2–1.0** VOLTS WITH THE ENGINE COOLANT TEMP. **60•**C (**140•**F) **–120•**C (**248•**F)
VTA1–E2 : **0.3–0.8** VOLTS WITH THE IGNITION SW ON AND THROTTLE VALVE FULLY CLOSED
3.2–4.9 VOLTS WITH THE IGNITION SW ON AND THROTTLE VALVE FULLY OPENED
VC–E2 : **4.5–5.5** VOLTS WITH THE IGNITION SW AT **ON** POSITION
OD1–E1 : **4.5–5.5** VOLTS WITH THE IGNITION SW AT **ON** POSITION
0D2–E1 : **9.0–14.0** VOLTS WITH THE IGNITION SW **ON** AND O/D MAIN SW TURNED OFF
0–3.0 VOLTS WITH THE IGNITION SW ON AND O/D MAIN SW TURNED ON
+B–E1 : **9.0–14.0** VOLTS WITH THE IGNITION SW AT **ON** POSITION

0 2 O/D MAIN SW

2–4 : CLOSED WITH THE O/D MAIN SW OFF, OPEN WITH THE O/D MAIN SW ON

: PARTS LOCATION

CODE		SEE PAGE	CODE		SEE PAGE	CODE		SEE PAGE
C 8	B	28	E10	D	28	J28	A	29
C 9	C	28	J 4		29	J29	B	29
C10	D	28	J 7		29	J30		29
C14		28	J16		29	O 2		29
E 3		26	J17		29	P 1		27
E 4		26	J24		29	S10		29
E 7	A	28	J25		29	T 2		27
E 8	B	28	J26		29	V 2		27
E 9	C	28	J27		29	V 3		27

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1H		
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1R		
1V		
1W		
2C	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2F		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2K		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IJ1	38	INSTRUMENT PANEL WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK2	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK3		
IL1	38	ENGINE WIRE AND INSTRUMENT PANEL WIRE (UNDER THE GLOVE BOX)

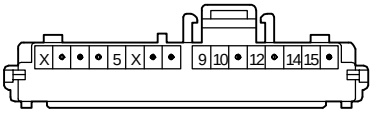
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EC	34	LEFT RADIATOR SIDE SUPPORT
ED	34	SURGE TANK RH
EE	34	REAR SIDE OF SURGE TANK
IG	36	LEFT KICK PANEL
IJ	36	INSTRUMENT PANEL BRACE RH

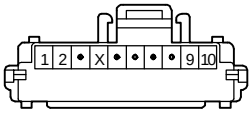
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I 5	38	ENGINE WIRE			

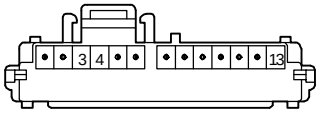
C8 (B)



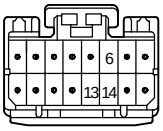
C9 (C) GRAY



C10 (D) BROWN



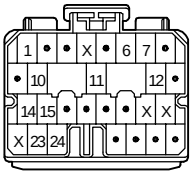
C14



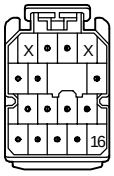
E3 GRAY

E4 DARK GRAY

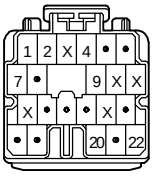
E7 (A)



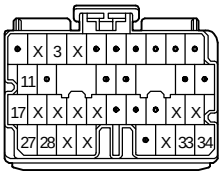
E8 (B)



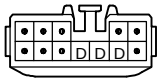
E9 (C)



E10 (D)

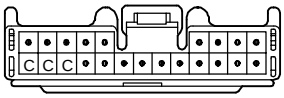


J4 BLACK



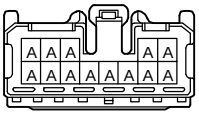
(HINT : SEE PAGE 7)

J7



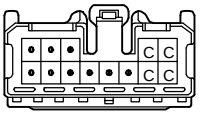
(HINT : SEE PAGE 7)

J16 ORANGE



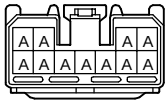
(HINT : SEE PAGE 7)

J17 BLUE



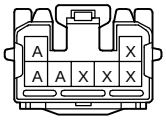
(HINT : SEE PAGE 7)

J24



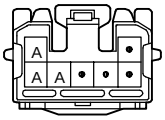
(HINT : SEE PAGE 7)

J25



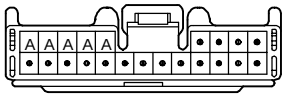
(HINT : SEE PAGE 7)

J26



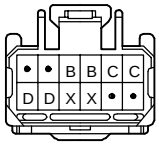
(HINT : SEE PAGE 7)

J27



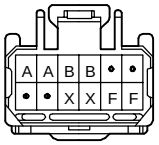
(HINT : SEE PAGE 7)

J28 (A)



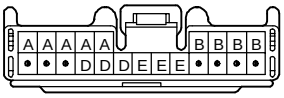
(HINT : SEE PAGE 7)

J29 (B)



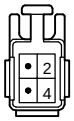
(HINT : SEE PAGE 7)

J30

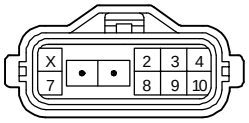


(HINT : SEE PAGE 7)

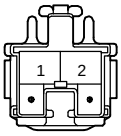
O2 BLUE



P1 GRAY



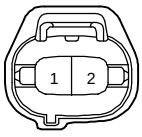
S10 BLUE

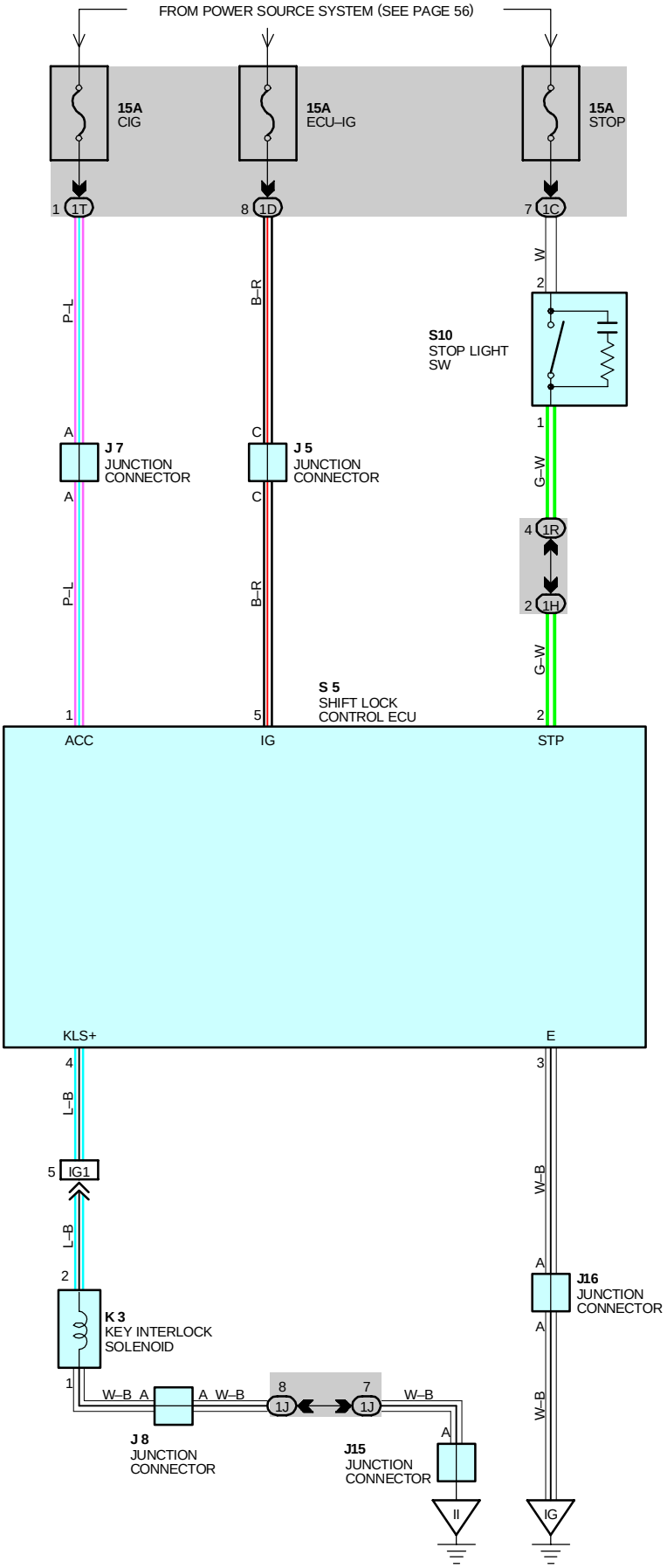


T2 BLACK

V2 BLACK

V3 BLACK




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A
CIG
15A
ECU–IG
15A
STOP
1
1T
8
1D
7
1C
P–L
B–R
W
2
S10
STOP LIGHT
SW
A
J 7
JUNCTION
CONNECTOR
A
C
J 5
JUNCTION
CONNECTOR
C
1
G–W
4
1R
2
1H
P–L
B–R
G–W
S 5
SHIFT LOCK
CONTROL ECU
1
5
2
ACC
IG
STP
KLS+
E
4
3
L–B
W–B
5
IG1
L–B
A
J16
JUNCTION
CONNECTOR
2
A
K 3
KEY INTERLOCK
SOLENOID
1
W–B
A
A
W–B
8
1J
7
1J
W–B
W–B
A
J 8
JUNCTION
CONNECTOR
J15
JUNCTION
CONNECTOR
II
IG

SERVICE HINTS

S 5 SHIFT LOCK CONTROL ECU

1–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ACC** OR **ON** POSITION
5–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
3–GROUND : ALWAYS CONTINUITY
2–GROUND : APPROX. **12** VOLTS WITH THE BRAKE PEDAL DEPRESSED
4–GROUND : **0** VOLTS WITH THE IGNITION SW AT **ACC** POSITION AND THE SHIFT LEVER POSITION IN **P** POSITION
6–12 VOLTS WITH THE IGNITION SW AT **ACC** POSITION AND THE SHIFT LEVER POSITION IN EXCEPT **P** POSITION

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
J 5	29	J15	29	S 5	29
J 7	29	J16	29	S10	29
J 8	29	K 3	29		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1H		
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1R		
1T	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)

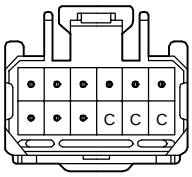
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IG1	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)

: GROUND POINTS

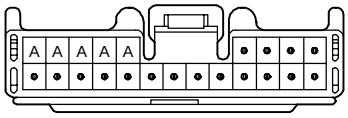
CODE	SEE PAGE	GROUND POINTS LOCATION
IG	36	LEFT KICK PANEL
II	36	INSTRUMENT PANEL BRACE LH

J 5 GRAY



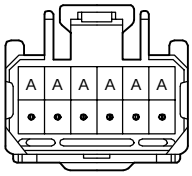
(HINT : SEE PAGE 7)

J 7



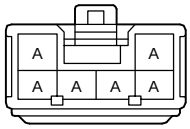
(HINT : SEE PAGE 7)

J 8 GRAY



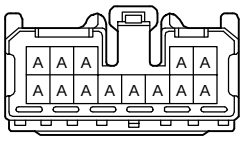
(HINT : SEE PAGE 7)

J15



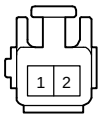
(HINT : SEE PAGE 7)

J16 ORANGE

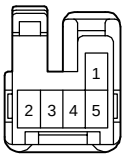


(HINT : SEE PAGE 7)

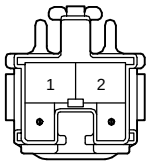
K 3 BLACK

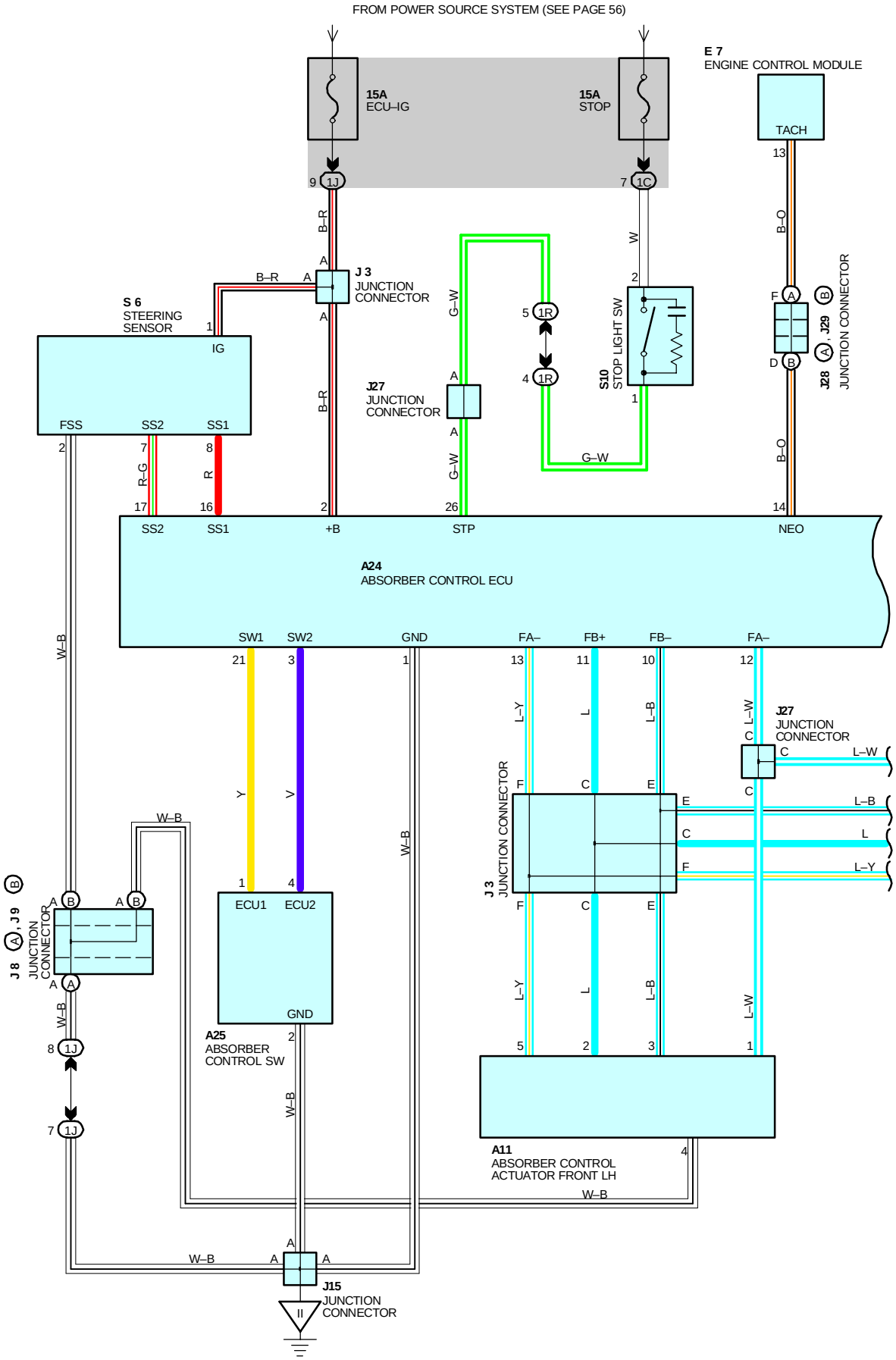


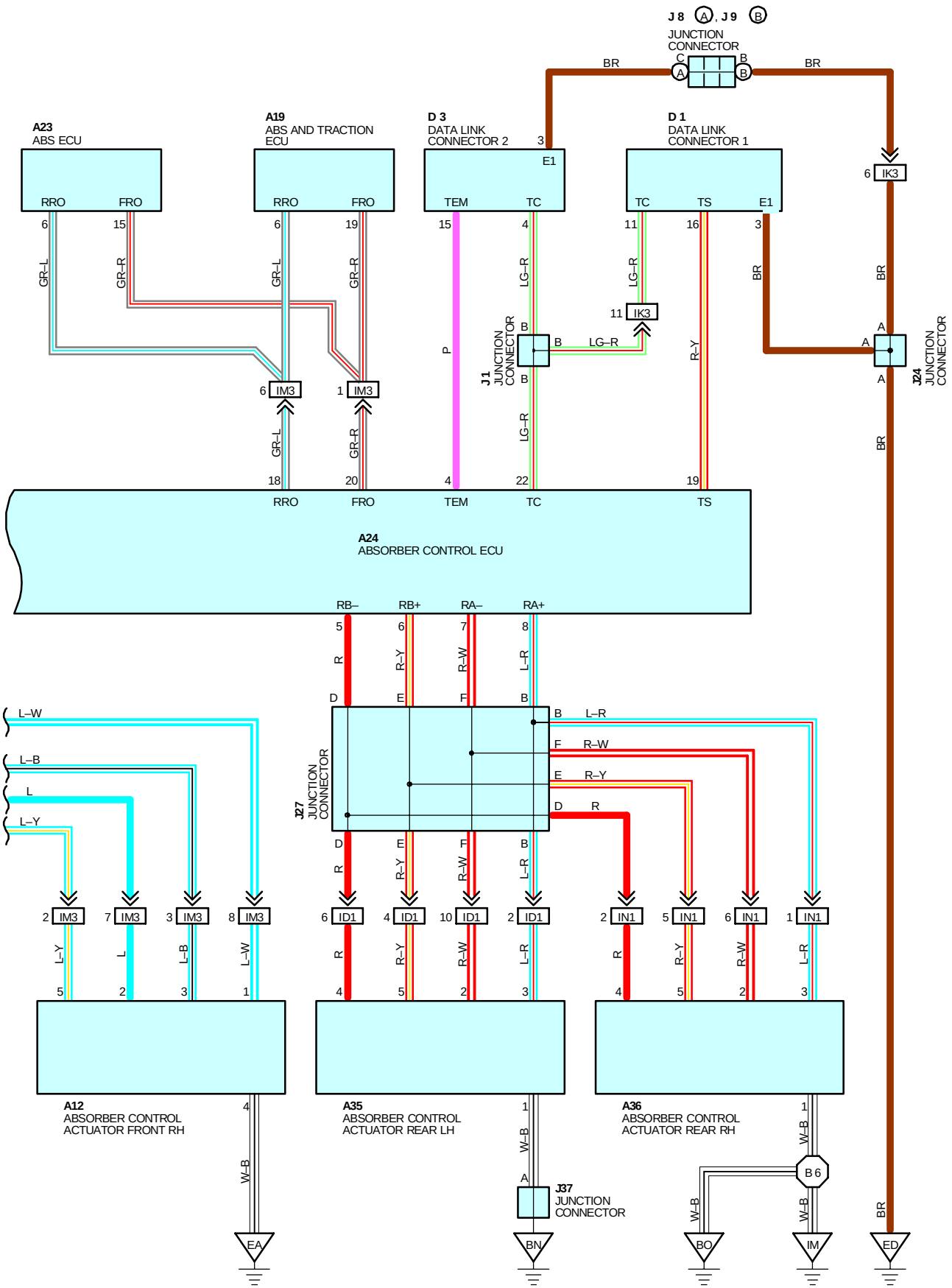
S 5



S10 BLUE




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A
ECU–IG
15A
STOP
E 7
ENGINE CONTROL MODULE
TACH
9 1J
7 1C
13
B–O
B–R
W
A
J 3
JUNCTION
CONNECTOR
2
F A B
A, J29
D B
J28
JUNCTION CONNECTOR
S 6
STEERING
SENSOR
1
IG
G–W
5 1R
4 1R
S10
STOP LIGHT SW
J27
JUNCTION
CONNECTOR
1
FSS
SS2
SS1
2
7
8
R–G
R
17
16
2
26
14
SS2
SS1
+B
STP
NEO
A24
ABSORBER CONTROL ECU
SW1
SW2
GND
FA–
FB+
FB–
FA–
21
3
1
13
11
10
12
L–Y
L
L–B
L–W
J27
JUNCTION
CONNECTOR
C
L–W
F
C
E
L–B
L
L–Y
J3
JUNCTION CONNECTOR
W–B
Y
V
1
4
ECU1
ECU2
GND
A25
ABSORBER
CONTROL SW
2
J8, J9
JUNCTION
CONNECTOR
A B
8 1J
7 1J
5
2
3
1
A11
ABSORBER CONTROL
ACTUATOR FRONT LH
4
J15
JUNCTION
CONNECTOR


J8 A, J9 B
JUNCTION CONNECTOR
A23
ABS ECU
A19
ABS AND TRACTION ECU
D 3
DATA LINK CONNECTOR 2
D 1
DATA LINK CONNECTOR 1
RRO
FRO
TEM
TC
TS
E1
IM3
IK3
J1
JUNCTION CONNECTOR
J24
JUNCTION CONNECTOR
A24
ABSORBER CONTROL ECU
RB–
RB+
RA–
RA+
J27
JUNCTION CONNECTOR
ID1
IN1
A12
ABSORBER CONTROL ACTUATOR FRONT RH
A35
ABSORBER CONTROL ACTUATOR REAR LH
A36
ABSORBER CONTROL ACTUATOR REAR RH
J37
JUNCTION CONNECTOR
B 6
EA
BN
BO
IM
ED

ELECTRONIC MODULATED SUSPENSION

SYSTEM OUTLINE

ELECTRIC MODULATED SUSPENSION SYSTEM IS THE DAMPING FORCE CONTROL SYSTEM USING SEVERAL SIGNALS WHICH RESTRAINS THE VEHICLE MOVEMENT (SUCH AS ROLLING, DRIVING, AND SQUAD) BY A DRIVER'S OPERATION TOGETHER WITH RESTRAINING AND ABSORBING THE VEHICLE MOVEMENT CHANGE AND VIBRATION AGAINST THE UNEVENNESS OF THE ROAD.

(1) STEERING SENSOR SIGNAL

TO INPUT THE ROTATION ANGLE OF THE STEERING WHEEL INTO THE **TERMINALS SS1** AND **SS2** OF THE ABSORBER CONTROL ECU.

(2) SPEED SENSOR SIGNAL

TO DETECT THE VEHICLE SPEED AT ABS SPEED SENSOR FRONT LH, RH, REAR LH, RH AND INPUT TO THE **TERMINALS FRO** AND **RRO** OF THE ABSORBER CONTROL ECU FROM ABS ECU OR ABS AND TRACTION ECU.

(3) STOP LIGHT SW SIGNAL

TO DETECT THE SIGNAL OF THE BRAKE IN OPERATION AND INPUT IT INTO THE **TERMINAL STP** OF THE ABSORBER CONTROL ECU.

(4) ENGINE ROTATION SIGNAL

TO DETECT THE ENGINE SPEED AND INPUT IT INTO THE **TERMINAL NEO** OF THE ABSORBER CONTROL ECU.

(5) ABSORBER CONTROL SW SIGNAL

TO DETECT THE SWITCH CONDITION AND INPUT IT INTO THE **TERMINALS SW1** AND **SW2** OF THE ABSORBER CONTROL ECU.

SERVICE HINTS

A24 ABSORBER CONTROL ECU

2–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
26–GROUND : APPROX. **12** VOLTS WITH THE BRAKE PEDAL DEPRESSED
1–GROUND : ALWAYS CONTINUITY

S 6 STEERING SENSOR

1–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
2–GROUND : ALWAYS CONTINUITY

: PARTS LOCATION

CODE	SEE PAGE	CODE	See Page	Code	See Page
A11	26	D 1	26	J24	29
A12	26	D 3	28	J27	29
A19	28	E27	28	J28 A	29
A23	28	J 1	29	J29 B	29
A24	28	J 3	29	J37	30
A25	28	J 8 A	29	S 6	29
A35	30	J 9 B	29	S10	29
A36	30	J15	29		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1C	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J		
1R		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
ID1	36	FLOOR WIRE AND COWL WIRE (LEFT KICK PANEL)
IK3	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM3	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IN1	38	FLOOR NO. 2 WIRE AND COWL WIRE (RIGHT KICK PANEL)

: GROUND POINTS

Code	See Page	GROUND POINTS LOCATION
EA	34	RIGHT RADIATOR SIDE SUPPORT
ED	34	SURGE TANK RH
II	36	INSTRUMENT PANEL BRACE LH
IM	36	RIGHT KICK PANEL
BN	40	UNDER THE LEFT CENTER PILLAR
BO	40	UNDER THE RIGHT CENTER PILLAR

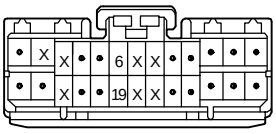
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B 6	40	FLOOR NO. 2 WIRE			

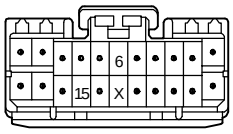
A11 GRAY

A12 GRAY

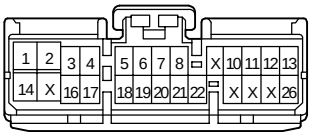
A19



A23



A24 GRAY



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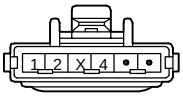
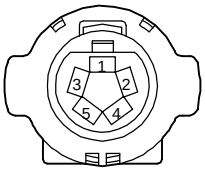
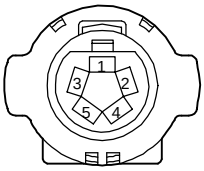


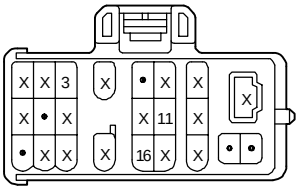
A35 GRAY



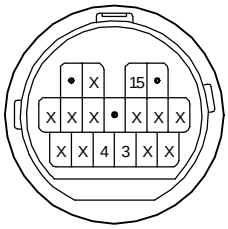
A36 GRAY



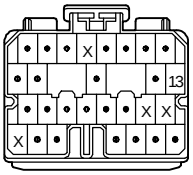
D1 BLACK



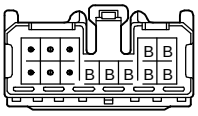
D3 DARK GRAY



E7



J1 GRAY

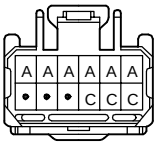


(HINT : SEE PAGE 7)

J3

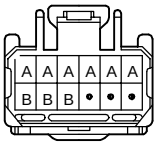
(HINT : SEE PAGE 7)

J8 (A) GRAY



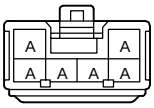
(HINT : SEE PAGE 7)

J9 (B) GRAY



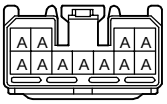
(HINT : SEE PAGE 7)

J15



(HINT : SEE PAGE 7)

J24

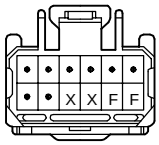


(HINT : SEE PAGE 7)

J27

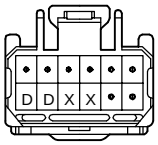
(HINT : SEE PAGE 7)

J28 (A)



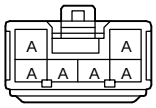
(HINT : SEE PAGE 7)

J29 (B)



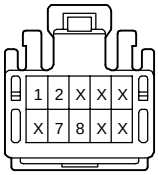
(HINT : SEE PAGE 7)

J37

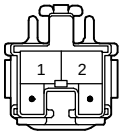


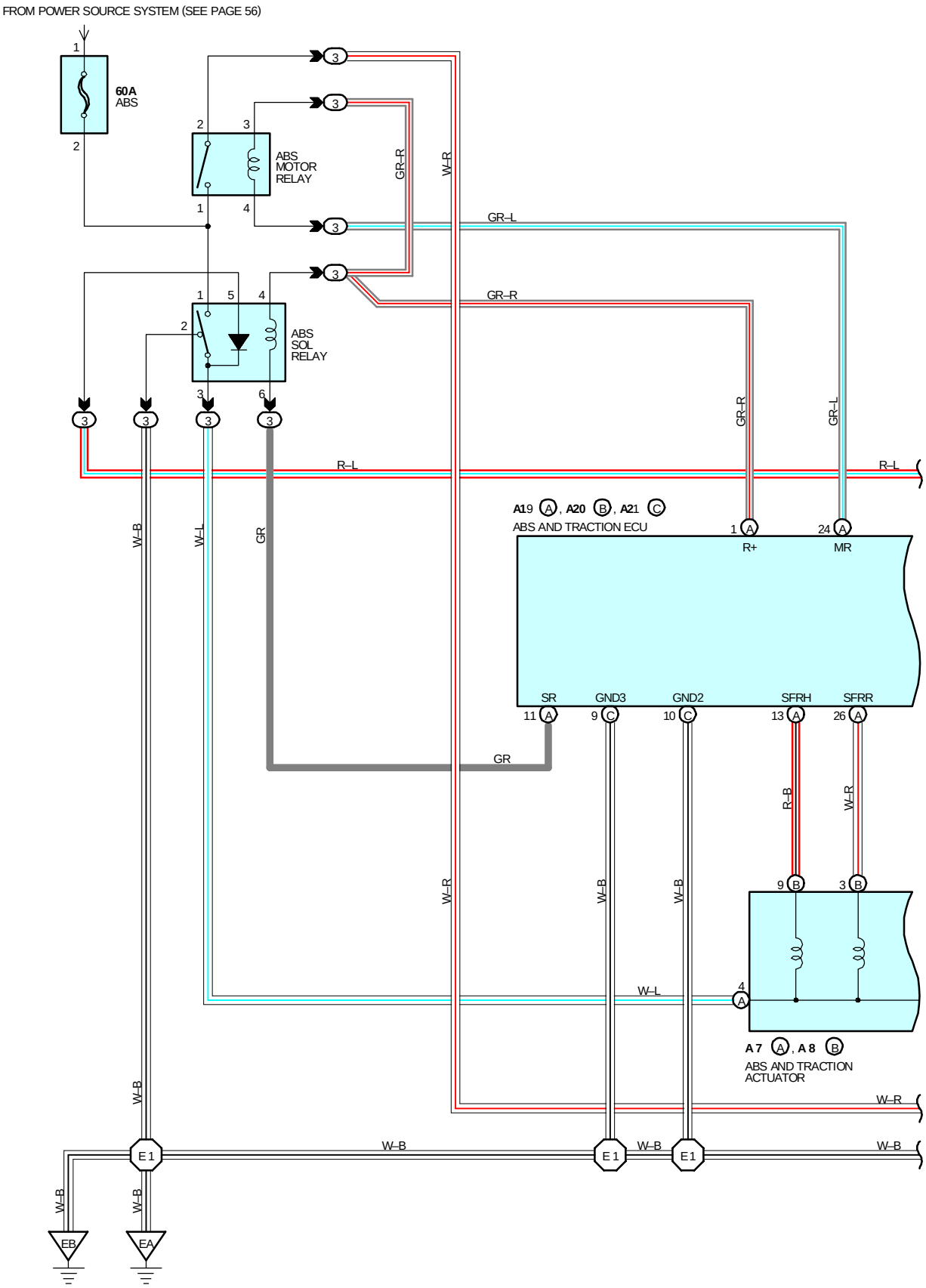
(HINT : SEE PAGE 7)

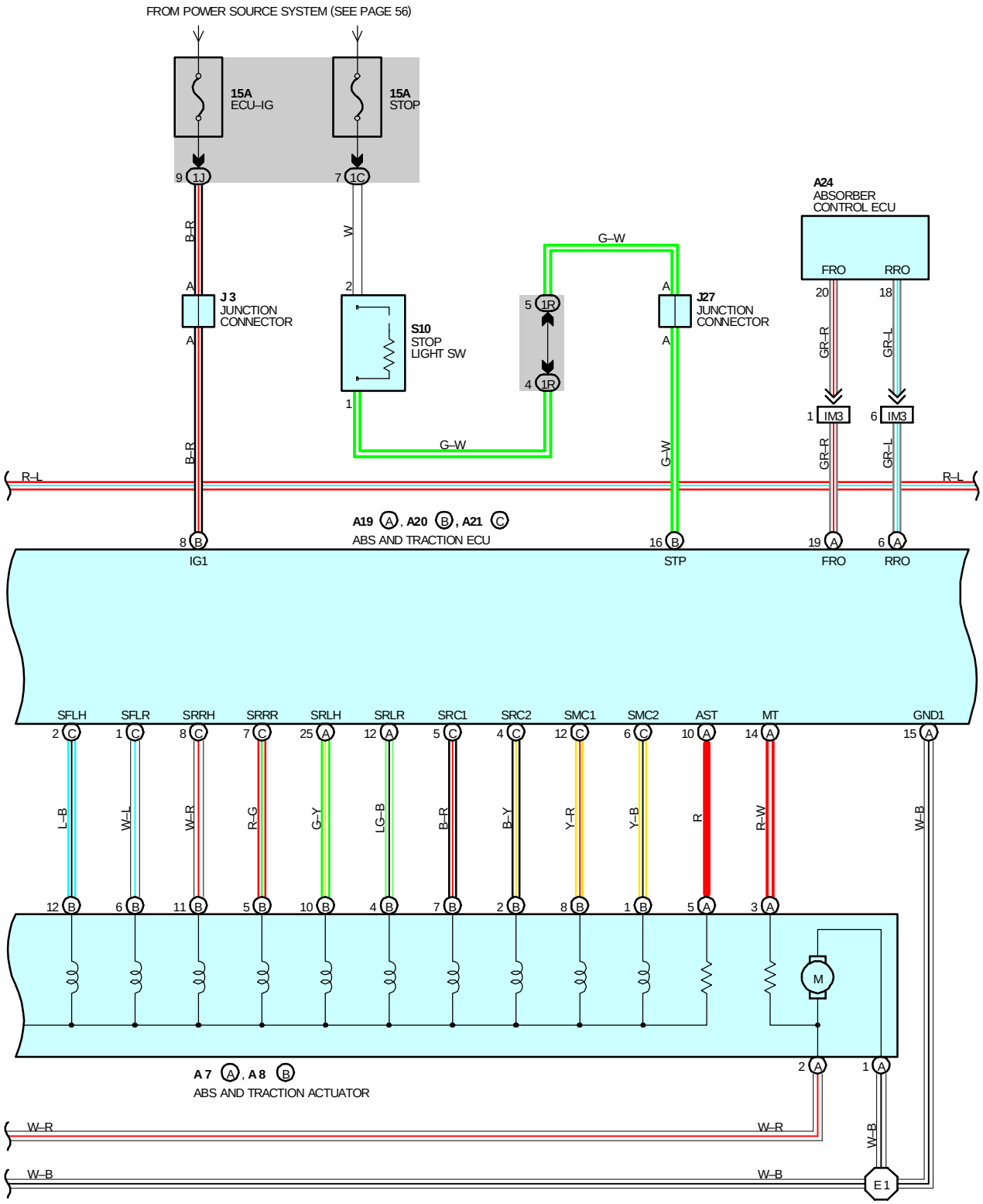
S6 GRAY



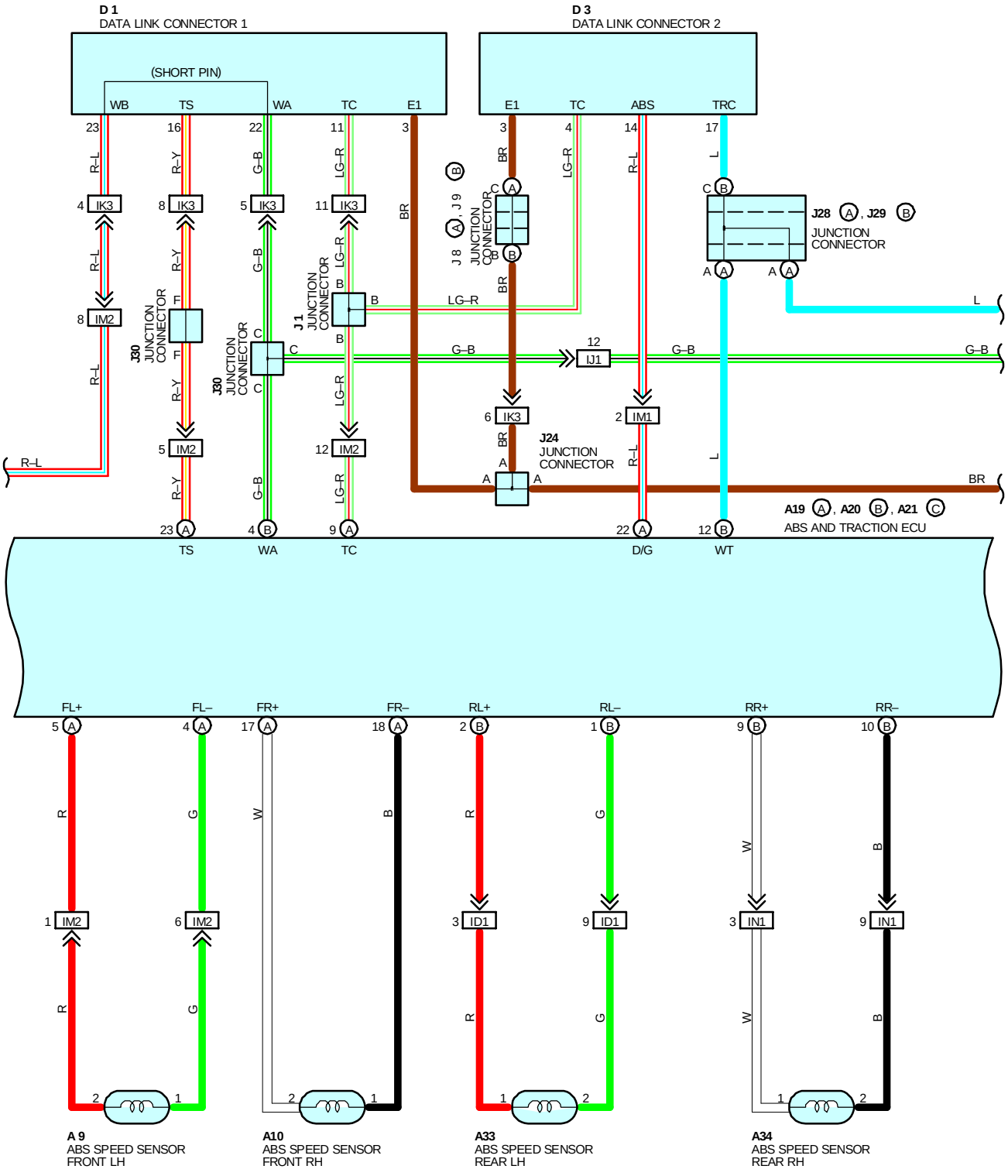
S10 BLUE

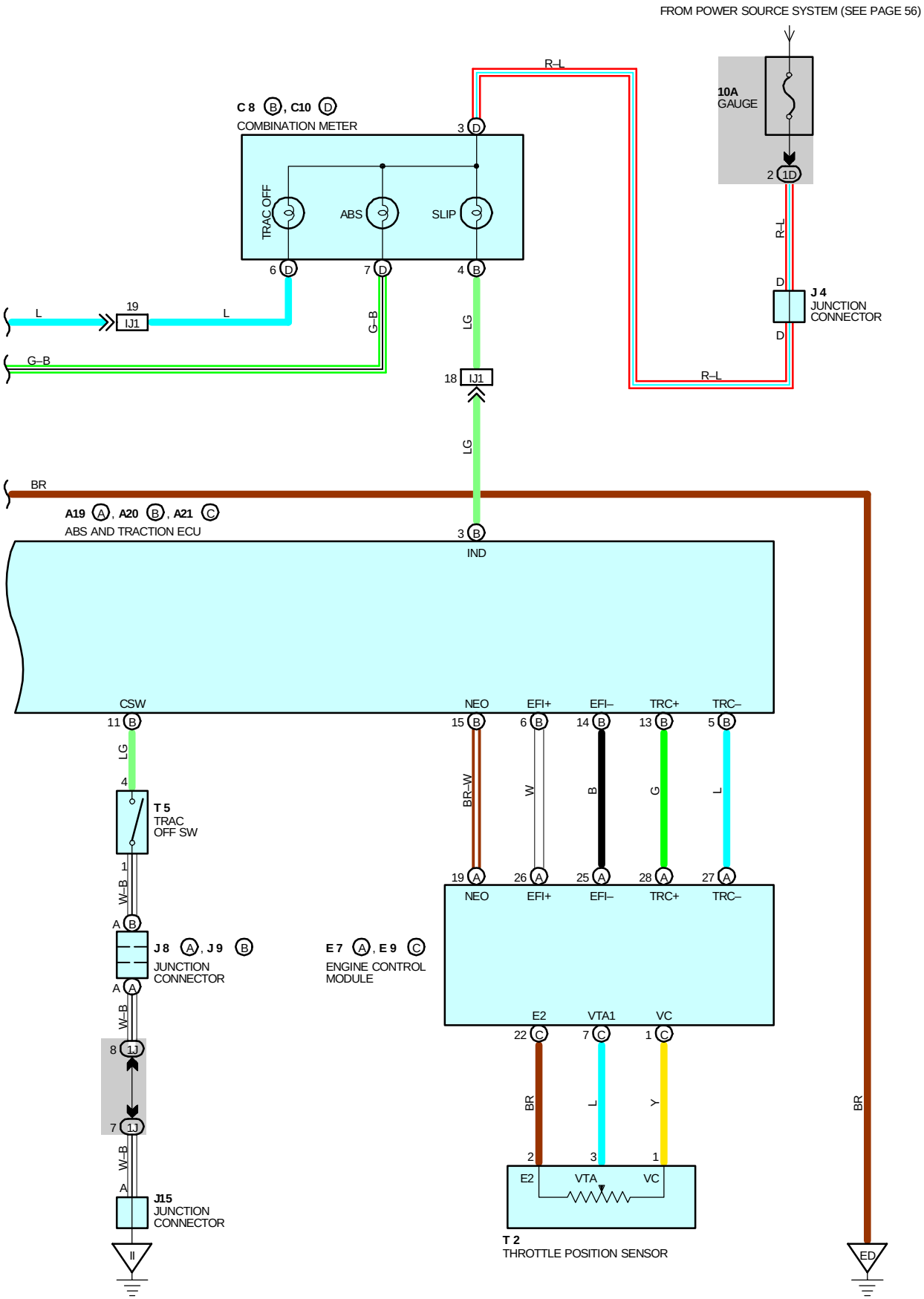



FROM POWER SOURCE SYSTEM (SEE PAGE 56)
60A
ABS
ABS
MOTOR
RELAY
ABS
SOL
RELAY
GR–R
W–R
GR–L
GR–R
R–L
W–B
W–L
GR
A19 A , A20 B , A21 C
ABS AND TRACTION ECU
R+
MR
SR
GND3
GND2
SFRH
SFRR
R–B
W–R
W–L
A7 A , A8 B
ABS AND TRACTION
ACTUATOR
E1
EB
EA


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
15A
ECU–IG
15A
STOP
9 1J
7 1C
B–R
W
A
J 3
JUNCTION
CONNECTOR
A
2
S10
STOP
LIGHT SW
1
G–W
5 1R
4 1R
G–W
A
J27
JUNCTION
CONNECTOR
A
A24
ABSORBER
CONTROL ECU
FRO
RRO
20
18
GR–R
GR–L
1 IM3
6 IM3
GR–R
GR–L
B–R
G–W
R–L
R–L
A19 A , A20 B , A21 C
ABS AND TRACTION ECU
8 B
IG1
16 B
STP
19 A
FRO
6 A
RRO
SFLH
SFLR
SRRH
SRRR
SRLH
SRLR
SRC1
SRC2
SMC1
SMC2
AST
MT
GND1
2 C
1 C
8 C
7 C
25 A
12 A
5 C
4 C
12 C
6 C
10 A
14 A
15 A
L–B
W–L
W–R
R–G
G–Y
LG–B
B–R
B–Y
Y–R
Y–B
R
R–W
W–B
12 B
6 B
11 B
5 B
10 B
4 B
7 B
2 B
8 B
1 B
5 A
3 A
M
A7 A , A8 B
ABS AND TRACTION ACTUATOR
2 A
1 A
W–R
W–R
W–B
W–B
W–B
E1

ABS AND TRACTION CONTROL




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A
GAUGE
2 1D
R–L
C 8 B, C10 D
COMBINATION METER
3 D
TRAC OFF
ABS
SLIP
6 D
7 D
4 B
L
19
IJ1
L
G–B
G–B
LG
18 IJ1
R–L
D
J 4
JUNCTION
CONNECTOR
D
LG
BR
A19 A, A20 B, A21 C
ABS AND TRACTION ECU
3 B
IND
CSW
11 B
LG
4
T 5
TRAC
OFF SW
1
W–B
A B
J 8 A, J 9 B
JUNCTION
CONNECTOR
A A
W–B
8 1J
7 1J
W–B
A
J15
JUNCTION
CONNECTOR
E7 A, E9 C
ENGINE CONTROL
MODULE
NEO
EFI+
EFI–
TRC+
TRC–
15 B
6 B
14 B
13 B
5 B
BR–W
W
B
G
L
19 A
26 A
25 A
28 A
27 A
NEO
EFI+
EFI–
TRC+
TRC–
E2
VTA1
VC
22 C
7 C
1 C
BR
L
Y
2
3
1
E2
VTA
VC
T 2
THROTTLE POSITION SENSOR
BR
ED

ABS AND TRACTION CONTROL

SYSTEM OUTLINE

(ABS)
ABS IS A BRAKE SYSTEM DESIGNED FOR THE PURPOSE TO IMPROVE THE OPERATING ABILITY SECURING THE STABILITY OF THE VEHICLE BY PREVENTING THE LOOKING–UP OF THE VEHICLE CONTROLLING THE WHEEL CYLINDER PRESSURE OF ALL THE FOUR WHEELS AT THE TIME OF SUDDEN BRAKING.

1. INPUT SIGNALS

(1) SPEED SENSOR SIGNAL
THE SPEED OF THE WHEELS IS DETECTED AND INPUT TO **TERMINALS FL+, FR+, RL+,** AND **RR+** OF THE ABS AND TRACTION ECU.

(2) STOP LIGHT SW SIGNAL
A SIGNAL IS INPUT TO **TERMINAL STP** OF THE ABS AND TRACTION ECU WHEN BRAKE PEDAL IS DEPRESSED.

2. SYSTEM OPERATION

WHEN THE WHEELS ARE TO BE LOCKED–UP, THE SOLENOID INSIDE THE ACTUATOR WILL BE CONTROLLED BY THE SIGNAL FROM THE ABS AND TRACTION ECU AND THE BRAKE FLUID IN THE WHEEL CYLINDER WILL FLOW THROUGH THE RESERVOIR AND REDUCE THE HYDRAULIC PRESSURE.
WHILE THE ABS IS IN OPERATION, AS THE ABS AND TRACTION ECU IS ALWAYS OUTPUTTING THE OPERATION SIGNAL TO THE PUMP INSIDE THE ACTUATOR, BRAKE FLUID STORED INSIDE THE RESERVOIR WILL BE SUCTIONED UP BY THE PUMP INSIDE THE ACTUATOR AND RETURNED TO THE MASTER CYLINDER.
WHEN THE HYDRAULIC PRESSURE OF THE WHEEL CYLINDER IS DECOMPRESSED OR INCREASED UNTIL THE NECESSARY HYDRAULIC PRESSURE, THE SOLENOID INSIDE THE ACTUATOR IS CONTROLLED BY THE CONTROL SIGNAL FROM THE ABS AND TRACTION ECU AND AS A RESULT, HYDRAULIC PRESSURE OF THE WHEEL CYLINDER WILL BE CLOSED AT BOTH ROUTES OF THE MASTER CYLINDER AND RESERVOIR SIDES AND THE HYDRAULIC PRESSURE OF THE WHEEL CYLINDER WILL BECOME TO BE IN THE HOLDING CONDITION.
IF THE INCREASE OF HYDRAULIC PRESSURE VOLUME OF THE WHEEL CYLINDER BECOMES NECESSARY, WITH THE CONTROL SIGNAL FROM THE ABS AND TRACTION ECU, THE SOLENOID INSIDE THE ACTUATOR WILL BE CONTROLLED AND BECOME THE SAME CONDITION AS USUAL AND THE BRAKE FLUID OF THE MASTER CYLINDER WILL BE SENT TO THE WHEEL CYLINDER AND WILL INCREASE THE HYDRAULIC PRESSURE OF THE WHEEL CYLINDER. AT THIS TIME, IN THE CASE THAT THE BRAKE FLUID STAYS LEFT IN THE RESERVOIR, IT WILL BE SUCTIONED UP BY THE PUMP INSIDE THE ACTUATOR AND WILL BE SENT TO THE WHEEL CYLINDER.
ALSO, INCREASING SPEED OF THE HYDRAULIC PRESSURE IS CONTROLLED BY OUTPUTTING THE INCREASING AND THE SAID HOLDING ONE AFTER ANOTHER.
(TRACTION CONTROL)
TRACTION CONTROL SYSTEM IS DESIGNED TO PERFORM THE ENGINE OUTPUT CONTROL BY THE FUEL CUT AND HYDRAULIC PRESSURE CONTROL OF DRIVING WHEEL BRAKE AND CONTROL THE SPINNING OF THE DRIVING WHEELS. BY DOING THIS, IT IMPROVES STARTING ACCELERATION AND OPERATING ABILITY OF THE VEHICLE SECURING THE DRIVING ABILITY IN ACCORDANCE WITH THE ROAD SURFACE CONDITION.

3. TRACTION CONTROL OPERATION

ESTIMATING THE VEHICLE SPEED FROM THE REAR WHEEL SPEED, COMPARING IT WITH THE FRONT, DRIVING WHEEL SPEED AND JUDGING THE GRIP CONDITION OF THE DRIVING WHEELS. FROM THE ESTIMATED VEHICLE SPEED, TARGET SPEED OF THE DRIVING SPEED WILL BE SET. WHEN THE FRONT, DRIVING WHEEL SPEED EXCEEDS THE CONTROL STARTING SPEED, IT JUDGES THAT THE TIRE SLIP IS OCCURRED AND PERFORMS THE FUEL CUT CYLINDER NUMBER CONTROL AND BRAKE CONTROL AND THEN ADJUST TO MAKE THE FRONT WHEEL SPEED BECOME THE TRACTION CONTROL TARGET SPEED. CONTROLLING OF THE TRACTION CONTROL WILL BE COMPLETED WHEN THE VEHICLE MOVE ONTO THE ROAD WHERE THE DRIVING WHEELS WILL NOT HAVE A TIRE SLIP OR WHEN THE DRIVER DECELERATE.

SERVICE HINTS

A19 Ⓐ, A20 Ⓑ,A21 Ⓒ ABS AND TRACTION ECU

IG1 – GND : **10–14** VOLTS WITH IGNITION SW AT **ON** POSITION
R+ – SR : **9–14** VOLTS WITH IGNITION SW AT **ON** POSITION AND ABS WARNING LIGHT OFF
R+ – MR : **0–1** VOLTS WITH IGNITION SW AT **ON** POSITION
WA – GND : **0–2** VOLTS WITH IGNITION SW AT **ON** POSITION AND ABS WARNING LIGHT ON
: **10–14** VOLTS WITH IGNITION SW AT **ON** POSITION AND ABS WARNING LIGHT OFF
STP – GND : **0–1.5** VOLTS WITH STOP LIGHT SW OFF
: **8–14** VOLTS WITH STOP LIGHT SW ON
D/G – GND : **10–14** VOLTS WITH IGNITION SW AT **ON** POSITION AND ABS WARNING LIGHT ON
MT – GND : **0–1.5** VOLTS WITH IGNITION SW AT **ON** POSITION
NEO – GND : PULES GENERATION WITH IDLING
IND – GND : **0–2** VOLTS WITH IGNITION SW AT **ON** POSITION AND SLIP INDICATOR LIGHT ON
: **10–14** VOLTS WITH IGNITION SW AT **ON** POSITION AND SLIP INDICATOR LIGHT OFF
WT – GND : **0–2** VOLTS WITH IGNITION SW AT **ON** POSITION AND TRAC OFF INDICATOR LIGHT ON
; **10–14** VOLTS WITH IGNITION SW AT **ON** POSITION AND TRAC OFF INDICATOR LIGHT OFF
CSW – GND : **0–2** VOLTS WITH IGNITION SW AT **ON** POSITION AND TRAC OFF SW PUSHED
: **8–14** VOLTS WITH IGNITION SW AT **ON** POSITION AND TRAC OFF SW RELEASED
TC, TS – GND : **8–14** VOLTS WITH IGNITION SW AT **ON** POSITION
TRC+, TRC– – GND : PULES GENERATION WITH TRACTION CONTROL ACTIVE
EFI+, ERI– – GND : PULES GENERATION WITH IGNITION SW AT **ON** POSITION
SRLH, SRLH, AST – GND : **10–14** VOLTS WITH IGNITION SW AT **ON** POSITION AND WARNING LIGHT OFF
SFLH, SRRR, SRRH – GND : **10–14** VOLTS WITH IGNITION SW AT **ON** POSITION AND WARNING LIGHT OFF
SFRR, SFRH, SFLR – GND : **10–14** VOLTS WITH IGNITION SW AT **ON** POSITION AND WARNING LIGHT OFF
SRC1, SRC2, SMC1, SMC2 – GND : **10–14** VOLTS WITH IGNITION SW AT **ON** POSITION AND TRAC OFF INDICATOR LIGHT OFF

S10 STOP LIGHT SW

2–1 : CLOSED WITH BRAKE PEDAL DEPRESSED

A 9, A10, A34, A35 ABS SPEED SENSOR FRONT LH, RH, REAR LH, RH

1–2 : **1.5–1.7** KΩ (**20**°C **68**°F)

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A 7 A	26	C 8 B	28	J 9 B	29
A 8 B	26	C10 D	28	J15	29
A 9	26	D 1	26	J24	29
A10	26	D 3	28	J27	29
A19 A	28	E 7 A	28	J28 A	29
A20 B	28	E 9 C	28	J29 B	29
A21 C	28	J 1	29	J30	29
A24	28	J 3	29	S10	29
A33	30	J 4	29	T 2	27
A34	30	J 8 A	29	T 5	29

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
3	23	ENGINE ROOM NO.3 R/B (RADIATOR UPPER SUPPORT RH)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1R		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
ID1	36	FLOOR WIRE AND COWL (LEFT KICK PANEL)
IJ1	38	INSTRUMENT PANEL WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK3	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IH1	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IM2		
IM3		
IN1	38	FLOOR NO. 2 WIRE AND COWL WIRE (RIGHT KICK PANEL)

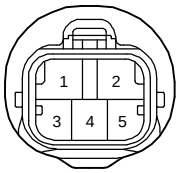
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	RIGHT RADIATOR SIDE SUPPORT
EB		
ED	34	SURGE TANK RH
II	36	INSTRUMENT PANEL BRACE LH

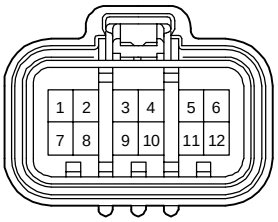
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 1	34	ENGINE ROOM MAIN WIRE			

A 7 (A) GRAY



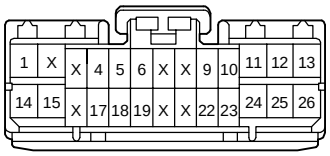
A 8 (B) BLACK



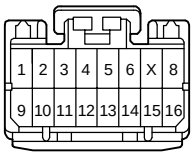
A 9 GRAY

A10 GRAY

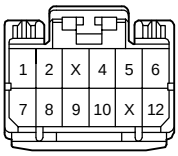
A19 (A)



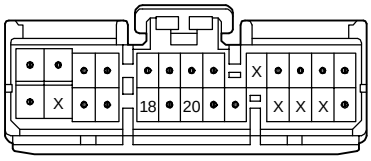
A20 (B)



A21 (C)



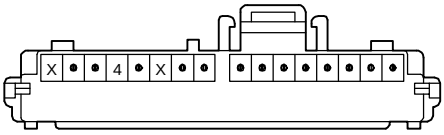
A24 GRAY



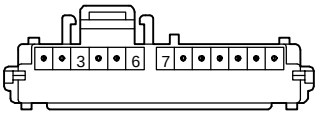
A33 GRAY

A34 GRAY

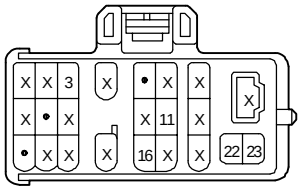
C 8 (B)



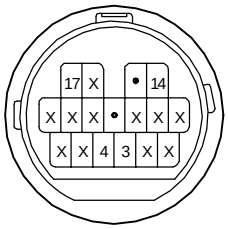
C10 (D) BROWN



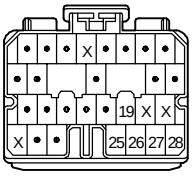
D1 BLACK



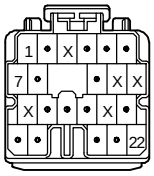
D3 DARK GRAY



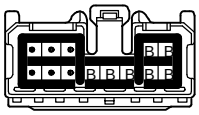
E7 (A)



E9 (C)

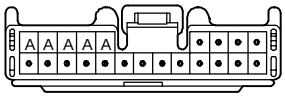


J1 GRAY



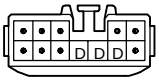
(HINT : SEE PAGE 7)

J3



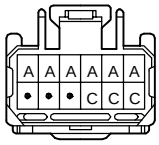
(HINT : SEE PAGE 7)

J4 BLACK



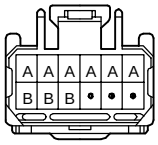
(HINT : SEE PAGE 7)

J8 (A) GRAY



(HINT : SEE PAGE 7)

J9 (B) GRAY



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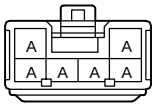
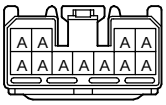
J15



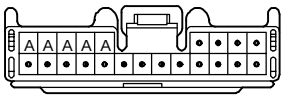
(HINT : SEE PAGE 7)

J24



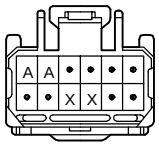
(HINT : SEE PAGE 7)

J27



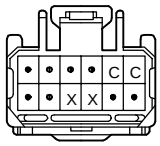
(HINT : SEE PAGE 7)

J28 (A)



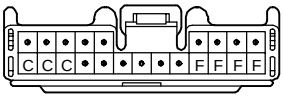
(HINT : SEE PAGE 7)

J29 (B)



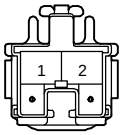
(HINT : SEE PAGE 7)

J30



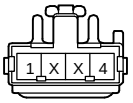
(HINT : SEE PAGE 7)

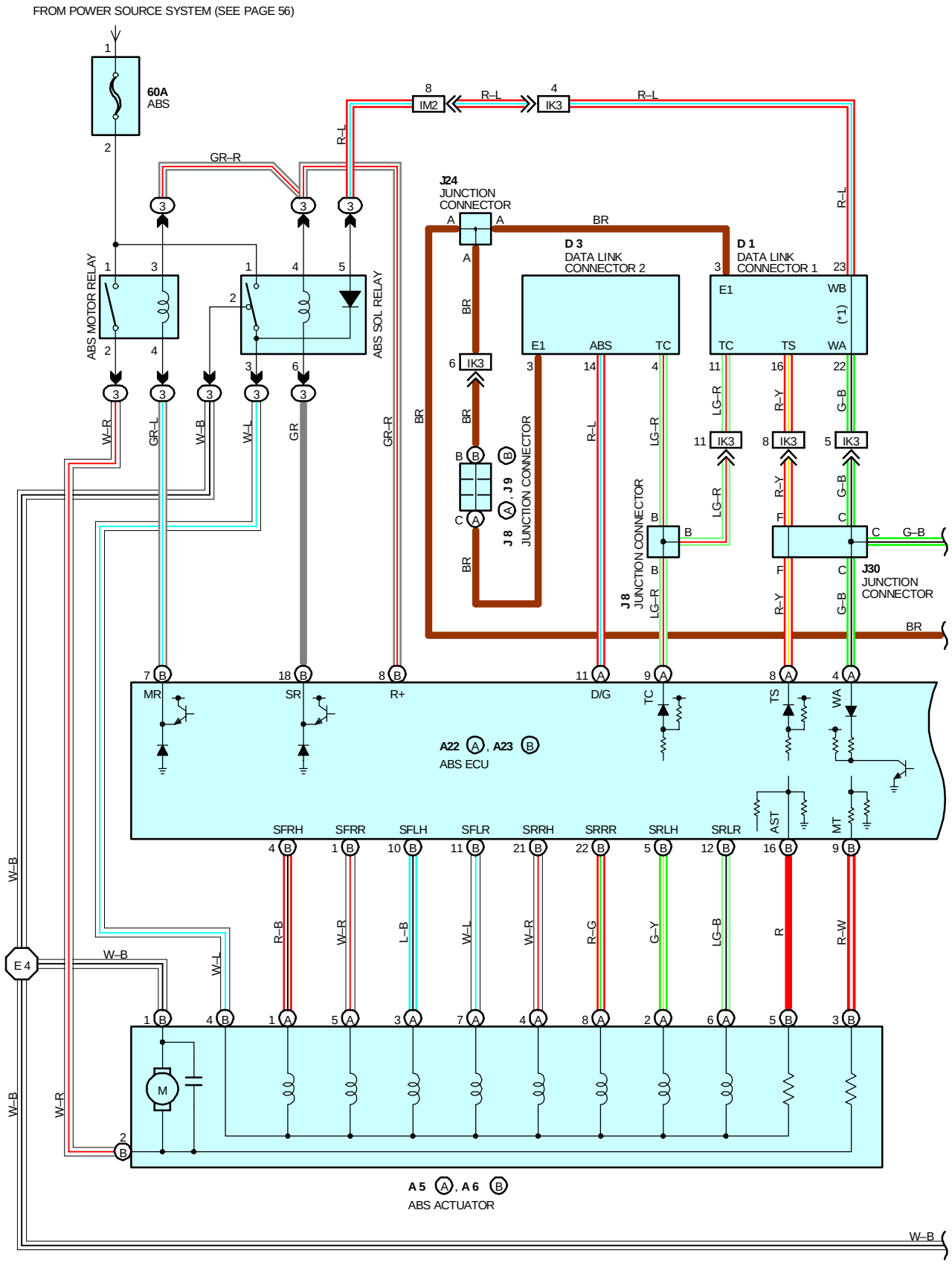
S10 BLUE

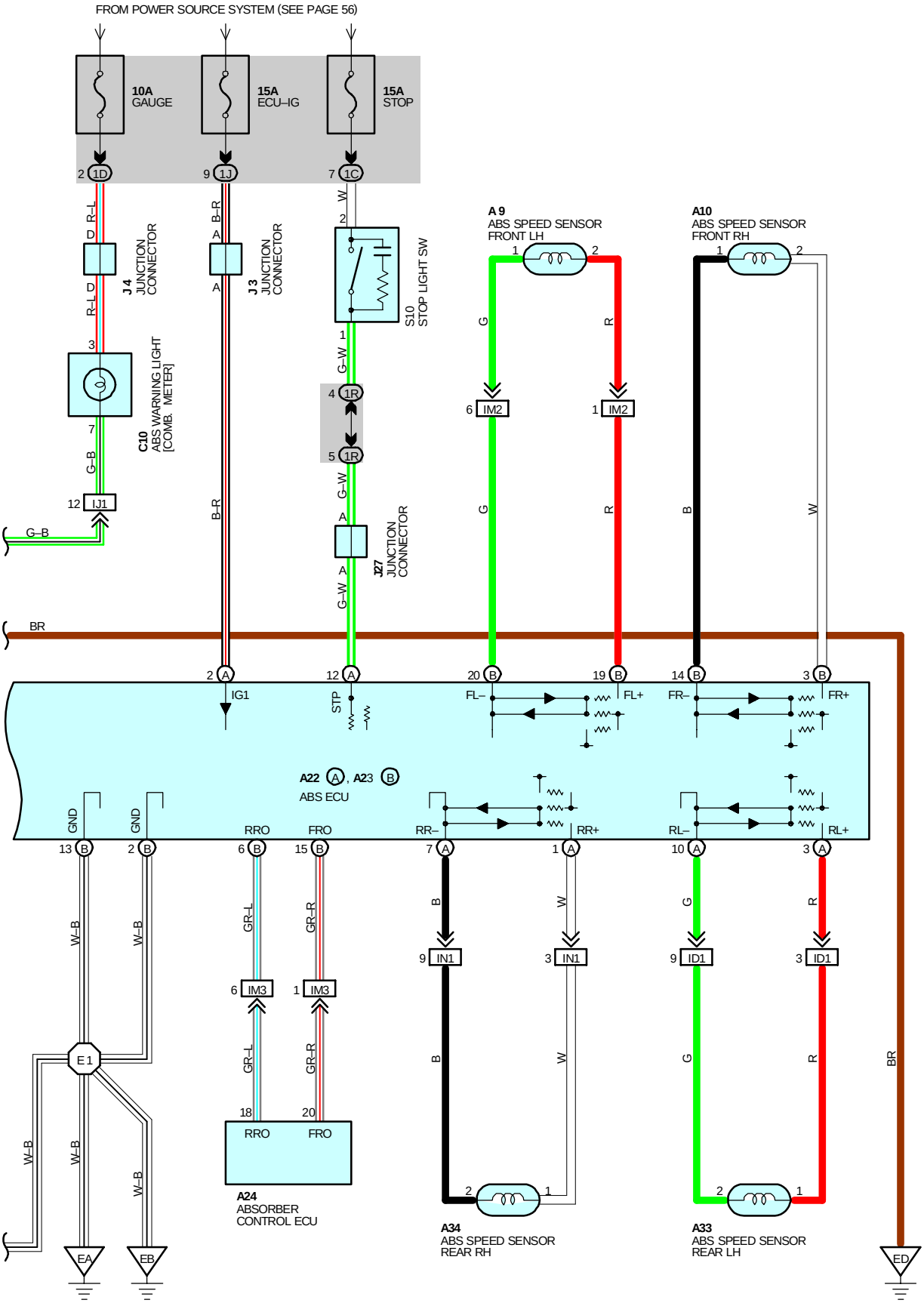


T2 BLACK

T5 BLACK




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
60A
ABS
IM2
IK3
R–L
GR–R
J24
JUNCTION
CONNECTOR
BR
D 3
DATA LINK
CONNECTOR 2
D 1
DATA LINK
CONNECTOR 1
E1
WB
(*1)
ABS
TC
TS
WA
ABS MOTOR RELAY
ABS SOL RELAY
W–R
GR–L
W–B
W–L
GR
GR–R
J 8 , J 9
JUNCTION CONNECTOR
LG–R
R–Y
G–B
J 8
JUNCTION CONNECTOR
J30
JUNCTION
CONNECTOR
MR
SR
R+
D/G
TC
TS
WA
A22 , A23
ABS ECU
AST
MT
SFRH
SFRR
SFLH
SFLR
SRRH
SRRR
SRLH
SRLR
R–B
W–R
L–B
W–L
R–G
G–Y
LG–B
R
R–W
E 4
M
A5 , A6
ABS ACTUATOR


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
10A GAUGE
15A ECU–IG
15A STOP
2 1D
9 1J
7 1C
J4 JUNCTION CONNECTOR
J3 JUNCTION CONNECTOR
S10 STOP LIGHT SW
C10 ABS WARNING LIGHT [COMB. METER]
12 1J1
J27 JUNCTION CONNECTOR
A9 ABS SPEED SENSOR FRONT LH
A10 ABS SPEED SENSOR FRONT RH
6 IM2
1 IM2
BR
2 A IG1
12 A STP
20 B FL–
19 B FL+
14 B FR–
3 B FR+
A22 A, A23 B ABS ECU
GND
GND
RRO
FRO
RR–
RR+
RL–
RL+
13 B
2 B
6 B
15 B
7 A
1 A
10 A
3 A
6 IM3
1 IM3
9 IN1
3 IN1
9 ID1
3 ID1
E1
18 RRO
20 FRO
A24 ABSORBER CONTROL ECU
A34 ABS SPEED SENSOR REAR RH
A33 ABS SPEED SENSOR REAR LH
EA
EB
ED

ABS

SYSTEM OUTLINE

THIS SYSTEM CONTROLS THE RESPECTIVE BRAKE FLUID PRESSURES ACTING ON THE DISC BRAKE CYLINDERS OF THE RIGHT FRONT WHEEL, LEFT FRONT WHEEL AND REAR WHEELS WHEN THE BRAKES ARE APPLIED IN A PANIC STOP SO THAT THE WHEELS DO NOT LOCK. THIS RESULTS IN IMPROVED DIRECTIONAL STABILITY AND STEERABILITY DURING PANIC BRAKING.

1. INPUT SIGNALS

(1) SPEED SENSOR SIGNAL
THE SPEED OF THE WHEELS IS DETECTED AND INPUT TO **TERMINALS FL+, FR+, RL+** AND **RR+** OF THE ABS ECU.

(2) STOP LIGHT SW SIGNAL
A SIGNAL IS INPUT TO **TERMINAL STP** OF THE ABS ECU WHEN BRAKE PEDAL IS OPERATED.

2. SYSTEM OPERATION

DURING SUDDEN BRAKING THE ABS ECU, WHICH HAS SIGNALS INPUT FROM EACH SENSOR, CONTROLS THE CURRENT FLOWING TO THE SOLENOID INSIDE THE ACTUATOR AND LETS THE HYDRAULIC PRESSURE ACTING ON EACH WHEEL CYLINDER ESCAPE TO THE RESERVOIR. THE PUMP INSIDE THE ACTUATOR IS ALSO OPERATING AT THIS TIME AND IT RETURNS THE BRAKE FLUID FROM THE RESERVOIR TO THE MASTER CYLINDER, THUS PREVENTING LOCKING OF THE VEHICLE WHEELS.
IF THE ECU JUDGES THAT THE HYDRAULIC PRESSURE ACTING ON THE WHEEL CYLINDER IS INSUFFICIENT, THE CURRENT ACTING ON THE SOLENOID IS CONTROLLED AND THE HYDRAULIC PRESSURE IS INCREASED. HOLDING OF THE HYDRAULIC PRESSURE IS ALSO CONTROLLED BY THE ECU, BY THE SAME METHOD AS ABOVE. PRESSURE REDUCTION, HOLDING AND INCREASE ARE REPEATED TO MAINTAIN VEHICLE STABILITY AND TO IMPROVE STEERABILITY DURING SUDDEN BRAKING.

SERVICE HINTS

A22 Ⓐ, A23 Ⓑ ABS ECU
(CONNECT THE ECU CONNECTOR)

Ⓑ 2–GROUND : ALWAYS CONTINUITY
Ⓑ13–GROUND : ALWAYS CONTINUITY
Ⓐ 2–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
Ⓐ12–GROUND : APPROX. **12** VOLTS WITH THE BRAKE PEDAL DEPRESSED

A 6 Ⓑ ABS ACTUATOR
1–GROUND : ALWAYS CONTINUITY

S10 STOP LIGHT SW
2–1 : CLOSED WITH THE BRAKE PEDAL DEPRESSED

○ : PARTS LOCATION

CODE		SEE PAGE	CODE	SEE PAGE	CODE		SEE PAGE
A 5	A	26	A33	30	J 8	A	29
A 6	B	26	A34	30	J 9	B	29
A 9		26	C10	28	J24		29
A10		26	D 1	26	J27		29
A22	A	28	D 3	28	J30		29
A23	B	28	J 3	29	S10		29
A24		28	J 4	29			

▭ : RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
3	23	ENGINE ROOM NO. 3 R/B (RADIATOR UPPER SUPPORT RH)

▭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1C	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1R		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

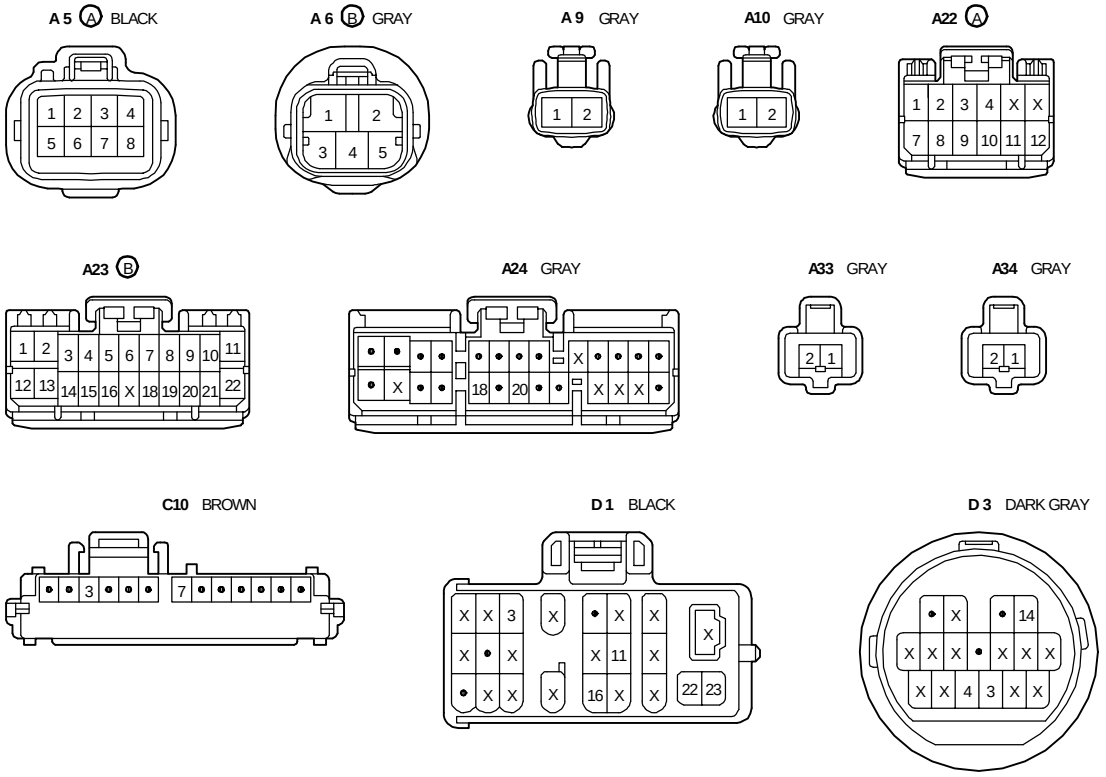
CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
ID1	36	FLOOR WIRE AND COWL WIRE (LEFT KICK PANEL)
IJ1	38	INSTRUMENT PANEL WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK3	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM2	38	RIGHT RADIATOR SIDE SUPPORT
IM3		ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IN1	38	FLOOR NO. 2 WIRE AND COWL WIRE (RIGHT KICK PANEL)

: GROUND POINTS

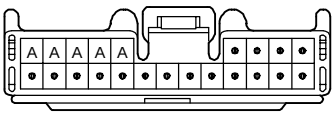
CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	RIGHT RADIATOR SIDE SUPPORT
EB		
ED	34	SURGE TANK RH

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 1	34	ENGINE ROOM MAIN WIRE			

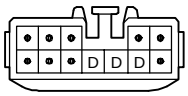


J3



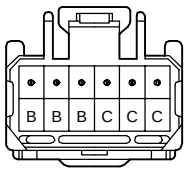
(HINT : SEE PAGE 7)

J4 BLACK



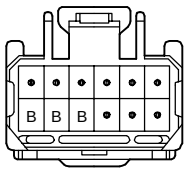
(HINT : SEE PAGE 7)

J8 (A) GRAY



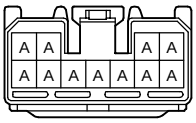
(HINT : SEE PAGE 7)

J9 (B) GRAY



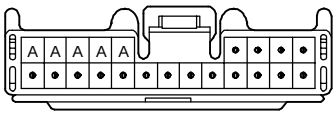
(HINT : SEE PAGE 7)

J24



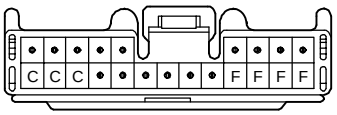
(HINT : SEE PAGE 7)

J27



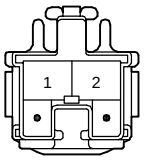
(HINT : SEE PAGE 7)

J30



(HINT : SEE PAGE 7)

S10 BLUE

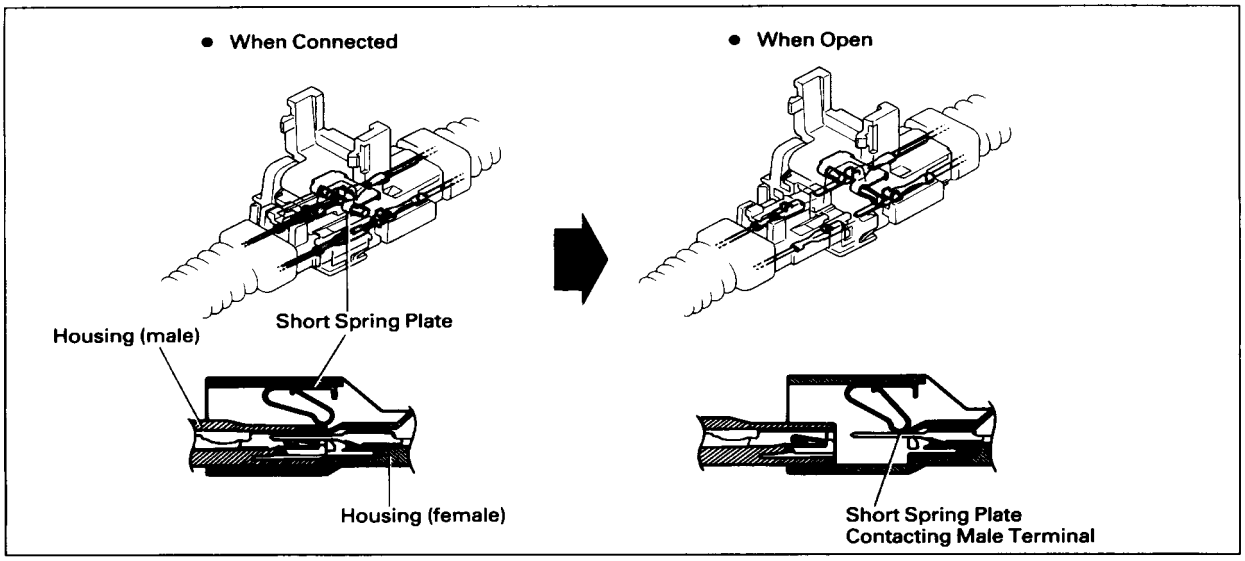


NOTICE: When inspecting or repairing the SRS, perform the operation in accordance with the following precautionary instructions and the procedure and precautions in the Repair Manual for the applicable model year.

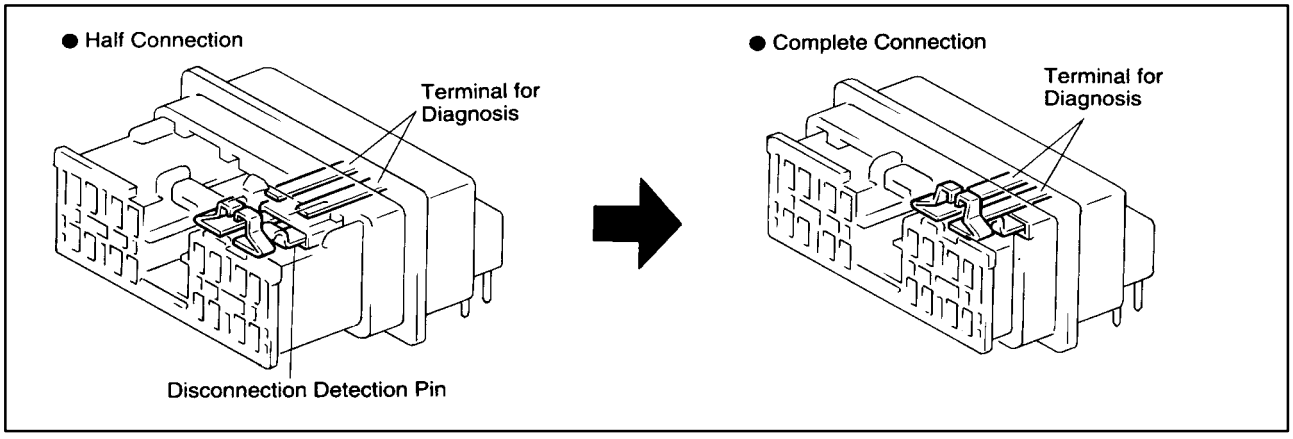
- Malfunction symptoms of the SRS are difficult to confirm, so the DTCs become the most important source of information when troubleshooting. When troubleshooting the SRS, always inspect the DTCs before disconnecting the battery.
- **Work must be started after 90 seconds from when the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.**
  (The SRS is equipped with a back–up power source so that if work is started within 90 seconds of disconnecting the negative (–) terminal cable of the battery, the SRS may be deployed.)
  When the negative (–) terminal cable is disconnected from the battery, the memory of the clock and audio system will be canceled. So before starting work, make a record of the contents memorized by the audio memory system. When work is finished, reset the audio systems as before and adjust the clock. To avoid erasing the memory of each memory system, never use a back–up power supply from outside the vehicle.
- Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, and airbag sensor assembly should be inspected.
- Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
- Never disassemble and repair the steering wheel pad, front passenger airbag assembly, or airbag sensor assembly in order to reuse it.
- If the steering wheel pad, front passenger airbag assembly or airbag sensor assembly has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
- Do not expose the steering wheel pad, front passenger airbag assembly, or airbag sensor assembly directly to hot air or flames.
- Use a volt/ohmmeter with a high impedance (10 kΩ/V minimum) for troubleshooting the system's electrical circuits.
- Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.
- After work on the SRS is completed, check the SRS warning light.
- If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section of the Repair Manual.

The SRS has connectors which possess the functions described below:

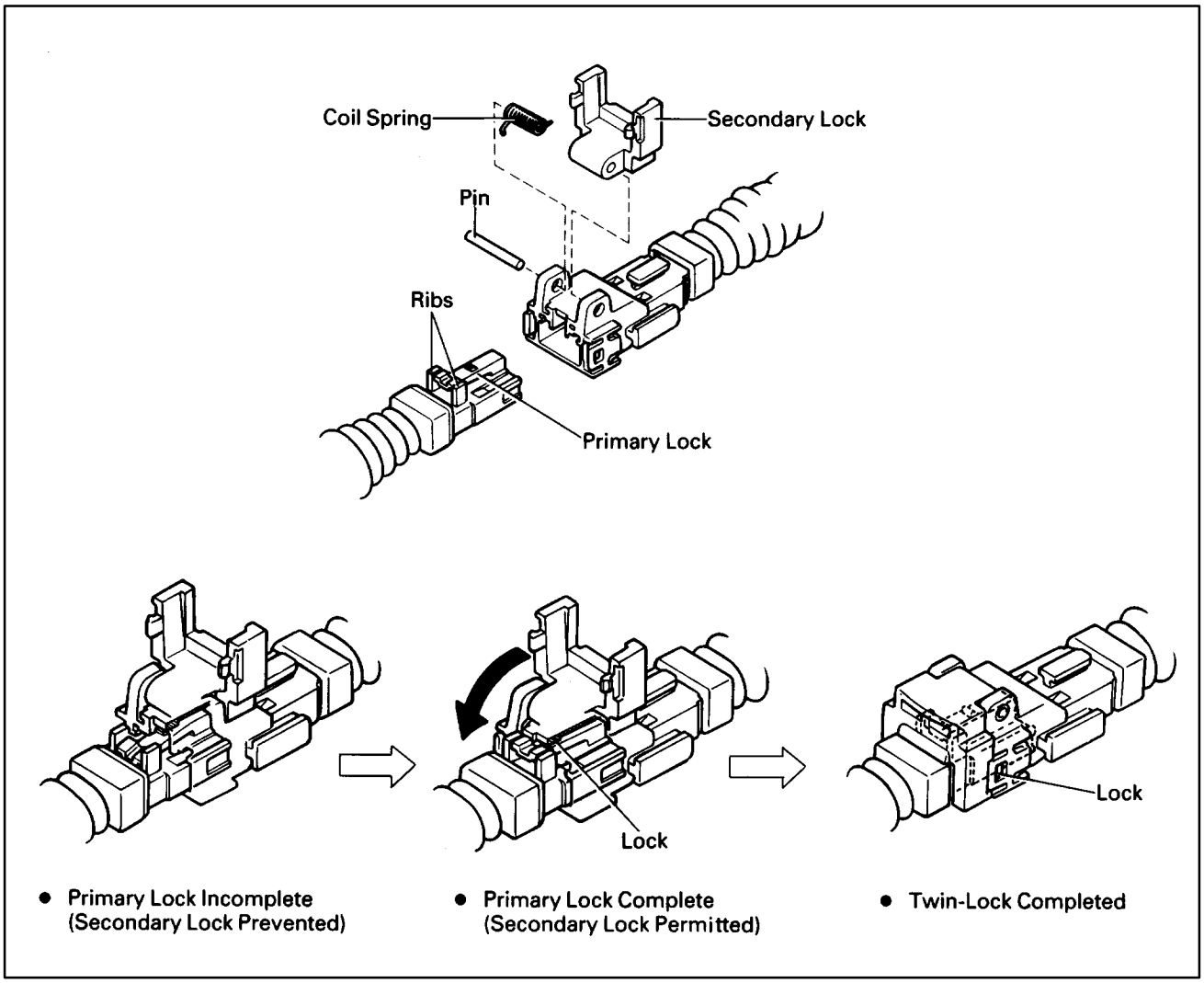
1. SRS ACTIVATION PREVENTION MECHANISM
   Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects the power source and grounding terminals of the squib to preclude a potential difference between the terminals.

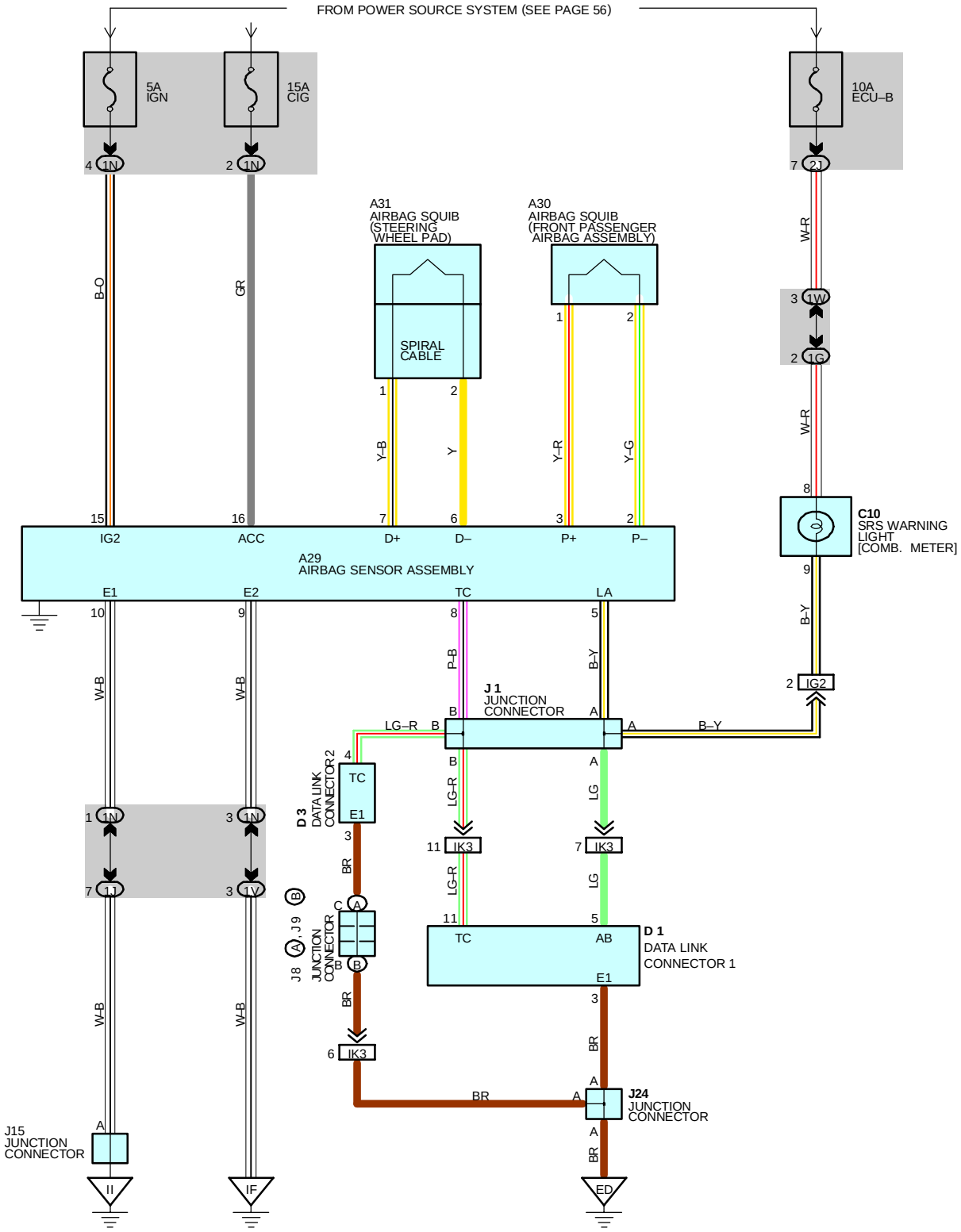


2. ELECTRICAL CONNECTION CHECK MECHANISM
   This mechanism is designed to electrically check if connectors are connected correctly and completely.
   The electrical connection check mechanism is designed so that the connection detection pin connects with the diagnosis terminals when the connector housing lock is in the locked condition.



3. CONNECTOR TWIN–LOCK MECHANISM
With this mechanism connectors (male and female connectors) are locked by two locking devices to increase connection reliability. If the primary lock is incomplete, ribs interfere and prevent the secondary lock.




FROM POWER SOURCE SYSTEM (SEE PAGE 56)
5A IGN
15A CIG
10A ECU–B
A31 AIRBAG SQUIB (STEERING WHEEL PAD)
A30 AIRBAG SQUIB (FRONT PASSENGER AIRBAG ASSEMBLY)
SPIRAL CABLE
C10 SRS WARNING LIGHT [COMB. METER]
A29 AIRBAG SENSOR ASSEMBLY
IG2
ACC
D+
D–
P+
P–
E1
E2
TC
LA
J1 JUNCTION CONNECTOR
D3 DATA LINK CONNECTOR 2
D1 DATA LINK CONNECTOR 1
J8, J9 JUNCTION CONNECTOR
J24 JUNCTION CONNECTOR
J15 JUNCTION CONNECTOR
B-O
GR
W-R
Y-B
Y
Y-R
Y-G
B-Y
W-B
P-B
LG-R
LG
BR

SYSTEM OUTLINE

THE SRS IS A DRIVER AND PASSENGER PROTECTION DEVICE WHICH HAS A SUPPLEMENTAL ROLE TO THE SEAT BELTS. WHEN THE IGNITION SW IS TURNED TO ACC OR ON, CURRENT FROM THE **CIG** FUSE FLOWS TO **TERMINAL 16** OF THE AIRBAG SENSOR ASSEMBLY. ONLY WHEN THE IGNITION SW IS ON DOES THE CURRENT FROM THE **IGN** FUSE TO **TERMINAL 15.** IF AN ACCIDENT OCCURS WHILE DRIVING, WHEN THE FRONTAL IMPACT EXCEEDS A SET LEVEL, CURRENT FROM THE **CIG** OR **IGN** FUSE FLOWS TO **TERMINALS 7 AND 3** OF THE AIRBAG SENSOR ASSEMBLY → **TERMINAL 1** OF THE AIRBAG SQUIBS → **TERMINAL 2** → **TERMINAL 6** AND **2** OF THE AIRBAG SENSOR ASSEMBLY → **TERMINAL 9** OR **TERMINAL 10** OR **BODY GROUND** → **GROUND,** SO THAT THE CURRENT FLOWS TO THE AIRBAG SQUIBS AND CAUSES IT TO OPERATE.
THE AIRBAG STORED INSIDE THE STEERING WHEEL PAD IS INSTANTANEOUSLY EXPANDED TO SOFTEN THE SHOCK TO THE DRIVER. THE AIRBAG STORED INSIDE THE PASSENGER'S INSTRUMENT PANEL IS INSTANTANEOUSLY EXPANDED TO SOFTEN THE SHOCK TO THE PASSENGER.

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A29	28	D 1	26	J 9 B	29
A30	28	D 3	28	J15	29
A31	28	J 1	29	J24	29
C10	28	J 8 A	29		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1G	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1N		
1V		
1W		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

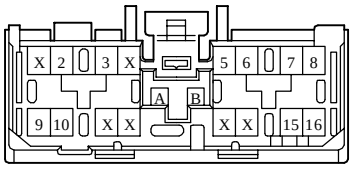
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IG2	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTUMENT PANEL J/B)
IK3	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)

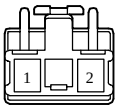
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
ED	34	SURGE TANK RH
IF	36	COWL SIDE PANEL LH
II	36	INSTRUMENT PANEL BRACE LH

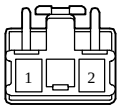
A29 YELLOW



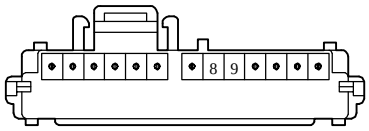
A30 YELLOW



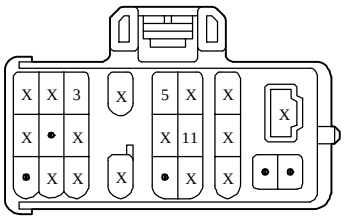
A31 YELLOW



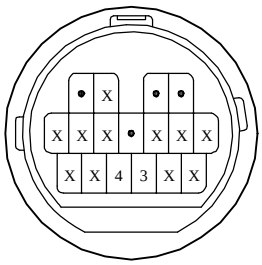
C10 BROWN



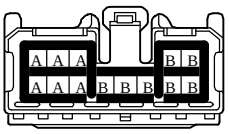
D 1 BLACK



D 3 DARK GRAY

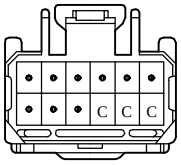


J 1 GRAY



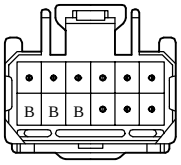
(HINT : SEE PAGE 7)

J 8 (A) GRAY



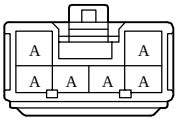
(HINT : SEE PAGE 7)

J 9 (B) GRAY



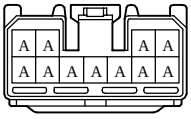
(HINT : SEE PAGE 7)

J15



(HINT : SEE PAGE 7)

J24



(HINT : SEE PAGE 7)

SYSTEM OUTLINE

CURRENT IS APPLIED AT ALL TIMES THROUGH THE **POWER** FUSE TO **TERMINAL 5** OF THE POWER RELAY. WITH THE IGNITION SW TURNED ON, THE CURRENT FLOWS THROUGH THE **GAUGE** FUSE → **TERMINAL 7** OF THE INTEGRATION RELAY → **TERMINAL Ⓐ 3** → **TERMINAL 1** OF THE POWER RELAY → **TERMINAL 2** → **GROUND.**
AS A RESULT, POWER RELAY IS ACTIVATED AND THE CURRENT TO **TERMINAL 5** OF THE POWER RELAY FLOWS FORM **TERMINAL 3** OF THE POWER RELAY TO **TERMINAL 4** OF THE MOON ROOF CONTROL SW AND MOON ROOF CONTROL RELAY.

1. SLIDE OPEN OPERATION

WHEN TURNING THE SLIDE OPEN SW “ON” WITH THE ROOF CLOSED, THE MOON ROOF CONTROL SW AND MOON ROOF CONTROL RELAY WILL MAKE THE MOTOR ROTATE TO THE “OPEN” DIRECTION UNTIL THEY BECOME ANY OF THE FOLLOWING CONDITIONS SUCH AS THE TERMINAL IG BECOMES “OFF” OR ANY OF THE SWS IS TURNED “ON” OR THE TIME LIMIT (ABOUT 20 SECONDS) IS UP OR THE CURRENT GOES UP THE UPPER LIMIT (ABOUT 17 AMPERE).

2. SLIDE CLOSE OPERATION

WHEN TURNING THE SLIDE CLOSE SW (TILT UP) “ON” WITH THE ROOF OPEN, THE MOON ROOF CONTROL SW AND MOON ROOF CONTROL RELAY WILL MAKE THE MOTOR ROTATE TO THE “CLOSE” DIRECTION UNTIL THEY BECOME HALF POSITION (LS1 SW TURNS FROM “ON” TO “OFF”). UNDER THE CONDITION WITH THE ROOF HALF CLOSED, WHEN TURNING THE SLIDE CLOSE SW (TILT UP) “ON” AGAIN, THEY WILL MAKE THE MOTOR ROTATE UNTIL THE ROOF IS COMPLETELY CLOSED.

3. TILT UP OPERATION

WITH THE ROOF CLOSED, WHEN THE TILT UP SWITCH IS PUSHED ON, THE MOON ROOF CONTROL SW AND MOON ROOF CONTROL RELAY DRIVES THE MOTOR IN DIRECTION OF UP (LS1 SW OFF, LS2 SW OFF).

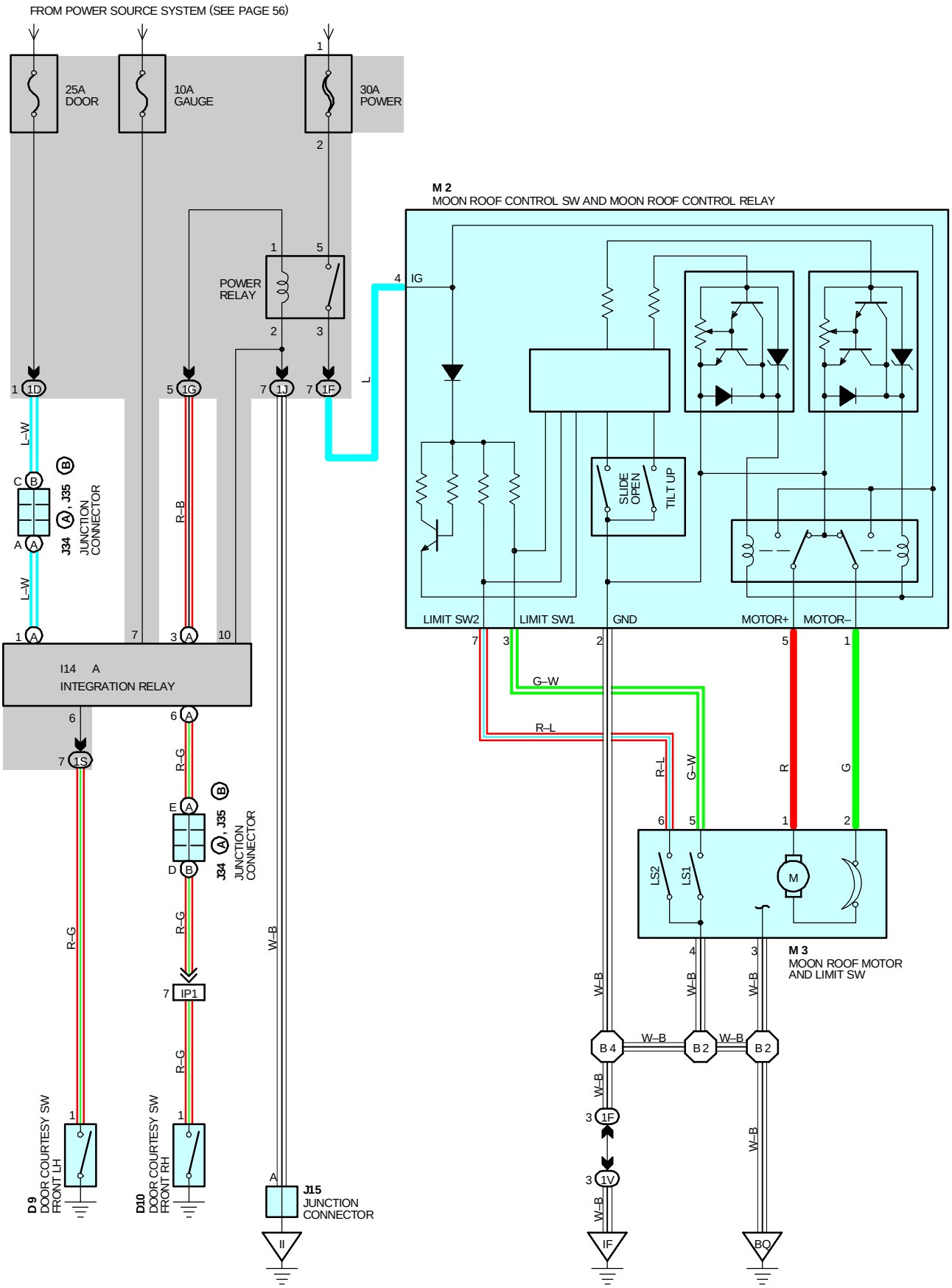
4. TILT DOWN OPERATION

WHEN THE ROOF UP, WHEN THE TILT DOWN SWITCH (SLIDE OPEN) IS PUSHED ON, THE MOON ROOF CONTROL SW AND MOON ROOF CONTROL RELAY DRIVES THE MOTOR IN DIRECTION OF DOWN, AND THE MOTOR STOPS AT FULLY DOWN POSITION (LS1 SW OFF TO ON).

5. KEY OFF MOON ROOF OPERATION

WITH THE IGNITION SW TURNED FROM ON TO OFF, INTEGRATION RELAY OPERATES AND CURRENT FLOWS FROM THE **DOOR** FUSE TO **TERMINAL Ⓐ 1** OF THE RELAY → **TERMINAL Ⓐ 3** → **TERMINAL 1** OF THE POWER RELAY→ **TERMINAL 2** → **GROUND** FOR ABOUT 43 SECONDS. THE SAME AS NORMAL OPERATION, THE CURRENT FLOWS FROM THE **POWER** FUSE TO **TERMINAL 5** OF THE POWER RELAY →**TERMINAL 3** → **TERMINAL 4** OF THE MOON ROOF CONTROL SW AND MOON ROOF CONTROL RELAY. AS A RESULT, FOR ABOUT 43 SECONDS AFTER THE IGNITION SW IS TURNED OFF, THE FUNCTIONING OF THIS RELAY MAKES IT POSSIBLE TO OPEN AND CLOSE THE MOON ROOF. ALSO, BY OPENING THE FRONT DOOR (DOOR COURTESY SW ON)WITHIN ABOUT 43 SECONDS AFTER TURNING THE IGNITION SW TO OFF, A SIGNAL IS INPUT TO **TERMINALS 6** OR **Ⓐ 6** OF THE INTEGRATION RELAY. AS A RESULT, THE RELAY TURNS OFF AND OPEN OPEN CLOSE MOVEMENT OF THE MOON ROOF STOPS.

MOON ROOF


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
25A DOOR
10A GAUGE
30A POWER
POWER RELAY
M 2
MOON ROOF CONTROL SW AND MOON ROOF CONTROL RELAY
IG
SLIDE OPEN
TILT UP
LIMIT SW2
LIMIT SW1
GND
MOTOR+
MOTOR–
L–W
R–B
L
G–W
R–L
R
G
W–B
R–G
I14 A
INTEGRATION RELAY
J34 JUNCTION CONNECTOR
J35 JUNCTION CONNECTOR
J15 JUNCTION CONNECTOR
D9 DOOR COURTESY SW FRONT LH
D10 DOOR COURTESY SW FRONT RH
M 3
MOON ROOF MOTOR AND LIMIT SW
LS2
LS1
M
B4
B2
B2
IF
BQ

SERVICE HINTS

POWER RELAY

5–3 : CLOSED WITH THE IGNITION SW AT ON POSITION

M 2 MOON ROOF CONTROL SW AND MOON ROOF CONTROL RELAY

2–GROUND : ALWAYS CONTINUITY

4–GROUND : APPROX. 12 VOLTS WITH THE IGNITION SW AT ON POSITION

○ : PARTS LOCATION

CODE		SEE PAGE	CODE		SEE PAGE	CODE	SEE PAGE
D 9		30	J15		29	M 2	31
D10		30	J34	A	29	M 3	31
I14	A	28	J35	B	29		

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1F	24	ROOF WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1G	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1S	24	FLOOR WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1V	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IP1	38	FLOOR NO. 2 WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)

▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IF	36	COWL SIDE PANEL LH
II	36	INSTRUMENT PANEL BRACE LH
BQ	40	ROOF LEFT

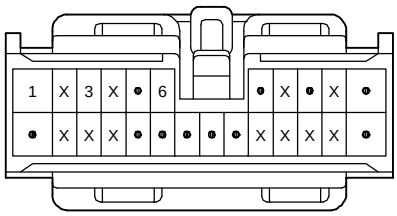
⬡ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B 2	40	ROOF WIRE	B 4	40	ROOF WIRE

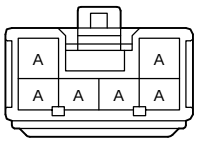
D 9

D10

I14 (A) ORANGE

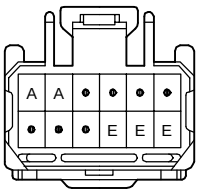


J15



(HINT : SEE PAGE 7)

J34 (A) BLACK



(HINT : SEE PAGE 7)

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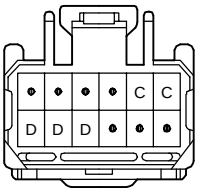
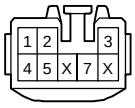
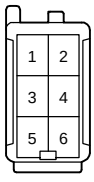


(HINT : SEE PAGE 7)

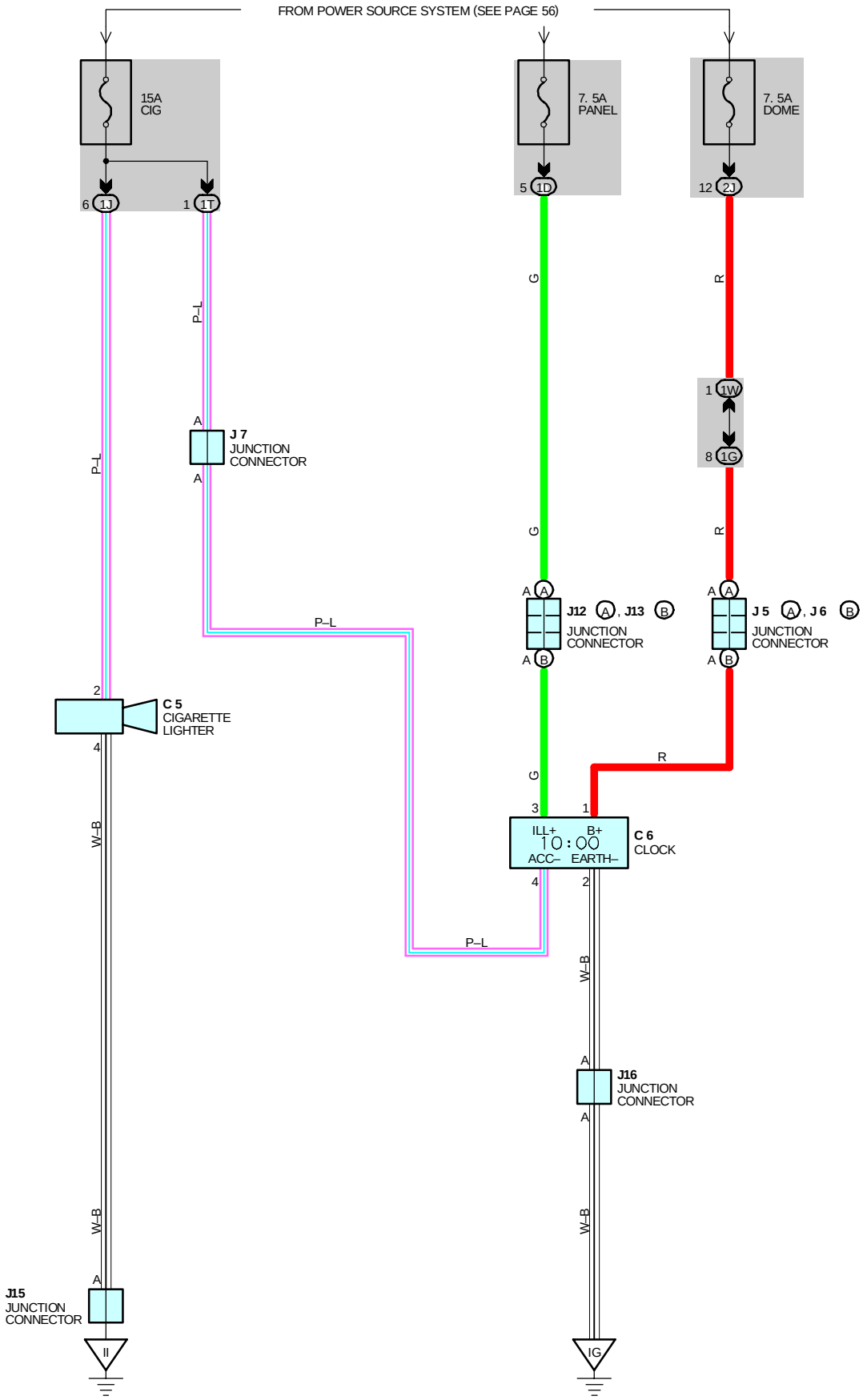
M 2



M 3



CIGARETTE LIGHTER AND CLOCK



SERVICE HINTS

C 5 CIGARETTE LIGHTER

2–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ACC** OR **ON** POSITION
4–GROUND : ALWAYS CONTINUITY

C 6 CLOCK

1–GROUND : ALWAYS APPROX. 12 VOLTS
4–GROUND : APPROX. 12 VOLTS WITH THE IGNITION SW AT **ACC** OR **ON** POSITION
2–GROUND : ALWAYS CONTINUITY
3–GROUND : APPROX 12 VOLTS WITH THE LIGHT CONTROL SW AT **TAIL** OR **HEAD** POSITION

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 5	28	J 6 B	29	J13 B	29
C 6	28	J7	29	J15	29
J 5 A	29	J12 A	29	J16	29

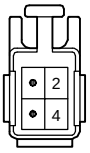
: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1D 1G	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1T	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1W	25	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

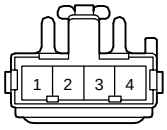
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IG	36	LEFT KICK PANEL
II	36	INSTRUMENT PANEL BRACE LH

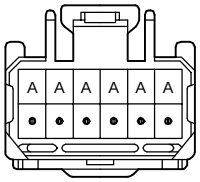
C 5



C 6 BLACK

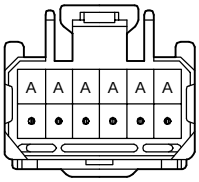


J 5 (A) GRAY



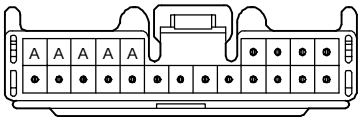
(HINT : SEE PAGE 7)

J 6 (B) GRAY



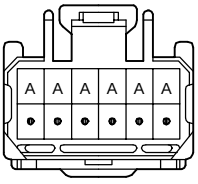
(HINT : SEE PAGE 7)

J 7



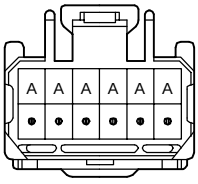
(HINT : SEE PAGE 7)

J12 (A) GRAY



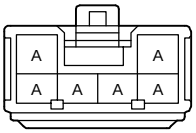
(HINT : SEE PAGE 7)

J13 (B) GRAY



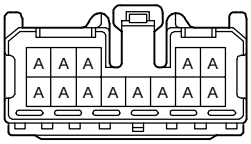
(HINT : SEE PAGE 7)

J15



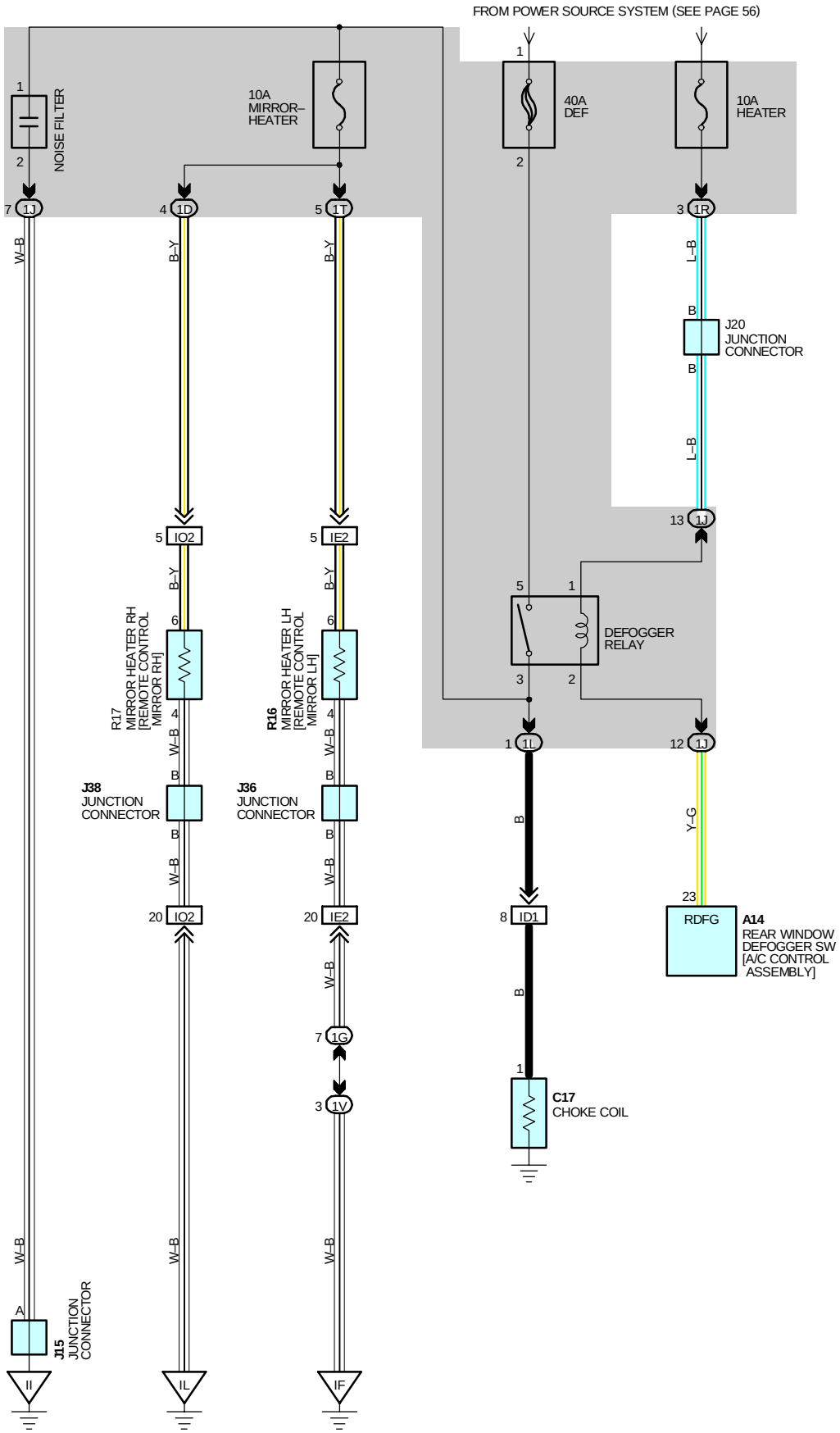
(HINT : SEE PAGE 7)

J16 ORANGE



(HINT : SEE PAGE 7)

REAR WINDOW DEFOGGER AND MIRROR HEATER



SERVICE HINTS

DEFOGGER RELAY

5–3 : CLOSED WITH THE IGNITION SW AT **ON** POSITION AND THE REAR WINDOW DEFOGGER SW [A/C CONTROL ASSEMBLY] ON

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A14	28	J20	29	R16	31
C17	30	J36	30	R17	31
J15	29	J38	30		

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1D 1G	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINSIH PANEL)
1J 1L 1R	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1T	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1V	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)

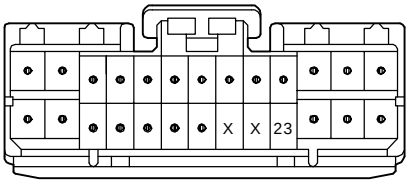
▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
ID1	36	FLOOR WIRE AND COWL WIRE (LEFT KICK PANEL)
IE2	36	FLOOR DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IO2	38	FLOOR DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)

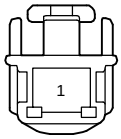
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IF	36	COWL SIDE PANEL LH
II	36	INSTRUMENT PANEL BRACE LH
IL	36	RIGHT KICK PANEL

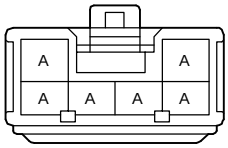
A14



C17

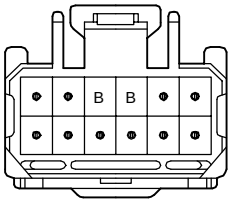


J15



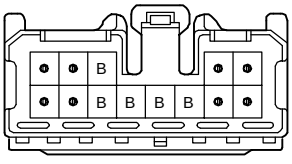
(HINT : SEE PAGE 7)

J20 BLACK



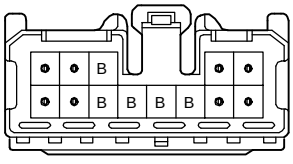
(HINT : SEE PAGE 7)

J36



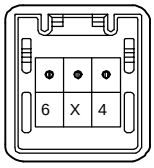
(HINT : SEE PAGE 7)

J38

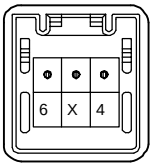


(HINT : SEE PAGE 7)

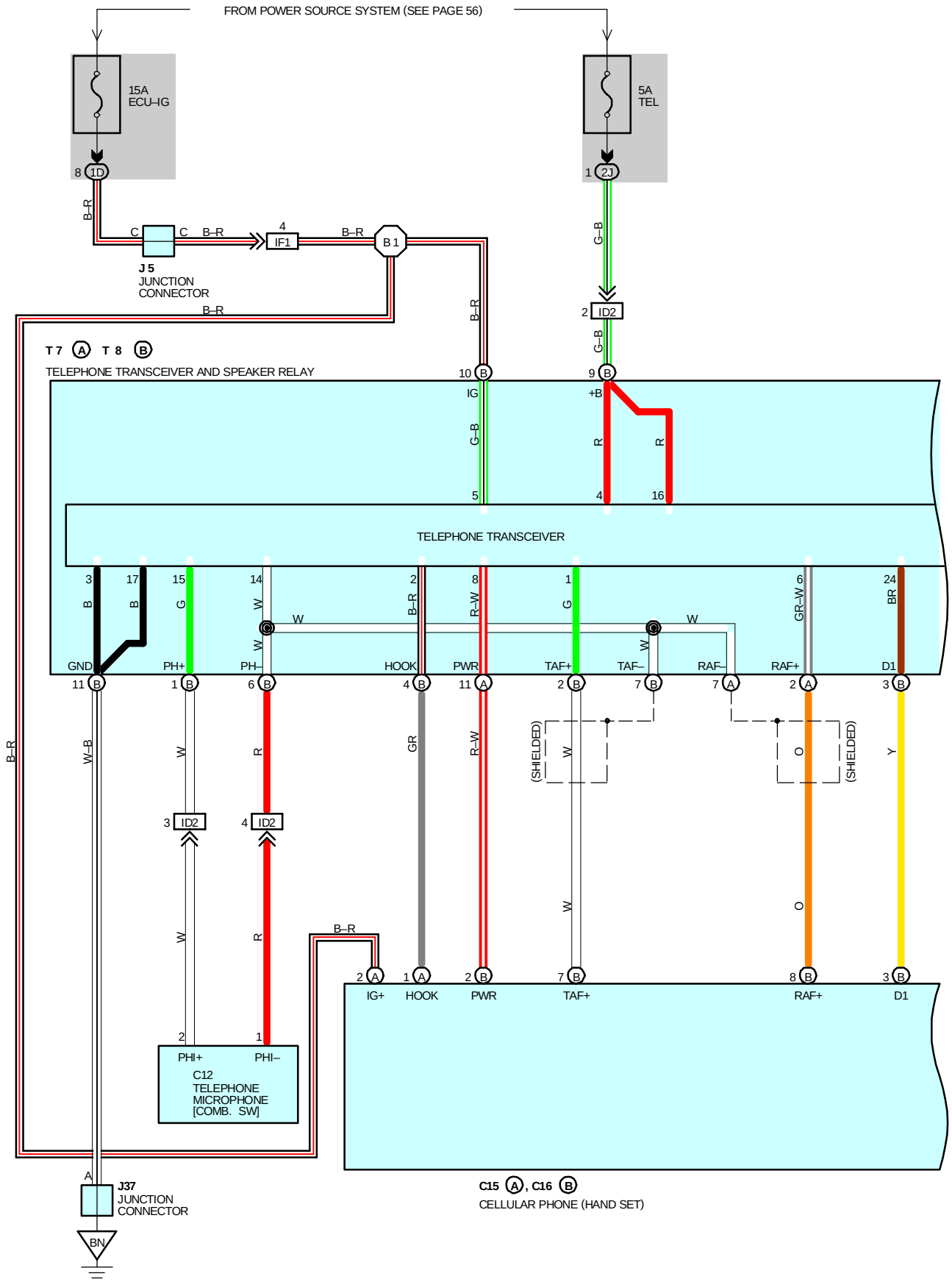
R16

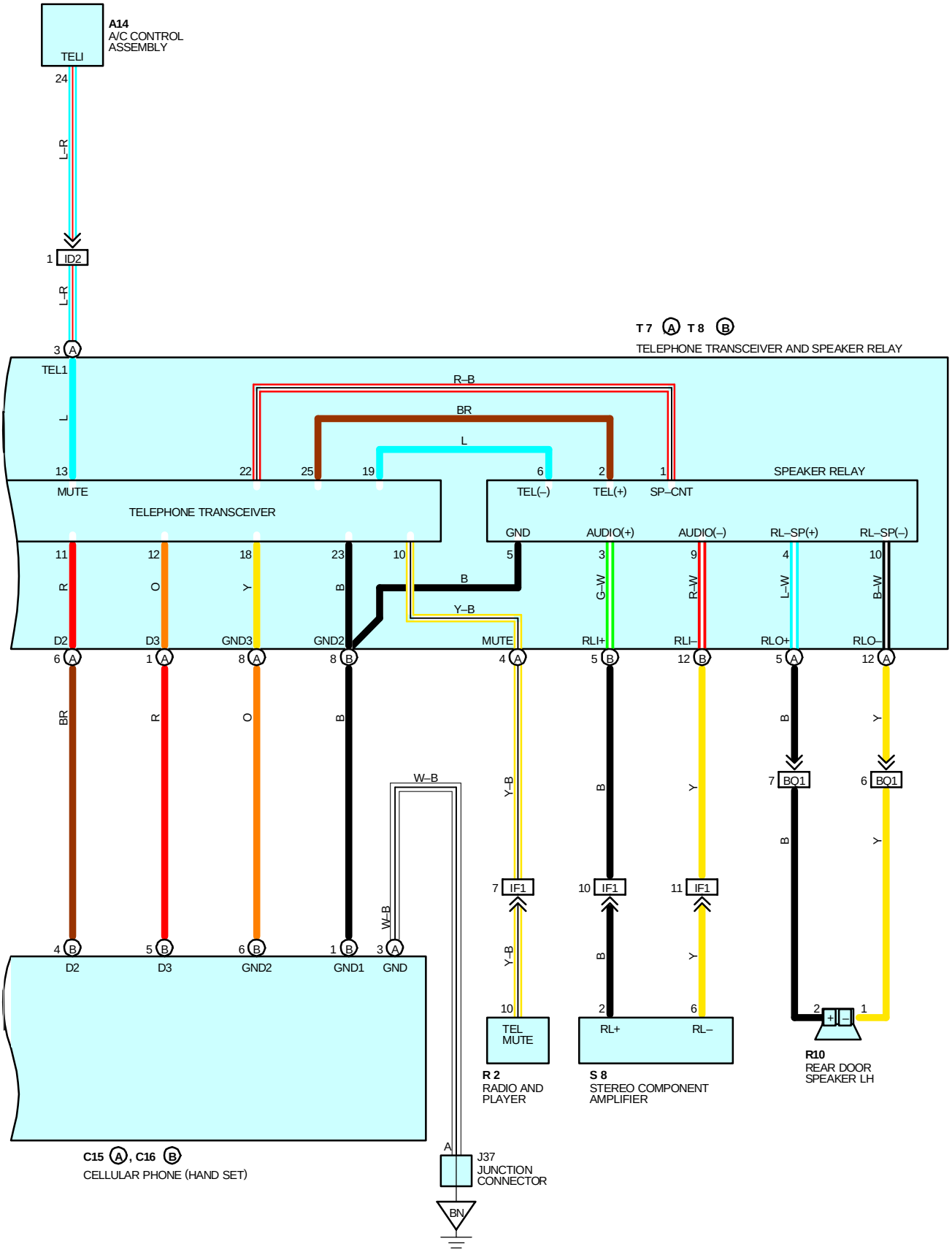


R17



CELLULAR MOBILE TELEPHONE




A14
A/C CONTROL
ASSEMBLY
TELI
24
L–R
1
ID2
L–R
3
A
TEL1
L
13
MUTE
T7 A T8 B
TELEPHONE TRANSCEIVER AND SPEAKER RELAY
R–B
BR
L
22
25
19
6
2
1
SPEAKER RELAY
TELEPHONE TRANSCEIVER
TEL(–)
TEL(+)
SP–CNT
GND
AUDIO(+)
AUDIO(–)
RL–SP(+)
RL–SP(–)
11
12
18
23
10
5
3
9
4
10
R
O
Y
B
B
G–W
R–W
L–W
B–W
Y–B
D2
D3
GND3
GND2
MUTE
RLI+
RLI–
RLO+
RLO–
6
A
1
A
8
A
8
B
4
A
5
B
12
B
5
A
12
A
BR
R
O
B
B
Y
Y
7
IF1
10
IF1
11
IF1
7
BQ1
6
BQ1
W–B
W–B
Y–B
B
Y
B
Y
4
B
5
B
6
B
1
B
3
A
D2
D3
GND2
GND1
GND
10
2
6
2
1
TEL
MUTE
RL+
RL–
R2
RADIO AND
PLAYER
S8
STEREO COMPONENT
AMPLIFIER
R10
REAR DOOR
SPEAKER LH
C15 A, C16 B
CELLULAR PHONE (HAND SET)
A
J37
JUNCTION
CONNECTOR
BN

CELLULAR MOBILE TELEPHONE

SERVICE HINTS

T 8 Ⓑ TELEPHONE TRANSCEIVER AND SPEAKER RELAY

Ⓑ 9–GROUND : ALWAYS APPROX. **12** VOLTS
Ⓑ 10–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
Ⓑ 11–GROUND : ALWAYS CONTINUITY

○ : PARTS LOCATION

CODE		SEE PAGE	CODE	SEE PAGE	CODE		SEE PAGE
A14		28	J5	29	S 8		29
C12		28	J37	30	T 7	A	31
C15	A	30	R2	29	T 8	B	31
C16	B	30	R10	31			

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT J/B (LOWER FINISH PANEL)
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
ID2	36	FLOOR WIRE AND COWL WIRE (LEFT KICK PANEL)
IF1	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
BQ1	40	REAR DOOR LH WIRE AND FLOOR WIRE (LEFT CENTER PILLAR)

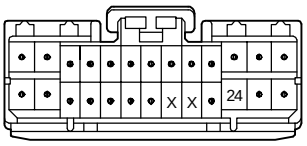
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
BN	40	UNDER THE LEFT CENTER PILLAR

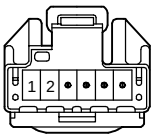
⬡ : SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
B 1	40	FLOOR WIRE			

A14



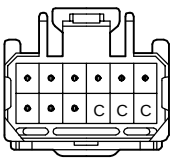
C12 BLACK



C15 Ⓐ

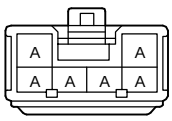
C16 Ⓑ

J5 GRAY



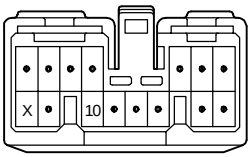
(HINT : SEE PAGE 7)

J37



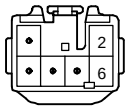
(HINT : SEE PAGE 7)

R 2

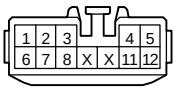


R10

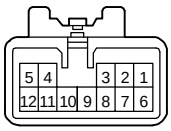
S 8



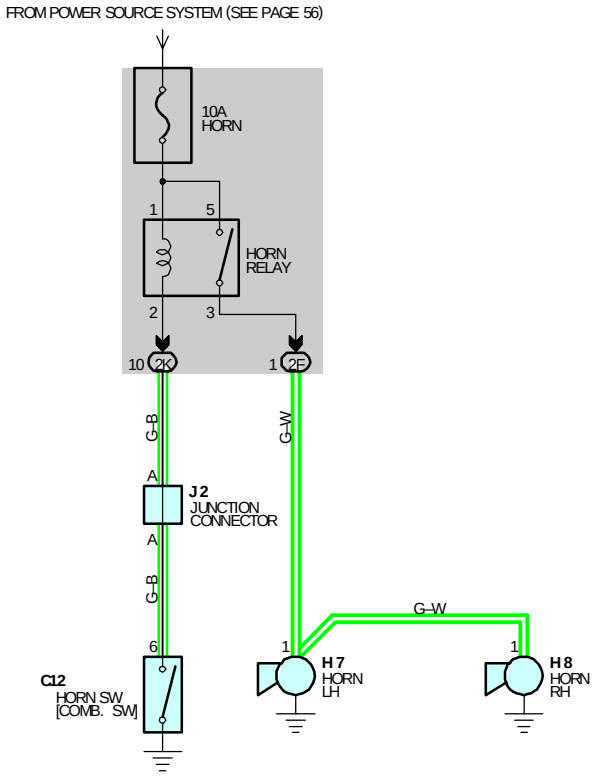
T 7 Ⓐ



T 8 Ⓑ



HORN



SERVICE HINTS

HORN RELAY

5–3 : CLOSED WITH THE HORN SW ON

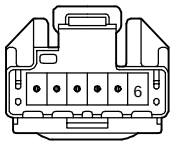
○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C12	28	H8	26		
H 7	26	J 2	29		

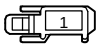
⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
2F	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2K	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

C12 BLACK

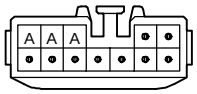


H 7 BLACK

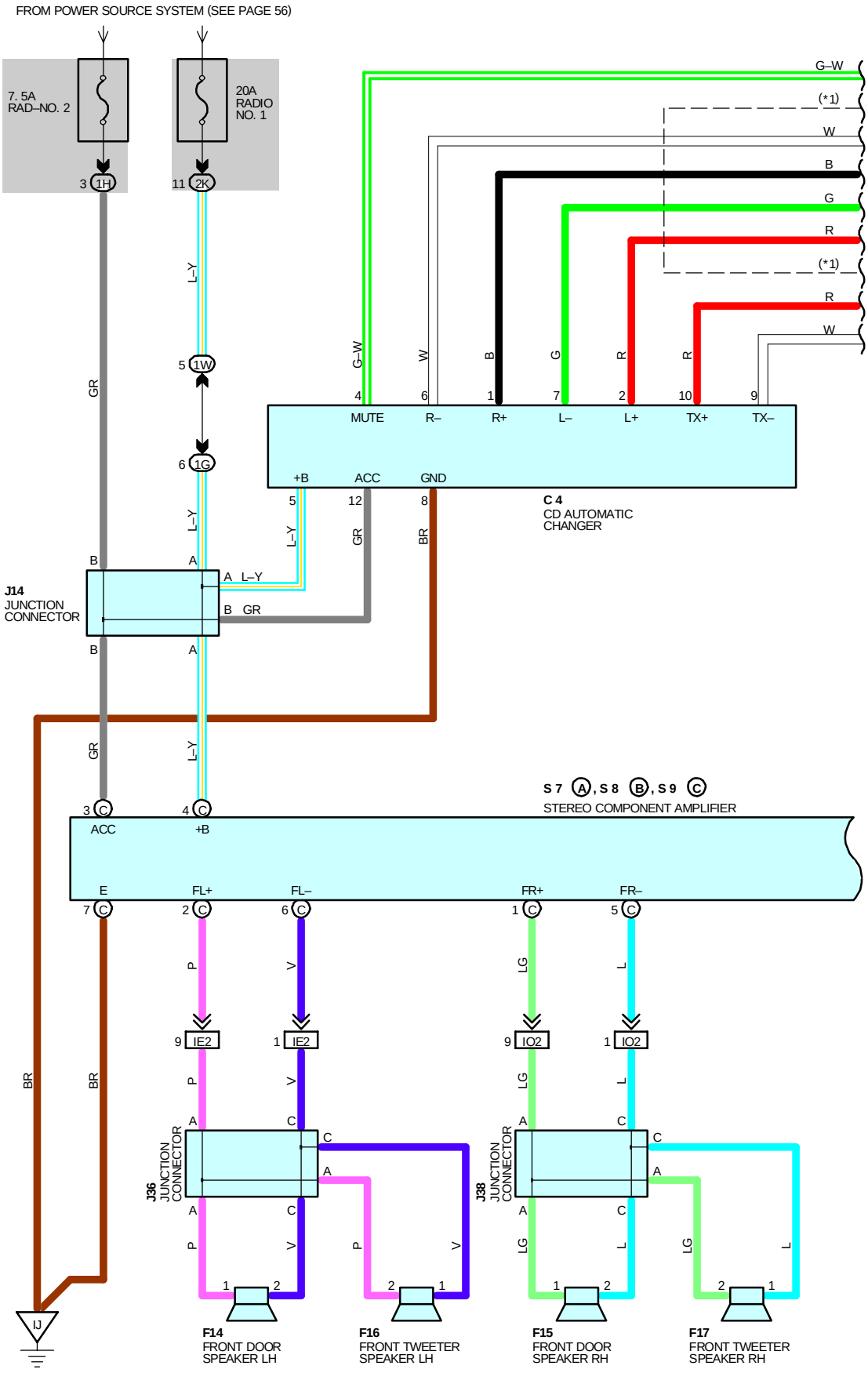


H 8 BLACK

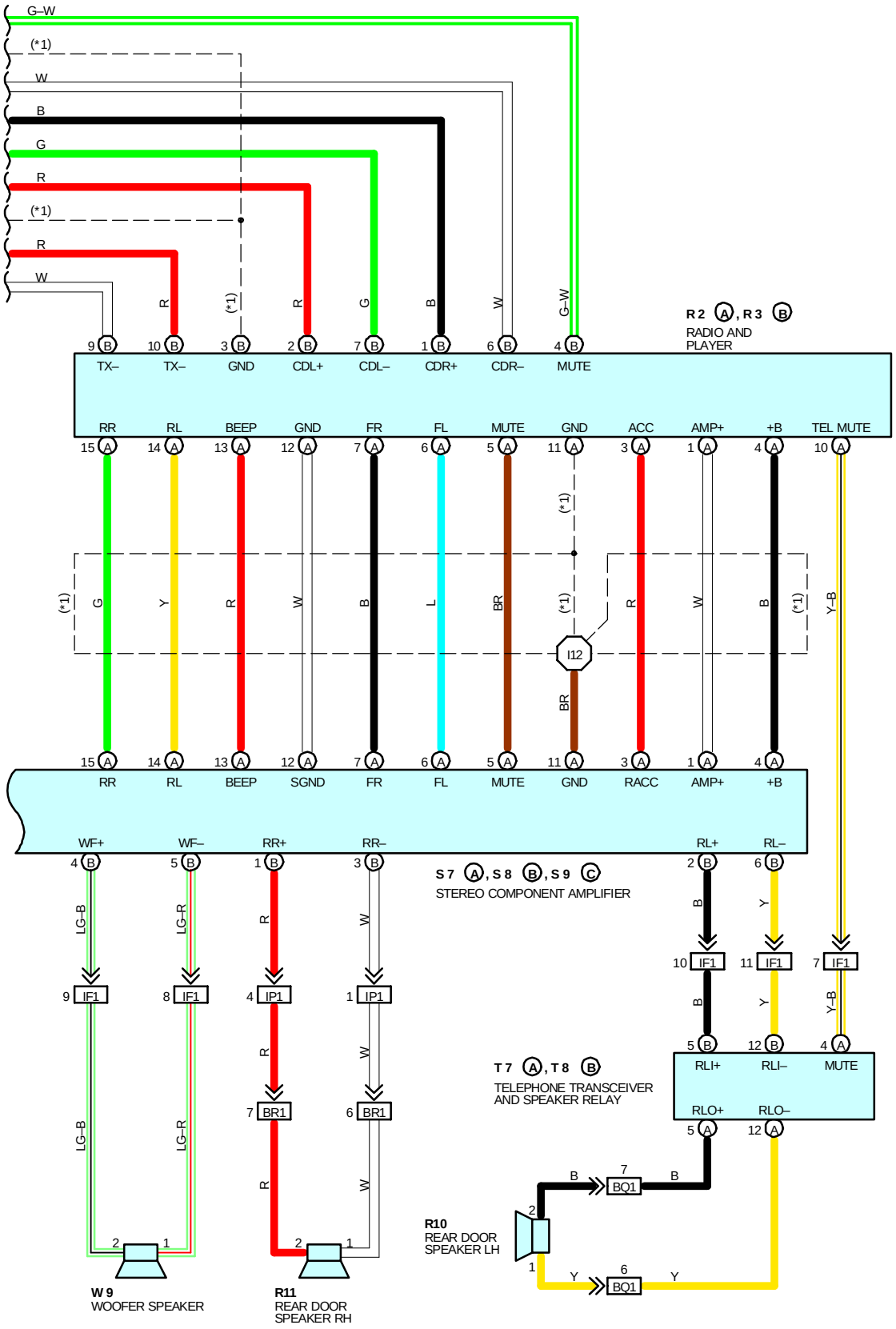
J 2 BLACK



(HINT : SEE PAGE 7)


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
7. 5A
RAD–NO. 2
20A
RADIO
NO. 1
3 1H
11 2K
L–Y
5 1W
GR
6 1G
G–W
W
B
G
R
R
W
(*1)
(*1)
4
6
1
7
2
10
9
MUTE
R–
R+
L–
L+
TX+
TX–
+B
ACC
GND
5
12
8
C 4
CD AUTOMATIC
CHANGER
L–Y
GR
BR
B
A
A L–Y
B GR
J14
JUNCTION
CONNECTOR
S 7 A, S 8 B, S 9 C
STEREO COMPONENT AMPLIFIER
3 C
4 C
ACC
+B
E
FL+
FL–
FR+
FR–
7 C
2 C
6 C
1 C
5 C
P
V
LG
L
9 IE2
1 IE2
9 IO2
1 IO2
J36
JUNCTION
CONNECTOR
J38
JUNCTION
CONNECTOR
BR
IJ
F14
FRONT DOOR
SPEAKER LH
F16
FRONT TWEETER
SPEAKER LH
F15
FRONT DOOR
SPEAKER RH
F17
FRONT TWEETER
SPEAKER RH

* 1 : SHIELDED


G–W
(*1)
W
B
G
R
(*1)
R
W
R2 A, R3 B
RADIO AND PLAYER
9 B TX–
10 B TX–
3 B GND
2 B CDL+
7 B CDL–
1 B CDR+
6 B CDR–
4 B MUTE
RR RL BEEP GND FR FL MUTE GND ACC AMP+ +B TEL MUTE
15 A 14 A 13 A 12 A 7 A 6 A 5 A 11 A 3 A 1 A 4 A 10 A
I12
15 A RR 14 A RL 13 A BEEP 12 A SGND 7 A FR 6 A FL 5 A MUTE 11 A GND 3 A RACC 1 A AMP+ 4 A +B
WF+ WF– RR+ RR–
4 B 5 B 1 B 3 B
S7 A, S8 B, S9 C
STEREO COMPONENT AMPLIFIER
RL+ RL–
2 B 6 B
9 IF1 8 IF1 4 IP1 1 IP1
10 IF1 11 IF1 7 IF1
7 BR1 6 BR1
RLI+ RLI– MUTE
5 B 12 B 4 A
RLO+ RLO–
5 A 12 A
T7 A, T8 B
TELEPHONE TRANSCEIVER AND SPEAKER RELAY
7 BQ1
6 BQ1
R10
REAR DOOR SPEAKER LH
W 9
WOOFER SPEAKER
R11
REAR DOOR SPEAKER RH

RADIO AND PLAYER

SERVICE HINTS

S 9 © STEREO COMPONENT AMPLIFIER

© 7–GROUND : ALWAYS CONTINUITY
© 3–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** OR **ACC** POSITION
© 4–GROUND : ALWAYS APPROX. **12** VOLTS

C 4 CD AUTOMATIC CHANGER

12–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** OR **ACC** POSITION
5–GROUND : ALWAYS APPROX. **12** VOLTS
8–GROUND : ALWAYS CONTINUITY

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
C 4	28	J36	30	S 7 A	29
F14	30	J38	30	S 8 B	29
F15	30	R2 A	29	S 9 C	29
F16	30	R 3 B	29	T 7 A	31
F17	30	R10	31	T 8 B	31
J14	29	R11	31	W 9	31

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1G 1H	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1W	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
2K	30	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IE2	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IF1	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IO2	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
IP1	38	FLOOR WIRE NO. 2 AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BQ1	40	REAR DOOR LH WIRE AND FLOOR WIRE (LEFT CENTER PILLAR)
BR1	40	REAR DOOR RH WIRE AND FLOOR NO. 2 WIRE (RIGHT CENTER PILLAR)

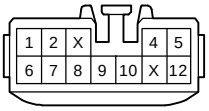
▽ : GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
IJ	36	INSTRUMENT PANEL BRACE RH

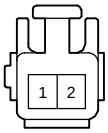
: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
I12	38	INSTRUMENT PANEL WIRE			

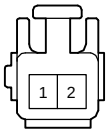
C 4



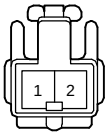
F14 BLUE



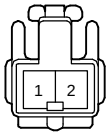
F15 BLUE



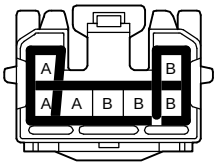
F16



F17

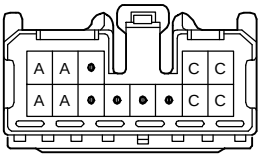


J14



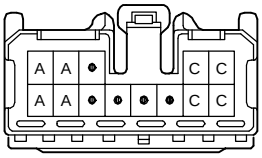
(HINT : SEE PAGE 7)

J36



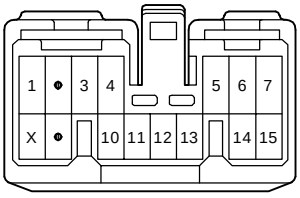
(HINT : SEE PAGE 7)

J38

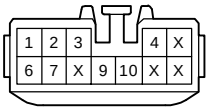


(HINT : SEE PAGE 7)

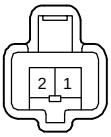
R 2 (A)



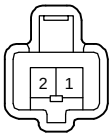
R 3 (B)



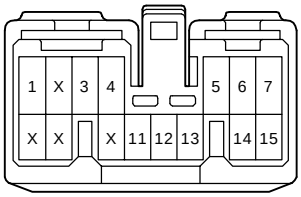
R10



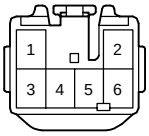
R11



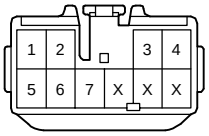
S 7 (A)



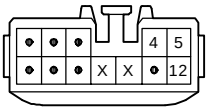
S 8 (B)



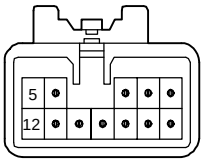
S 9 (C)



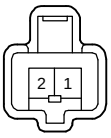
T 7 (A)



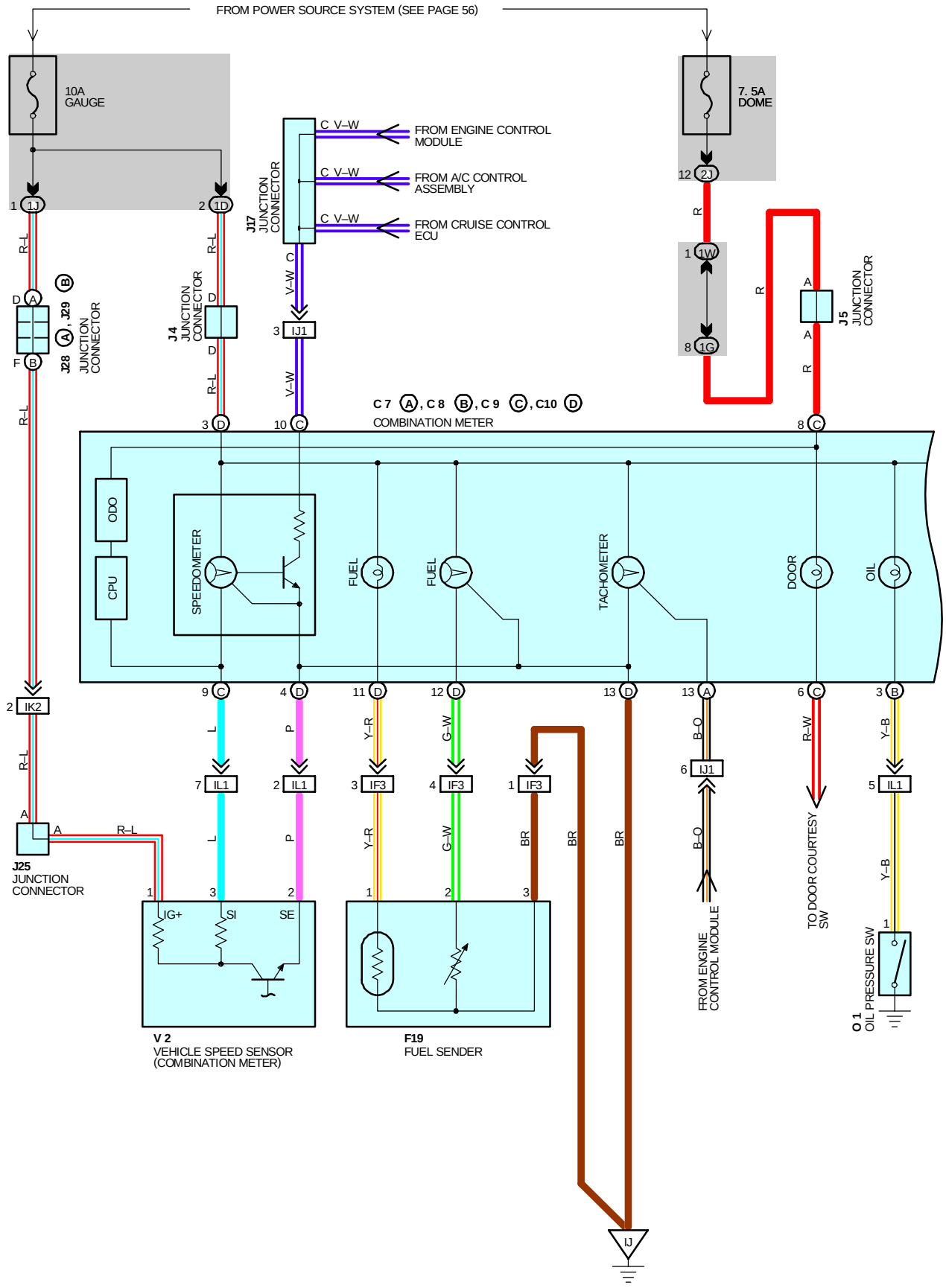
T 8 (B)

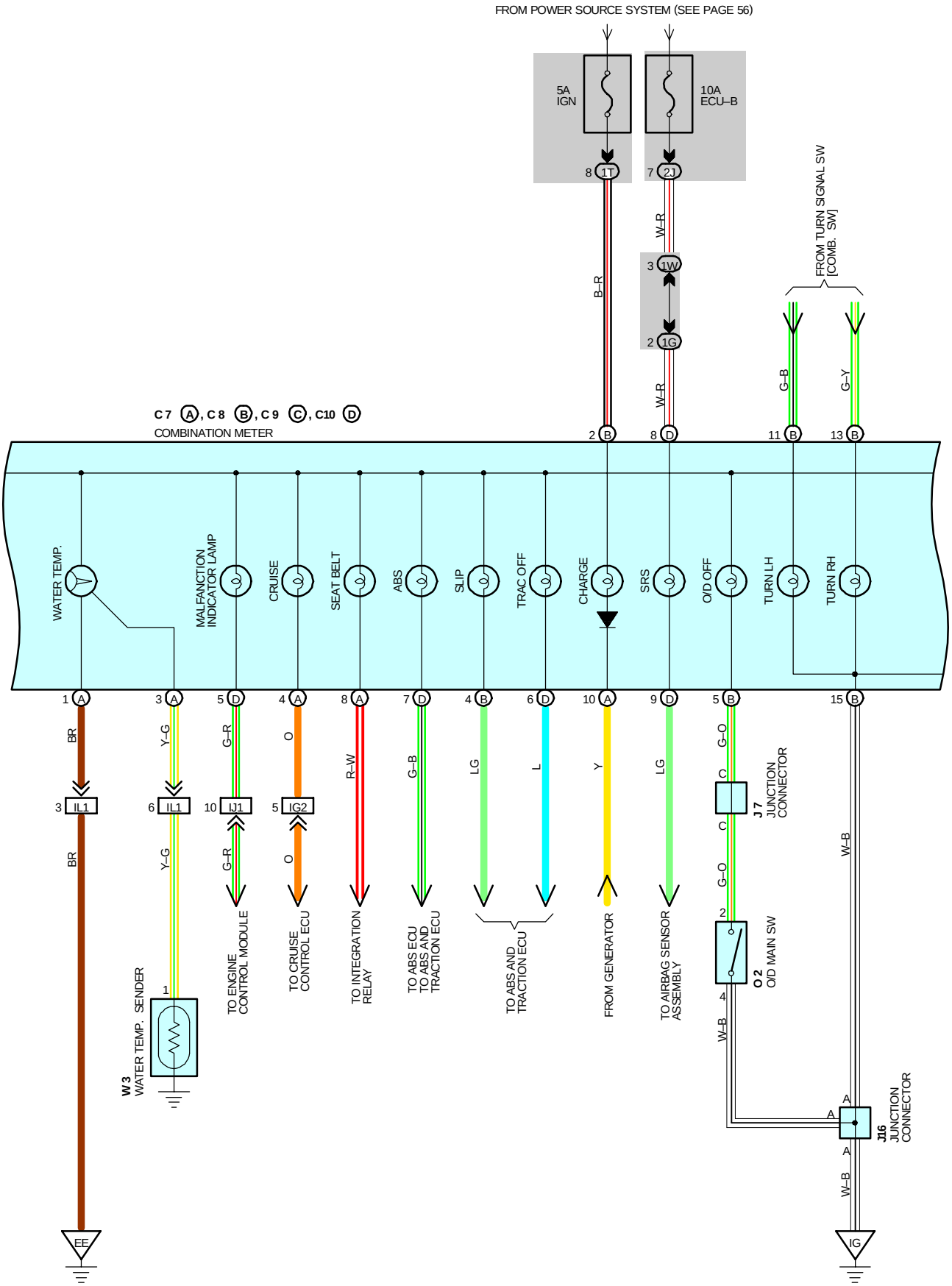


W 9

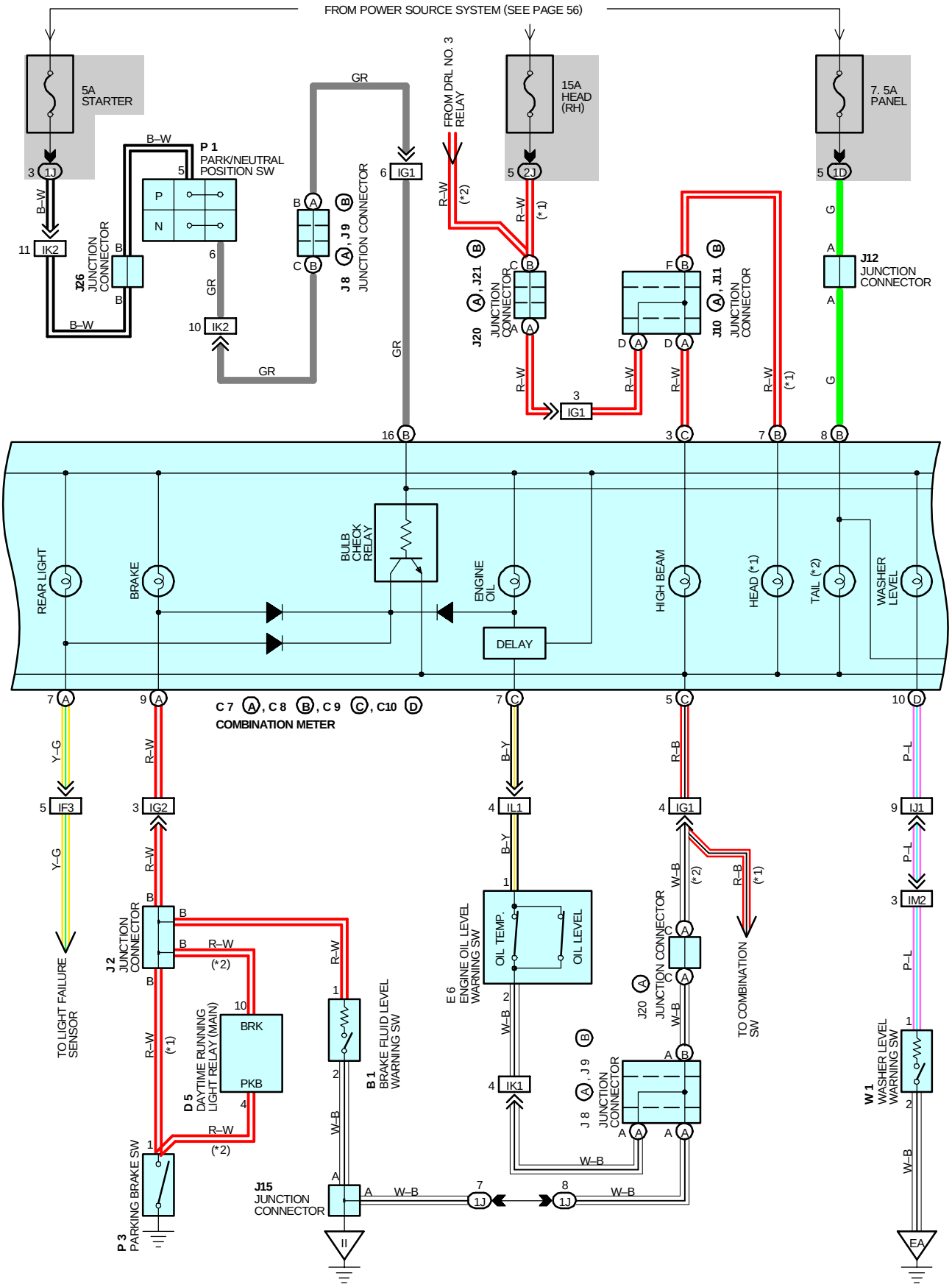


COMBINATION METER

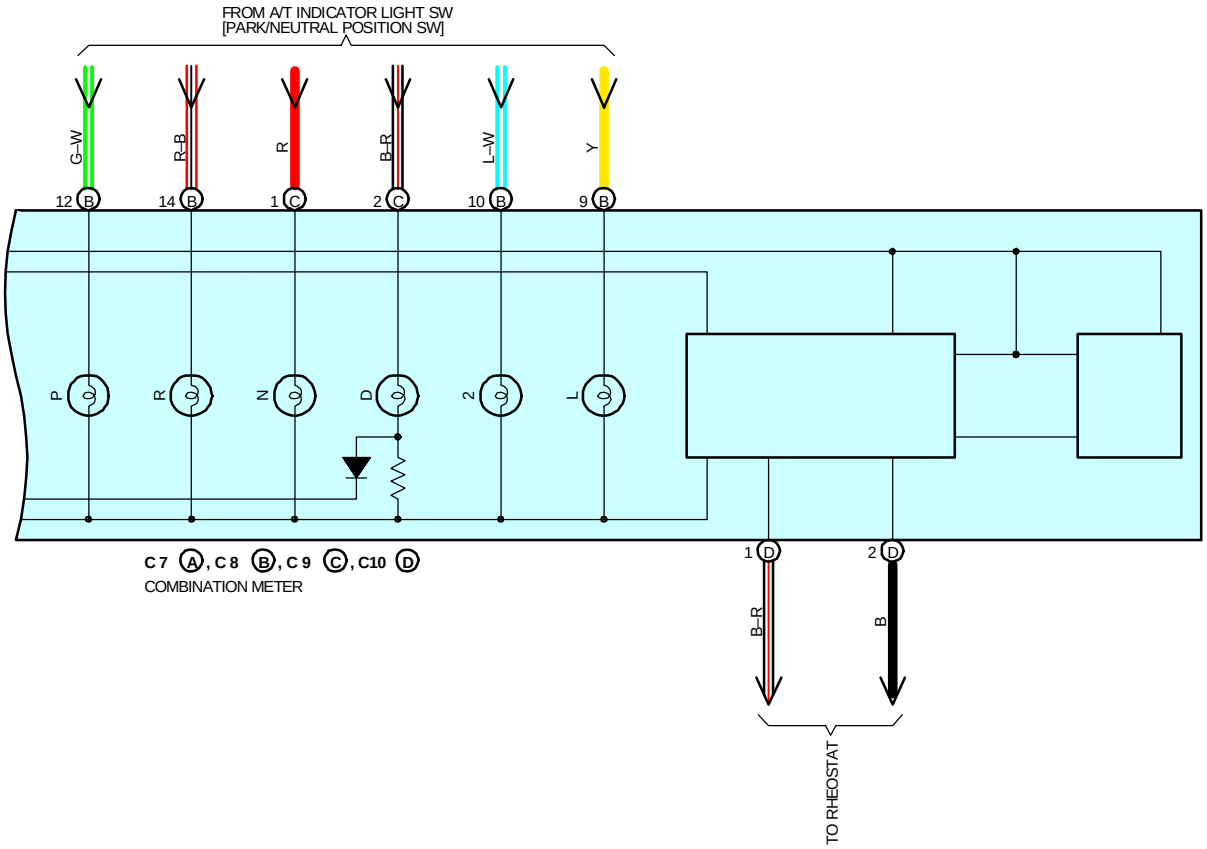



FROM POWER SOURCE SYSTEM (SEE PAGE 56)
5A IGN
10A ECU–B
8 1T
7 2J
B–R
W–R
3 1W
2 1G
W–R
FROM TURN SIGNAL SW [COMB. SW]
G–B
G–Y
C 7 A, C 8 B, C 9 C, C10 D
COMBINATION METER
2 B
8 D
11 B
13 B
WATER TEMP.
MALFANCTION INDICATOR LAMP
CRUISE
SEAT BELT
ABS
SLIP
TRAC OFF
CHARGE
SRS
O/D OFF
TURN LH
TURN RH
1 A
3 A
5 D
4 A
8 A
7 D
4 B
6 D
10 A
9 D
5 B
15 B
BR
Y–G
G–R
O
R–W
G–B
LG
L
Y
LG
G–O
W–B
3 IL1
6 IL1
10 IJ1
5 IG2
C
2
4
W–B
W–B
A
A
A
W3
WATER TEMP. SENDER
1
TO ENGINE CONTROL MODULE
TO CRUISE CONTROL ECU
TO INTEGRATION RELAY
TO ABS ECU
TO ABS AND TRACTION ECU
TO ABS AND TRACTION ECU
FROM GENERATOR
TO AIRBAG SENSOR ASSEMBLY
J 7
JUNCTION CONNECTOR
O 2
O/D MAIN SW
J16
JUNCTION CONNECTOR
EE
IG

COMBINATION METER



* 1 : USA
* 2 : CANADA



COMBINATION METER

SERVICE HINTS

B 1 BRAKE FLUID LEVEL WARNING SW

1–2 : CLOSED WITH THE FLOAT DOWN

P 3 PARKING BRAKE SW

1–GROUND : CLOSED WITH THE PARKING BRAKE PEDAL DEPRESSED

O 1 OIL PRESSURE SW

1–GROUND : CLOSED WITH THE OIL PRESSURE BELOW APPOX. **0.2** KG/CM^2 (**2.8** PSI, **20** KPA)

W 3 WATER TEMP. SENDER

1–GROUND : APPROX. **226** Ω (**50°** C, **122°** F)
APPROX. **25** Ω (**115°** C, **239°** F)

E 6 ENGINE OIL LEVEL WARNING SW

1–2 : CLOSED WITH THE FLOAT UP AND THE ENGINE OIL TEMP. AT BELOW APPROX. **55°** C (**131°** F)
OPEN WITH THE FLOAT

F19 FUEL SENDER

2–3 : APPROX. 3 Ω AT FUEL FULL
APPROX. 110 Ω AT FUEL EMPTY

C 7 Ⓐ , C 8 Ⓑ ,C 9 Ⓒ ,C10 Ⓓ COMBINATION METER

Ⓓ 3–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT **ON** POSITION
Ⓓ 13–GROUND : ALWAYS CONTINUITY
Ⓐ 1–GROUND : ALWAYS CONTINUITY
Ⓒ 8–GROUND : ALWAYS APPROX. **12** VOLTS
Ⓑ 15–GROUND : ALWAYS CONTINUITY
Ⓒ 5–GROUND : ALWAYS CONTINUITY
Ⓓ 8–GROUND : ALWAYS APPROX. **12** VOLTS

○ : PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
B 1	26	J 7	29	J25	29
C 7 A	28	J 8 A	29	J26	29
C 8 B	28	J 9 B	29	J28 A	29
C 9 C	28	J10 A	29	J29 B	29
C10 D	28	J11 B	29	O 1	27
D 5	28	J12	29	O 2	29
E 6	26	J15	29	P 1	27
F19	30	J16	29	P 3	29
J 2	29	J17	29	V 2	27
J 4	29	J20 A	29	W 1	27
J 5	29	J21 B	29	W 3	27

⬭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1D	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1G		
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1T	24	INSTRUMENT PANEL WIRE AND INSTRUMENT J/B (LOWER FINISH PANEL)
1W	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

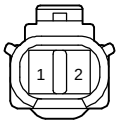
▭ : CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
IF3	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IG1	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)
IG2		
IJ1	38	INSTRUMENT PANEL WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK2	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IL1	38	ENGINE WIRE AND INSTRUMENT PANEL WIRE (UNDER THE GLOVE BOX)
IM2	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)

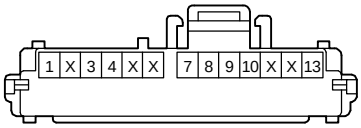
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	RIGHT RADIATOR SIDE SUPPORT
EE	34	REAR SIDE OF SURGE TANK
IG	36	LEFT KICK PANEL
II	36	INSTRUMENT PANEL BRACE LH
IJ	36	INSTRUMENT PANEL BRACE RH

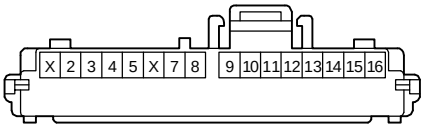
B 1 GRAY



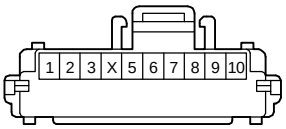
C 7 (A) BLUE



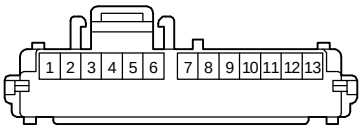
C 8 (B)



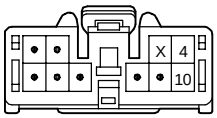
C 9 (C) GRAY



C10 (D) BROWN



D 5 GRAY



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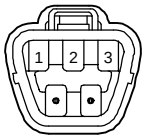

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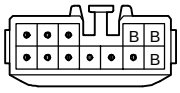

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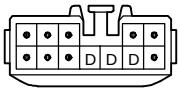

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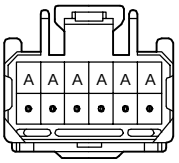

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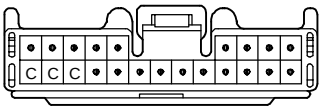

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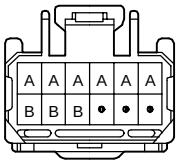

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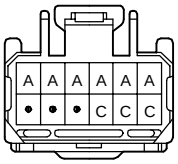

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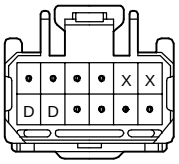

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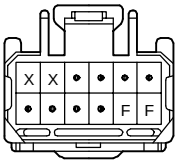

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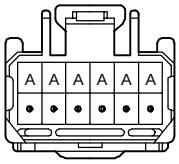

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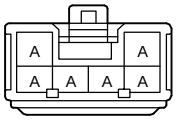

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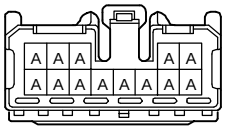

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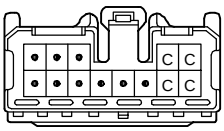

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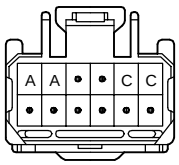

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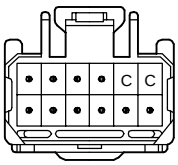

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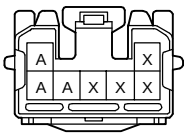

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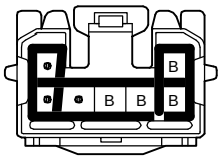
COMBINATION METER

J26



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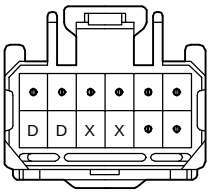

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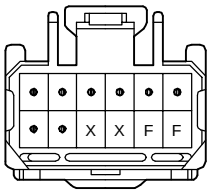

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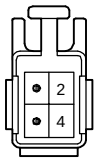

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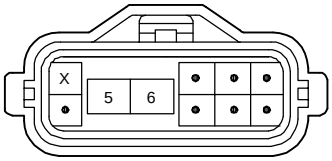

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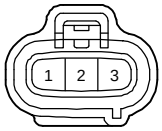

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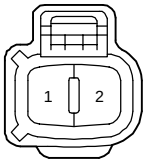


W 3 GRAY

SYSTEM OUTLINE

WITH THE IGNITION SW TURNED ON, THE CURRENT THROUGH THE **ECU–IG** FUSE FLOWS TO THE FAN NO. 1 RELAY (COIL SIDE), FAN NO. 2 RELAY (COIL SIDE) AND FAN NO. 3 RELAY (COIL SIDE). FURTHERMORE, THE CURRENT THROUGH THE FAN NO. 1 RELAY (COIL SIDE) THE FAN NO. 2 RELAY (COIL SIDE) FLOWS TO **TERMINAL 3** OF THE A/C SINGLE PRESSURE SW → **TERMINAL 2** → **TERMINAL 2** OF THE WATER TEMP. SW NO. 1 → **TERMINAL 1** → **GROUND**, CAUSING THE FAN NO. 2 RELAY TO TURN ON.

1. LOW SPEED OPERATION

ONLY WHEN THE A/C SYSTEM IS ACTIVATED OR THE WATER TEMP. SW NO. 2 IS TURNED ON, THE A/C CONDENSER FAN MOTOR AND THE RADIATOR FAN MOTOR ROTATES AT LOW SPEED.

WHEN THE A/C SYSTEM IS ACTIVATED, THE CURRENT FROM ECU–IG FUSE FLOWS TO THE FAN NO. 3 RELAY (COIL SIDE) → **TERMINAL 1** OF THE DIODE (A/C) → **TERMINAL 2** → **TERMINAL 2** OF THE A/C CONTROL ASSEMBLY, CAUSING THE FAN NO. 3 RELAY TO TURN ON. AS A RESULT, THE CURRENT THROUGH THE CDS FUSE FLOWS TO **TERMINAL 2** OF THE A/C CONDENSER FAN MOTOR → **TERMINAL 1** → **TERMINAL 3** OF THE FAN NO. 2 RELAY → **TERMINAL 5** → **TERMINAL 5** OF THE FAN NO. 3 RELAY → **TERMINAL 3** → **TERMINAL 2** OF THE RADIATOR FAN MOTOR → **TERMINAL 1** → **GROUND**. AS THIS FLOWING IN SERIES FOR THE MOTORS, THE MOTORS ROTATE AT LOW SPEED.

WHEN THE WATER TEMP. SW NO. 2 IS TURNED ON, THE CURRENT FROM **ECU–IG** FUSE FLOWS TO THE FAN NO. 3 RELAY (COIL SIDE) → **TERMINAL 1** OF THE WATER TEMP. SW NO. 2 → **GROUND**, CAUSING THE FAN NO. 3 RELAY TO TURN ON. AS A RESULT, THE CURRENT THROUGH THE CDS FUSE FLOWS THE SAME ROUTE AS ABOVE, ROTATING THE MOTORS AT LOW SPEED.

2. HIGH SPEED OPERATION

ONLY WHEN THE A/C SINGLE PRESSURE SW IS TURNED OFF OR THE WATER TEMP. SW NO. 1 IS TURNED OFF, THE A/C CONDENSER FAN MOTOR AND THE RADIATOR FAN MOTOR ROTATE AT HIGH SPEED.

WHEN THE A/C SINGLE PRESSURE SW IS TURNED OFF, THE CURRENT FROM THE **RDI** FUSE FLOWS TO THE FAN NO. 1 RELAY (POINT SIDE) → **TERMINAL 2** OF THE RADIATOR FAN MOTOR → **TERMINAL 1** → **GROUND**. AT THE SAME TIME, THE CURRENT FROM THE **CDS** FUSE FLOWS TO **TERMINAL 2** OF THE A/C CONDENSER FAN MOTOR → **TERMINAL 1** → **TERMINAL 3** OF THE FAN NO. 2 RELAY → **TERMINAL 4** → **GROUND**.

AS THE CURRENT FLOWING IN PARALLEL FOR THE MOTORS AS ABOVE, THE MOTORS ROTATE AT HIGH SPEED.

SERVICE HINTS

A 4 A/C SINGLE PRESSURE SW

3–2 : OPEN ABOVE APPROX. **15.5** KG/CM^2 (**220** PSI, **1520** KPA)
CLOSE BELOW APPROX. **12.5** KG/CM^2 (**142** PSI, **980** KPA)

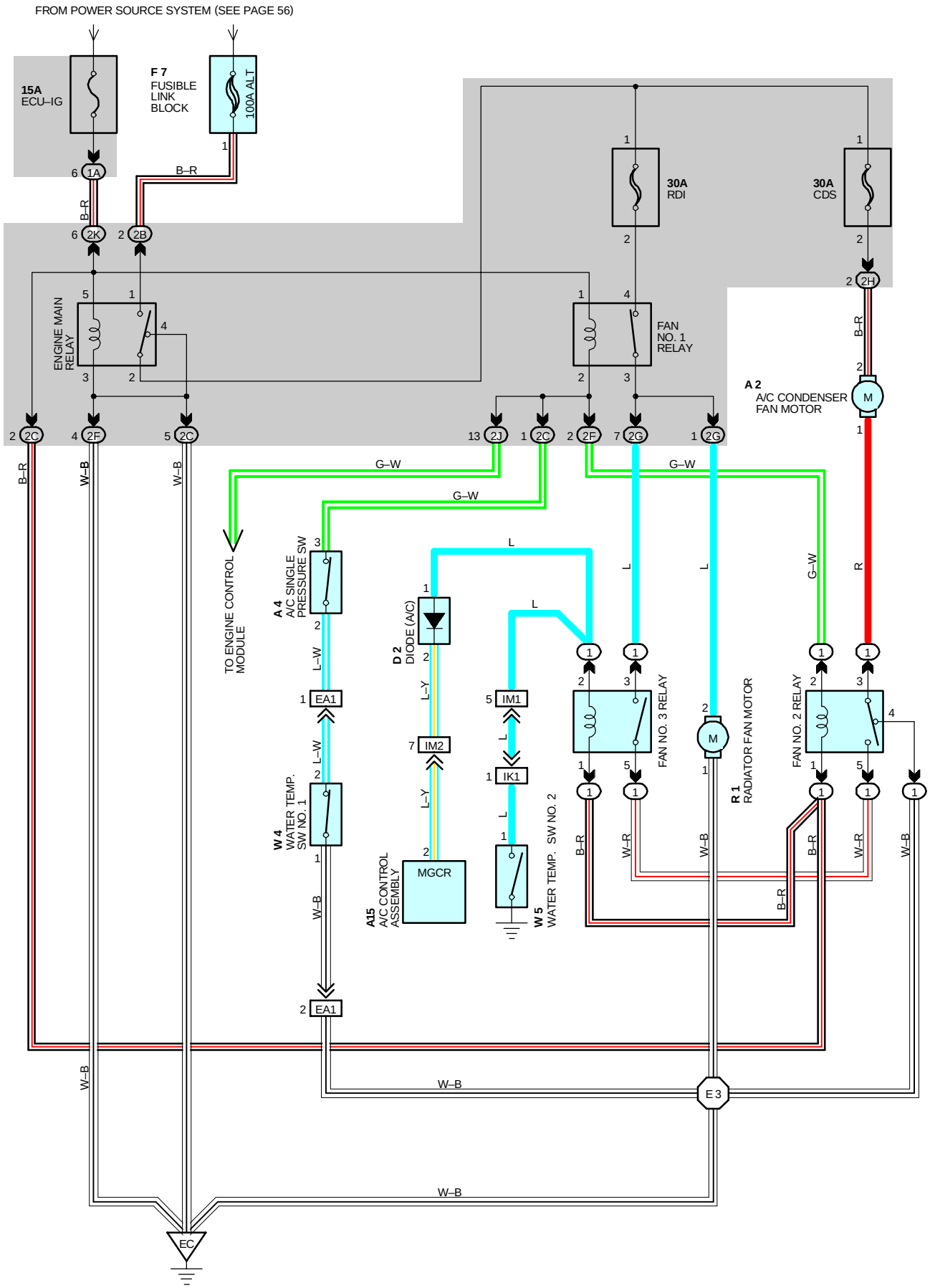
W 4 WATER TERMP. SW NO. 1

2–1 : OPEN ABOVE APPROX. **95**°C (**203**°F)

W 5 WATER TEMP. SW NO. 2

1–GROUND : CLOSE ABOVE APPROX. **90**°C (**198**°F)

RADIATOR FAN AND CONDENSER FAN



: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE	SEE PAGE
A 2	26	D 2	26	W 4	27
A 4	26	F 7	26	W 5	27
A15	28	R 1	27		

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
1	22	ENGINE ROOM R/B (ENGINE COMPARTMENT LEFT)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1A	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
2B	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2C		
2F		
2G		
2H		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2K		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EA1	34	ENGINE ROOM MAIN WIRE AND ENGINE ROOM MAIN NO. 3 WIRE (BEHIND HEADLIGHT LH)
IK1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IM1	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)
IM2		

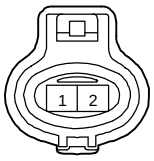
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EC	34	LEFT RADIATOR SIDE SUPPORT

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E 3	34	ENGINE ROOM MAIN WIRE			

A 2 GRAY



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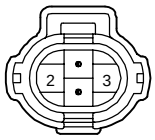

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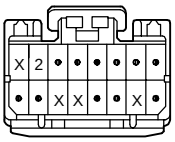

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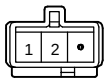

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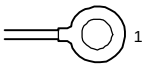

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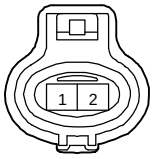


W 4 GRAY

W 5 GRAY

SYSTEM OUTLINE

1. HEATER BLOWER MOTOR OPERATION

CURRENT IS APPLIED AT ALL TIMES THROUGH **HTR** FUSE TO **TERMINAL 1** OF THE HTR RELAY. WHEN THE IGNITION SW IS TURNED ON, CURRENT FLOWS THROUGH THE **HEATER** FUSE TO **TERMINAL 5** OF THE HTR RELAY ➔ **TERMINAL 3** ➔ **TERMINAL HR** OF THE A/C CONTROL ASSEMBLY. AT THE SAME TIME, CURRENT ALSO FLOWS FROM **HEATER** FUSE TO **TERMINAL IG+** OF THE A/C CONTROL ASSEMBLY.

* LOW SPEED OPERATION
  WHEN THE BLOWER SW (A/C CONTROL ASSEMBLY) IS PUSHED TO **LOW SPEED** POSITION, THE CURRENT TO **TERMINAL HR** OF THE A/C CONTROL ASSEMBLY FLOWS TO **TERMINAL GND** OF THE A/C CONTROL ASSEMBLY ➔ **GROUND** AND TURNS THE HTR RELAY ON. AS A RESULT, THE CURRENT TO **TERMINAL 1** OF THE HTR RELAY FLOWS TO **TERMINAL 2** OF THE RELAY ➔ **TERMINAL 2** OF THE BLOWER MOTOR **TERMINAL 1** ➔ **TERMIANL 1** OF THE BLOWER RESISTOR ➔ **TERMINAL 2** ➔ **GROUND** AND CAUSES THE BLOWER MOTOR TO ROTATE AT LOW SPEED.
* HIGH SPEED OPERATION
  WHEN THE BLOWER SW (A/C CONTROL ASSEMBLY) IS PUSHED TO **HIGH SPEED** POSITION, THE CURRENT TO **TERMINAL HR** OF THE A/C CONTROL ASSEMBLY FLOWS TO **TERMINAL GND** OF THE A/C CONTROL ASSEMBLY ➔ **GROUND** AND TURNS THE HTR RELAY ON. AS A RESULT, THE CURRENT TO **TERMIANL 1** OF THE HTR RELAY FLOWS TO **TERMINAL 2** ➔ **TERMINAL 2** OF THE BLOWER MOTOR **TERMINAL 1** ➔ **TERMINAL 4** OF THE A/C BLOWER MOTOR LINEAR CONTROLLER ➔ **TERMINAL 2** ➔ **TERMINAL BLW** OF THE A/C CONTROL ASSEMBLY (WHICH IS ACTIVATED WHEN THE BLOWER SW IS PUSHED TO HIGH SPEED POSITION) ➔ **TERMINAL GND** ➔ **GROUND** WITHOUT PASSING THROUGH THE BLOWER RESISTOR, CAUSING THE BLOWER MOTOR TO ROTATE AT HIGH SPEED.

2. AIR INLET CONTROL SERVO MOTOR OPERATION

(SWITCHING FROM FRESH TO RECIRC)

WITH THE IGNITION SW TURNED ON, THE CURRENT FLOWS FROM HEATER FUSE TO **TERMINAL IG+** OF THE A/C CONTROL ASSEMBLY ➔ **TERMINAL AIR** ➔ **TERMINAL 7** OF THE AIR INLET CONTROL SERVO MOTOR **TERMINAL 6** ➔ **TERMINAL AIF** OF THE A/C CONTROL ASSEMBLY ➔ **TERMINAL GND** ➔ **GROUND**. THE MOTOR ROTATES AND THE DAMPER MOVES TO THE **RECIRC** SIDE. WHEN THE DAMPER OPERATES WITH THE A/C SW AT **RECIRC** POSITION, THE DAMPER POSITION SIGNAL IS INPUT FROM **TERMINAL 5** OF THE SERVO MOTOR TO **TERMINAL TPI** OF THE ECU (BUILT INTO THE A/C CONTROL ASSEMBLY). AS A RESULT, CURRENT TO THE SERVO MOTOR CIRCUIT IS CUT OFF BY THE ECU, SO THE DAMPER STOPS AT THAT POSITION.

(SWITCHING FROM RECIRC TO FRESH)

WITH THE IGNITION SW TURNED ON, WHEN THE RECIRC/FRESH SW IS SWITCHED TO THE FRESH SIDE, THE CURRENT FLOWS FROM **TERMINAL IG+** OF THE A/C CONTROL ASSEMBLY ➔ **TERMINAL AIF** ➔ **TERMINAL 6** OF THE AIR INLET CONTROL SERVO MOTOR ➔ **TERMINAL 7** ➔ **TERMINAL AIR** OF THE A/C CONTROL ASSEMBLY **TERMINAL GND** ➔ **GROUND,** THE MOTOR ROTATES AND THE DAMPER STOPS AT THAT POSITION.

3. AIR VENT MODE CONTROL SERVO MOTOR OPERATION

WHEN THE IGNITION SW TURNED ON, THE CURRENT FLOWS FROM **HEATER** FUSE TO **TERMINAL IG+** OF THE A/C CONTROL ASSEMBLY.

(SWITCHING FROM DEF TO FACE)

THE CURRENT FLOWS FROM **TERMINAL FACE** OF THE A/C CONTROL ASSEMBLY ➔ **TERMINAL 4** OF THE AIR VENT MODE CONTROL SERVO MOTOR ➔ **TERMINAL 8** ➔ **TERMINAL DEF** OF THE A/C CONTROL ASSEMBLY ➔ **TERMINAL GND** ➔ **GROUND.** THE MOTOR ROTATES AND THE DAMPER MOVES TO THE FACE SIDE. WHEN TE DAMPER OPERATES WITH THE A/C SW AT FACE POSITION, THE DAMPER POSITION SIGNAL IS INPUT FROM **TERMINAL 8** OF THE SERVO MOTOR TO THE **TERMINAL DEF** OF THE ECU (BUILT INTO THE A/C CONTROL ASSEMBLY). AS A RESULT, CURRENT TO THE SERVO MOTOR CIRCUIT IS CUT OFF BY THE ECU, SO THE DAMPER STOPS AT THAT POSITION.

(SWITCHING FROM FACE TO DEF)

THE CURRENT FLOWS FROM **TERMINAL DEF** OF THE A/C CONTROL ASSEMBLY ➔ **TERMINAL 8** OF THE AIR VENT CONTROL SERVO MOTOR ➔ **TERMINAL** ➔ **4 TERMINAL FACE** OF THE A/C CONTROL ASSEMBLY ➔ **TERMINAL GND** ➔ **GROUND**, THE MOTOR ROTATES AND THE DAMPER STOPS AT THAT POSITION.

4. AIR MIX CONTROL SERVO MOTOR OPERATION

WHEN THE TEMPERATURE CONTROL SW (A/C CONTROL ASSEMBLY) IS TURNED TO THE “COOL” SIDE THE CURRENT FLOWS FROM **TERMINAL AMC** OF THE A/C CONTROL ASSEMBLY ➔ **TERMINAL 1** OF THE AIR MIX CONTROL SERVO MOTOR ➔ MOTOR ➔ **TERMINAL 2** ➔ **TERMINAL AMH** OF THE A/C CONTROL ASSEMBLY ➔ **GROUND** AND THE MOTOR ROTATES. THE DAMPER OPENING ANGLE AT THIS TIME IS INPUT FROM **TERMINAL 3** OF THE SERVO MOTOR TO **TERMINAL TP** OF THE A/C CONTROL ASSEMBLY. THIS IS USED TO DETERMINE THE **DAMPER STOP** POSITION AND MAINTAIN THE SET TEMPERATURE.

WHEN THE TEMPERATURE CONTROL SW (A/C CONTROL ASSEMBLY) IS TURNED TO THE “HOT” SIDE, THE CURRENT FLOWS FROM SERVO MOTOR ➔ **TERMINAL AMH** OF THE A/C CONTROL ASSEMBLY ➔ **TERMINAL 2** OF THE AIR MIX CONTROL SERVO MOTOR ➔ MOTOR ➔ **TERMINAL 1** ➔ **TERMINAL AMC** OF THE A/C CONTROL ASSEMBLY, ROTATING THE MOTOR IN REVERSE AND SWITCHING THE DAMPER FROM “COOL” TO “HOT” SIDE.

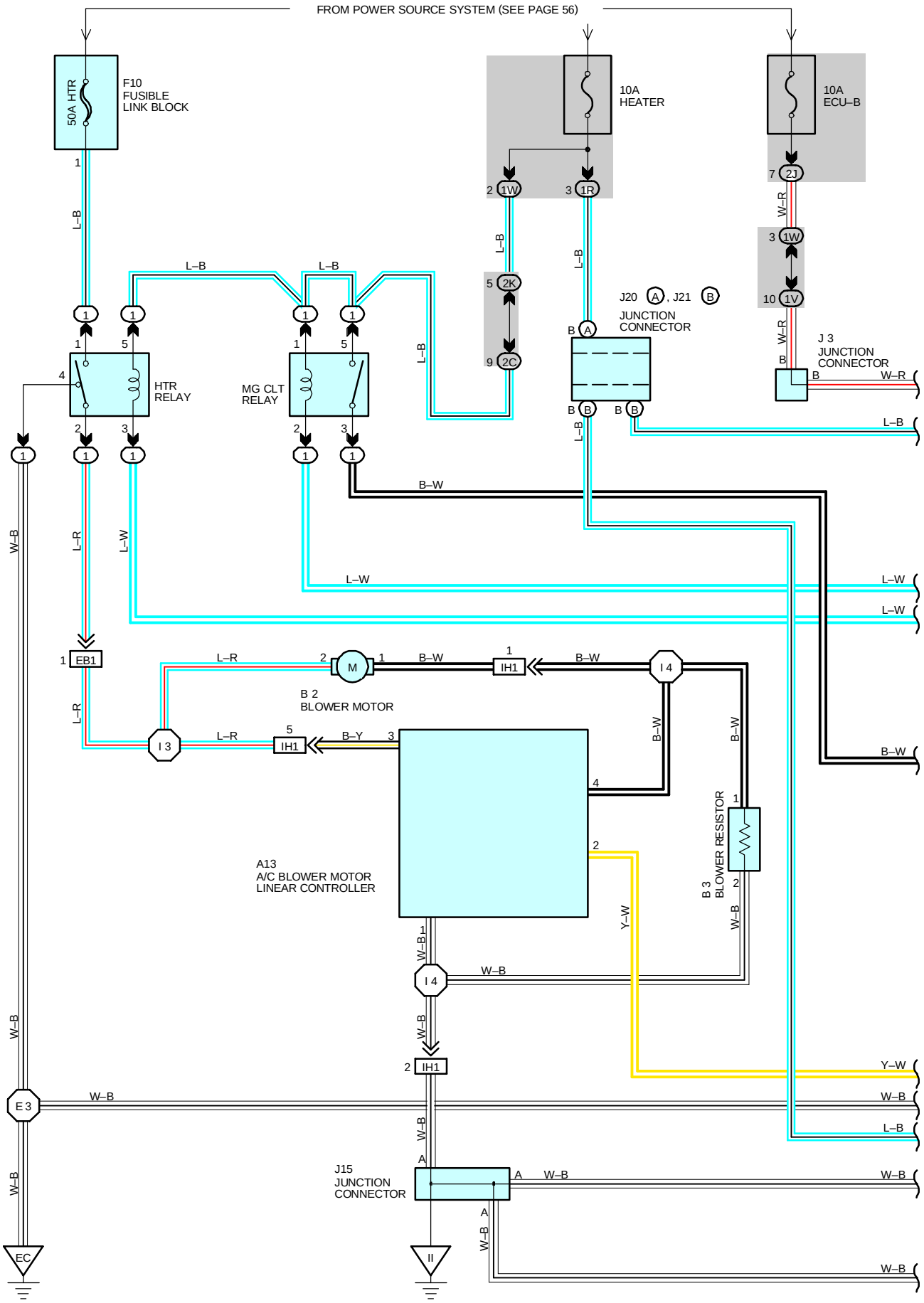
5. AIR CONDITIONING OPERATION

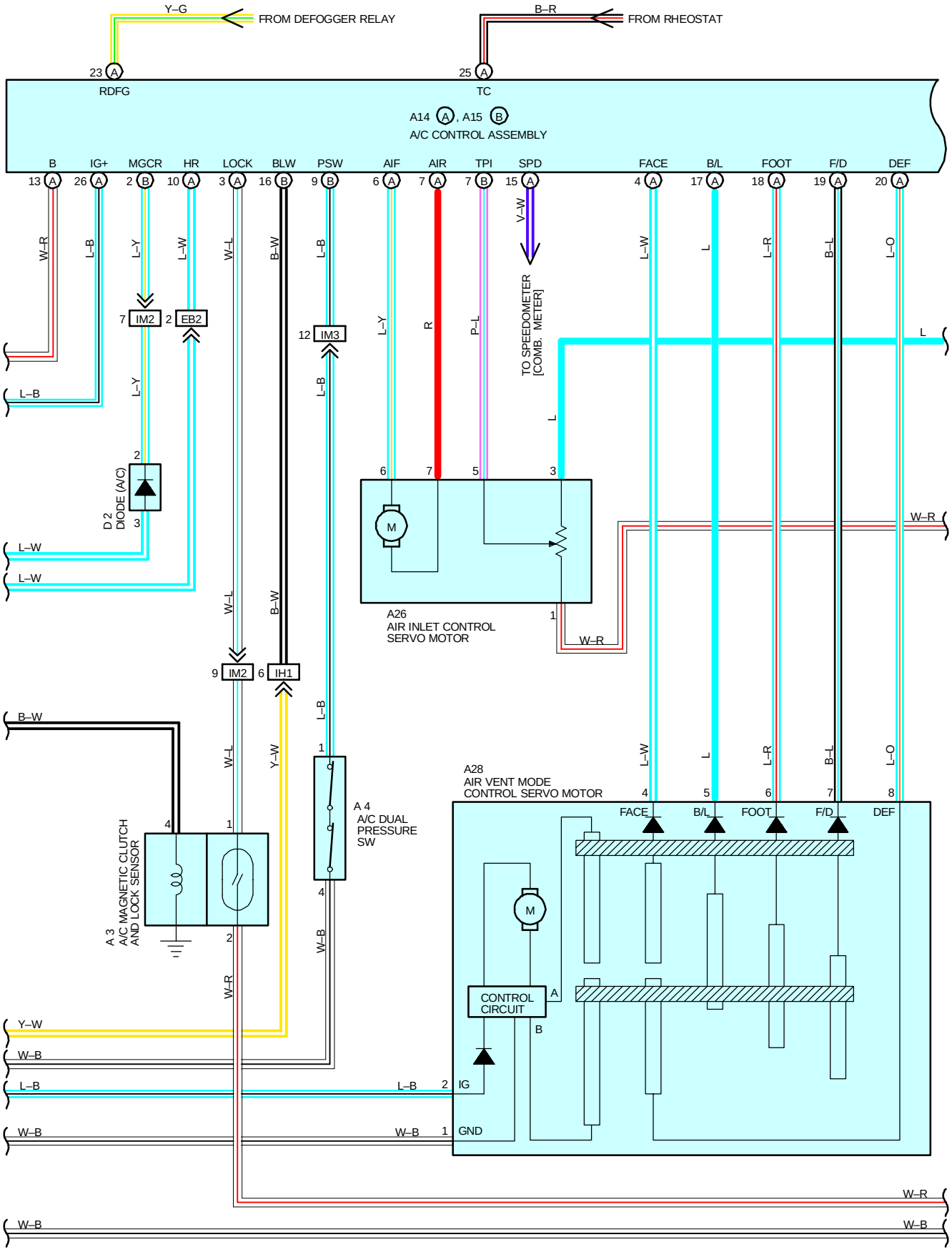
THE A/C CONTROL ASSEMBLY RECEIVES VARIOUS SIGNALS, I.E., THE ENGINE RPM FROM THE ENGINE CONTROL MODULE, OUT SIDE AIR TEMPERATURE SIGNAL FROM THE A/C AMBIENT TEMP. SENSOR, COOLANT TEMPERATURE FROM THE ENGINE CONTROL MODULE AND THE LOCK SIGNAL FROM THE A/C COMPRESSOR, ETC. WHEN THE ENGINE IS STARTED AND THE A/C SW (A/C CONTROL ASSEMBLY) IS ON, A SIGNAL IS INPUT TO THE ECU. (BUILT IN THE A/C CONTROL ASSEMBLY).

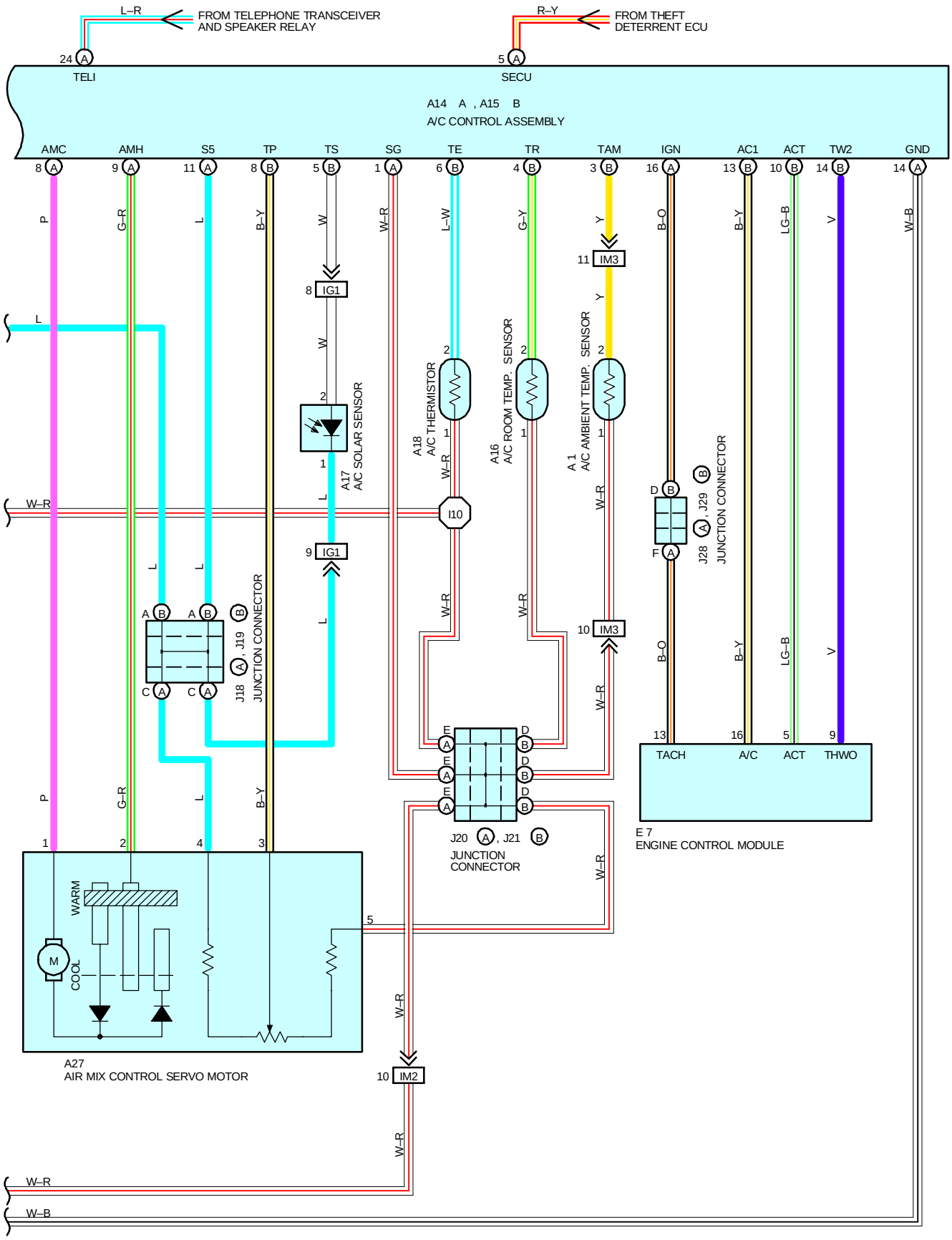
AS A RESULT, THE GROUND CIRCUIT IN A/C CONTROL ASSEMBLY IS CLOSED AND CURRENT FLOWS FROM **HEATER** FUSE TO **TERMINAL 1** OF THE MG CLT RELAY ➔ **TERMINAL 2** ➔ **TERMINAL MGCR** OF THE A/C CONTROL ASSEMBLY ➔ **TERMINAL GND** ➔ **GROUND**, TURNING THE MG CLT RELAY ON, SO THAT THE MAGNETIC CLUTCH IS ON AND THE A/C COMPRESSOR OPERATES.

AT THE SAME TIME, THE ENGINE CONTROL MODULE DETECTS THE MAGNETIC CLUTCH IS ON AND THE A/C COMPRESSOR OPERATES. IF THE A/C CONTROL ASSEMBLY DETECTS THE FOLLOWING CONDITIONS, IT STOPS THE AIR CONDITIONING:

- EVAPORATOR OUTLET AIR IS TOO LOW.
- THERE IS A MARKED DIFFERENCE BETWEEN THE COMPRESSOR SPEED AND THE ENGINE SPEED.
- THE REFRGIRANT PRESSURE IS ABNORMALLY HIGH OR ABNORMALLY LOW.
- THE ENGINE SPEED IS TOO LOW.
- RAPID ACCELERATION OCCURS.


FROM POWER SOURCE SYSTEM (SEE PAGE 56)
50A HTR
F10
FUSIBLE
LINK BLOCK
10A
HEATER
10A
ECU–B
HTR
RELAY
MG CLT
RELAY
J20 A , J21 B
JUNCTION
CONNECTOR
J 3
JUNCTION
CONNECTOR
EB1
M
B 2
BLOWER MOTOR
IH1
I 4
I 3
A13
A/C BLOWER MOTOR
LINEAR CONTROLLER
B 3
BLOWER RESISTOR
J15
JUNCTION
CONNECTOR
E 3
EC
II
L–B
L–R
L–W
W–B
B–W
B–Y
Y–W
W–R


Y–G
FROM DEFOGGER RELAY
B–R
FROM RHEOSTAT
23 A
RDFG
25 A
TC
A14 A, A15 B
A/C CONTROL ASSEMBLY
B
IG+
MGCR
HR
LOCK
BLW
PSW
AIF
AIR
TPI
SPD
FACE
B/L
FOOT
F/D
DEF
13 A
26 A
2 B
10 A
3 A
16 B
9 B
6 A
7 A
7 B
15 A
4 A
17 A
18 A
19 A
20 A
W–R
L–B
L–Y
L–W
W–L
B–W
L–B
L–Y
R
P–L
V–W
TO SPEEDOMETER [COMB. METER]
L–W
L
L–R
B–L
L–O
L
7 IM2
2 EB2
12 IM3
D 2
DIODE (A/C)
2
3
L–B
L–Y
L–W
L–W
6
7
5
3
M
A26
AIR INLET CONTROL SERVO MOTOR
1
W–R
W–R
9 IM2
6 IH1
W–L
B–W
L–B
B–W
W–L
Y–W
1
4
A 4
A/C DUAL PRESSURE SW
A28
AIR VENT MODE CONTROL SERVO MOTOR
4
5
6
7
8
FACE
B/L
FOOT
F/D
DEF
A 3
A/C MAGNETIC CLUTCH AND LOCK SENSOR
4
1
2
W–R
W–B
M
CONTROL CIRCUIT
A
B
Y–W
W–B
L–B
L–B
2 IG
W–B
W–B
1 GND
W–R
W–B
W–B


L–R
FROM TELEPHONE TRANSCEIVER AND SPEAKER RELAY
R–Y
FROM THEFT DETERRENT ECU
24 A
TELI
5 A
SECU
A14 A , A15 B
A/C CONTROL ASSEMBLY
AMC AMH S5 TP TS SG TE TR TAM IGN AC1 ACT TW2 GND
8 A 9 A 11 A 8 B 5 B 1 A 6 B 4 B 3 B 16 A 13 B 10 B 14 B 14 A
P G–R L B–Y W W–R L–W G–Y Y B–O B–Y LG–B V W–B
11 IM3
8 IG1
W
2
A17 A/C SOLAR SENSOR
1
L
9 IG1
A18 A/C THERMISTOR
A16 A/C ROOM TEMP. SENSOR
A 1 A/C AMBIENT TEMP. SENSOR
W–R
I10
10 IM3
D B
F A
B
A
J28 , J29 JUNCTION CONNECTOR
A B A B B
C A C A A
J18 , J19 JUNCTION CONNECTOR
E D
A B
J20 A , J21 B
JUNCTION CONNECTOR
13 16 5 9
TACH A/C ACT THWO
E 7
ENGINE CONTROL MODULE
1 2 4 3
WARM
COOL
M
5
A27
AIR MIX CONTROL SERVO MOTOR
10 IM2
W–R
W–B

SERVICE HINTS

A4 A/C DUAL PRESSURE SW

4–1 : OPEN ABOVE APPROX. **15.5** KG/CM^2 (**30** PSI, **206** KPA) OR **32** KG/CM^2 (**455** PSI, **3138** KPA)

A3 A/C MAGNETIC CLUTCH

4–GROUND : APPROX. 3.7Ω

A14 (A), A15 (B) A/C CONTROL ASSEMBLY

B–GROUND : ALWAYS APPROX. 12 VOLTS
IG+–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT ON POSITION
HR–GROUND : APPROX. **12** VOLTS WITH THE IGNITION SW AT ON POSTIION AND DO NOT TURN THE BLOWER MOTOR
BELOW **1** VOLT WITH THE IGNITION SW AT ON POSITION AND TURN THE BLOWER MOTOR
PSW–GROUND : BELOW **1** VOLT WITH THE IGNITION SW ON
AC1–GROUND : BELOW **1** VOLT AT START THE ENGINE, OPERATE THE COMPRESSOR
+OR MORE VOLTS AT START THE ENGINE. DO NOT OPERATE THE COMPRESSOR
BLW–GROUND : BELOW **1.5** VOLTS WITH THE IGNITION SW ON AND TURN THE BLOWER MOTOR
S5–SG : **4–6** VOLTS WITH THE IGNITION SW ON
SG–GROUND : ALWAYS CONTINUITY
AMH–AMC : **1.3–1.9** VOLTS WITH THE IGNITION SW OFF
AIF–GROND : APPROX. **12** VOLTS WITH THE FRESH SW ON
AIR–GROUND ; APPROX. **12** VOLTS WITH THE RECIRC SW ON
FACE–GROUND : APPROX. **12** VOLTS WITH THE FACE SW ON
DEF–GROUND : APPROX. **12** VOLTS WITH THE DEF SW ON
GND–GROUND : ALWAYS CONTINUITY

: PARTS LOCATION

CODE	SEE PAGE	CODE	SEE PAGE	CODE		SEE PAGE
A1	26	A26	28	J15		29
A3	26	A27	28	J18	A	29
A4	26	A28	28	J19	B	29
A13	28	B2	28	J20	A	29
A14 A	28	B3	28	J21	B	29
A15 B	28	D2	26	J28	A	29
A16	28	E7	28	J29	B	29
A17	28	F10	26			
A18	28	J3	29			

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
1	22	ENGINE ROOM R/B (ENGINE COMPARTMENT LEFT)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1R 1V 1W	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
2C	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2J 2K	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EB1 EB2	34	COWL WIRE AND ENGINE ROOM MAIN WIRE (UNDER THE ENGINE ROOM J/B)
IG1	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)
IH1	36	COWL WIRE AND A/C SUB WIRE (BEHIND RADIO AND PLAYER)
IM2 IM3	38	ENGINE ROOM MAIN WIRE AND COWL WIRE (RIGHT KICK PANEL)

: GROUND POINTS

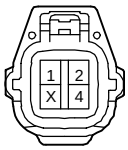
CODE	SEE PAGE	GROUND POINTS LOCATION
EC	34	LEFT RADIATOR SIDE SUPPORT
II	36	INSTRUMENT PANEL BRACE LH

: SPLICE POINTS

CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E3	34	ENGINE ROOM MAIN WIRE	I4	38	A/C SUB WIRE
I3	38	COWL WIRE	I10	38	COWL WIRE

A 1 DARK GRAY

A 3 GRAY



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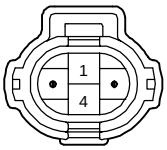

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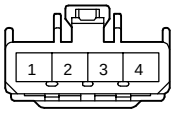
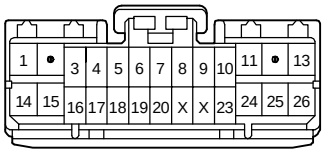
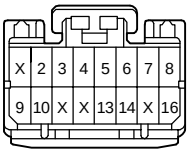


A14 (A)



A15 (B)



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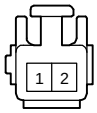

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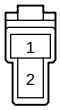
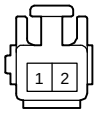


A18



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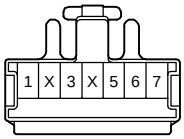
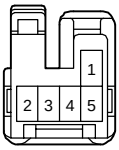


A27



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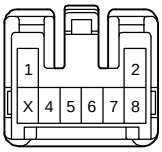
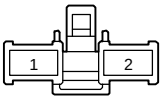
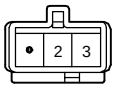


B 2

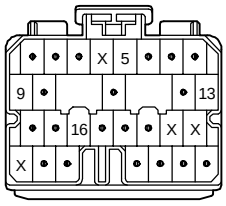


B 3 BLACK

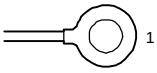
D 2 ORANGE



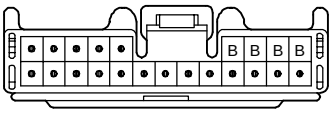
E 7



F10

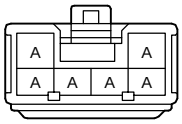


J 3



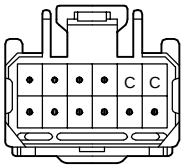
(HINT : SEE PAGE 7)

J15



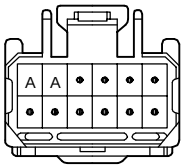
(HINT : SEE PAGE 7)

J18 (A) BLACK



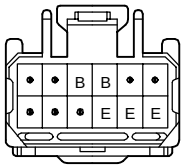
(HINT : SEE PAGE 7)

J19 (B) BLACK



(HINT : SEE PAGE 7)

J20 (A) BLACK



(HINT : SEE PAGE 7)

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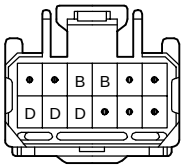
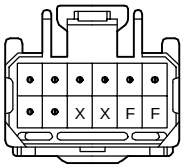


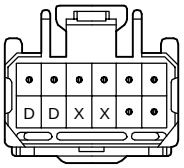
(HINT : SEE PAGE 7)

J28 (A)



(HINT : SEE PAGE 7)

J29 (B)

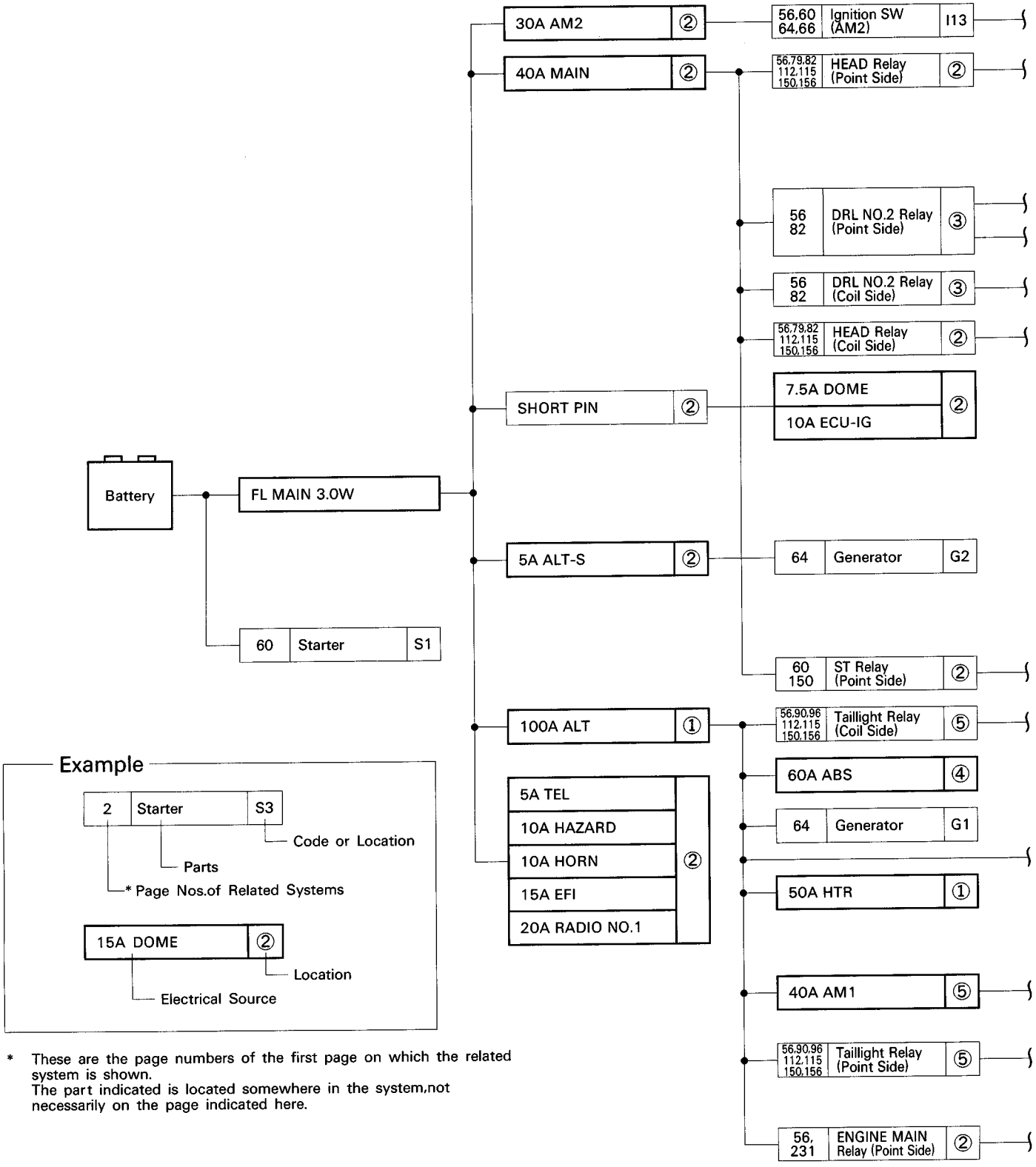


(HINT : SEE PAGE 7)

H POWER SOURCE (Current Flow Chart)

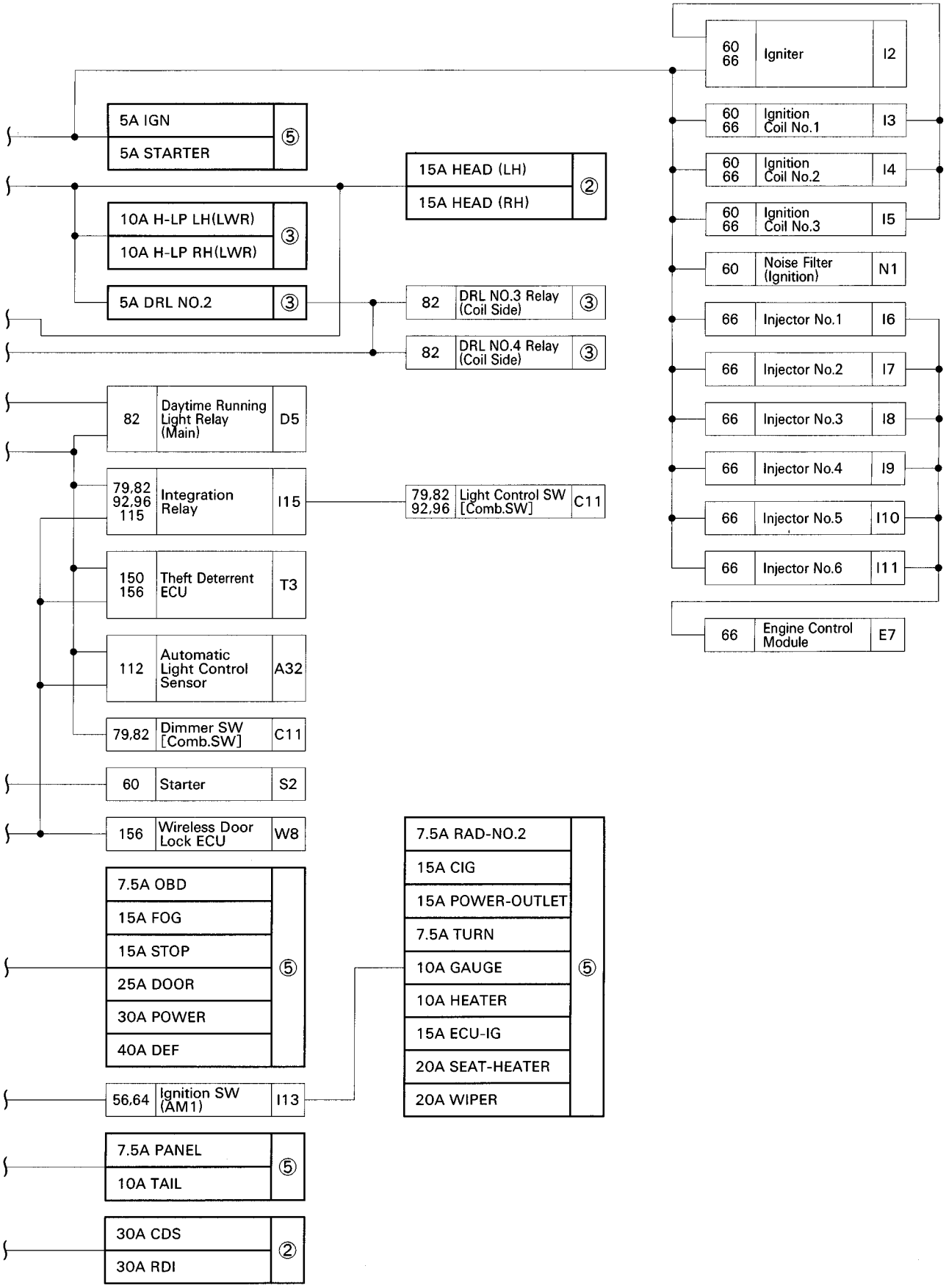
The chart below shows the route by which current flows from the battery to each electrical source (Fusible Link,Circuit Breaker,Fuse,etc.)and other parts.

The next page and following pages show the parts to which each electrical source outputs current.



* These are the page numbers of the first page on which the related system is shown.
The part indicated is located somewhere in the system,not necessarily on the page indicated here.

[LOCATION] ①:Fusible Link Block (See Page 22) ②:Engine Room J/B (See Page 20)
⑤:Instrument Panel J/B (See Page 24)



③:Engine Room No.2 R/B (See Page 23) ④:Engine Room No.3 R/B (See Page 23)

H POWER SOURCE (Current Flow Chart)

		*Page Nos.of Related Systems	231	234	231	198	190	234	66 96 214 234	231 234	190	190	190	198	198	184	96	234	203	112	224	234	234	220
		Parts	A/C Condenser Fan Motor	A/C Magnetic Clutch and Lock Sensor	A/C Single Pressure SW	ABS Actuator	ABS and Traction Actuator	A/C Blower Motor Linear Controller	A/C Control Assembly	A/C Control Assembly	ABS and Traction ECU	ABS and Traction ECU	ABS and Traction ECU	ABS ECU	ABS ECU	Absorber Control ECU	Absorber Control SW	Air Vent Mode Control Servo Motor	Airbag Sensor Assembly	Automatic Light Control Sensor	Brake Fluid Level Warning SW	Blower Motor	Blower Resistor	CD Automatic Changer
		Code or Location																						
		CB or Fuse	A2	A3	A4	A6	A7	A13	A14	A15	A19	A20	A21	A22	A23	A24	A25	A28	A29	A32	B1	B2	B3	C4
①	50A	HTR						●														●	●	
②	5A	TEL																						
	7.5A	DOME																		●				
	10A	ECU-B							●										●					
	10A	HAZARD																						
	10A	HORN																						
	15A	EFI																						
	15A	HEAD(LH)																						
	15A	HEAD(RH)																						
	20A	RADIO NO.1																						●
	30A	CDS	●																					
	30A	RDI																						
③	10A	H-LP LH(LWR)																						
	10A	H-LP RH(LWR)																						
④	60A	ABS				●	●				●		●		●									
⑤	5A	IGN																	●					
	5A	STARTER																						
	7.5A	OBD																						
	7.5A	PANEL							●								●							
	7.5A	RAD-NO.2																						●
	7.5A	TURN																						
	10A	GAUGE				●	●		●		●	●	●	●	●						●			
	10A	HEATER		●					●	●								●						
	10A	MIRROR-HEATER																						
	10A	TAIL																						
	15A	CIG																	●					
	15A	ECU-IG			●					●		●		●		●				●				
	15A	FOG																						
	15A	POWER-OUTLET																						
	15A	STOP										●		●		●								
	25A	DOOR																						
	20A	SEAT-HEATER																						
	20A	WIPER																						
	30A	POWER																						
	40A	DEF																						

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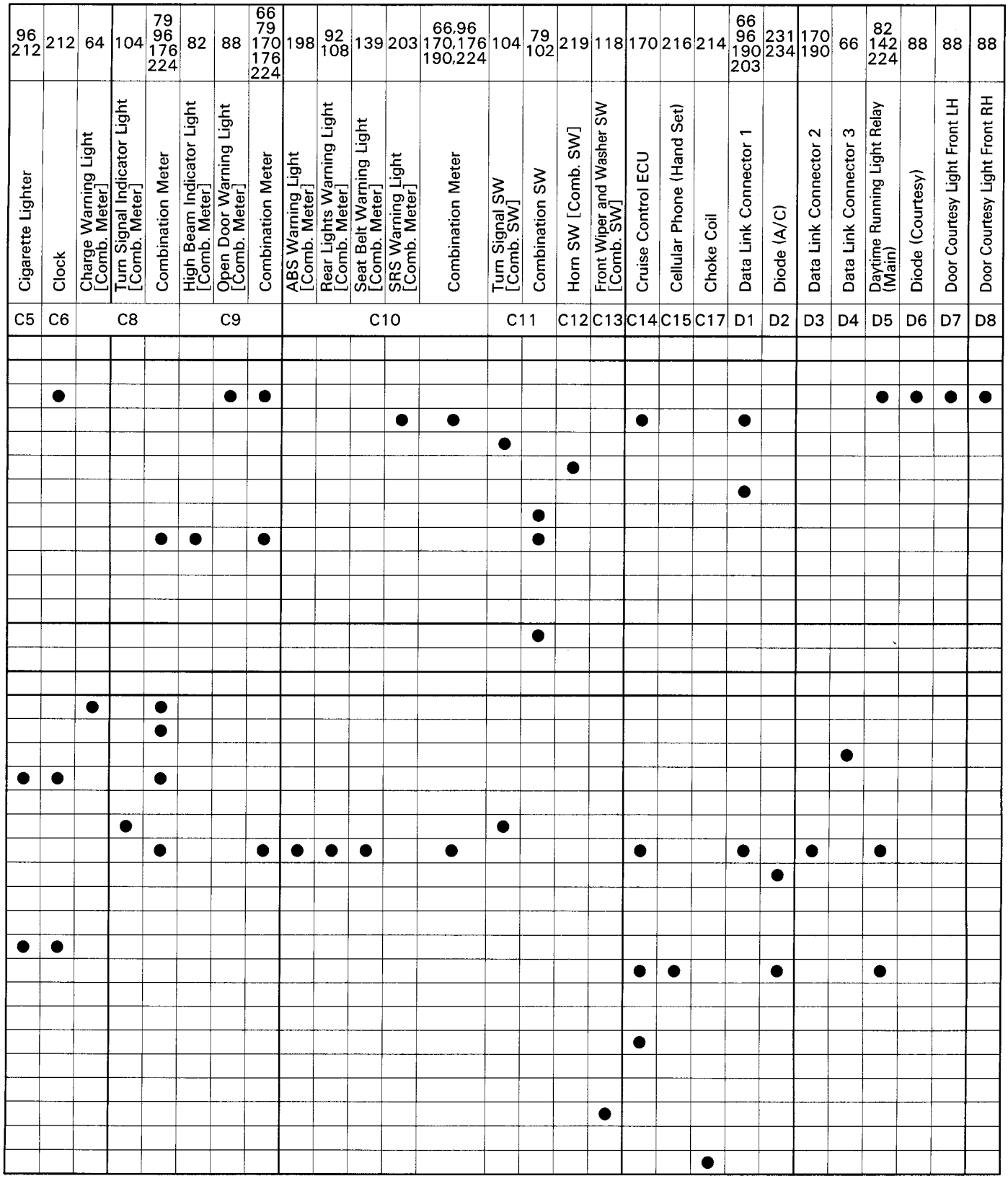
[LOCATION] ①:Fusible Link Block(See page 22) ②:Engine Room J/B(See page 20)
⑤:Instrument Panel J/B(See Page 24) ⑥:Engine Room R/B(See page 22)



③:Engine Room No.2 R/B (See page 23) ④:Engine Room No.3 R/B (See page 23)

H POWER SOURCE (Current Flow Chart)

CB or Fuse		*Page Nos.of Related Systems	88	88	88	88	224	60 66	66	66	66 76	102	102	92 104	92 104	118	102	166	166	66 224	64	96	96
		Parts	Door Courtesy SW Front LH	Door Courtesy SW Front RH	Door Courtesy SW Rear LH	Door Courtesy SW Rear RH	Engine Oil Level Warning SW	Engine Control Module	Engine Control Module	Engine Control Module	Engine Control Module	Front Fog Light LH	Front Fog Light RH	Front Turn Signal and Front Parking Light LH	Front Turn Signal and Front Parking Light RH	Front Wiper Motor	Front Fog Light Relay	Fuel Lid and Luggage Compartment Door Opener SW	Fuel Lid Opener Solenoid	Fuel Pump and Fuel Sender	Generator	Glove Box Light	Glove Box Light SW
		Code or Location	D9	D10	D11	D12	E6	E7	E8	E9	E10	F1	F2	F3	F4	F5	F12	F13	F18	F19	G2	G3	G4
①	50A	HTR																					
②	5A	TEL																					
	7.5A	DOME	●	●	●	●																	
	10A	ECU-B																					
	10A	HAZARD												●	●								
	10A	HORN																					
	15A	EFI						●	●	●	●									●			
	15A	HEAD(LH)																					
	15A	HEAD(RH)															●						
	20A	RADIO NO.1																					
	30A	CDS																					
	30A	RDI																					
③	10A	H-LP LH(LWR)															●						
	10A	H-LP RH(LWR)																					
④	60A	ABS																					
⑤	5A	IGN																			●		
	5A	STARTER						●															
	7.5A	OBD																					
	7.5A	PANEL																				●	●
	7.5A	RAD-NO.2																					
	7.5A	TURN												●	●								
	10A	GAUGE					●			●	●									●	●		
	10A	HEATER																					
	10A	MIRROR-HEATER									●												
	10A	TAIL									●			●	●								
	15A	CIG																					
	15A	ECU-IG																					
	15A	FOG										●	●				●						
	15A	POWER-OUTLET																					
	15A	STOP									●												
	25A	DOOR																●	●				
	20A	SEAT-HEATER																					
	20A	WIPER														●							
	30A	POWER																					
	40A	DEF																					

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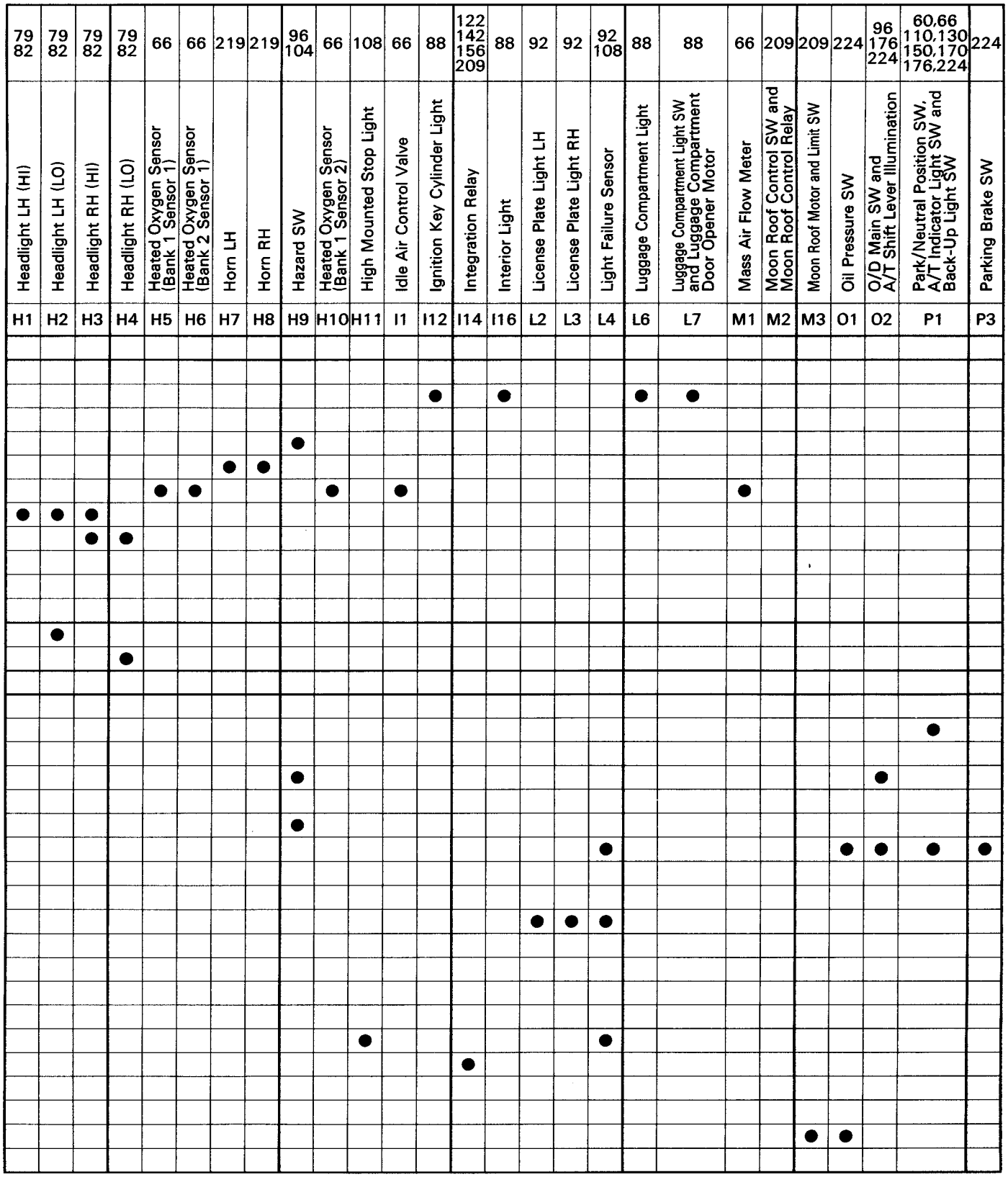
⑤:Instrument Panel J/B(See Page 24) ⑥:Engine Room R/B(See page 22)



③:Engine Room No.2 R/B (See page 23) ④:Engine Room No.3 R/B (See page 23)

H POWER SOURCE (Current Flow Chart)

			*Page Nos.of Related Systems	121	88	122	122	122	122 142	122	122	122	122	130	136	136	136	130	136	136	136	136	136	136
			Parts	Power Outlet	Personal Light	Power Window Control SW Front RH	Power Window Control SW Rear LH	Power Window Control SW Rear RH	Power Window Master SW and Door Lock Control SW Front LH	Power Window Motor Front LH	Power Window Motor Front RH	Power Window Motor Rear LH	Power Window Motor Rear RH	Power Seat Control SW (Driver's Seat Lumber Support Control)	Power Seat Control SW (Driver's Seat)	Power Seat Control SW (Front Passenger's Seat)	Power Seat Motor (Driver's Seat Front Vertical Control)	Power Seat Motor (Driver's Seat Lumber Support Control)	Power Seat Motor (Driver's Seat Rear Vertical Control)	Power Seat Motor (Driver's Seat Reclining Control)	Power Seat Motor (Driver's Seat Slide Control)	Power Seat Motor (Front Passenger's Seat Front Vertical Control)	Power Seat Motor (Front Passenger's Seat Rear Vertical Control)	Power Seat Motor (Front Passenger's Seat Reclining Control)
			Code or Location																					
			CB or Fuse	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21	P22	P23	P24
①	50A	HTR																						
②	5A	TEL																						
	7.5A	DOME		●																				
	10A	ECU-B																						
	10A	HAZARD																						
	10A	HORN																						
	15A	EFI																						
	15A	HEAD(LH)																						
	15A	HEAD(RH)																						
	20A	RADIO NO.1																						
	30A	CDS																						
	30A	RDI																						
③	10A	H-LP LH(LWR)																						
	10A	H-LP RH(LWR)																						
④	60A	ABS																						
⑤	5A	IGN																						
	5A	STARTER																						
	7.5A	OBD																						
	7.5A	PANEL																						
	7.5A	RAD-NO.2																						
	7.5A	TURN																						
	10A	GAUGE																						
	10A	HEATER																						
	10A	MIRROR-HEATER																						
	10A	TAIL																						
	15A	CIG																						
	15A	ECU-IG																						
	15A	FOG																						
	15A	POWER-OUTLET		●																				
	15A	STOP																						
	25A	DOOR																						
	20A	SEAT-HEATER																						
	20A	WIPER																						
	30A	POWER				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	40A	DEF																						

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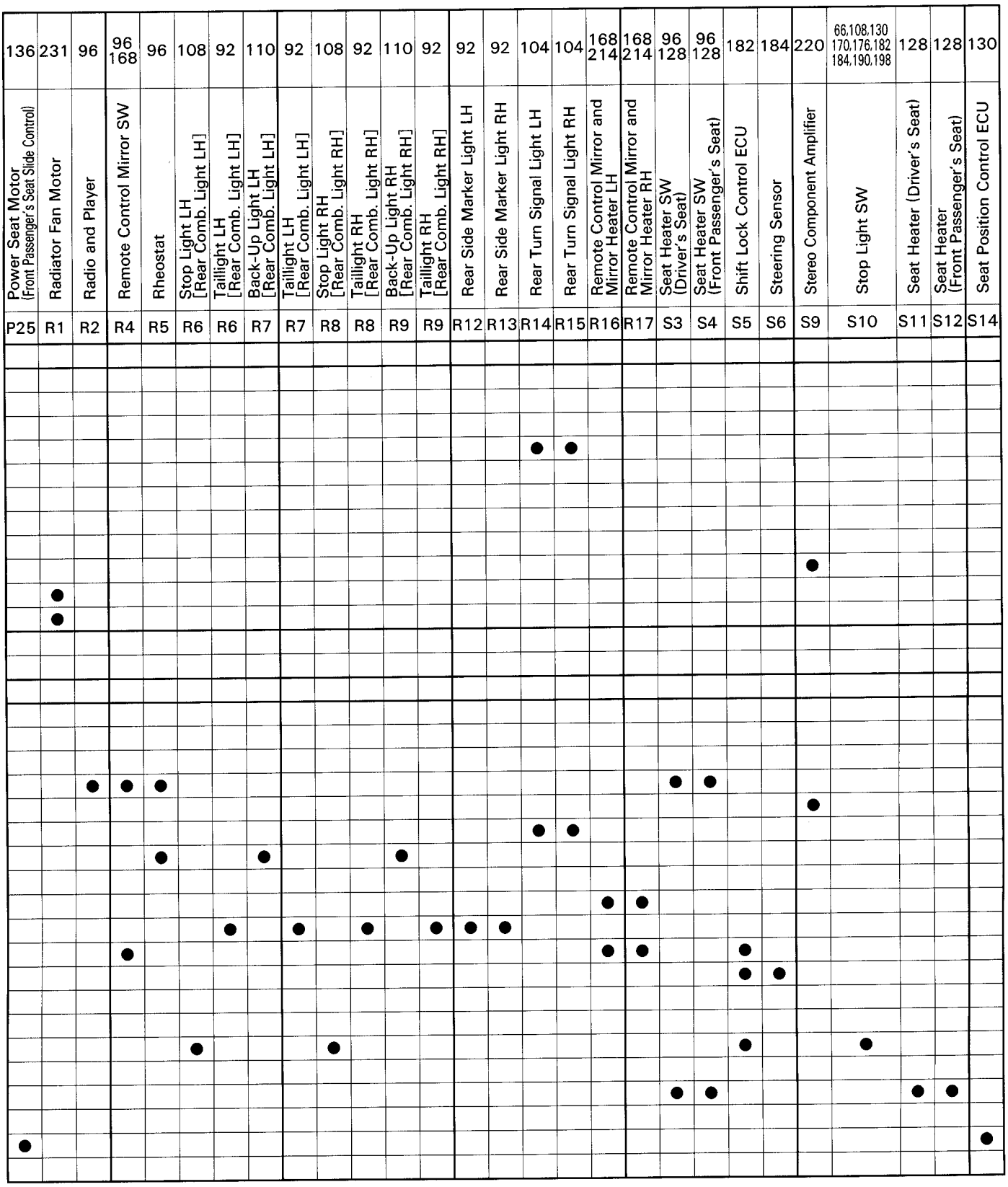
[LOCATION] ①:Fusible Link Block(See page 22) ②:Engine Room J/B(See page 20)
⑤:Instrument Panel J/B(See Page 24) ⑥:Engine Room R/B(See page 22)



③:Engine Room No.2 R/B (See page 23) ④:Engine Room No.3 R/B (See page 23)

H POWER SOURCE (Current Flow Chart)

		*Page Nos.of Related Systems	130	150 156	60 150 156 166	150 156	104	216	66 170 176 224	66	66	66	66	88	88	224	118	224	231	231	156	66 176	66 176	231
		Parts	Seat Position Control ECU	Theft Deterrent Horn	Theft Deterrent ECU	Theft Deterrent ECU	Turn Signal Flasher Relay	Telephone Transceiver and Speaker Relay	Vehicle Speed Sensor (Combination Meter)	VSV (EGR)	VSV (EVAP)	VSV (Intake Air Control)	VSV (Vapor Pressure Sensor)	Vanity Light LH	Vanity Light RH	Washer Level Warning SW	Washer Motor	Water Temp. Sender	Water Temp. SW No.1	Water Temp. SW No.2	Wireless Door Lock ECU	EFI Relay (Coil Side)	EFI Relay (Point Side)	ENGINE MAIN Relay (Coil Side)
		Code or Location																						
		CB or Fuse	S15	T1	T3	T4	T6	T8	V2	V4	V5	V6	V7	V8	V9	W1	W2	W3	W4	W5	W8	②		
①	50A	HTR																						
	5A	TEL						●																
	7.5A	DOME				●								●	●						●			
	10A	ECU-B	●																					
	10A	HAZARD					●																	
	10A	HORN		●	●																			
②	15A	EFI								●	●	●	●										●	
	15A	HEAD(LH)																						
	15A	HEAD(RH)																						
	20A	RADIO NO.1																						
	30A	CDS																						
	30A	RDI																						
③	10A	H-LP LH(LWR)																						
	10A	H-LP RH(LWR)																						
④	60A	ABS																						
	5A	IGN																				●		
	5A	STARTER			●																			
	7.5A	OBD																						
	7.5A	PANEL																						
	7.5A	RAD-NO.2																						
	7.5A	TURN					●																	
	10A	GAUGE	●						●							●		●						
	10A	HEATER																						
	10A	MIRROR-HEATER																						
⑤	10A	TAIL																						
	15A	CIG				●																		
	15A	ECU-IG	●			●		●											●	●	●			●
	15A	FOG																						
	15A	POWER-OUTLET																						
	15A	STOP	●																					
	25A	DOOR			●																			
	20A	SEAT-HEATER																						
	20A	WIPER															●							
	30A	POWER																						
	40A	DEF																						

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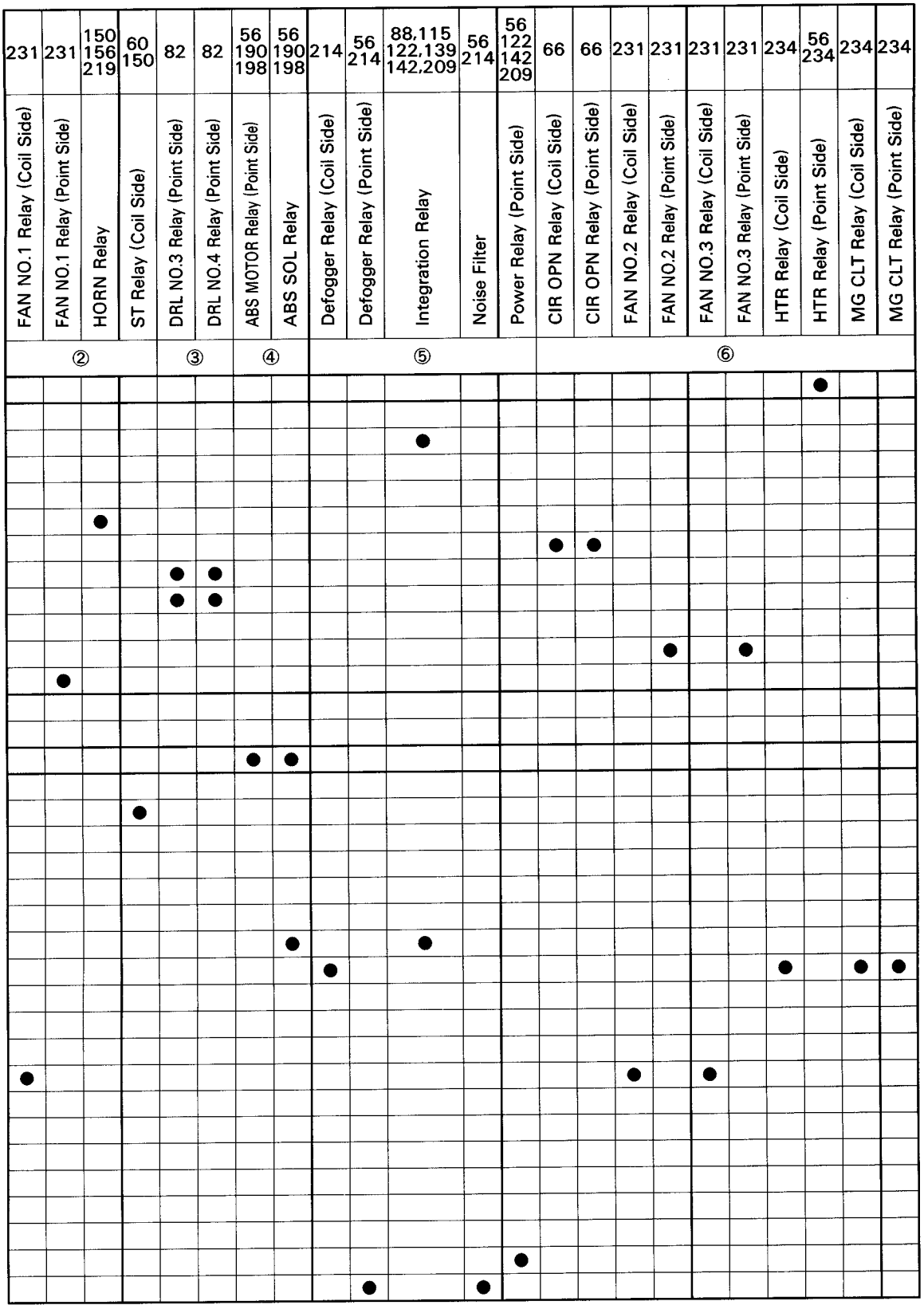
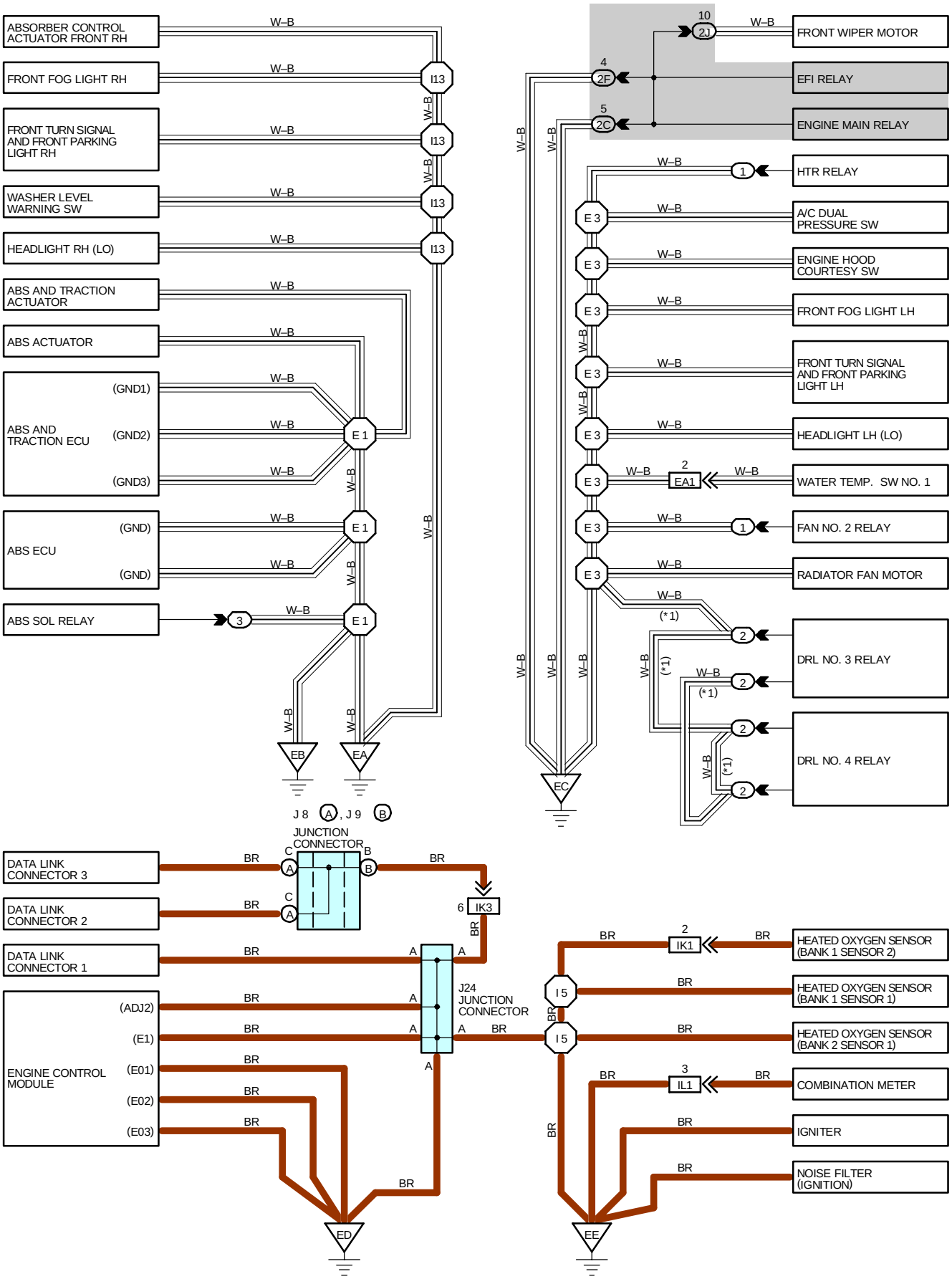
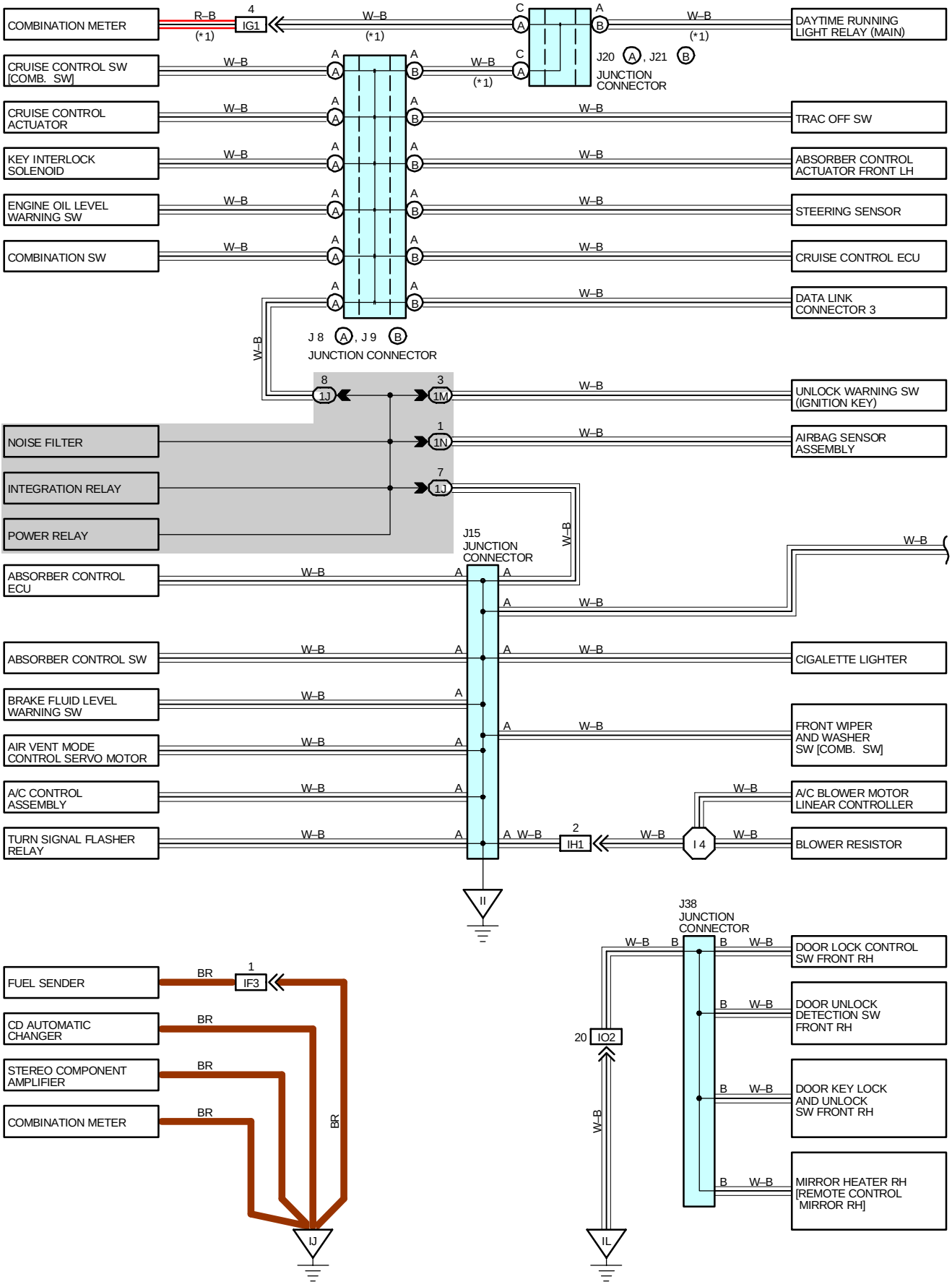
⑤:Instrument Panel J/B(See Page 24) ⑥:Engine Room R/B(See page 22)



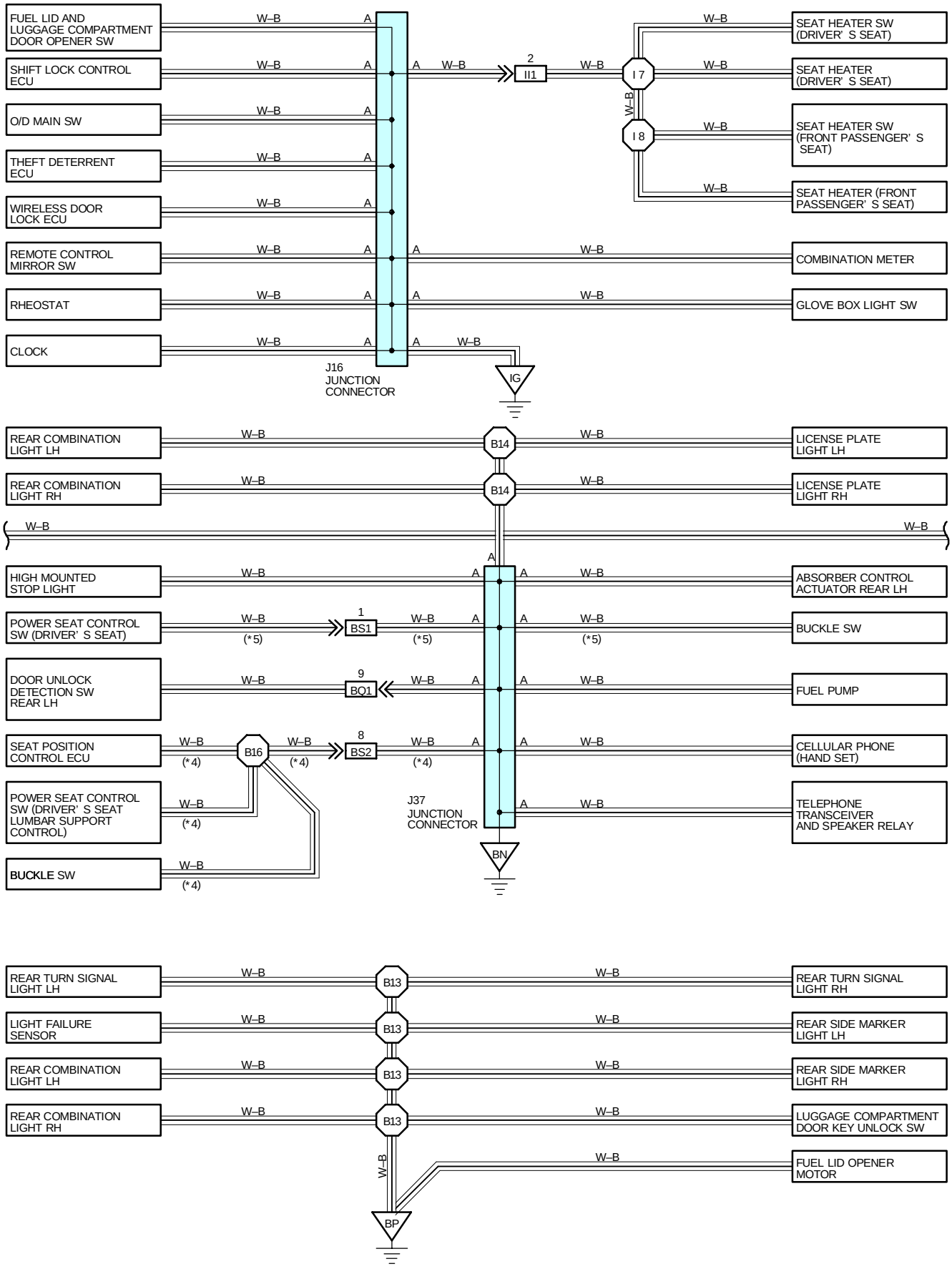
③:Engine Room No.2 R/B (See page 23) ④:Engine Room No.3 R/B (See page 23)

J GROUND POINT

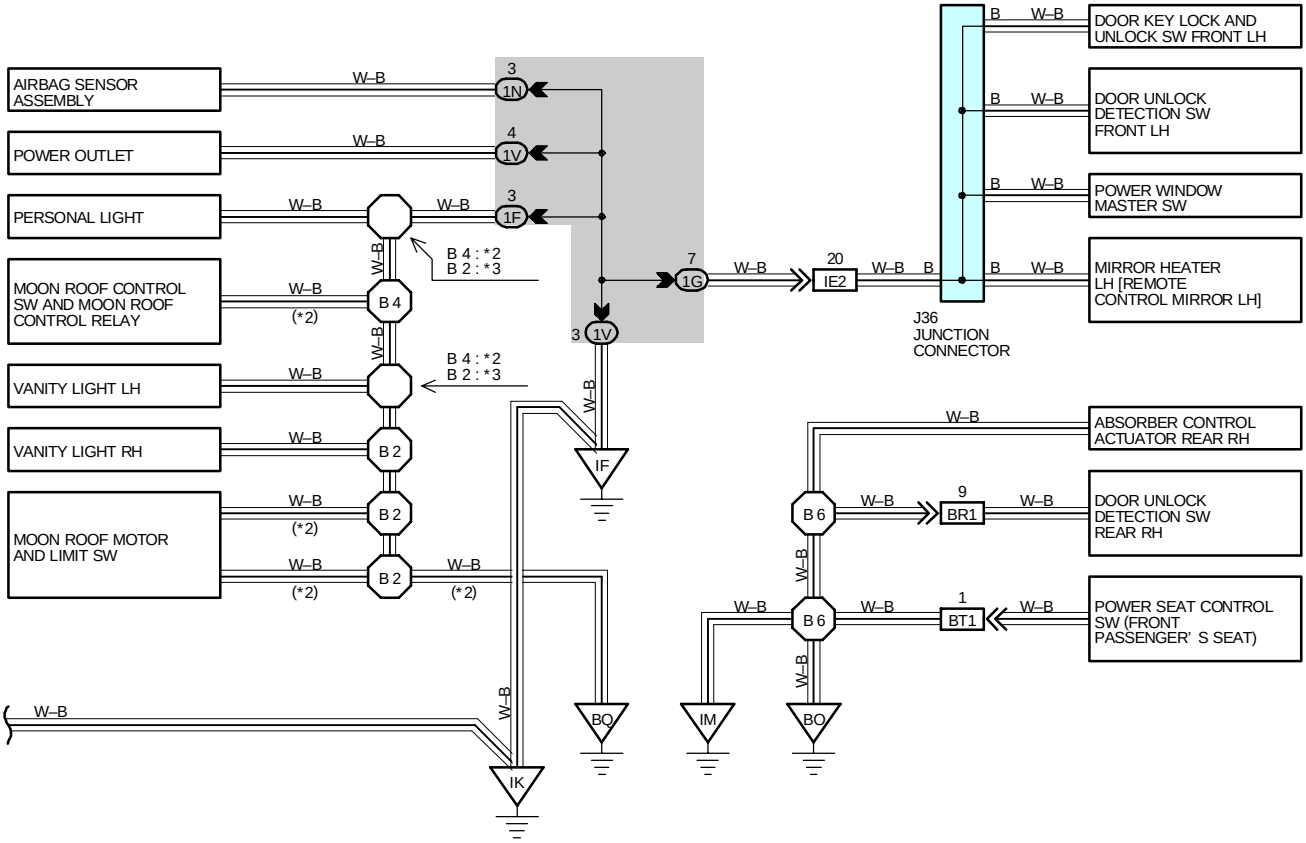


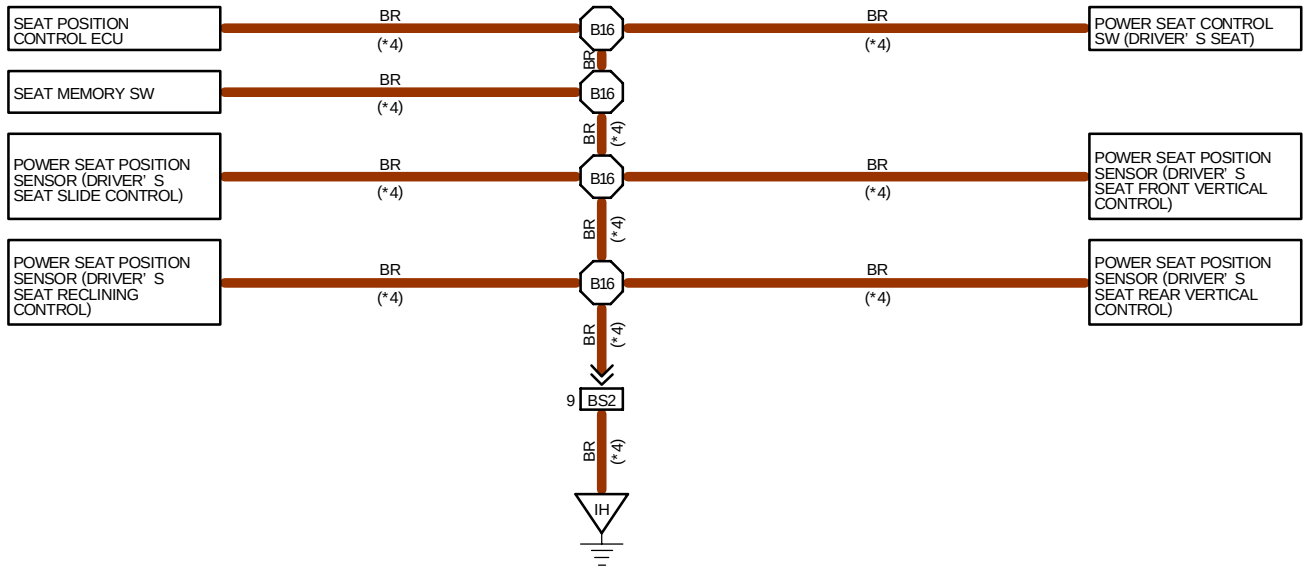

COMBINATION METER
R–B
(*1)
4
IG1
W–B
(*1)
C
A
A
B
W–B
(*1)
DAYTIME RUNNING LIGHT RELAY (MAIN)
CRUISE CONTROL SW [COMB. SW]
W–B
A
A
A
B
W–B
(*1)
C
A
J20 A , J21 B
JUNCTION CONNECTOR
CRUISE CONTROL ACTUATOR
W–B
W–B
TRAC OFF SW
KEY INTERLOCK SOLENOID
W–B
W–B
ABSORBER CONTROL ACTUATOR FRONT LH
ENGINE OIL LEVEL WARNING SW
W–B
W–B
STEERING SENSOR
COMBINATION SW
W–B
W–B
CRUISE CONTROL ECU
W–B
DATA LINK CONNECTOR 3
W–B
J8 A , J9 B
JUNCTION CONNECTOR
8
1J
3
1M
W–B
UNLOCK WARNING SW (IGNITION KEY)
NOISE FILTER
1
1N
W–B
AIRBAG SENSOR ASSEMBLY
INTEGRATION RELAY
7
1J
POWER RELAY
J15
JUNCTION
CONNECTOR
W–B
ABSORBER CONTROL ECU
W–B
A
A
A
W–B
W–B
ABSORBER CONTROL SW
W–B
A
A
W–B
CIGALETTE LIGHTER
BRAKE FLUID LEVEL WARNING SW
W–B
A
AIR VENT MODE CONTROL SERVO MOTOR
W–B
A
A
W–B
FRONT WIPER AND WASHER SW [COMB. SW]
A/C CONTROL ASSEMBLY
W–B
A
W–B
A/C BLOWER MOTOR LINEAR CONTROLLER
TURN SIGNAL FLASHER RELAY
W–B
A
A W–B
2
IH1
W–B
I 4
W–B
BLOWER RESISTOR
II
J38
JUNCTION
CONNECTOR
W–B
B
B
W–B
DOOR LOCK CONTROL SW FRONT RH
B
W–B
DOOR UNLOCK DETECTION SW FRONT RH
20
IO2
W–B
B
W–B
DOOR KEY LOCK AND UNLOCK SW FRONT RH
B
W–B
MIRROR HEATER RH [REMOTE CONTROL MIRROR RH]
IL
FUEL SENDER
BR
1
IF3
CD AUTOMATIC CHANGER
BR
STEREO COMPONENT AMPLIFIER
BR
COMBINATION METER
BR
BR
IJ

J GROUND POINT



* 2 : W/ MOON ROOF
* 3 : W/O MOON ROOF
* 4 : W/ DRIVING POSITION MEMORY
* 5 : W/O DRIVING POSITION MEMORY





J GROUND POINT

: PARTS LOCATION

CODE		SEE PAGE	CODE		SEE PAGE	CODE	SEE PAGE
J8	A	29	J20	A	29	J37	30
J9	B	29	J21	B	29	J38	30
J15		29	J24		29		
J16		29	J36		30		

: RELAY BLOCKS

CODE	SEE PAGE	RELAY BLOCKS (RELAY BLOCK LOCATION)
1	22	ENGINE ROOM R/B (ENGINE COMPARTMENT LEFT)
2	23	ENGINE ROOM NO. 2 R/B (ENGINE COMPARTMENT LEFT)
3	23	ENGINE ROOM NO. 3 R/B (RADIATOR UPPER SUPPORT RH)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

CODE	SEE PAGE	JUNCTION BLOCK AND WIRE HARNESS (CONNECTOR LOCATION)
1F	24	ROOF WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1G	24	INSTRUMENT PANEL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1J	24	COWL WIRE AND INSTRUMENT PANEL J/B (LOWER FINISH PANEL)
1M		
1N		
1V		
2C	20	ENGINE ROOM MAIN WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)
2F		
2J	20	COWL WIRE AND ENGINE ROOM J/B (ENGINE COMPARTMENT LEFT)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

CODE	SEE PAGE	JOINING WIRE HARNESS AND WIRE HARNESS (CONNECTOR LOCATION)
EA1	34	ENGINE ROOM MAIN WIRE AND ENGINE ROOM MAIN NO. 3 WIRE (BEHIND HEADLIGHT LH)
IE2	36	FRONT DOOR LH WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IF3	36	FLOOR WIRE AND INSTRUMENT PANEL WIRE (LEFT KICK PANEL)
IG1	36	INSTRUMENT PANEL WIRE AND COWL WIRE (RIGHT SIDE OF INSTRUMENT PANEL J/B)
IH1	36	COWL WIRE AND A/C SUB WIRE (BEHIND RADIO AND PLAYER)
II1	38	FLOOR NO. 3 WIRE AND INSTRUMENT PANEL WIRE (UNDER THE CONSOLE BOX)
IK1	38	ENGINE WIRE AND COWL WIRE (UNDER THE GLOVE BOX)
IK3		
IL1	38	ENGINE WIRE AND INSTRUMENT PANEL WIRE (UNDER THE GLOVE BOX)
I02	38	FRONT DOOR RH WIRE AND INSTRUMENT PANEL WIRE (RIGHT KICK PANEL)
BQ1	40	REAR DOOR LH WIRE AND FLOOR WIRE (LEFT CENTER PILLAR)
BR1	40	REAR DOOR RH WIRE AND FLOOR NO. 2 WIRE (RIGHT CENTER PILLAR)
BS1	42	FLOOR WIRE AND SEAT NO. 1 WIRE (UNDER THE DRIVER'S SEAT)
BS2		
BT1	42	FLOOR NO. 2 WIRE AND SEAT NO. 2 WIRE (UNDER THE FRONT PASSENGER'S SEAT)

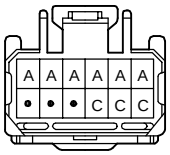
: GROUND POINTS

CODE	SEE PAGE	GROUND POINTS LOCATION
EA	34	RIGHT RADIATOR SIDE SUPPORT
EB		
EC	34	LEFT RADIATOR SIDE SUPPORT
ED	34	SURGE TANK RH
EE	34	REAR SIDE OF SURGE TANK
IF	36	COWL SIDE PANEL LH
IG	36	LEFT KICK PANEL
IH		
II	36	INSTRUMENT PANEL BRACE LH
IJ	36	INSTRUMENT PANEL BRACE RH
IK	36	COWL SIDE PANEL RH
IL	36	RIGHT KICK PANEL
IM		
BN	40	UNDER THE LEFT CENTER PILLAR
BO	40	UNDER THE RIGHT CENTER PILLAR
BP	40	BACK PANEL CENTER
BQ	40	ROOF LEFT

: **SPLICE POINTS**

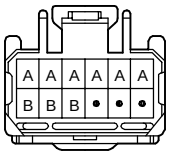
CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS	CODE	SEE PAGE	WIRE HARNESS WITH SPLICE POINTS
E1	34	ENGINE ROOM MAIN WIRE	I13	38	ENGINE ROOM MAIN WIRE
E3			B2	40	ROOF WIRE
I4	38	A/C SUB WIRE	B6		FLOOR NO. 2 WIRE
I5		ENGINE WIRE	B13		FLOOR WIRE
I7		FLOOR NO. 3 WIRE	B14		
I8			B16	42	SEAT NO. 1 WIRE

J 8 (A) GRAY



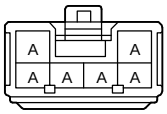
(HINT : SEE PAGE 7)

J 9 (B) GRAY



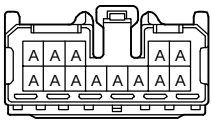
(HINT : SEE PAGE 7)

J15



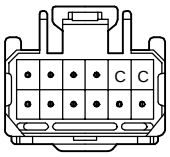
(HINT : SEE PAGE 7)

J16 ORANGE



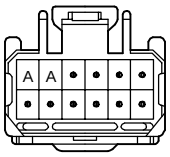
(HINT : SEE PAGE 7)

J20 (A) BLACK



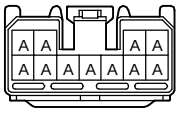
(HINT : SEE PAGE 7)

J21 (B) BLACK



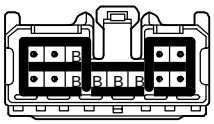
(HINT : SEE PAGE 7)

J24



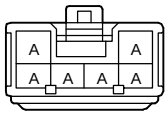
(HINT : SEE PAGE 7)

J36



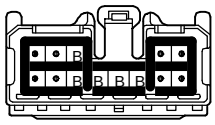
(HINT : SEE PAGE 7)

J37



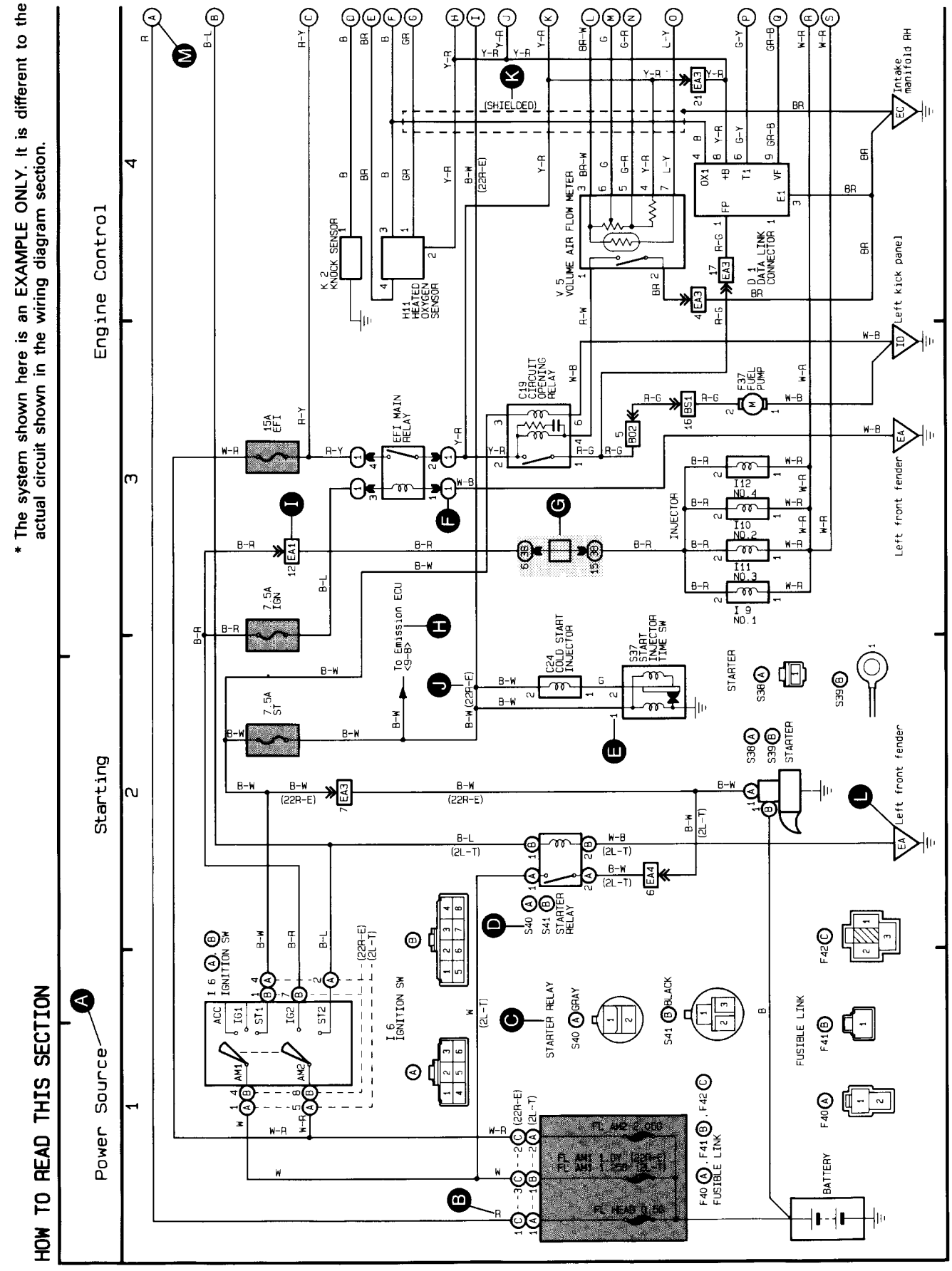
(HINT : SEE PAGE 7)

J38



(HINT : SEE PAGE 7)

K OVERALL ELECTRICAL WIRING DIAGRAM



Ⓐ: System Title

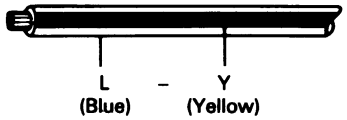
Ⓑ: Indicates the wiring color.

Wire colors are indicated by an alphabetical code.

B	= Black	L	= Blue	R	= Red
BR	= Brown	LG	= Light Green	V	= Violet
G	= Green	O	= Orange	W	= White
GR	= Gray	P	= Pink	Y	= Yellow

The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

Example: L – Y

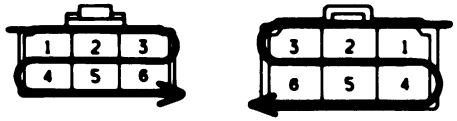


Ⓒ: Indicates the connector to be connected to a part (the numeral indicates the pin No.)

Ⓓ: The position of the parts is the same as shown in the wiring diagram and wire routing.

Ⓔ: Indicates the pin number of the connector. The numbering system is different for female and male connectors.

Example: Numbered in order from upper left to lower right / Numbered in order from upper right to lower left



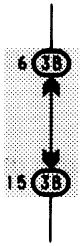
The numbering system for the overall wiring diagram is the same as above.

Ⓕ: Indicates a Relay Block. No shading is used and only the Relay Block No. is shown to distinguish it from the J/B.

Example: ① Indicates Relay Block No. 1.

Ⓖ: Junction Block (The number in the circle is the J/B No. and the connector code is shown beside it). Junction Blocks are shaded to clearly separate them from other parts.

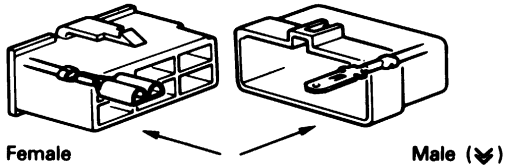
Example:



3B indicates that it is inside Junction Block No. 3.

Ⓗ: Indicates related system.

Ⓘ: Indicates the wiring harness and wiring harness connector. The wiring harness with male terminal is shown with arrows (⩔). Outside numerals are pin numbers.



Ⓙ: ( ) is used to indicate different wiring and connector, etc. when the vehicle model, engine type, or specification is different.

Ⓚ: Indicates a shielded cable.

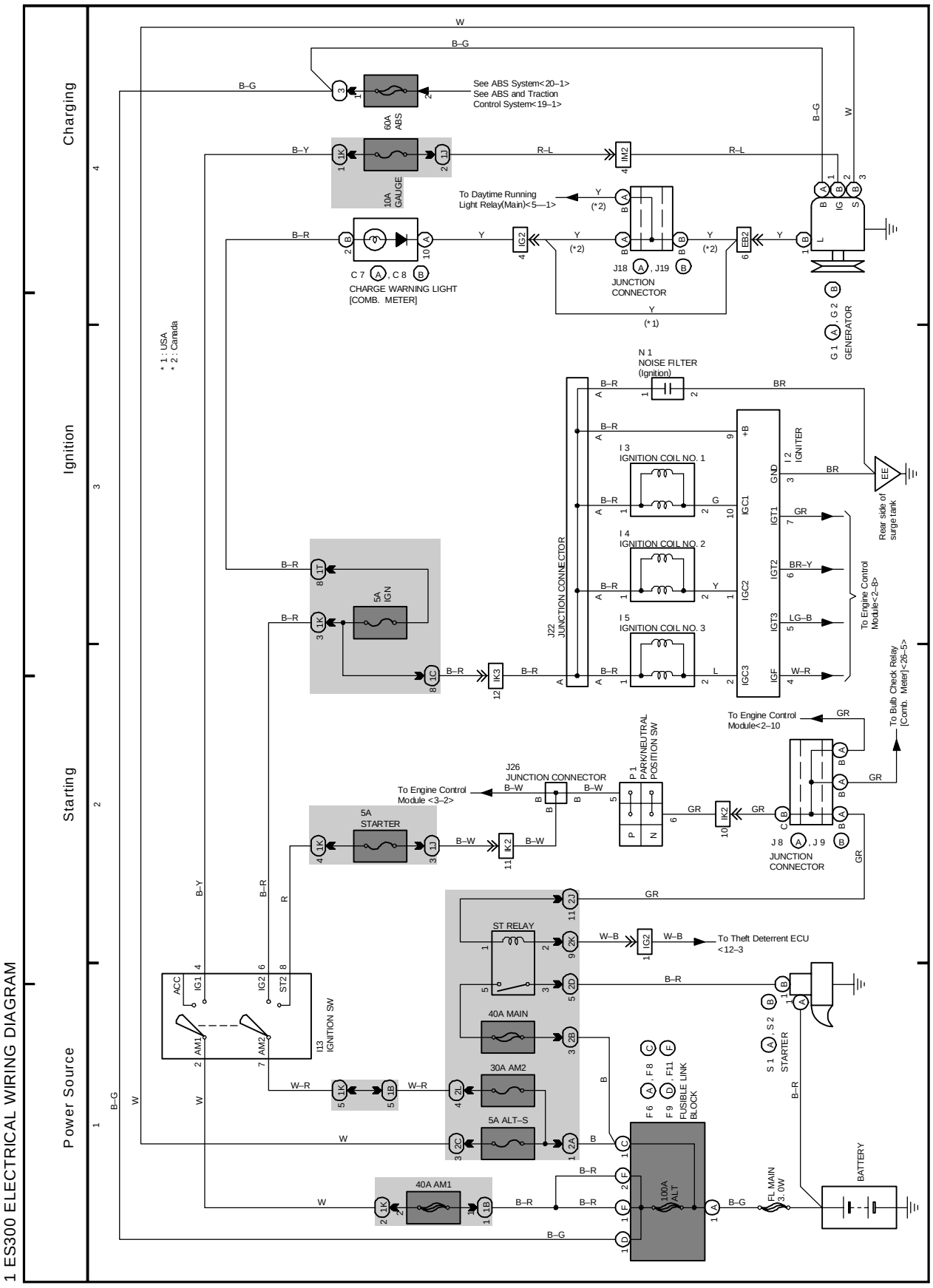
Ⓛ: Indicates and located on ground point.

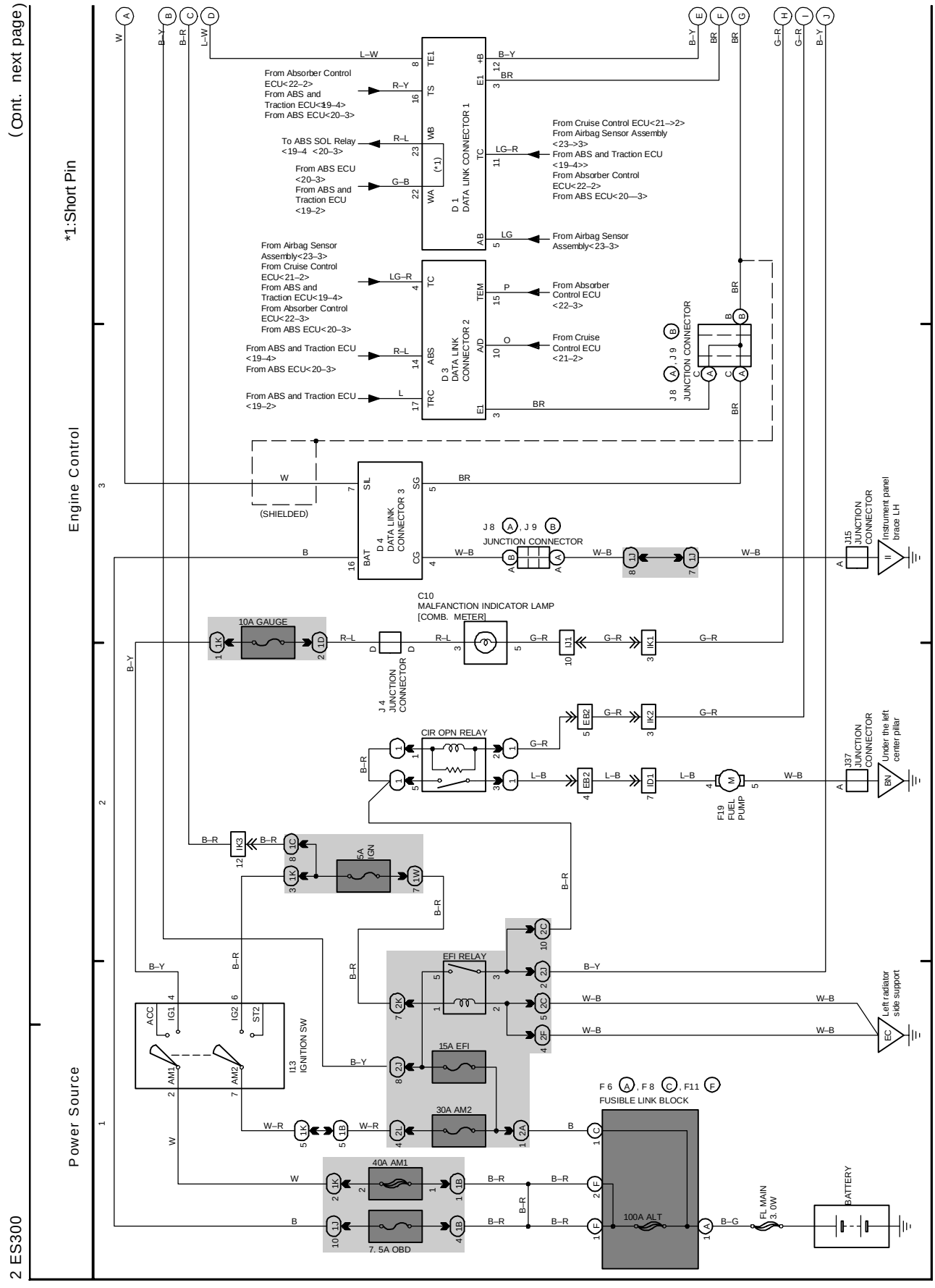
Ⓜ: The same code occuring on the next page indicates that the wire harness is continuous.

SYSTEM INDEX

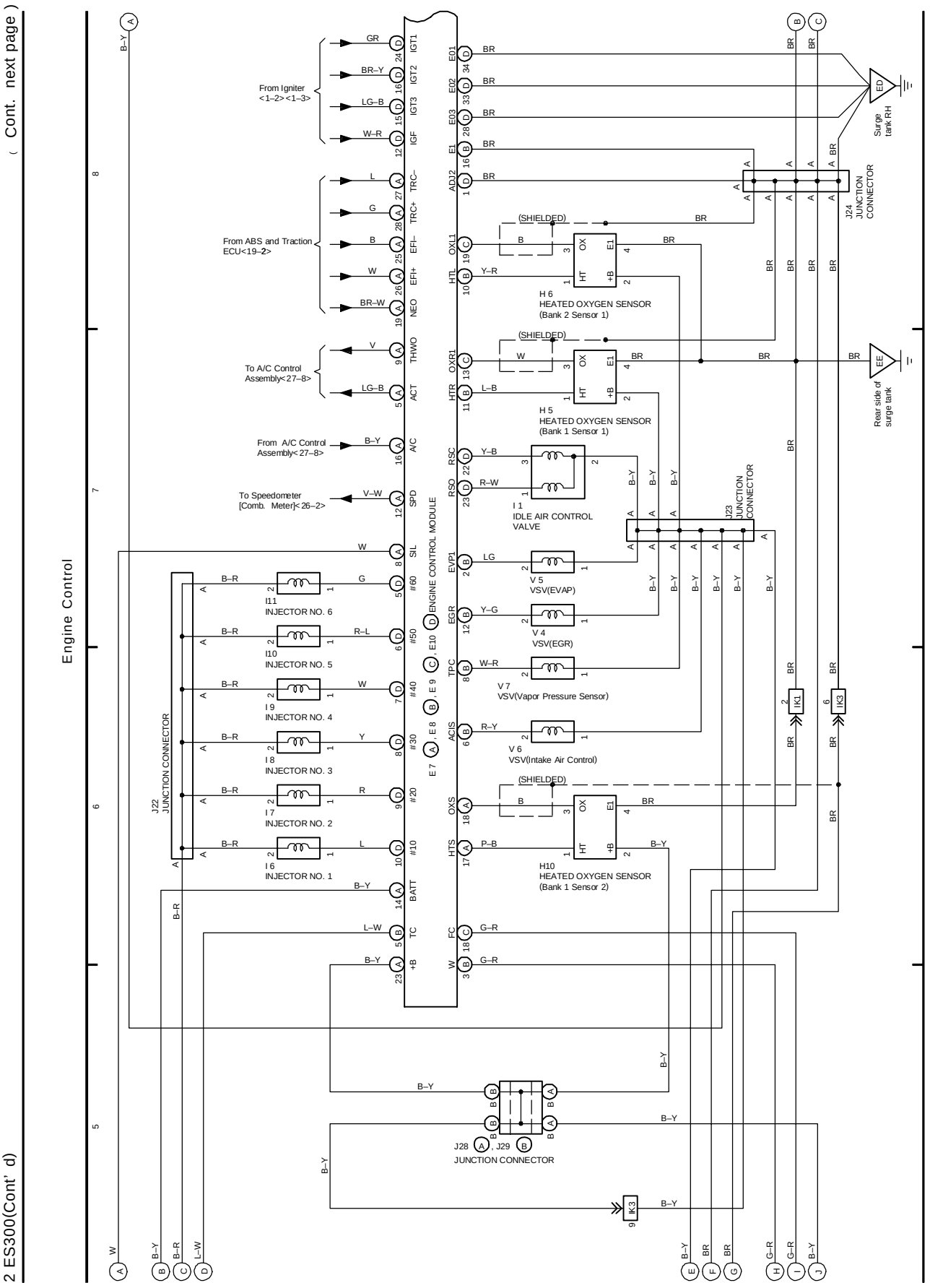
(Location No.1 to 27)

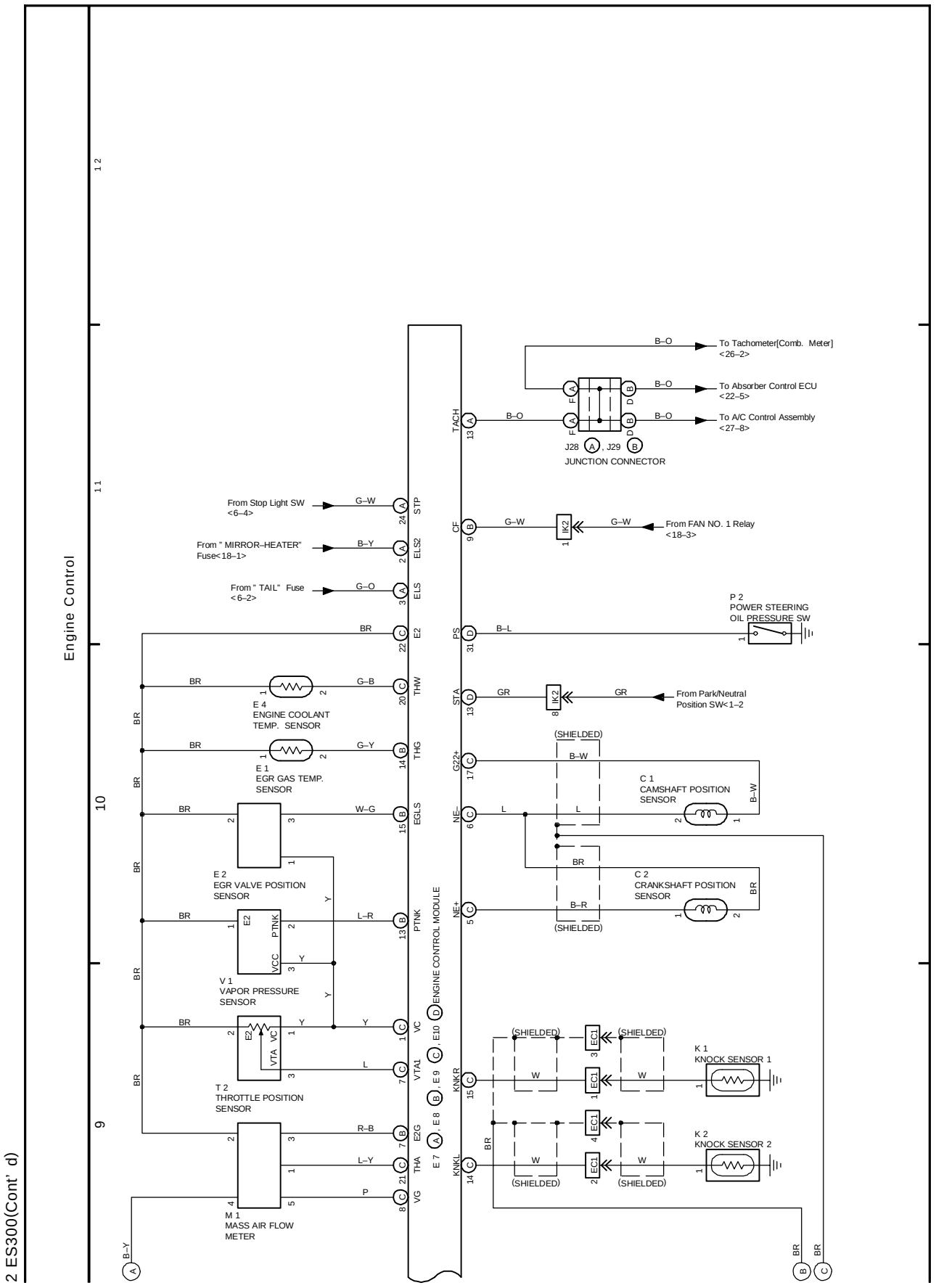
SYSTEMS	LOCATION
ABS	20-3
ABS and Traction Control	19-3
Automatic Air Conditioning	27-3
Automatic Light Control	10-2
Back-Up Light	9-4
Cellular Mobile Telephone	24-2
Charging	1-4
Cigarette Lighter and Clock	23-4
Combination Meter	26-3
Cruise Control	21-3
Door Lock Control	11-3
Electric Modulated Suspension	22-3
Electronically Controlled Transmission and A/T Indicator	3-2
Engine Control	2-3
Front Fog Light	4-4
Fuel Lid and Luggage Compartment Door Opener	10-3
Headlight	4-2 (USA) 5-3 (Canada)
Horn	14-4
Ignition	1-3
Illumination	7-3
Interior Light	8-3
Light Auto Turn Off	10-3
Moon Roof	14-2
Power Outlet	23-3 15-2 (Driver's Seat w/ Driving Position Memory)
Power Seat	16-1 (Driver's Seat w/o Driving Position Memory) 16-3 (Front Passenger's Seat)
Power Source	1~27-1
Power Window	13-3
Radiator Fan and Condenser Fan	18-3
Radio and Player	25-3
Rear Window Defogger and Mirror Heater	18-2
Remote Control Mirror	17-3
Seat Heater	16-4
Shift Lock	24-4
SRS	23-2
Starting	1-2
Stop Light	6-4
Taillight	6-2
Theft Deterrent System	12-3
Turn Signal and Hazard Warning Light	9-2
Unlock and Seat Belt Warning	14-3
Wiper and Washer	17-2
Wireless Door Lock Control	11-7


1 ES300 ELECTRICAL WIRING DIAGRAM
Power Source
Starting
Ignition
Charging
* 1 : USA
* 2 : Canada
See ABS System<20–1>
See ABS and Traction Control System<19–1>
60A ABS
10A GAUGE
To Daytime Running Light Relay(Main)<5—1>
CHARGE WARNING LIGHT [COMB. METER]
JUNCTION CONNECTOR
GENERATOR
N 1 NOISE FILTER (Ignition)
I 3 IGNITION COIL NO. 1
I 4 IGNITION COIL NO. 2
I 5 IGNITION COIL NO. 3
I 2 IGNITER
J22 JUNCTION CONNECTOR
Rear side of surge tank
5A IGN
To Engine Control Module<2–8>
To Engine Control Module<2–10
To Bulb Check Relay [Comb. Meter]<26–5>
J26 JUNCTION CONNECTOR
To Engine Control Module <3–2>
5A STARTER
P 1 PARK/NEUTRAL POSITION SW
J 8 , J 9 JUNCTION CONNECTOR
ST RELAY
To Theft Deterrent ECU <12–3
40A MAIN
30A AM2
5A ALT–S
40A AM1
I13 IGNITION SW
ACC
IG1
IG2
ST2
AM1
AM2
FUSIBLE LINK BLOCK
100A ALT
FL MAIN 3.0W
STARTER
BATTERY

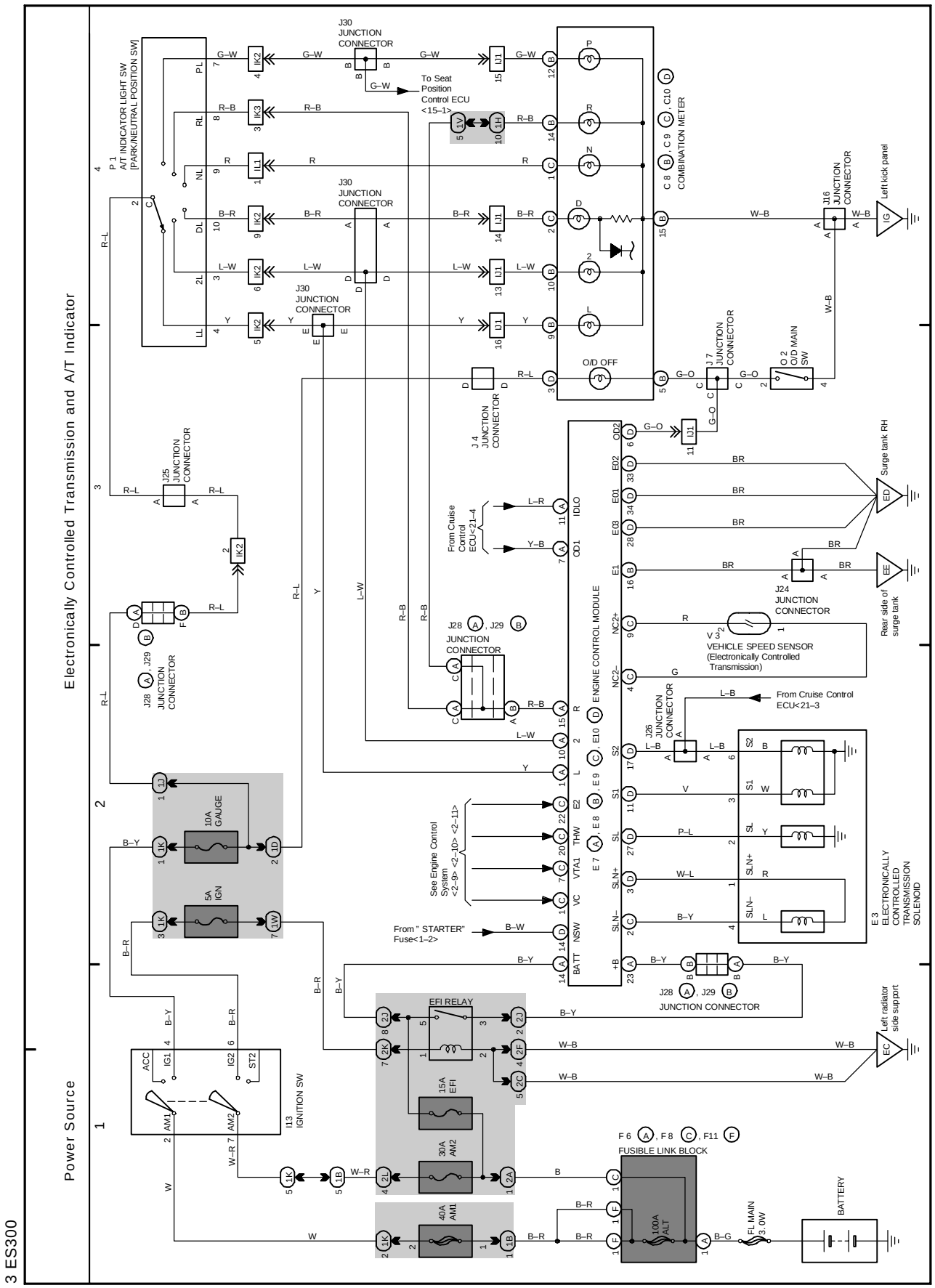

(Cont. next page)
*1:Short Pin
Engine Control
Power Source
2 ES300
From Absorber Control ECU<22–2> From ABS and Traction ECU<19–4> From ABS ECU<20–3>
To ABS SOL Relay <19–4 <20–3>
From ABS ECU <20–3> From ABS and Traction ECU <19–2>
From Cruise Control ECU<21–>2> From Airbag Sensor Assembly <23–>3> From ABS and Traction ECU <19–4>> From Absorber Control ECU<22–2> From ABS ECU<20—3>
From Airbag Sensor Assembly<23–3>
D 1 DATA LINK CONNECTOR 1
From Airbag Sensor Assembly<23–3> From Cruise Control ECU<21–2> From ABS and Traction ECU<19–4> From Absorber Control ECU<22–3> From ABS ECU<20–3>
From ABS and Traction ECU <19–4> From ABS ECU<20–3>
From ABS and Traction ECU <19–2>
D 3 DATA LINK CONNECTOR 2
From Absorber Control ECU <22–3>
From Cruise Control ECU <21–2>
J 8 , J 9 JUNCTION CONNECTOR
(SHIELDED)
D 4 DATA LINK CONNECTOR 3
J 8 , J 9 JUNCTION CONNECTOR
J15 JUNCTION CONNECTOR
Instrument panel brace LH
C10 MALFANCTION INDICATOR LAMP [COMB. METER]
10A GAUGE
J 4 JUNCTION CONNECTOR
CIR OPN RELAY
J37 JUNCTION CONNECTOR
Under the left center pillar
F19 FUEL PUMP
5A IGN
EFI RELAY
I13 IGNITION SW
ACC IG1 IG2 ST2 AM1 AM2
15A EFI
30A AM2
Left radiator side support
F 6 , F 8 , F11
FUSIBLE LINK BLOCK
40A AM1
7. 5A OBD
100A ALT
FL MAIN 3. 0W
BATTERY

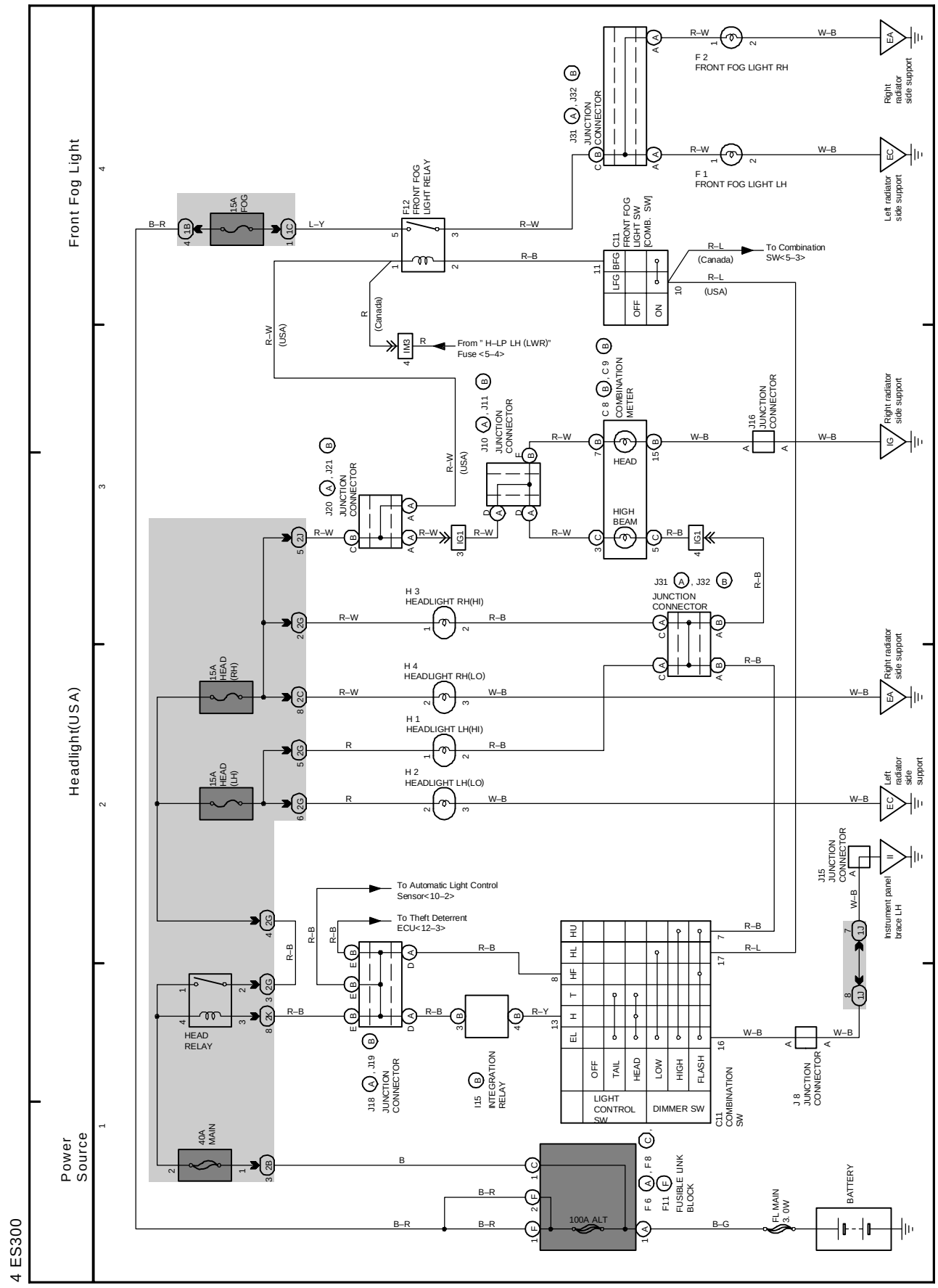
K OVERALL ELECTRICAL WIRING DIAGRAM



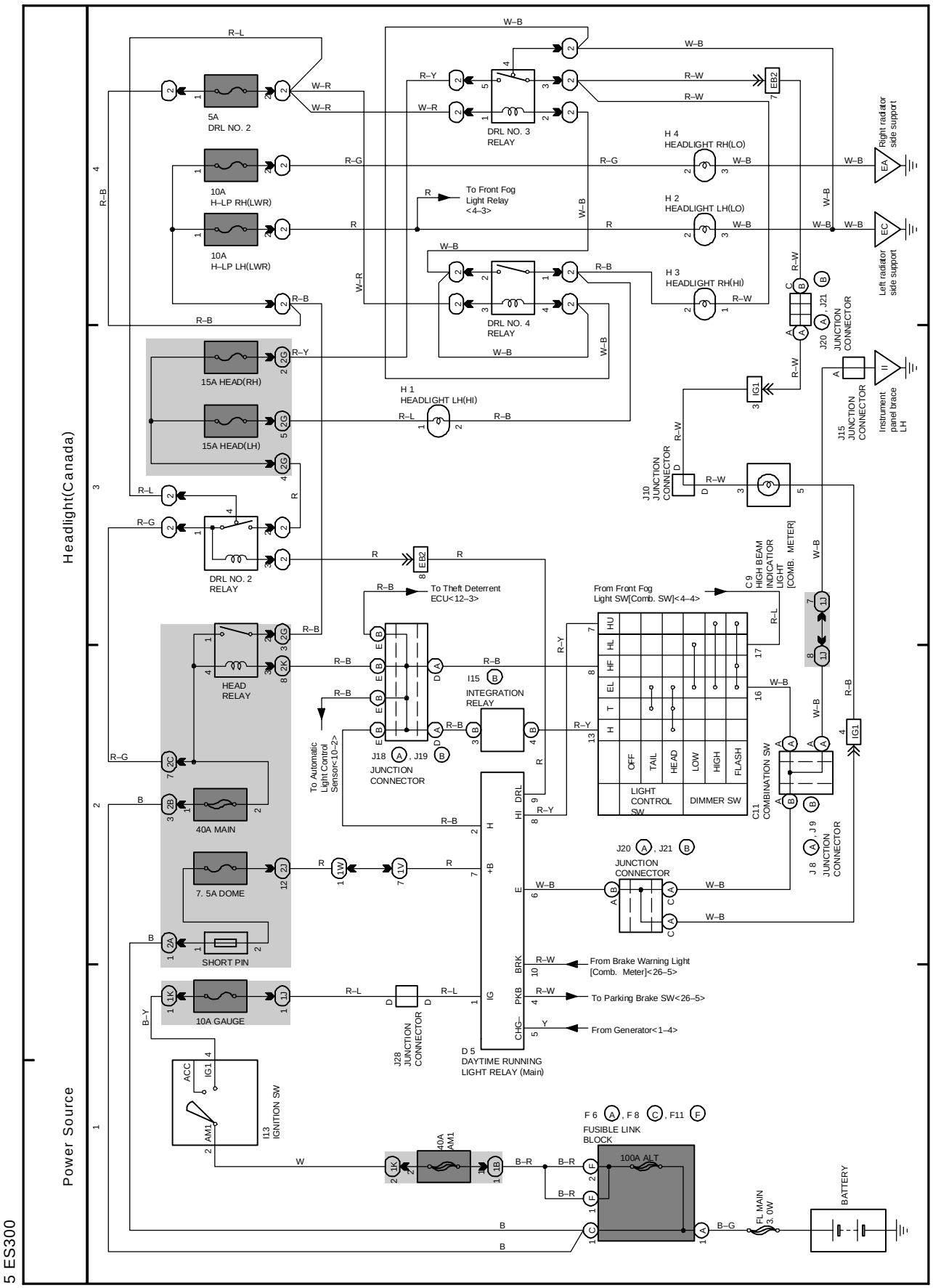

2 ES300(Cont' d)
Engine Control
To Tachometer[Comb. Meter] <26–2>
To Absorber Control ECU <22–5>
To A/C Control Assembly <27–8>
J28 , J29
JUNCTION CONNECTOR
From Stop Light SW <6–4>
From " MIRROR–HEATER" Fuse<18–1>
From " TAIL" Fuse <6–2>
From FAN NO. 1 Relay <18–3>
P 2
POWER STEERING OIL PRESSURE SW
From Park/Neutral Position SW<1–2
E 4
ENGINE COOLANT TEMP. SENSOR
E 1
EGR GAS TEMP. SENSOR
E 2
EGR VALVE POSITION SENSOR
V 1
VAPOR PRESSURE SENSOR
T 2
THROTTLE POSITION SENSOR
M 1
MASS AIR FLOW METER
C 1
CAMSHAFT POSITION SENSOR
C 2
CRANKSHAFT POSITION SENSOR
K 1
KNOCK SENSOR 1
K 2
KNOCK SENSOR 2
ENGINE CONTROL MODULE
(SHIELDED)

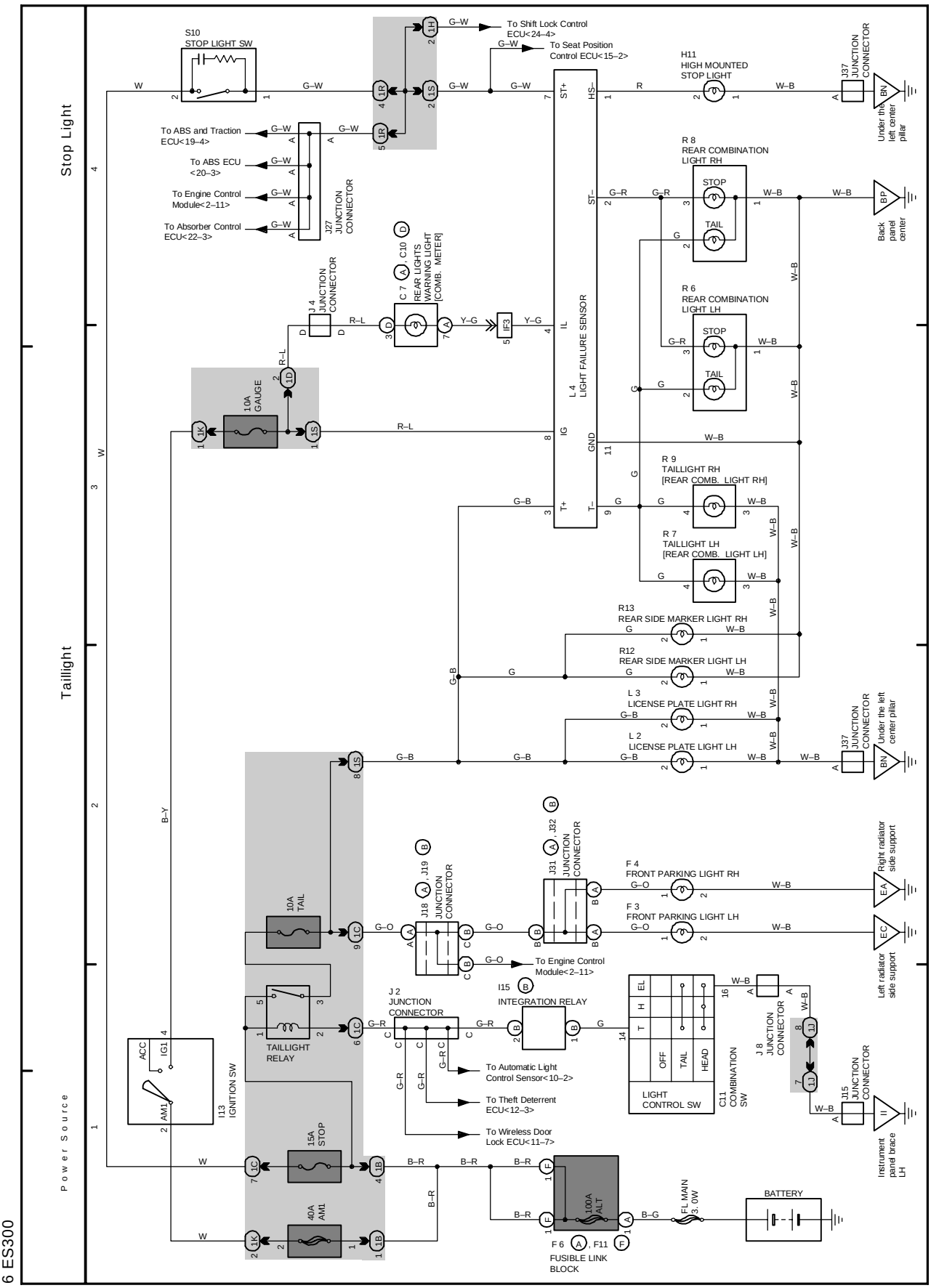
K OVERALL ELECTRICAL WIRING DIAGRAM



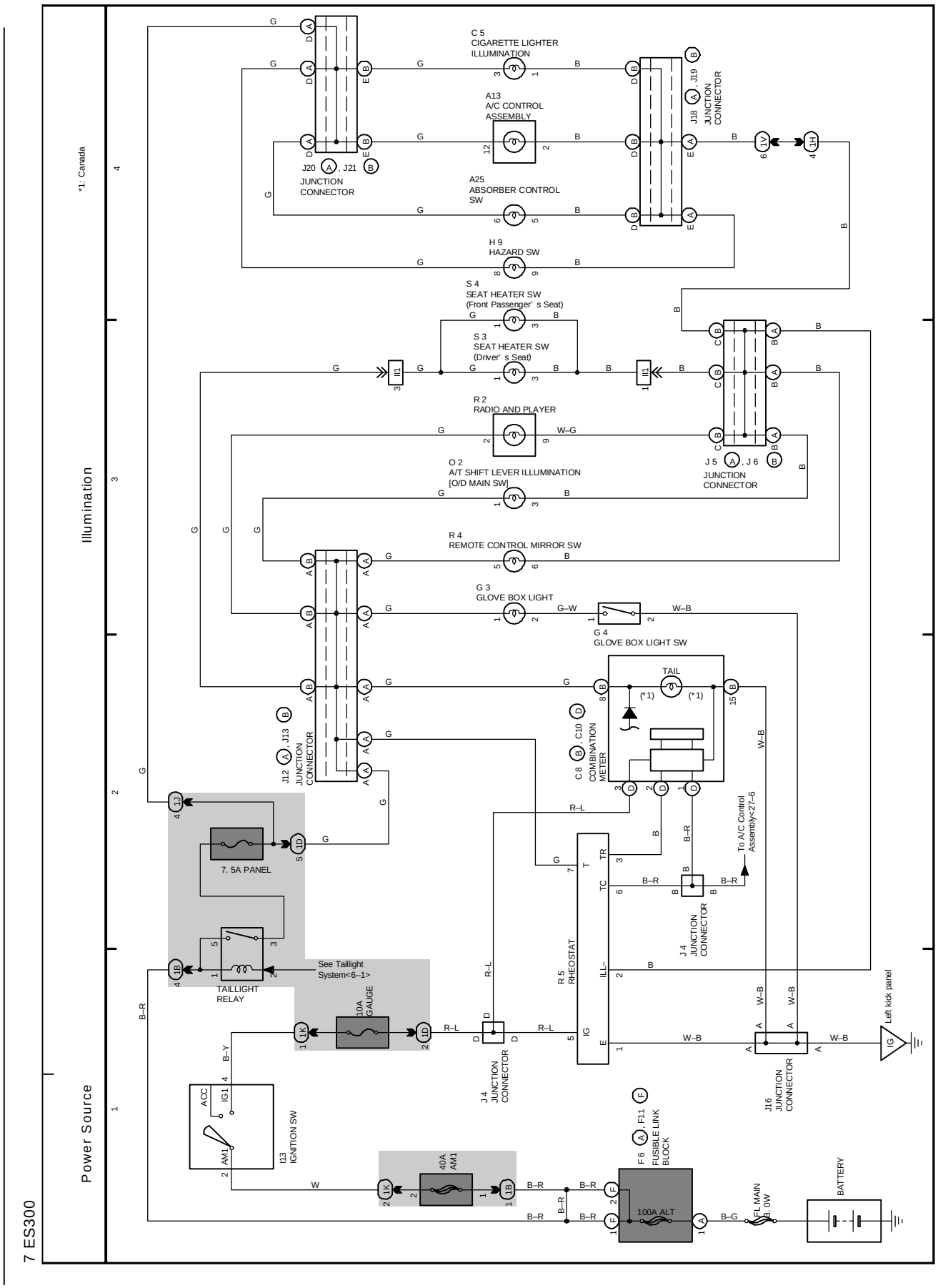

4 ES300
Power Source
Headlight(USA)
Front Fog Light
15A FOG
F12 FRONT FOG LIGHT RELAY
C11 FRONT FOG LIGHT SW [COMB. SW]
LFG
BFG
OFF
ON
To Combination SW<5–3>
(Canada)
(USA)
From " H–LP LH (LWR)" Fuse <5–4>
J31 , J32 JUNCTION CONNECTOR
F 2 FRONT FOG LIGHT RH
F 1 FRONT FOG LIGHT LH
Right radiator side support
Left radiator side support
J10 , J11 JUNCTION CONNECTOR
J20 , J21 JUNCTION CONNECTOR
C 8 , C 9 COMBINATION METER
HEAD
HIGH BEAM
J16 JUNCTION CONNECTOR
IG
IG1
H 3 HEADLIGHT RH(HI)
H 4 HEADLIGHT RH(LO)
H 1 HEADLIGHT LH(HI)
H 2 HEADLIGHT LH(LO)
15A HEAD (RH)
15A HEAD (LH)
To Automatic Light Control Sensor<10–2>
To Theft Deterrent ECU<12–3>
HEAD RELAY
J18 , J19 JUNCTION CONNECTOR
I15 INTEGRATION RELAY
C11 COMBINATION SW
LIGHT CONTROL SW
DIMMER SW
OFF
TAIL
HEAD
LOW
HIGH
FLASH
J15 JUNCTION CONNECTOR
Instrument panel brace LH
J 8 JUNCTION CONNECTOR
40A MAIN
100A ALT
F 6 , F 8 , F11 FUSIBLE LINK BLOCK
FL MAIN 3. 0W
BATTERY

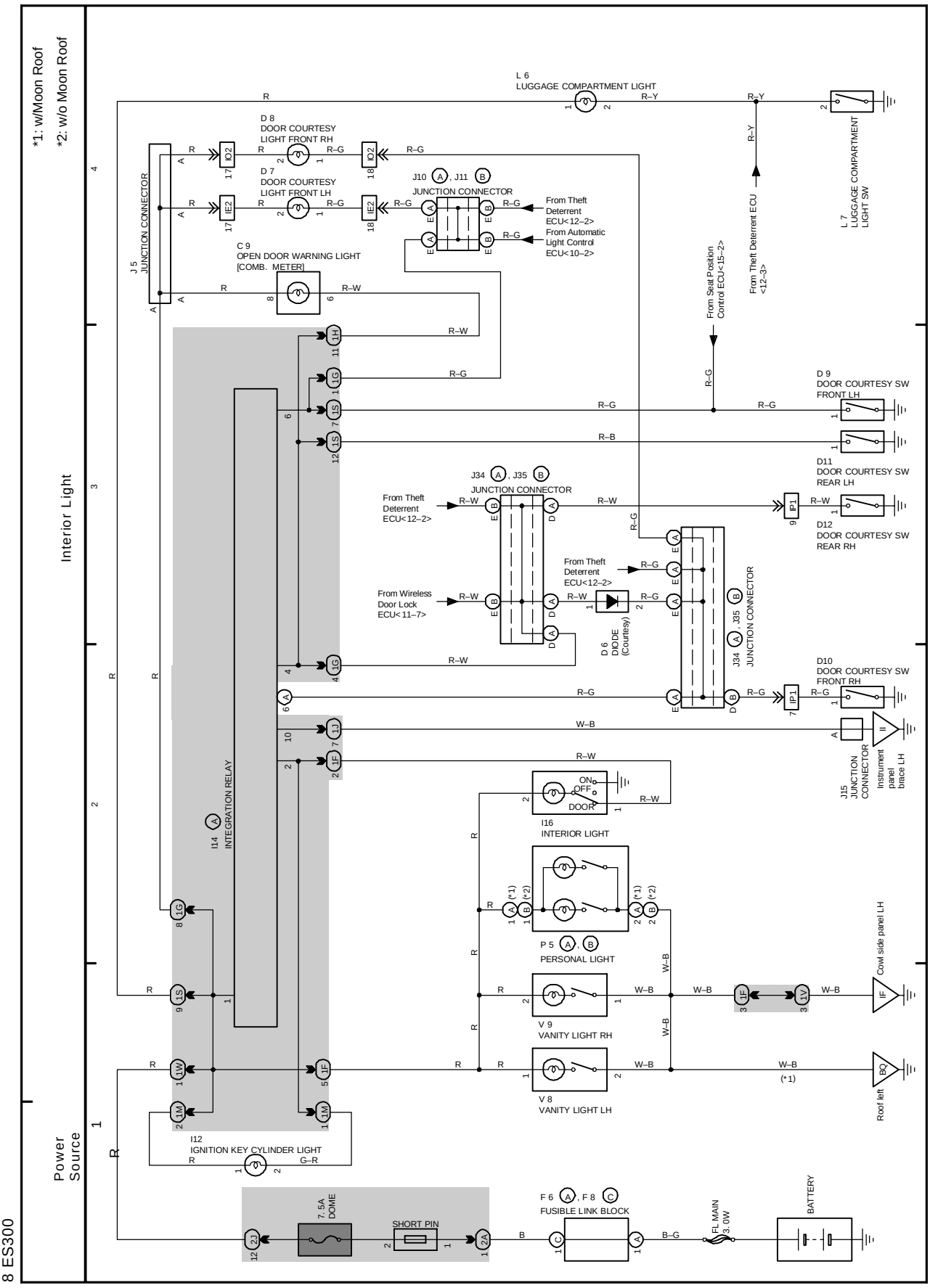
K OVERALL ELECTRICAL WIRING DIAGRAM



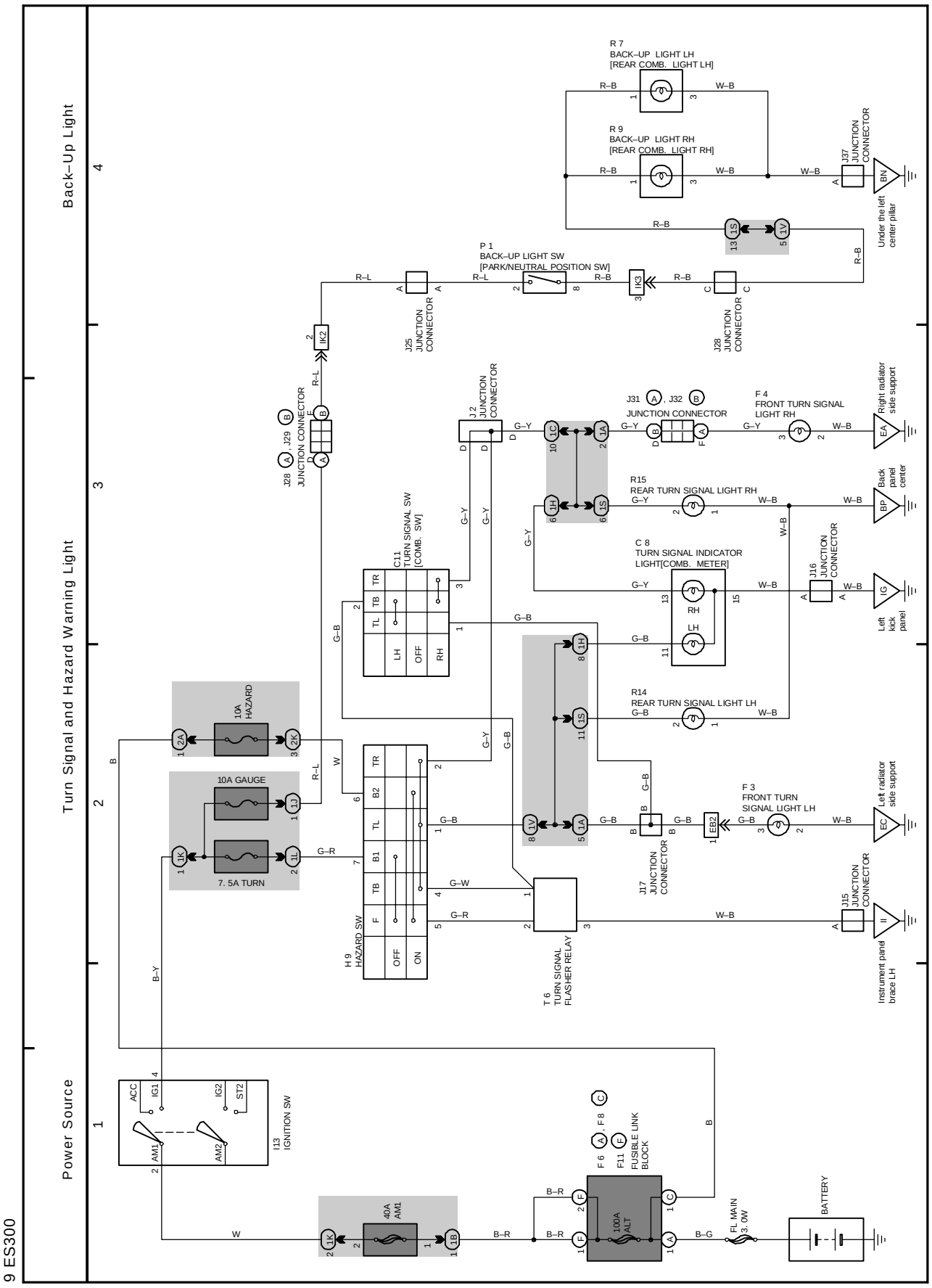

Stop Light
Taillight
Power Source
S10
STOP LIGHT SW
To Shift Lock Control ECU<24–4>
To Seat Position Control ECU<15–2>
H11
HIGH MOUNTED STOP LIGHT
J37 JUNCTION CONNECTOR
Under the left center pillar
To ABS and Traction ECU<19–4>
To ABS ECU <20–3>
To Engine Control Module<2–11>
To Absorber Control ECU<22–3>
J27 JUNCTION CONNECTOR
R 8
REAR COMBINATION LIGHT RH
R 6
REAR COMBINATION LIGHT LH
STOP
TAIL
Back panel center
J 4 JUNCTION CONNECTOR
C 7, C10
REAR LIGHTS WARNING LIGHT [COMB. METER]
IF3
L 4
LIGHT FAILURE SENSOR
IL
IG
GND
ST+
ST–
HS–
T+
T–
10A GAUGE
R 9
TAILLIGHT RH
[REAR COMB. LIGHT RH]
R 7
TAILLIGHT LH
[REAR COMB. LIGHT LH]
R13
REAR SIDE MARKER LIGHT RH
R12
REAR SIDE MARKER LIGHT LH
L 3
LICENSE PLATE LIGHT RH
L 2
LICENSE PLATE LIGHT LH
10A TAIL
J18, J19 JUNCTION CONNECTOR
J31, J32 JUNCTION CONNECTOR
F 4
FRONT PARKING LIGHT RH
F 3
FRONT PARKING LIGHT LH
Right radiator side support
Left radiator side support
To Engine Control Module<2–11>
J 2 JUNCTION CONNECTOR
I15
INTEGRATION RELAY
TAILLIGHT RELAY
ACC
IG1
AM1
I13
IGNITION SW
To Automatic Light Control Sensor<10–2>
To Theft Deterrent ECU<12–3>
To Wireless Door Lock ECU<11–7>
LIGHT CONTROL SW
C11
COMBINATION SW
EL
H
T
OFF
TAIL
HEAD
J 8 JUNCTION CONNECTOR
J15 JUNCTION CONNECTOR
Instrument panel brace LH
15A STOP
40A AM1
100A ALT
FL MAIN
3.0W
BATTERY
F 6, F11
FUSIBLE LINK BLOCK

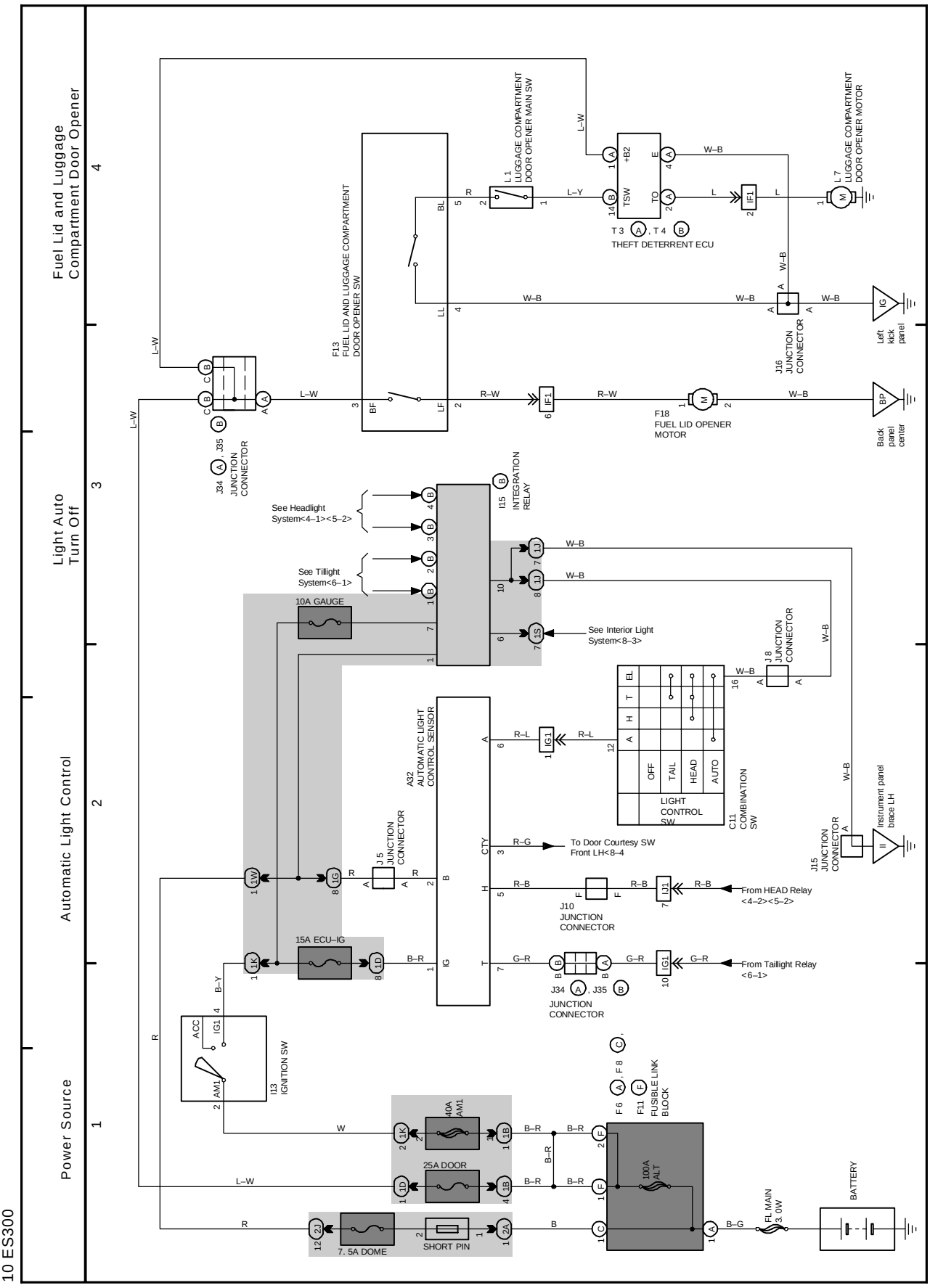
K OVERALL ELECTRICAL WIRING DIAGRAM



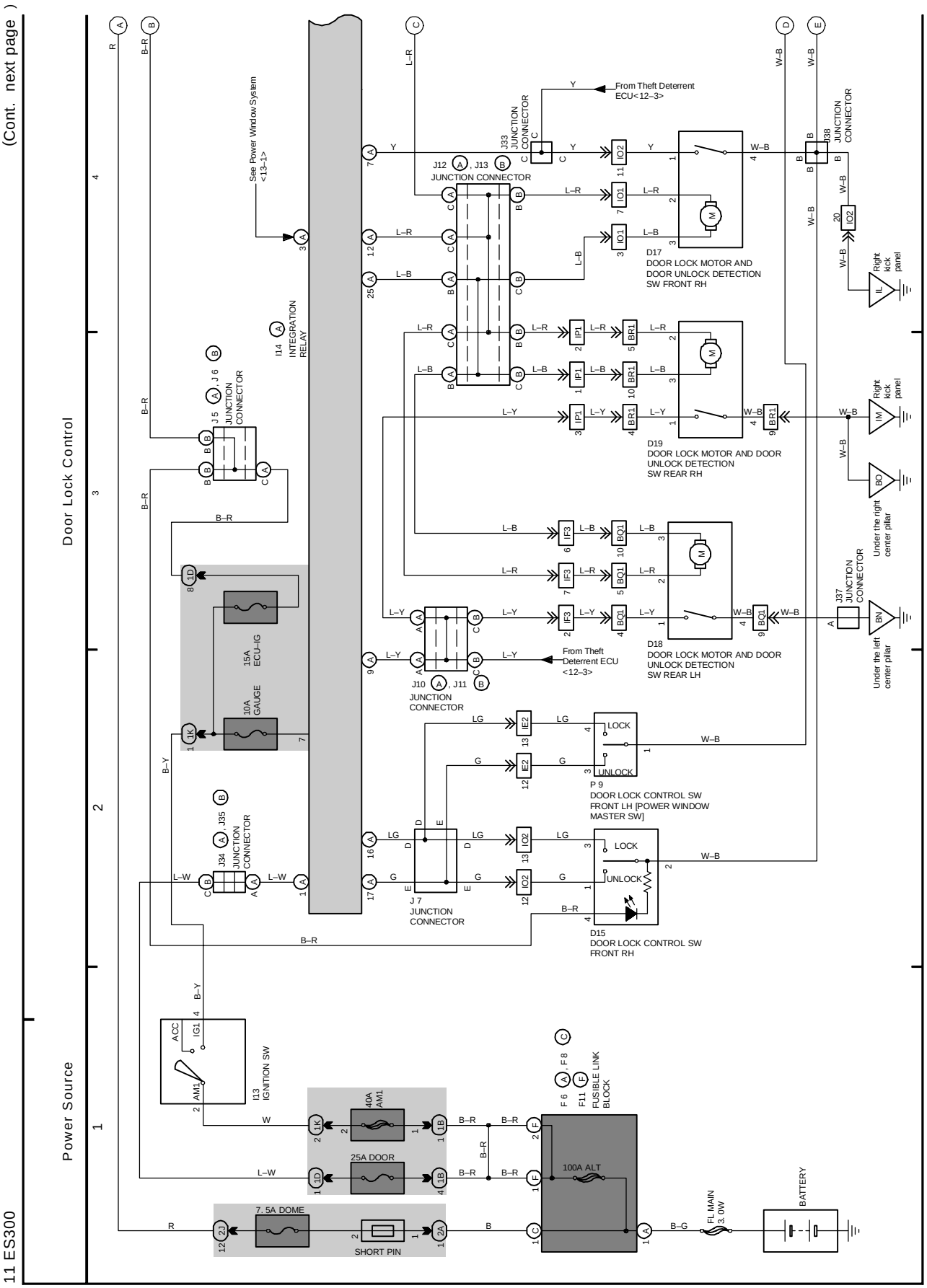

*1: w/Moon Roof
*2: w/o Moon Roof
Interior Light
Power Source
L 6
LUGGAGE COMPARTMENT LIGHT
L 7
LUGGAGE COMPARTMENT LIGHT SW
D 8
DOOR COURTESY LIGHT FRONT RH
D 7
DOOR COURTESY LIGHT FRONT LH
J10 , J11
JUNCTION CONNECTOR
From Theft Deterrent ECU<12–2>
From Automatic Light Control ECU<10–2>
From Theft Deterrent ECU <12–3>
From Seat Position Control ECU<15–2>
J 5
JUNCTION CONNECTOR
C 9
OPEN DOOR WARNING LIGHT [COMB. METER]
D 9
DOOR COURTESY SW FRONT LH
D11
DOOR COURTESY SW REAR LH
D12
DOOR COURTESY SW REAR RH
D10
DOOR COURTESY SW FRONT RH
J34 , J35
JUNCTION CONNECTOR
From Theft Deterrent ECU<12–2>
From Wireless Door Lock ECU< 11–7>
D 6
DIODE (Courtesy)
I14
INTEGRATION RELAY
I16
INTERIOR LIGHT
ON
OFF
DOOR
P 5
PERSONAL LIGHT
V 9
VANITY LIGHT RH
V 8
VANITY LIGHT LH
I12
IGNITION KEY CYLINDER LIGHT
J15
JUNCTION CONNECTOR
Instrument panel brace LH
Cowl side panel LH
Roof left
7.5A DOME
SHORT PIN
F 6 , F 8
FUSIBLE LINK BLOCK
FL MAIN 3.0W
BATTERY

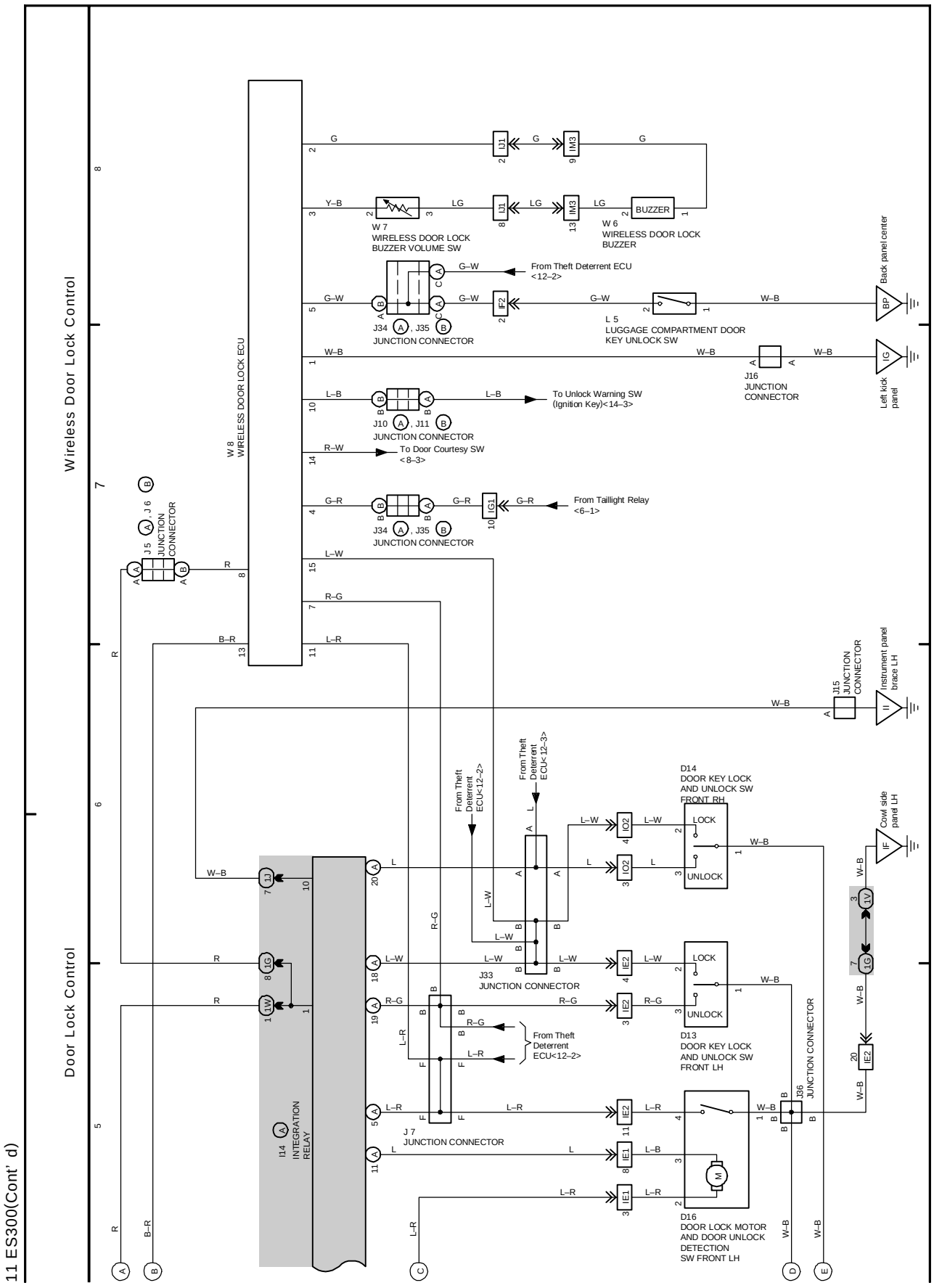
K OVERALL ELECTRICAL WIRING DIAGRAM



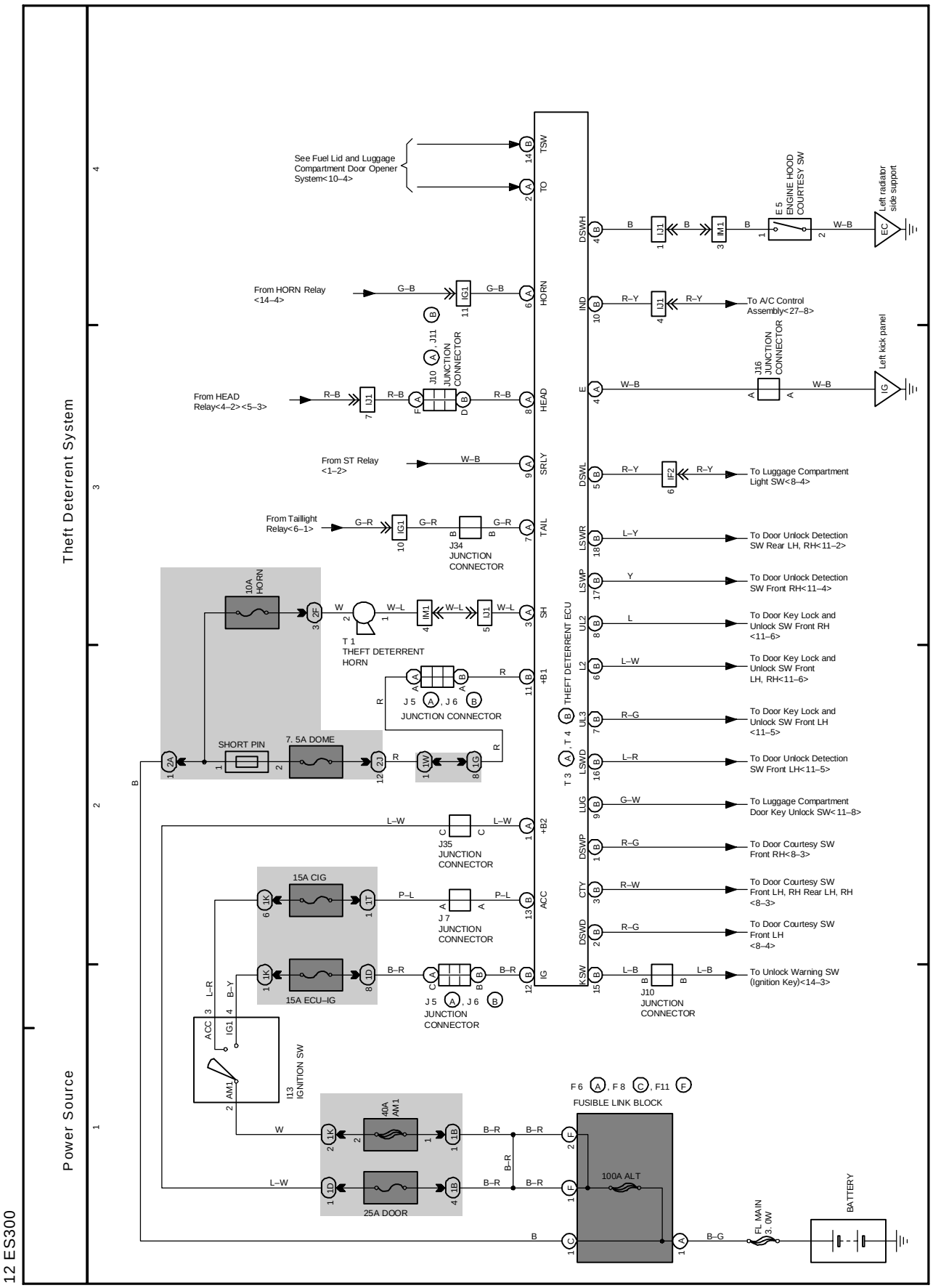

10 ES300
Power Source
Automatic Light Control
Light Auto Turn Off
Fuel Lid and Luggage Compartment Door Opener
1
2
3
4
L–W
L–Y
W–B
R–W
R–L
R–G
R–B
B–R
B–Y
G–R
B–G
L
R
W
B
BL
LL
BF
LF
CTY
L1 LUGGAGE COMPARTMENT DOOR OPENER MAIN SW
L 7 LUGGAGE COMPARTMENT DOOR OPENER MOTOR
F13 FUEL LID AND LUGGAGE COMPARTMENT DOOR OPENER SW
F18 FUEL LID OPENER MOTOR
T 3 (A), T 4 (B) THEFT DETERRENT ECU
+B2
TSW
TO
IF1
J16 JUNCTION CONNECTOR
IG
Left kick panel
Back panel center
J34 (A), J35 JUNCTION CONNECTOR
I15 INTEGRATION RELAY
See Headlight System<4–1><5–2>
See Tillight System<6–1>
See Interior Light System<8–3>
10A GAUGE
15A ECU–IG
7. 5A DOME
SHORT PIN
25A DOOR
40A AM1
100A ALT
F6 (A), F8 (C), F11 (E) FUSIBLE LINK BLOCK
FL MAIN 3. 0W
BATTERY
I13 IGNITION SW
ACC
IG1
AM1
A32 AUTOMATIC LIGHT CONTROL SENSOR
J5 JUNCTION CONNECTOR
J10 JUNCTION CONNECTOR
J8 JUNCTION CONNECTOR
J15 JUNCTION CONNECTOR
C11 COMBINATION SW
LIGHT CONTROL SW
OFF
TAIL
HEAD
AUTO
To Door Courtesy SW Front LH<8–4
From HEAD Relay <4–2><5–2>
From Taillight Relay <6–1>
Instrument panel brace LH

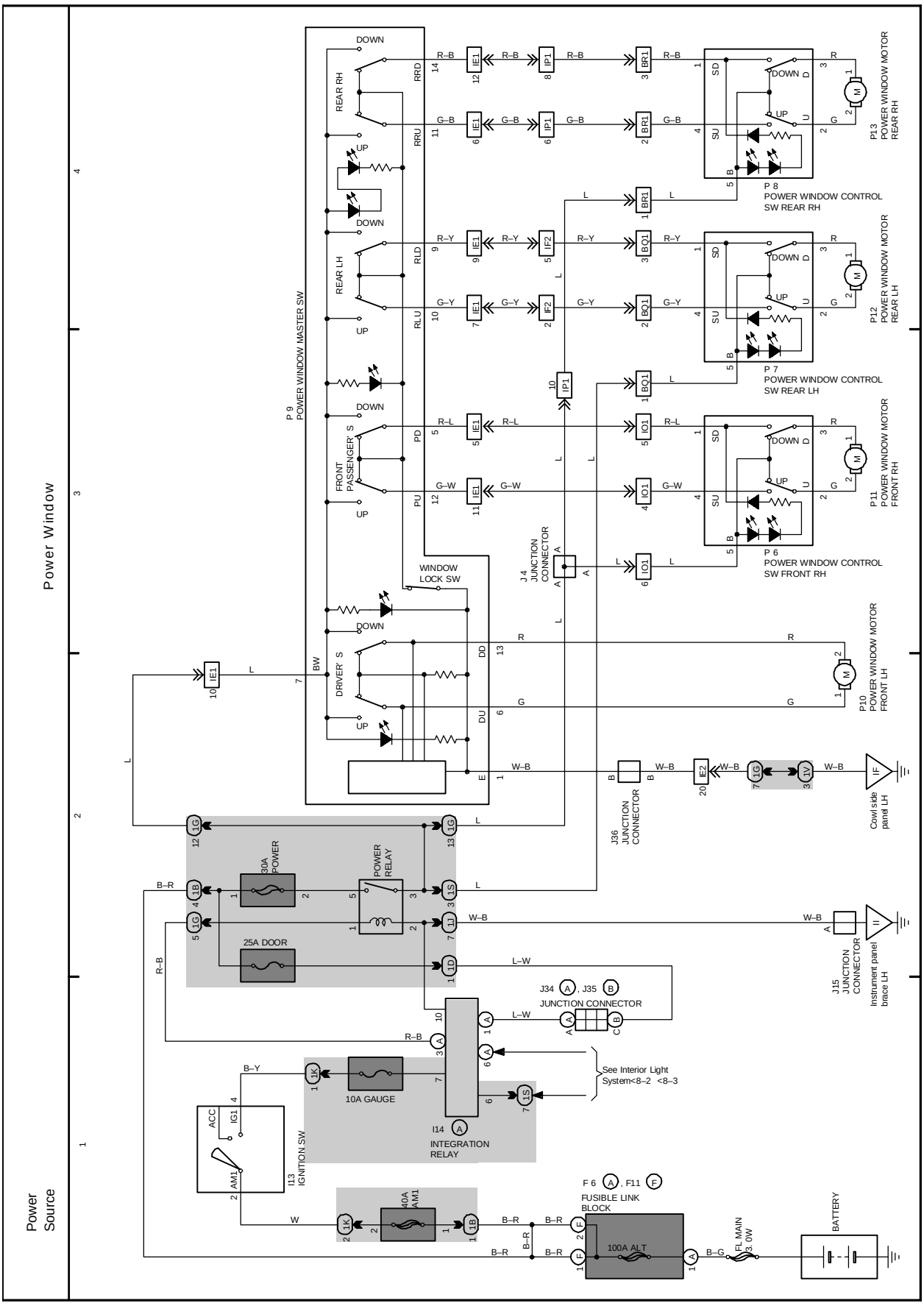
K OVERALL ELECTRICAL WIRING DIAGRAM



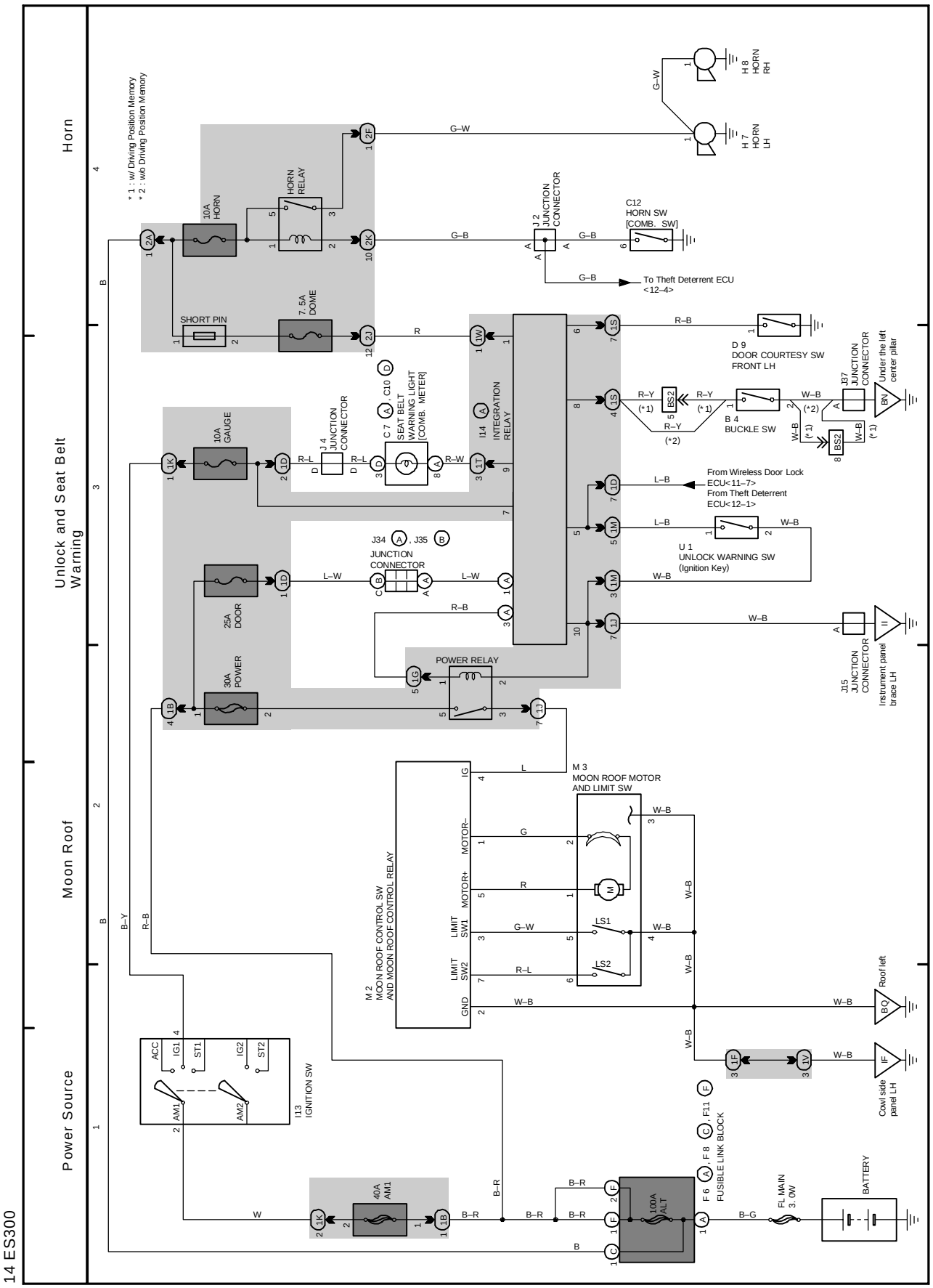

11 ES300(Cont' d)
Wireless Door Lock Control
Door Lock Control
W 8
WIRELESS DOOR LOCK ECU
W 7
WIRELESS DOOR LOCK
BUZZER VOLUME SW
W 6
WIRELESS DOOR LOCK
BUZZER
BUZZER
From Theft Deterrent ECU
<12–2>
L 5
LUGGAGE COMPARTMENT DOOR
KEY UNLOCK SW
Back panel center
J34 , J35
JUNCTION CONNECTOR
J16
JUNCTION
CONNECTOR
Left kick
panel
To Unlock Warning SW
(Ignition Key)<14–3>
J10 , J11
JUNCTION CONNECTOR
To Door Courtesy SW
<8–3>
From Taillight Relay
<6–1>
J5
JUNCTION
CONNECTOR
J15
JUNCTION
CONNECTOR
Instrument panel
brace LH
From Theft
Deterrent
ECU<12–2>
From Theft
Deterrent
ECU<12–3>
D14
DOOR KEY LOCK
AND UNLOCK SW
FRONT RH
LOCK
UNLOCK
Cowl side
panel LH
J33
JUNCTION CONNECTOR
D13
DOOR KEY LOCK
AND UNLOCK SW
FRONT LH
From Theft
Deterrent
ECU<12–2>
I14
INTEGRATION
RELAY
J 7
JUNCTION CONNECTOR
J36
JUNCTION CONNECTOR
D16
DOOR LOCK MOTOR
AND DOOR UNLOCK
DETECTION
SW FRONT LH

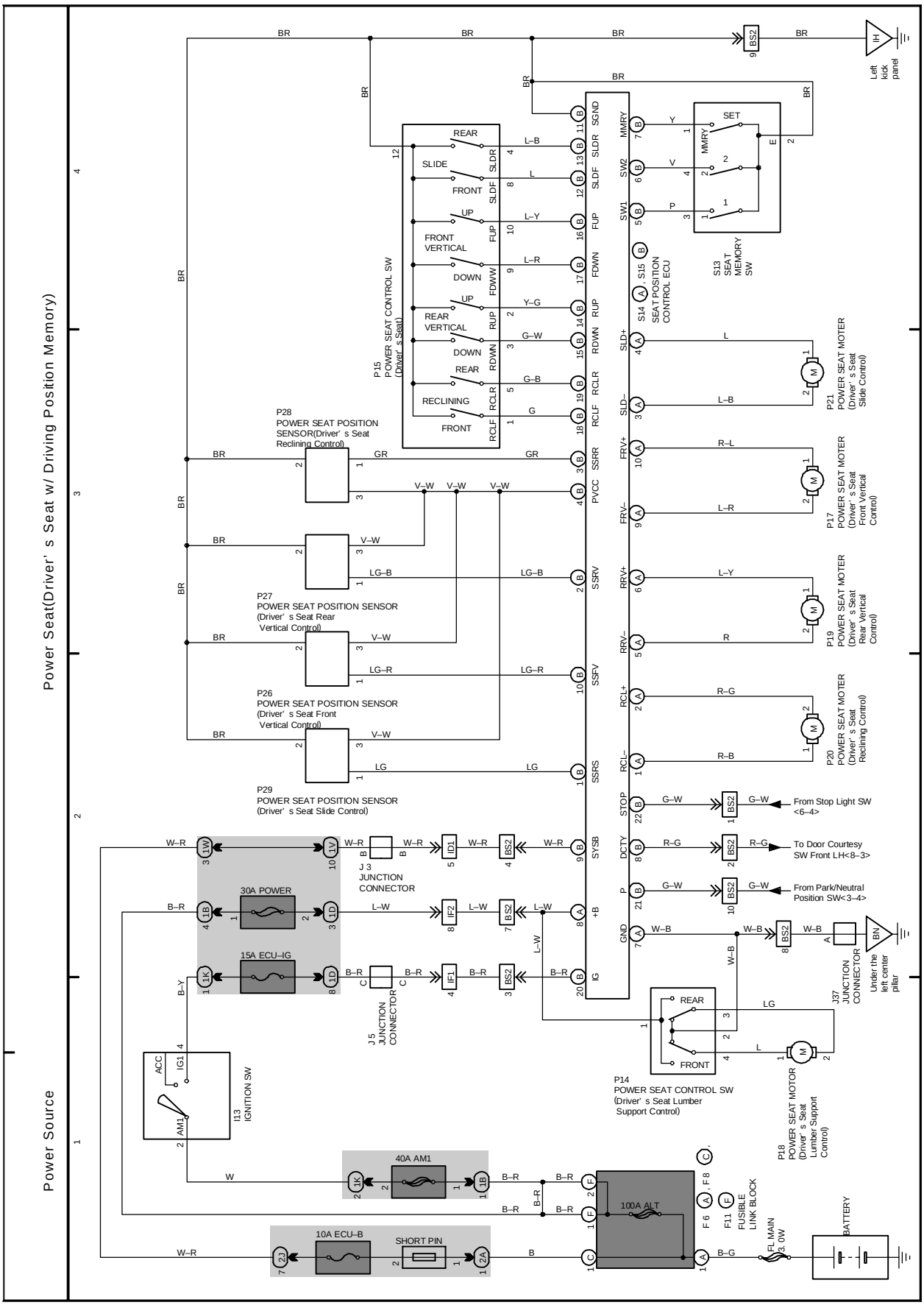
K OVERALL ELECTRICAL WIRING DIAGRAM



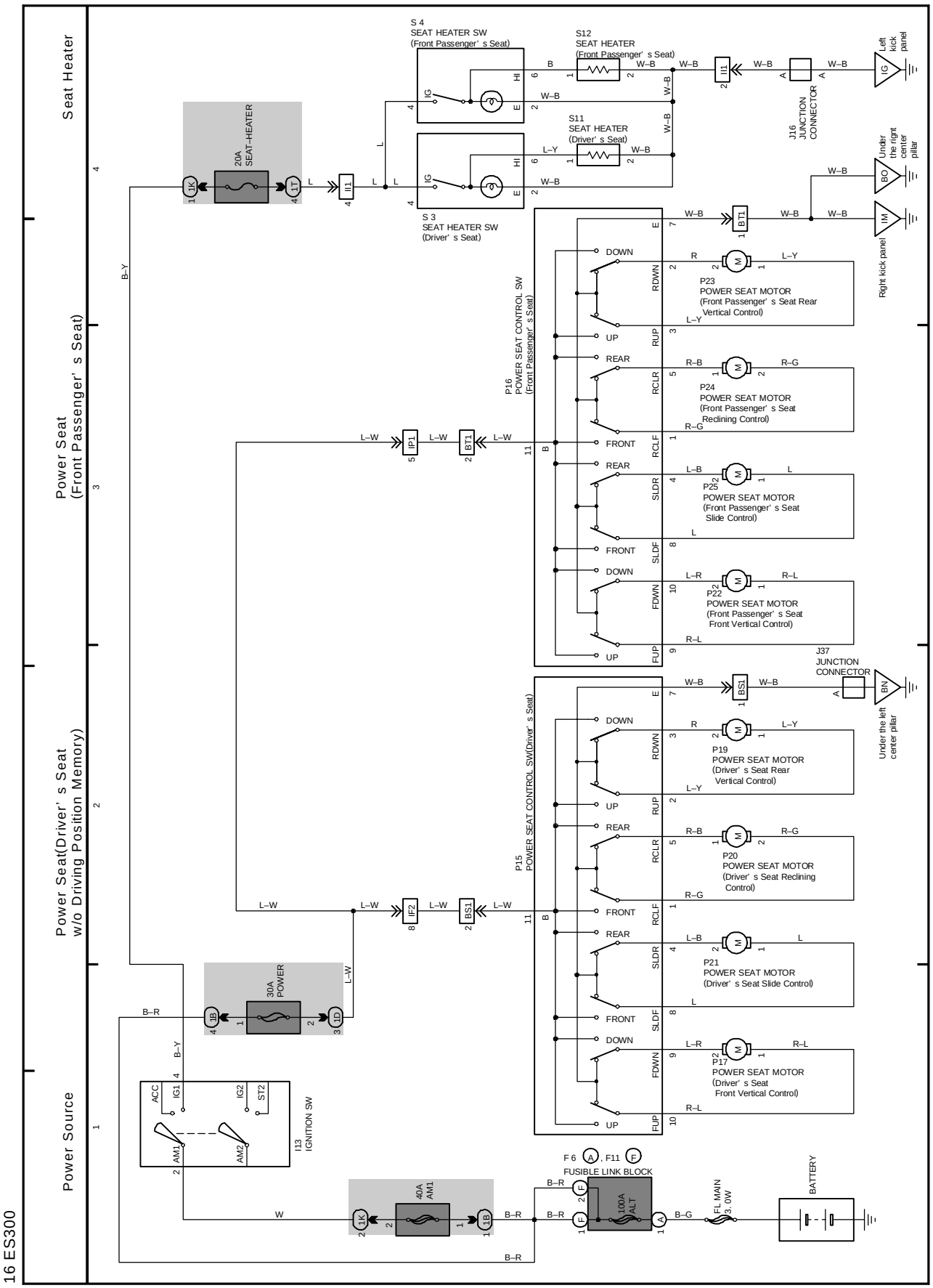

13 ES300
Power Source
Power Window
P 9
POWER WINDOW MASTER SW
DOWN
REAR RH
UP
REAR LH
FRONT PASSENGER' S
DRIVER' S
WINDOW LOCK SW
P 8
POWER WINDOW CONTROL SW REAR RH
P 7
POWER WINDOW CONTROL SW REAR LH
P 6
POWER WINDOW CONTROL SW FRONT RH
P13
POWER WINDOW MOTOR REAR RH
P12
POWER WINDOW MOTOR REAR LH
P11
POWER WINDOW MOTOR FRONT RH
P10
POWER WINDOW MOTOR FRONT LH
J4
JUNCTION CONNECTOR
J36
JUNCTION CONNECTOR
J15
JUNCTION CONNECTOR
Instrument panel brace LH
Cowl side panel LH
J34 A , J35 B
JUNCTION CONNECTOR
30A POWER
POWER RELAY
25A DOOR
10A GAUGE
I14
INTEGRATION RELAY
See Interior Light System<8–2 <8–3
I13
IGNITION SW
ACC
IG1
AM1
40A AM1
F 6 A , F11 F
FUSIBLE LINK BLOCK
100A ALT
BATTERY
FL MAIN 3. 0W

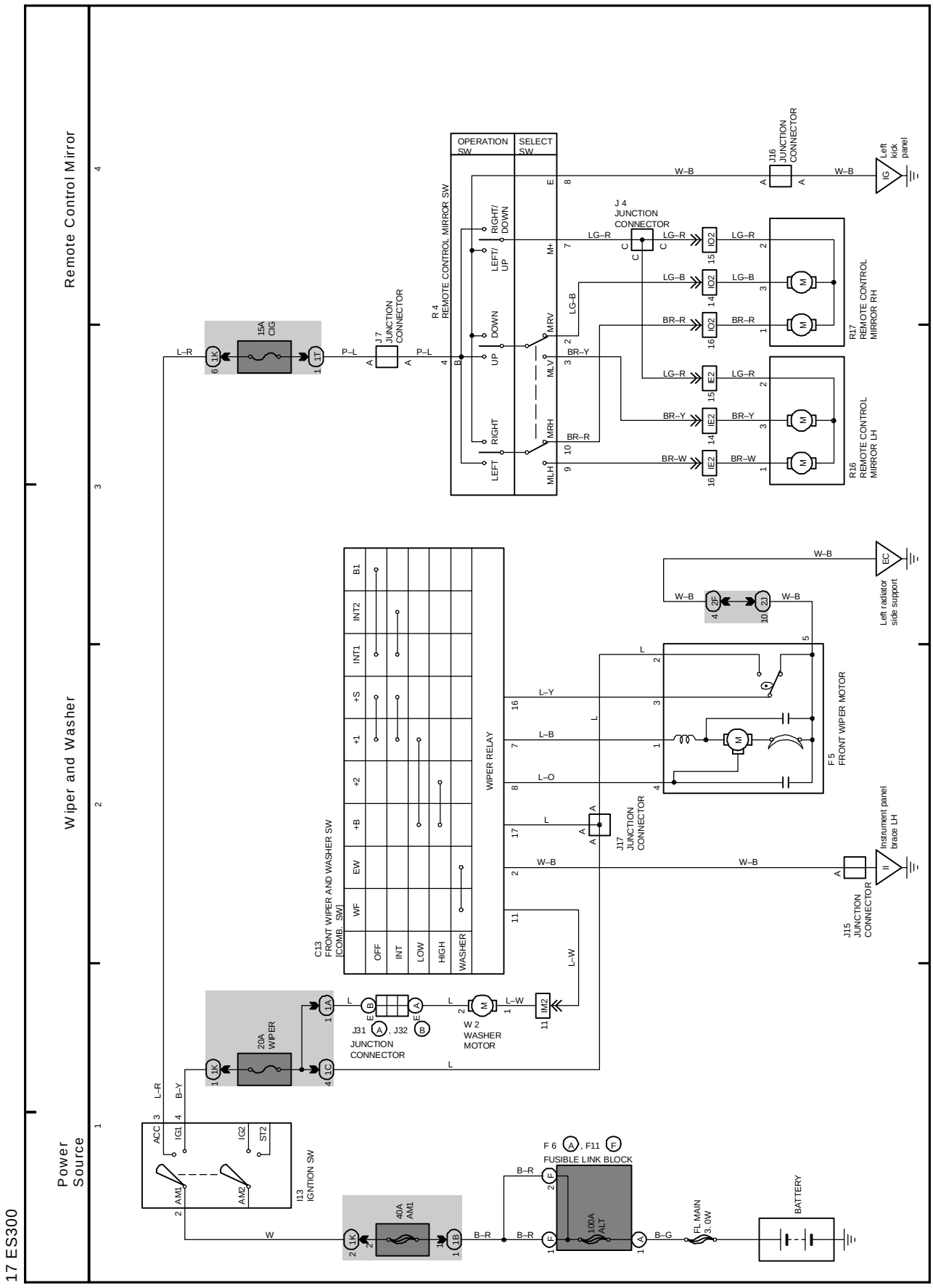
K OVERALL ELECTRICAL WIRING DIAGRAM



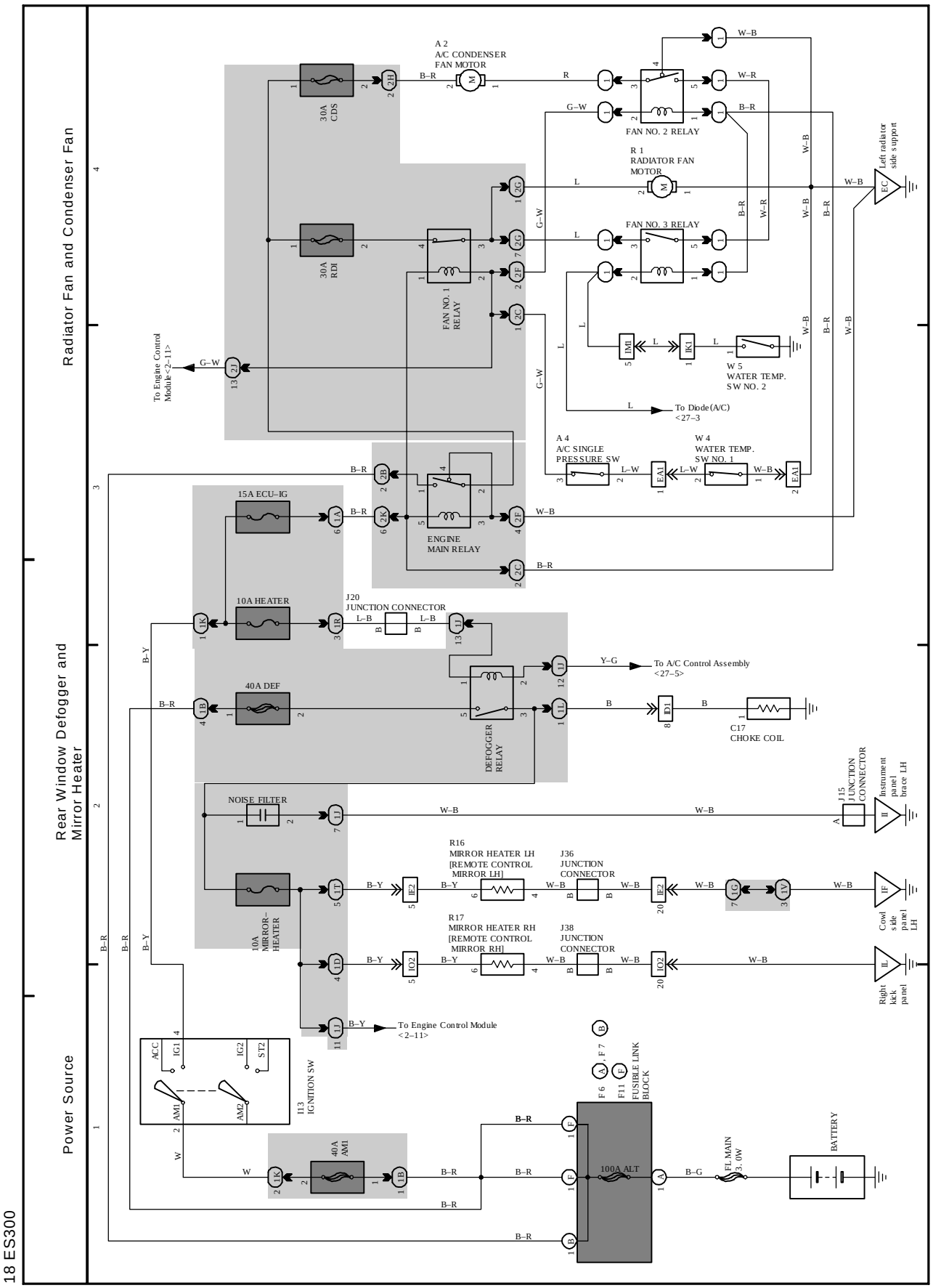

15 ES300
Power Source
Power Seat(Driver' s Seat w/ Driving Position Memory)
P15 POWER SEAT CONTROL SW (Driver' s Seat)
REAR
SLIDE
FRONT
UP
FRONT VERTICAL
DOWN
UP
REAR VERTICAL
DOWN
REAR
RECLINING
FRONT
P28 POWER SEAT POSITION SENSOR(Driver' s Seat Reclining Control)
P27 POWER SEAT POSITION SENSOR (Driver' s Seat Rear Vertical Control)
P26 POWER SEAT POSITION SENSOR (Driver' s Seat Front Vertical Control)
P29 POWER SEAT POSITION SENSOR (Driver' s Seat Slide Control)
S13 SEAT MEMORY SW
S14 , S15 SEAT POSITION CONTROL ECU
P21 POWER SEAT MOTER (Driver' s Seat Slide Control)
P17 POWER SEAT MOTER (Driver' s Seat Front Vertical Control)
P19 POWER SEAT MOTER (Driver' s Seat Rear Vertical Control)
P20 POWER SEAT MOTER (Driver' s Seat Reclining Control)
From Stop Light SW <6–4>
To Door Courtesy SW Front LH<8–3>
From Park/Neutral Position SW<3–4>
J3 JUNCTION CONNECTOR
J5 JUNCTION CONNECTOR
J37 JUNCTION CONNECTOR
Under the left center pillar
Left kick panel
30A POWER
15A ECU–IG
40A AM1
10A ECU–B
SHORT PIN
100A ALT
I13 IGNITION SW
P14 POWER SEAT CONTROL SW (Driver' s Seat Lumber Support Control)
P18 POWER SEAT MOTOR (Driver' s Seat Lumber Support Control)
FUSIBLE LINK BLOCK
FL MAIN
BATTERY

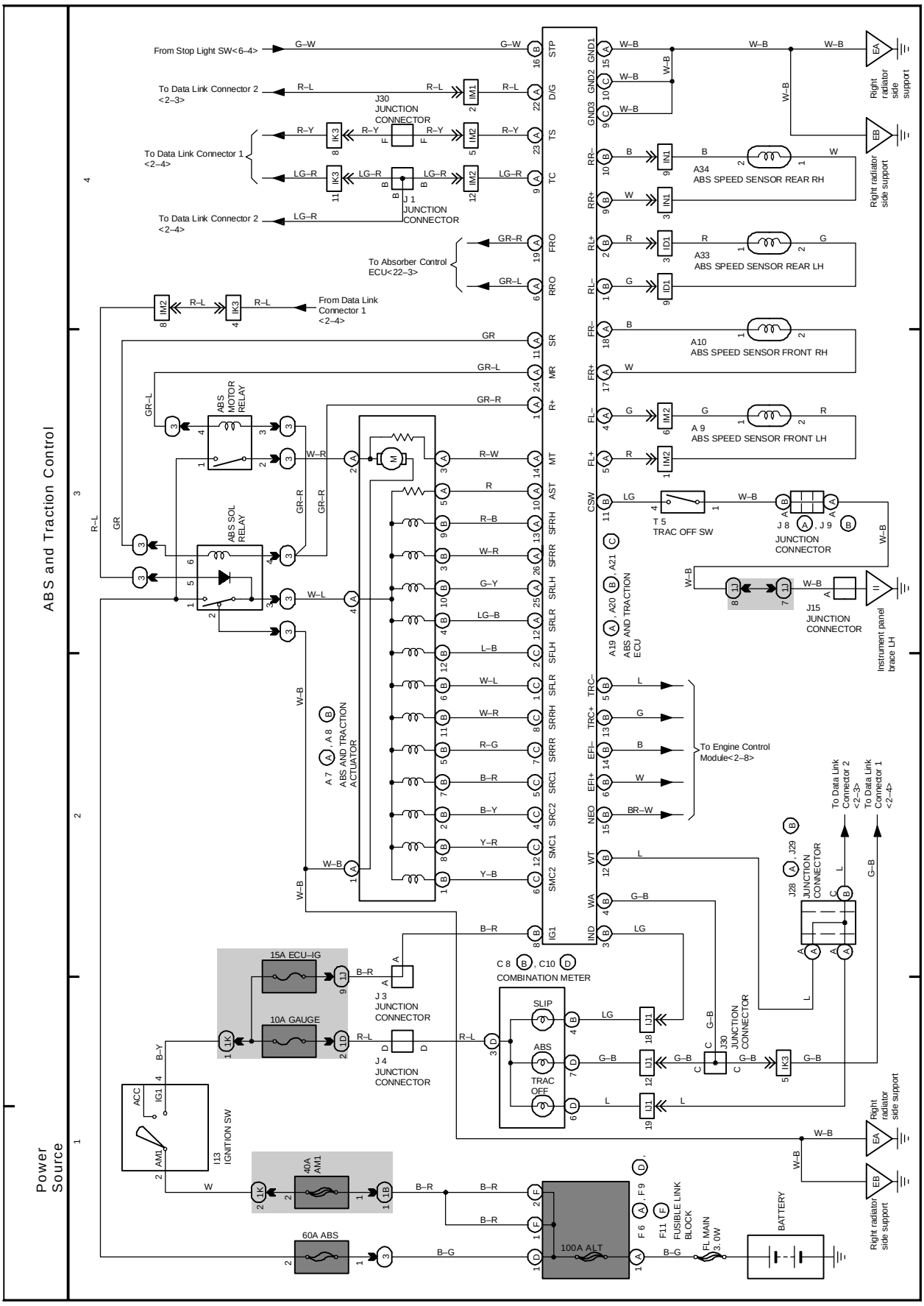
K OVERALL ELECTRICAL WIRING DIAGRAM



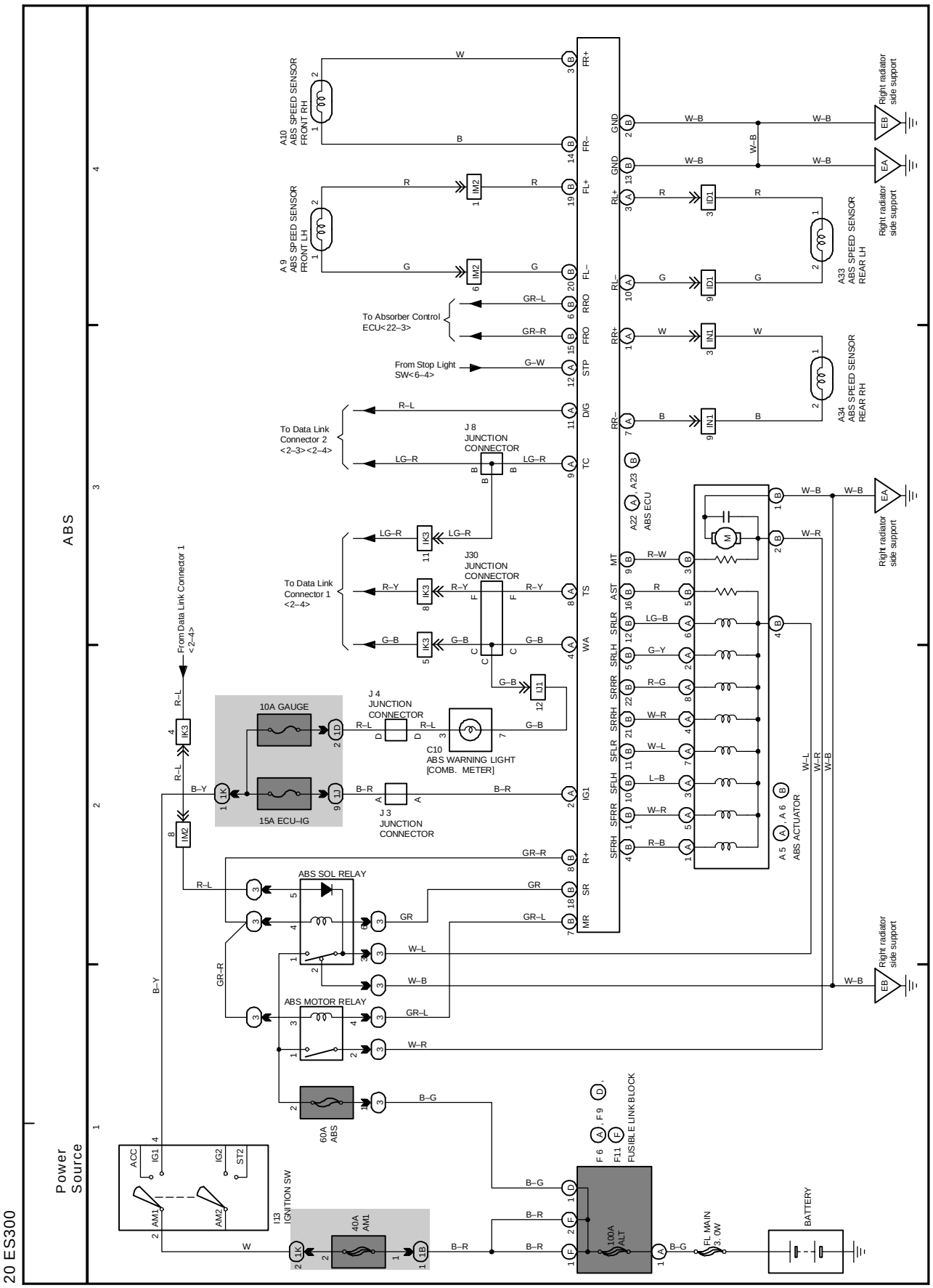

17 ES300
Power Source
Wiper and Washer
Remote Control Mirror
1
2
3
4
I13 IGNITION SW
ACC
IG1
IG2
ST2
AM1
AM2
40A AM1
20A WIPER
15A CIG
FUSIBLE LINK BLOCK
F 6 , F11
100A ALT
FL MAIN
3. 0W
BATTERY
C13 FRONT WIPER AND WASHER SW (COMB. SW)
OFF
INT
LOW
HIGH
WASHER
WF
EW
+B
+2
+1
+S
INT1
INT2
B1
WIPER RELAY
J31 , J32
JUNCTION CONNECTOR
W 2 WASHER MOTOR
J17 JUNCTION CONNECTOR
F 5 FRONT WIPER MOTOR
J15 JUNCTION CONNECTOR
Instrument panel brace LH
Left radiator side support
R 4 REMOTE CONTROL MIRROR SW
OPERATION SW
SELECT SW
LEFT
RIGHT
UP
DOWN
LEFT/ UP
RIGHT/ DOWN
MRH
MLH
MRV
MLV
M+
J 7 JUNCTION CONNECTOR
J 4 JUNCTION CONNECTOR
J16 JUNCTION CONNECTOR
Left kick panel
R17 REMOTE CONTROL MIRROR RH
R16 REMOTE CONTROL MIRROR LH
L–R
P–L
B–Y
W
B–R
B–G
L
L–Y
L–B
L–O
L–W
LG–R
LG–B
BR–R
BR–Y
BR–W
W–B

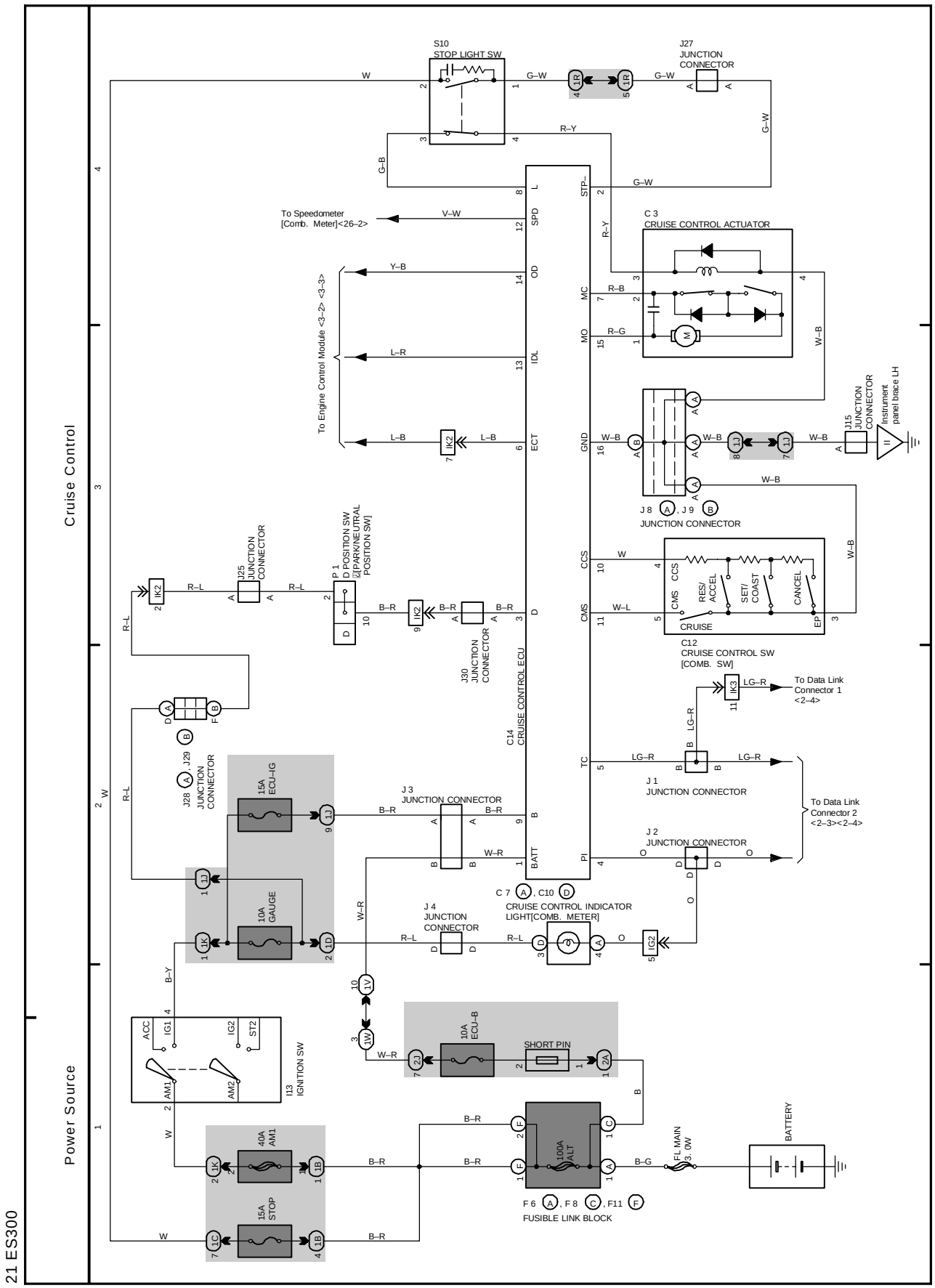
K OVERALL ELECTRICAL WIRING DIAGRAM



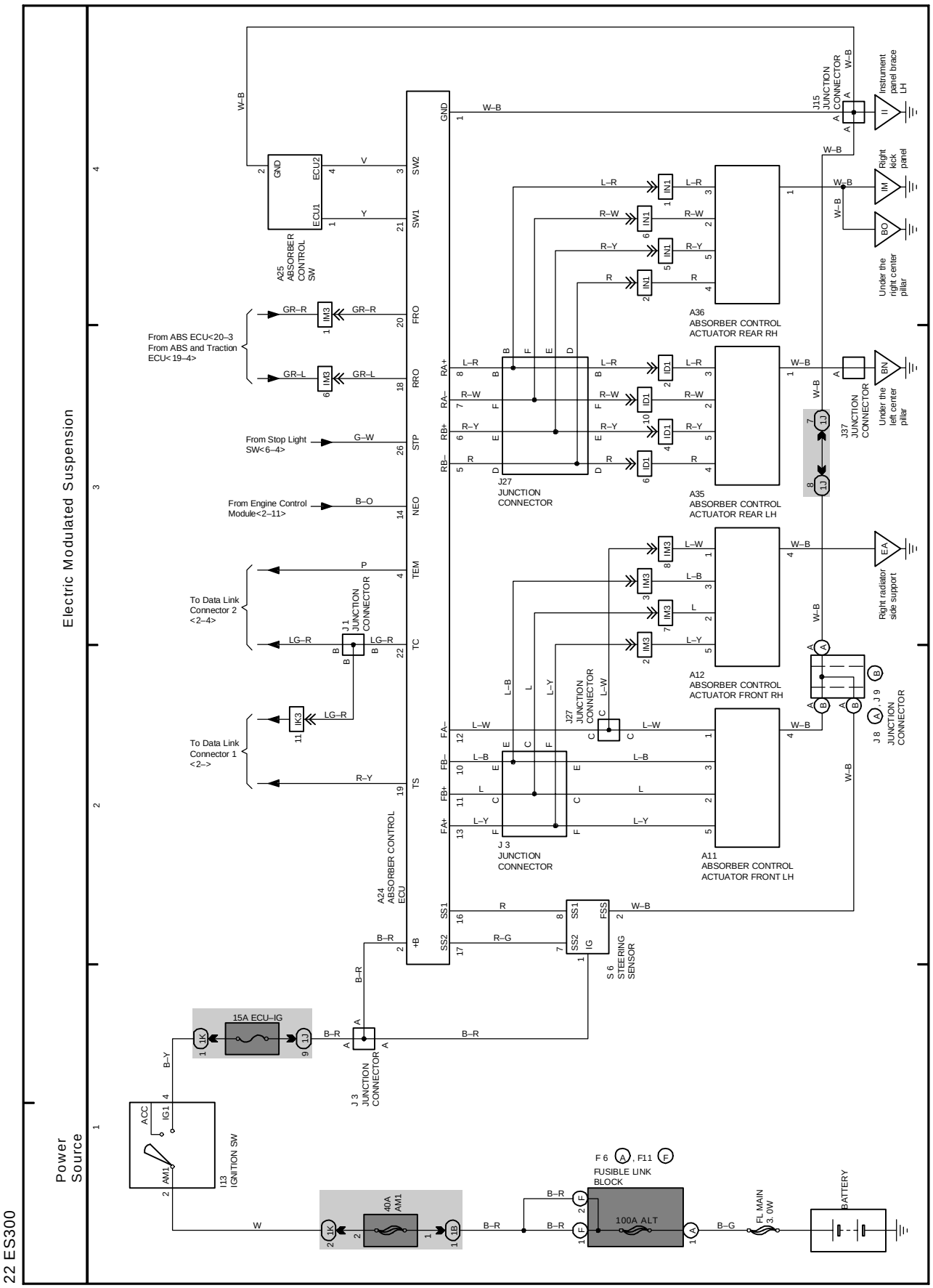

19 ES300
ABS and Traction Control
Power Source
From Stop Light SW<6–4>
To Data Link Connector 2 <2–3>
To Data Link Connector 1 <2–4>
To Data Link Connector 2 <2–4>
J30 JUNCTION CONNECTOR
J 1 JUNCTION CONNECTOR
To Absorber Control ECU<22–3>
From Data Link Connector 1 <2–4>
ABS MOTOR RELAY
ABS SOL RELAY
A34 ABS SPEED SENSOR REAR RH
A33 ABS SPEED SENSOR REAR LH
A10 ABS SPEED SENSOR FRONT RH
A 9 ABS SPEED SENSOR FRONT LH
T 5 TRAC OFF SW
J 8 , J 9 JUNCTION CONNECTOR
J15 JUNCTION CONNECTOR
Instrument panel brace LH
A19 , A20 , A21 ABS AND TRACTION ECU
A 7 , A 8 ABS AND TRACTION ACTUATOR
To Engine Control Module<2–8>
To Data Link Connector 2 <2–3>
To Data Link Connector 1 <2–4>
J28 , J29 JUNCTION CONNECTOR
J30 JUNCTION CONNECTOR
C 8 , C10 COMBINATION METER
SLIP
ABS
TRAC OFF
15A ECU–IG
10A GAUGE
J 3 JUNCTION CONNECTOR
J 4 JUNCTION CONNECTOR
I13 IGNITION SW
40A AM1
60A ABS
100A ALT
F 6 , F 9
F11 FUSIBLE LINK BLOCK
FL MAIN 3. 0W
BATTERY
Right radiator side support
Right radiator side support
Right radiator side support
Right radiator side support

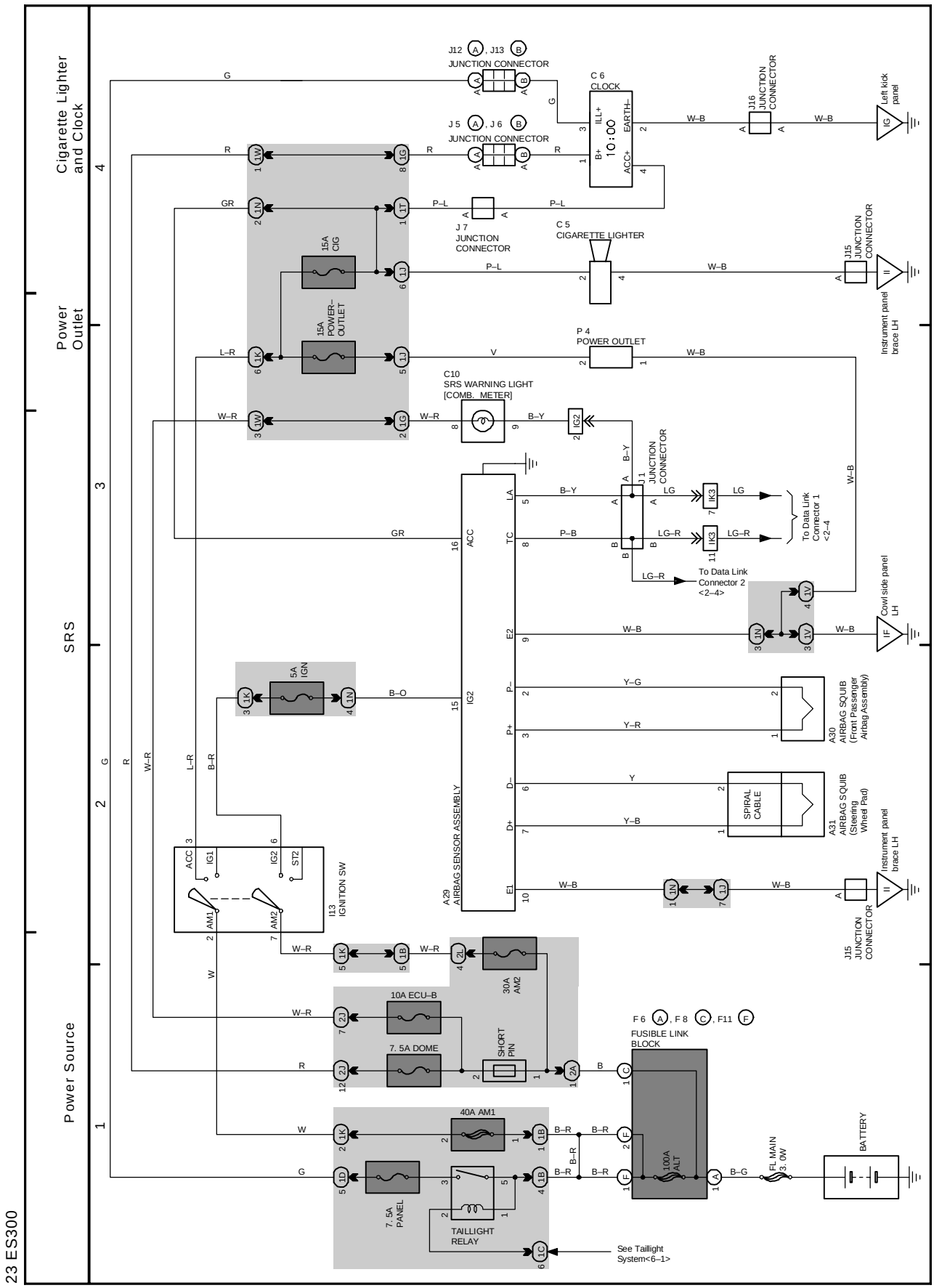
K OVERALL ELECTRICAL WIRING DIAGRAM



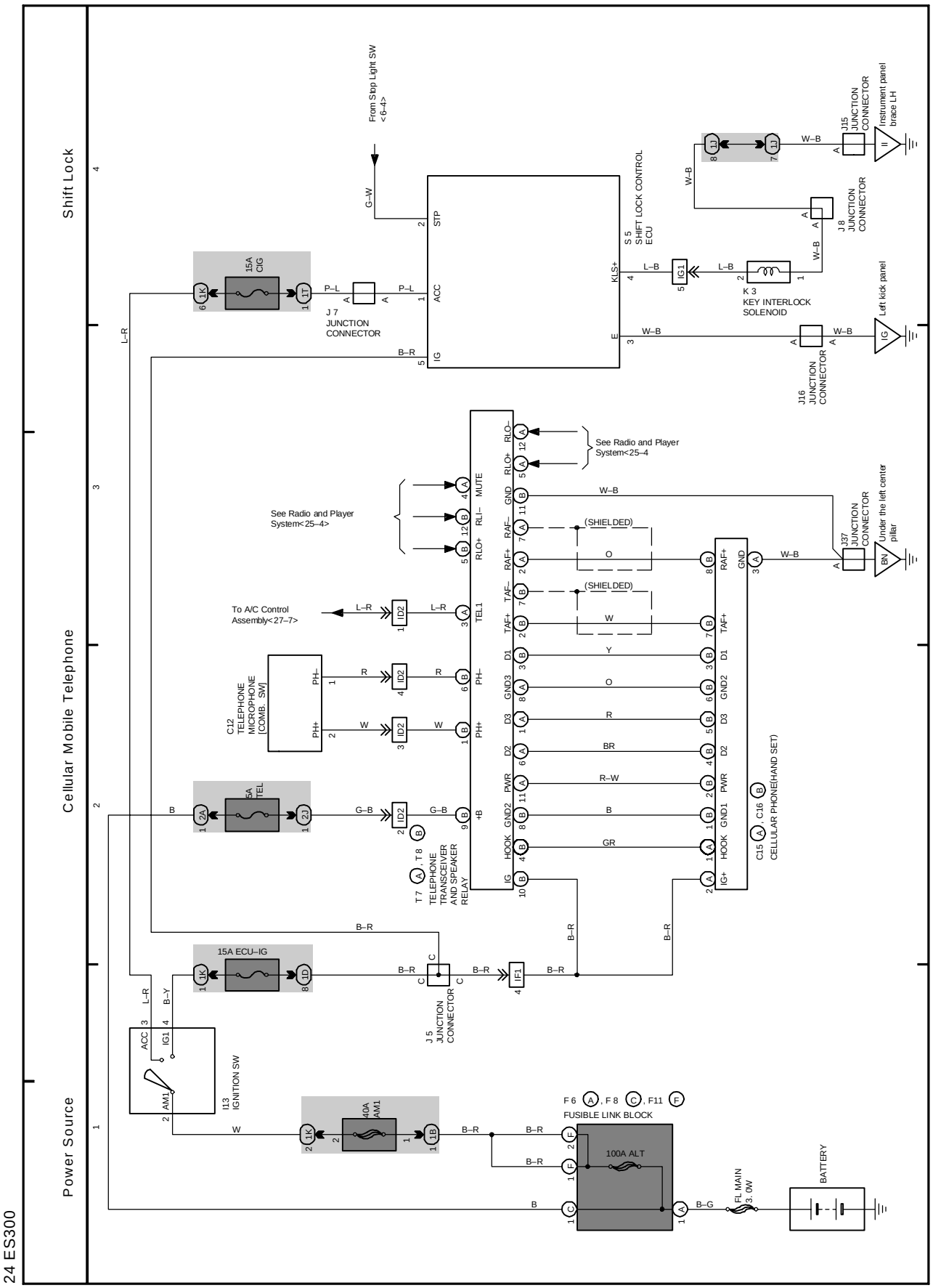

Cruise Control
Power Source
S10
STOP LIGHT SW
J27
JUNCTION
CONNECTOR
To Speedometer
[Comb. Meter]<26–2>
To Engine Control Module <3–2> <3–3>
C 3
CRUISE CONTROL ACTUATOR
J15
JUNCTION
CONNECTOR
Instrument
panel brace LH
J 8 , J 9
JUNCTION CONNECTOR
C12
CRUISE CONTROL SW
[COMB. SW]
CRUISE
J25
JUNCTION
CONNECTOR
P 1
D POSITION SW
[PARK/NEUTRAL
POSITION SW]
J30
JUNCTION
CONNECTOR
C14
CRUISE CONTROL ECU
To Data Link
Connector 1
<2–4>
J 1
JUNCTION CONNECTOR
To Data Link
Connector 2
<2–3><2–4>
J 2
JUNCTION CONNECTOR
J 3
JUNCTION CONNECTOR
J 4
JUNCTION
CONNECTOR
J28 , J29
JUNCTION
CONNECTOR
C 7 , C10
CRUISE CONTROL INDICATOR
LIGHT[COMB. METER]
15A
ECU–IG
10A
GAUGE
10A
ECU–B
SHORT PIN
I13
IGNITION SW
40A
AM1
15A
STOP
100A
ALT
FL MAIN
3. 0W
BATTERY
F 6 , F 8 , F11
FUSIBLE LINK BLOCK

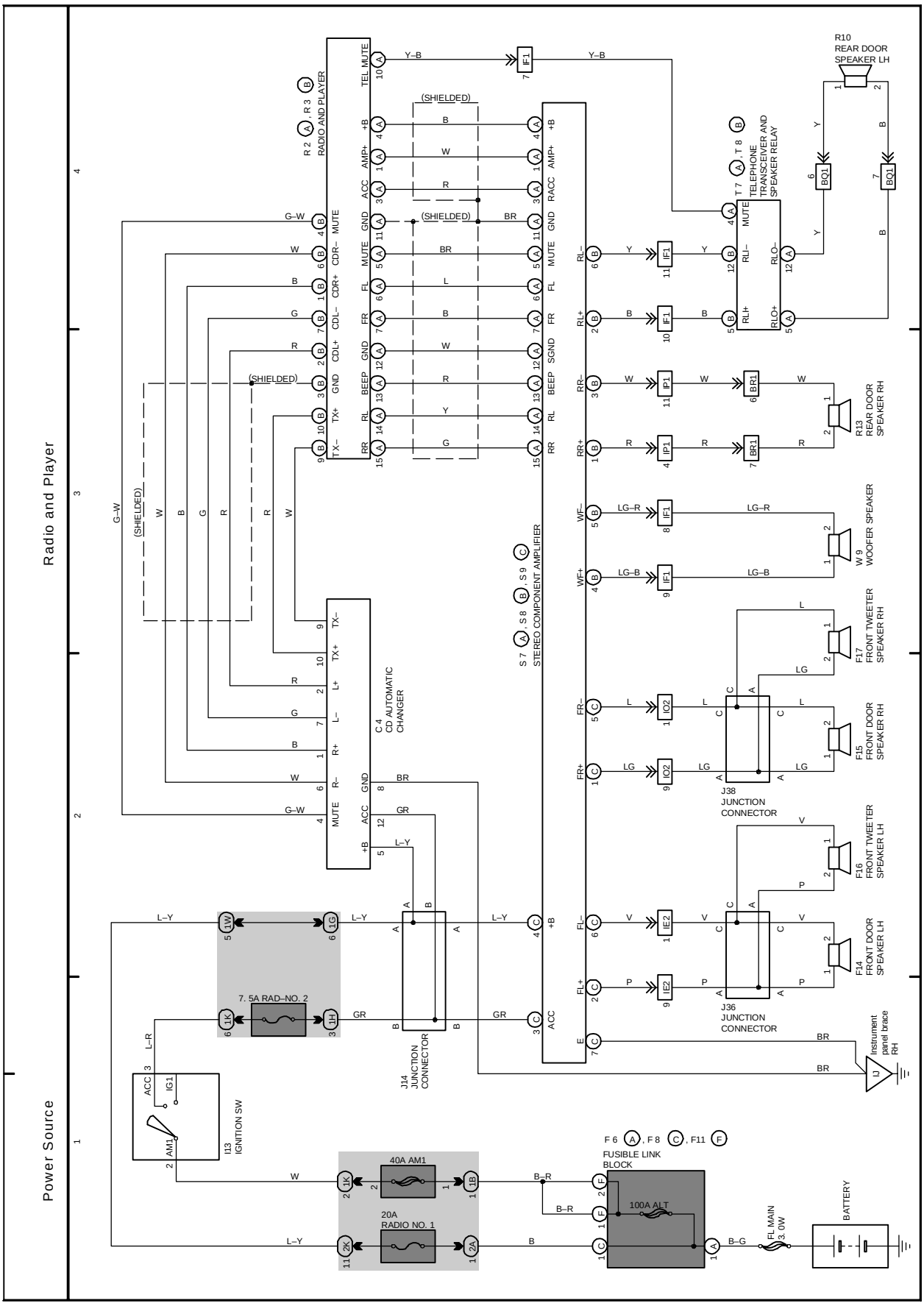
K OVERALL ELECTRICAL WIRING DIAGRAM



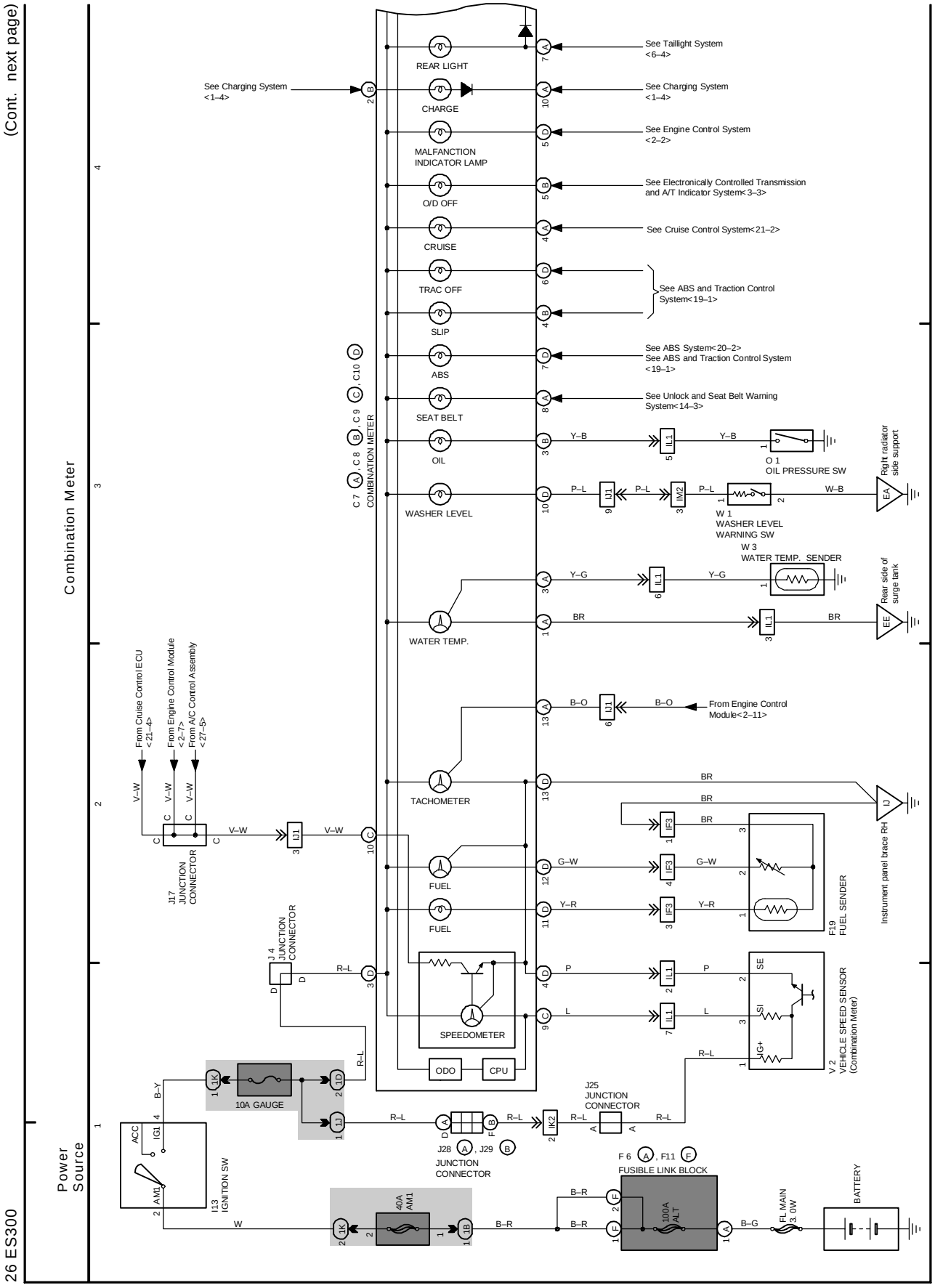

Cigarette Lighter and Clock
Power Outlet
SRS
Power Source
J12 A, J13 B JUNCTION CONNECTOR
J5 A, J6 B JUNCTION CONNECTOR
C 6 CLOCK
ILL+
EARTH–
B+
ACC+
10:00
J16 JUNCTION CONNECTOR
Left kick panel
J 7 JUNCTION CONNECTOR
C 5 CIGARETTE LIGHTER
15A CIG
15A POWER–OUTLET
P 4 POWER OUTLET
J15 JUNCTION CONNECTOR
Instrument panel brace LH
C10 SRS WARNING LIGHT [COMB. METER]
J1 JUNCTION CONNECTOR
To Data Link Connector 1 <2–4
To Data Link Connector 2 <2–4>
Cowl side panel LH
A29 AIRBAG SENSOR ASSEMBLY
A30 AIRBAG SQUIB (Front Passenger Airbag Assembly)
A31 AIRBAG SQUIB (Steering Wheel Pad)
SPIRAL CABLE
I13 IGNITION SW
5A IGN
30A AM2
10A ECU–B
7. 5A DOME
SHORT PIN
F 6 A, F 8 C, F11 F
FUSIBLE LINK BLOCK
40A AM1
100A ALT
FL MAIN
3. 0W
BATTERY
7. 5A PANEL
TAILLIGHT RELAY
See Taillight System<6–1>
23 ES300

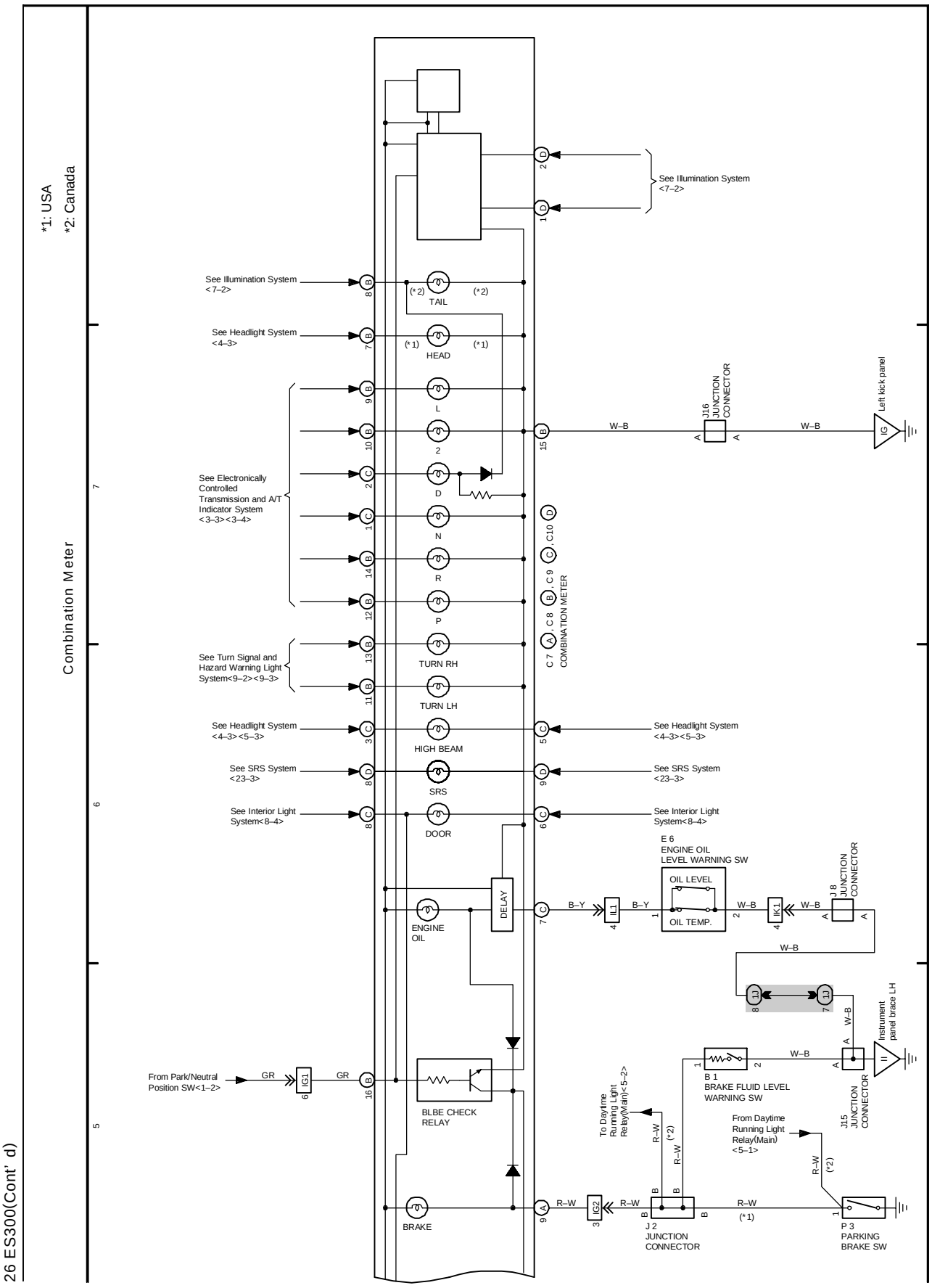
K OVERALL ELECTRICAL WIRING DIAGRAM



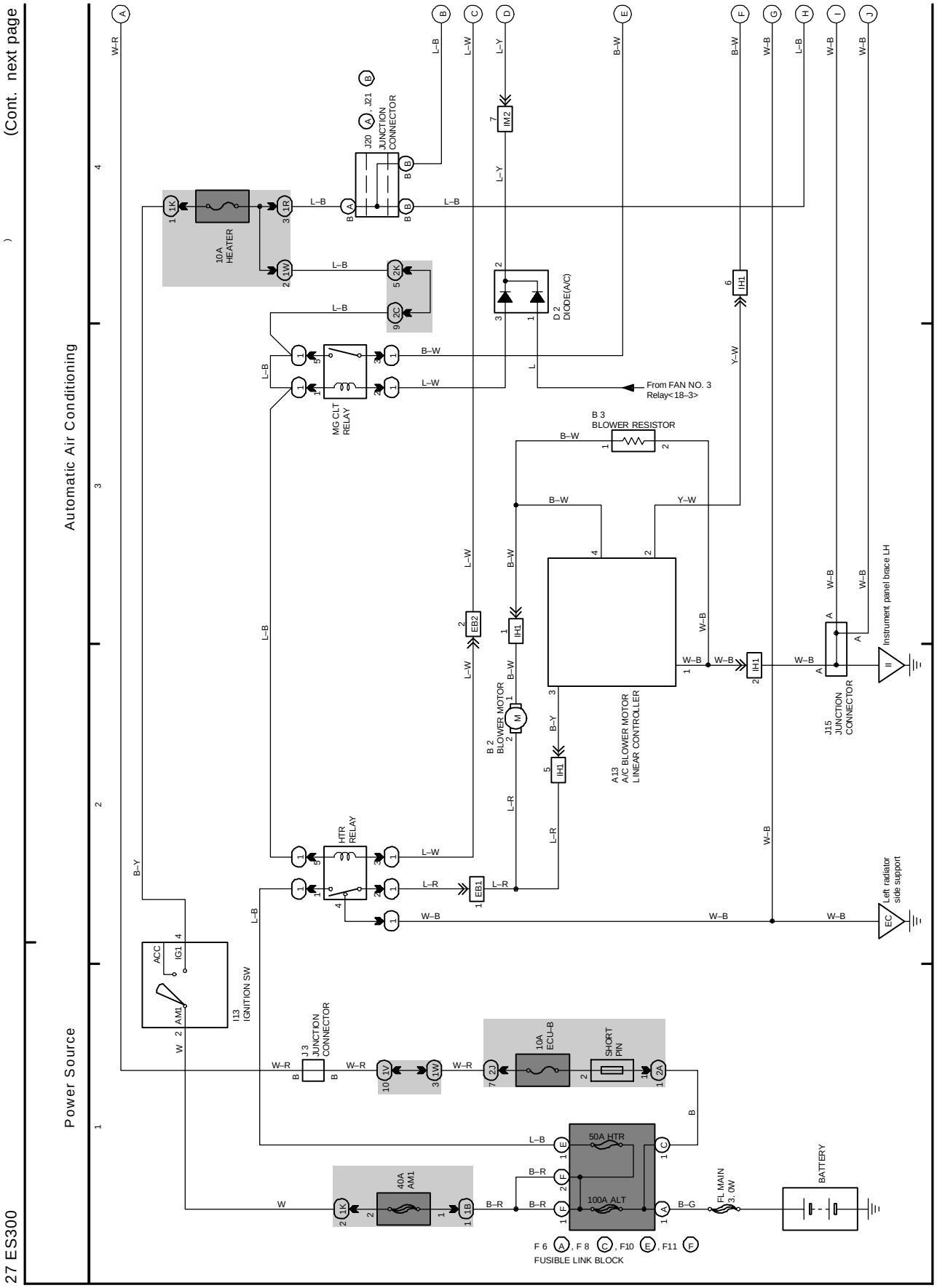

Radio and Player
Power Source
R 2 , R 3
RADIO AND PLAYER
R10
REAR DOOR
SPEAKER LH
T 7 , T 8
TELEPHONE
TRANSCEIVER AND
SPEAKER RELAY
(SHIELDED)
S 7 , S 8 , S 9
STEREO COMPONENT AMPLIFIER
C 4
CD AUTOMATIC
CHANGER
R13
REAR DOOR
SPEAKER RH
W 9
WOOFER SPEAKER
F17
FRONT TWEETER
SPEAKER RH
F15
FRONT DOOR
SPEAKER RH
J38
JUNCTION
CONNECTOR
F16
FRONT TWEETER
SPEAKER LH
F14
FRONT DOOR
SPEAKER LH
J36
JUNCTION
CONNECTOR
J14
JUNCTION
CONNECTOR
7. 5A RAD–NO. 2
I13
IGNITION SW
40A AM1
20A
RADIO NO. 1
F 6 , F 8 , F11
FUSIBLE LINK
BLOCK
100A ALT
FL MAIN
3. 0W
BATTERY
J1
Instrument
panel brace
RH

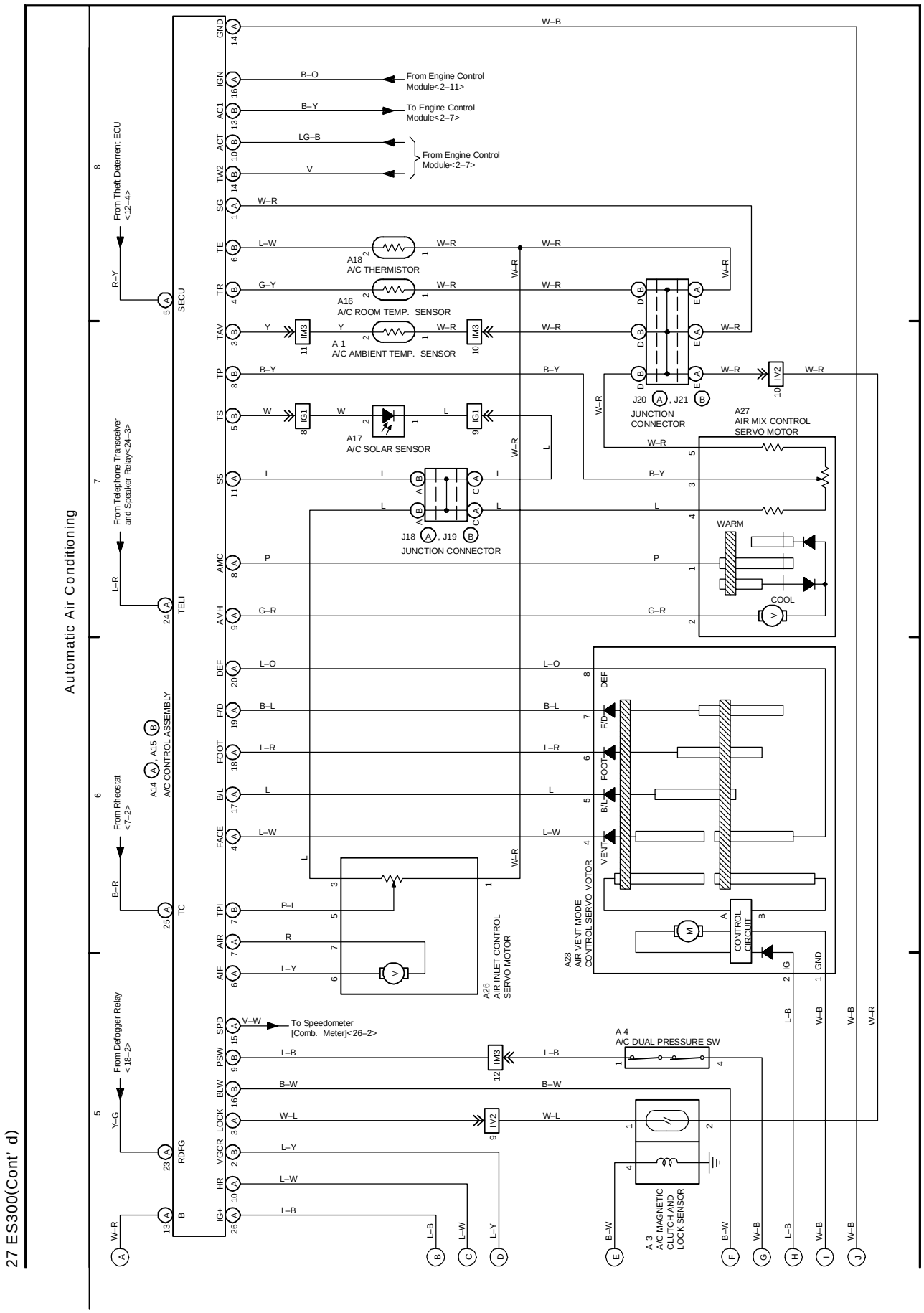
K OVERALL ELECTRICAL WIRING DIAGRAM




*1: USA
*2: Canada
Combination Meter
See Illumination System <7–2>
See Illumination System <7–2>
See Headlight System <4–3>
See Electronically Controlled Transmission and A/T Indicator System <3–3><3–4>
See Turn Signal and Hazard Warning Light System<9–2><9–3>
See Headlight System <4–3><5–3>
See SRS System <23–3>
See Interior Light System<8–4>
TAIL
HEAD
L
2
D
N
R
P
TURN RH
TURN LH
HIGH BEAM
SRS
DOOR
DELAY
ENGINE OIL
BLBE CHECK RELAY
BRAKE
C 7, C 8, C 9, C10
COMBINATION METER
W–B
J16 JUNCTION CONNECTOR
Left kick panel
IG
B–Y
IL1
E 6
ENGINE OIL LEVEL WARNING SW
OIL LEVEL
OIL TEMP.
IK1
J 8 JUNCTION CONNECTOR
J3
Instrument panel brace LH
B 1
BRAKE FLUID LEVEL WARNING SW
J15 JUNCTION CONNECTOR
From Park/Neutral Position SW<1–2>
GR
IG1
To Daytime Running Light Relay(Main)<5–2>
From Daytime Running Light Relay(Main) <5–1>
R–W
(*2)
(*1)
IG2
J 2 JUNCTION CONNECTOR
P 3 PARKING BRAKE SW

K OVERALL ELECTRICAL WIRING DIAGRAM




27 ES300(Cont' d)
Automatic Air Conditioning
From Theft Deterrent ECU <12–4>
From Telephone Transceiver and Speaker Relay<24–3>
From Rheostat <7–2>
From Defogger Relay <18–2>
A14 A15 A/C CONTROL ASSEMBLY
From Engine Control Module<2–11>
To Engine Control Module<2–7>
From Engine Control Module<2–7>
To Speedometer [Comb. Meter]<26–2>
A18 A/C THERMISTOR
A16 A/C ROOM TEMP. SENSOR
A 1 A/C AMBIENT TEMP. SENSOR
A17 A/C SOLAR SENSOR
J18 , J19 JUNCTION CONNECTOR
J20 , J21 JUNCTION CONNECTOR
A27 AIR MIX CONTROL SERVO MOTOR
WARM
COOL
A26 AIR INLET CONTROL SERVO MOTOR
A28 AIR VENT MODE CONTROL SERVO MOTOR
CONTROL CIRCUIT
A 4 A/C DUAL PRESSURE SW
A 3 A/C MAGNETIC CLUTCH AND LOCK SENSOR
GND
IGN
AC1
ACT
TW2
SG
TE
TR
TAM
TP
TS
S5
AMC
AMH
DEF
F/D
FOOT
B/L
FACE
TPI
AIR
AIF
SPD
PSW
BLW
LOCK
MGCR
HR
IG+
SECU
TELI
TC
RDFG
IG
VENT